

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

---

October 2021

## A Categorical Review paper on Bibliometric and Citation Studies

Sobhagyawati Gupta

Central University of Rajasthan, shobhagupt@gmail.com

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>



Part of the [Library and Information Science Commons](#)

---

Gupta, Sobhagyawati, "A Categorical Review paper on Bibliometric and Citation Studies" (2021). *Library Philosophy and Practice (e-journal)*. 6260.

<https://digitalcommons.unl.edu/libphilprac/6260>

# **A Categorical Review paper on Bibliometric and Citation Studies**

Sobhagyawati Gupta  
Assistant Librarian, Central University of Rajasthan  
shobhagupt@gmail.com

## **ABSTARCT**

In this paper, the review process was adopted by surveying the 50 research articles in last 9 years (2006-2014) for extraction of information about 7 sub issues. A categorical review done in the area of Bibliometric & Citation Studies for various issues like Single Journal studies, Subject area based publications studies, Citation or Index databases studies, Country based publications studies, Subject area based multiple journals studies, Institution based publications studies, and PhD Thesis publications studies. From review it was found that these studies indicate towards the merits and weakness of the journal which will be helpful for its further development. The current research will raise new science and policy questions, which lead to new strategic linkages. It is useful to identify the contribution of the authors in the particular journal and it provides a comprehensive overview of authorship in the particular subject community. This would be helpful for the journal editor to obtain the bibliometric portrait of the studied journal (JIS) and recognize its interaction with other subject disciplines. Obsolescence studies play a vital role for librarians, researchers, and managers as a decision support tools for the retention of the most frequently-used literature, and is also useful for weeding out unused or less-used literature. The studies of the obsolescence of literature help the practicing library professionals in deciding which document is to be kept and which is to be discarded, in order to maintain the need-based collection in the different libraries.

The outcomes of the review process shows that the bibliometric and citation analysis can be done by identifying the different parameters and collecting the data related to the same parameters from different sources according to the objective of study. Thereafter, the collected data may be analysed using different tools and techniques with applying the different bibliometric laws and formulas. Most of the researcher used Subarmanyam formula for testing the degree of collaboration of authors. Most of the researchers used MS-Excel software to record the data. Very few researchers used SPSS and other bibliometric analysis tools i.e. Histcite, Bibexcel, etc. Researchers studied the authorship patterns; authors' productivity using Lotka's Law; language-wise and year-wise distribution of articles; country-wise distribution of journals; core journals in the subject area; indexing term frequency; and Bradford distribution of articles, and other parameters of bibliometric study. Very few Researchers have done the citation analysis as a part of bibliometric analysis. Most of researchers worked on content analysis but not on the further interrelationship of the parameters. Very few researchers analyzed the each and every parameter of the bibliometric or citation analysis. No particular research was found regarding effect of any bibliometric study over the academic or research community. Researchers did not identify the full coverage of the database or research publications taken for the study. No particular work was found emphasizing the interdisciplinary approach of two or more related subject areas.

Keywords: Bbliometric studies, Citation studies, Categorical review, Literature review

# 1. INTRODUCTION

The present review is done with a view to understand or study the bibliometric and citation analysis methods by using different techniques for different purposes.

## 1.1 Bibliometric Studies

Knowledge is continuously expanding at a faster speed. Libraries are the reservoirs of knowledge, they should not be kept unused rather they should be used optimally. The main purpose of any information system is to develop a comprehensive need based and updated collection and keep it active by disseminating them. The number of new titles added in the fields of periodical literature of in all fields has grown at an alarming rate while subscription prices for the establishing journals have been rising at a rate of inflation. It therefore becomes very critical for the library managers to be judicious in selecting the documents based on the user needs and regularly evaluate the use of information sources available in the library.

Quantitative study is one such universally acceptable tool or technique. It helps in determining the major forms of reading materials such as periodicals, textbooks, manuals, handbooks etc. Bibliometric is the application of mathematical and statistical method for measuring quantitative and qualitative changes in the production of literature in a given subject or area of specialization. Modern bibliometric techniques help in delineating the inherent properties of the published literature quantitatively. Most bibliometric research is done with subjects dealing with the branches of science and technology with only a few in social sciences and humanities. Bibliometrics is still considered as one of the most fascinating field of study among the library and information scientists. The study is popular because it helps to improve scientific documentation, information and communication activities by quantitative analysis of library collections and services. Besides its specific uses in the libraries, it also assists to contribute to a better understanding of the mechanism of scientific research as a social activity, a quantitative analysis of the generation, propagation and utilization of scientific information aspect. It is also being used as one of the techniques to evaluate and study the scientific works.

The subject of bibliometrics was first defined by Pritchard (1996) as “the application of mathematical and statistical methods to books and other media”. It involves the analysis of a set of publications characterized by bibliographic variables such as the author(s), the place of publication, the associated subject keywords, and the citations. There have been several previous bibliometric studies of information science. One of the very first such studies sought to identify the principal subject areas in the discipline (Salton and Bergmark 1979) while, more recently, Goodrum et al. (2001) and Katerattanakul, Han and Hong (2003) have reviewed the discipline’s literature. The very basic attribute of bibliometrics governing the relationships between information items and activities has thus made librarians and statisticians to conduct the bibliometric studies. Hence, we are witnessing large number of bibliometric studies for over last two decades.

Naseer (Mirza Muhammad) and Mahmood (Khalid) (2009), discussed and concluded on the basis of the preceding review of literature and that bibliometric studies were very useful for LIS professionals for evaluating library services, collection development, policy making and refinement, decision making, resource allocation, analysis of curriculum and quality assessment of research output. These studies had the potential to determine the causes of problems faced by the LIS profession.

Bibliometrics is an important field of information science because it represents a unique set of techniques for the monitoring and analysis of information resources and for the management of knowledge in social and organisational contexts. Bibliometric methods are used in studies of properties and behaviour of recorded knowledge, for analysis of the structures of scientific and research areas, and for evaluation of research activity and administration of scientific information. Various statistical methods are applied to study to measure, authorship, citation and publication pattern, and the relationship within scientific domains and research communities and to structure of specific fields. In this sense, bibliometrics is also relevant for researchers, policy and decision makers and also researchers outside the library and information science (LIS) field to track the trend in the specific field in their research work. Moreover, bibliometrics studies should be encouraged to evaluate research performance of a particular field of research in a country. Even national science policy can be decided on the basis of bibliometrics/scientometrics study. It is expected that more and more subject experts would take keen interest in this area of study.

## **1.2 Citation Studies:**

Citations are generally considered to be a useful indication of a paper's impact and value to the wider scientific research community. Citation analysis is the examination of the frequency, patterns, and graphs of citations in articles and books. It uses citations in scholarly works to establish links to other works or other researchers. Citation analysis is one of the most widely used methods of bibliometrics. For example, bibliographic coupling and co-citation are association measures based on citation analysis (shared citations or shared references). Citation analysis is an increasingly important means of measuring a researcher's publication output and 'ranking' as well as an individual journal title's 'rating'.

In terms of research performance, 'quantitative' (bibliometric) measurements are used to complement 'qualitative' measures such as peer-review. Publication and citation data can be used alongside other forms of measurement and assessment of research activity, for example:

- Peer-review
- Funding received
- Awards granted
- Patents

The benefits of using bibliometric data to help assess research performance are:

- It is seen as a fair and 'objective' method (rather than relying solely on qualitative measures such as peer-review)
- It is considered cost effective (data is easily produced)
- It is transparent and easy to understand

The basic concepts of the bibliometric and citation studies are discussed in this paper and it includes the categorical literature review of the selected papers.

## 2. Categorical Review in Bibliometric and Citation Studies

The review process was adopted by surveying the research in last 9 years (2006-2014) for extraction of information about 7 sub issues. The 50 research articles were reviewed to cover the Bibliometric and Citation Studies in following various issues like Single Journal studies, Subject area based publications studies, Citation or Index databases studies, Country based publications studies, Subject area based multiple journals studies, Institution based publications studies, and PhD Thesis publications studies.

**2.1 Various issues:** The Bibliometric and Citation studies divided into following seven sub issues. The review and discussion of sub issues is ranging from year 2006-2014.

	Name of the Issue	No. of Papers	Journals/Transactions
2.1.1	Single Journal studies	21	IJIDT, MJCS & MJLIS (University of Malaya), <b>DESIDOC</b> , JALIS, JSS (Science Publications), IJODLS, IJMHS (BioMed Central), <b>Taylor &amp; Francis</b> , IOSR-JHSS, <b>ELSEVIER</b> , Digital Commons, IJSR (Global Publications), JLM, IJSRP
2.1.2	Subject area based publications studies	9	<b>Emerald</b> , <b>DESIDOC</b> , <b>NISCAIR</b> , <b>Wiley</b> Publications, CLIEJ, <b>Current Science Association</b> , Scientometrics ( <b>Springer</b> )
2.1.3	Citation or Index databases studies	4	JATIT, AJMS, <b>COLLNET</b> , Scientometrics ( <b>Springer</b> )
2.1.4	Country based publications studies	10	JNR (Taiwan Nurse Association), AVICENA, <b>World Health Organization</b> , PLOS, IJMEDPH (Wolters Kluwer Health), Chinese Librarianship, Scientometrics ( <b>Springer</b> )
2.1.5	Subject area based multiple journals studies	2	<b>Taylor &amp; Francis</b> , <b>Springer</b>
2.1.6	Institution based publications studies	1	NISCAIR
2.1.7	PhD Thesis publications studies	3	GJAL (Research India Publications), LSRJ

## 2.2 Literature Review in particular area

### 2.2.1 Single Journal studies:

[Praveen Kumar, 2013] conducted a bibliometric analysis of Journal of Indian Library Association from the year 2007 to 2011. The focus of the study was to identify the number of articles published in the 'Journal of Indian Library Association' in the said period, the number of references made, the authorship patterns and average length of paper published

etc. Methodology applied in the paper was bibliometric analysis, to identify in detail the bibliographic features of the articles and citation analysis of the references at the end of each article published in JILA from 2007-2011. Author has reviewed the related literature of the subject which was conducted or studied on the same lines. Total 71 articles found out in 13 issues of 5 volumes during the period of study. In view of the parameters of study, different tables of related data have been prepared for the analysis and representation of the results. Bar-charts and pie-charts were also prepared for representation of the data. Recorded data have been analysed and study concluded that the majority of the articles were contributed by single authors; and most authors were librarians, faculty members or researchers affiliated with academic or research institutions. Out of 13 issues published during 2007-2011, no special issue was brought out. A maximum number of references i.e. 116 were given in single article in 2010 profession. Only single author from foreign country contributed in the journal during the period. This study was a good attempt of the author to identify the contribution of the authors in the particular journal. It has been observed that in 5 years of study, very less number of articles contributed by the authors of the field. With this limited data results of the study cannot be generalized.

[Zafrunnisha and Reddy, 2009] conducted the citation analysis study of Indian Journal of Marketing. The major objectives of the study were to find out the authorship pattern, bibliographic form, subject, language, country and rank wise distribution of citation of articles appeared in the Indian journal of Marketing 36<sup>th</sup> issue published in the year 2006, i.e. January to December 2006. Total 74 articles were published in these 12 issues. Overall 701 citations were featuring all these 74 articles. All citations arrived were collected using a predefined worksheet according to the objectives. Collected data was analysed with the help of MS-Excel software package. Ulrich's International Periodicals Directory was preferred to identify country, language and subject of journals. Testing the degree of collaboration was done using the formula given by Subramanyam. On the basis of the analysis of the data author found that the total 136 authors were participated in total 74 articles. The highest number of articles (8) published in March, 2006. Average number of articles per month was 6.16 and average number of citations per article was 9.47. Authors of Indian Journal of Marketing have mostly cited book source for their research. In IJM Journal, the single authorship was high compared to multiple authorship. The authors of IJM have cited Indian Journal of Agricultural Economics and Journal of Marketing most of the times. According to subject-wise distribution of journals, they have cited marketing subject journals more number of times. Authors of IJM have preferred US publications more in number comparatively other countries publications. The degree of collaboration of authorship was 0.46. IJM authors have cited predominantly of English language publications. This study was a good attempt of the author to understand the pattern of the journal on the basis of some parameters which were the objectives of the study but very limited data was taken for the study which has not given the results that could be generalized. Authors also have not done the desired survey of literature related to the study that could be important to select the data size required and some more parameters which could be helpful to clearly understand and solve the problem.

[Thanuskodi, 2012] brought out the results of a bibliometric analysis of the journal titled "Indian Journal of Agricultural Research" for the period from 2001 to 2010. The present study has been undertaken in order to know the nature and contents of articles in the Indian Journal of Agricultural Research and study also aims at analysing the research output performance of agricultural scientists on agricultural science subjects. The analysis cover mainly the number of articles, authorship pattern, subject wise distribution of articles, average number of references per articles, forms of documents cited, year wise distribution of

cited journals etc. For conducting this study, the data were downloaded from the journal's website. The data pertaining to Indian Journal of Agricultural Research regarding 602 articles made from volume 35 in 2001 to volume 44 in 2010. All the bibliographic details such as authors, title, year of publication, pagination, institutional affiliation etc. of all articles published from 2001 to 2010 were noted and a computerised database is then created for indepth analysis. After carrying out the analysis of the recorded data, the result showed that out of 602 articles joint authors contributed 564 (93.69%) articles while the rest 38 (6.31%) articles were contributed by single author. Study reveals that most of the contributions are from India with 98.67 % and the rest 1.33% only from foreign sources. The present study reveals that majority of the contributions appeared under Plant Pathology 63 (10.47%) followed by Agronomy 57 (9.47%). The study revealed that the highest contributions were from universities with 168 (27.90%). Majority of the authors preferred journals as the source of information providing the highest number of citations 2269 (37.75%). The study revealed that maximum number of citations accounted in the period 2001-2010, 1734 (28.85%). Author has also reviewed few studies conducted abroad as well as in India on bibliometric analysis in different fields. All the points of this study indicate towards the merits and weakness of the journal which will be helpful for its further development. Indian Journal of Agricultural Research is the highly preferred journal for communication by the agricultural scientists.

[Zainab, et. al., 2009] conducted a study applies selective bibliometric measures to a single Asian journal in the field of computer science i.e. the *Malaysian Journal of Computer Science (MJCS)*. The main objective of this paper is to bibliometrically profile *MJCS* using bibliometric measures and this involves; (a) determining the publication productivity of *MJCS* between the years 1985 and 2007; (b) assessing the author productivity using Lotka's law of authorship distribution, and identifying the core authors (c) identifying the authorship pattern; (d) analysing the content of *MJCS* in terms of subject areas covered; (e) analysing the pattern of citations, the core journals identified by using Bradford's law of journal distribution; and (f) assessing the pattern of citations received by articles published in *MJCS* in terms of total number of citations received as indicated by *Google Scholar*, the types of citation resources, the author and journal self-citation and the journal's impact factor. The sample for this study comprises 272 journal articles published in *MJCS* from 1985 to 2007. Access to this journal is obtained from two databases, *EJUM (Electronic Journal University of Malaya)*, which provides access to full-text from the years 1996 to 2008, and *MyAIS (Malaysian Abstracting and Indexing system)*, which provides bibliographic and reference information from 1985 to 2008. Citations data was obtained from *Google Scholar* since *MJCS* has only just been covered by *Scopus* and *SCI* beginning with its 2007 issues and no citation information can be obtained as yet. A more recent review on bibliometrics studies on single journals was carried out by the authors of this study, covering 82 literatures published from 1997 to 2008. In the review of these studies they have found that the all single journal studies have highlighted the variety of bibliometric measures that were used to study the content and format of a journal which subsequently reflected the characteristics of the literature and communication behaviour in the fields they represent. Article productivity or total article output was a common measure used. Besides this, authorship productivity is almost always used as a common measure. Another measure used was co-authorship pattern; degree of collaboration; content analysis. Citation analysis was also frequently used in single journal studies. On basis of the review, authors of this paper have selected the measures to analyse a single journal i.e. the *Malaysian Journal of Computer Science*. Identified measures have been analysed and resulted that the number of articles was maximum in 1995 (23 articles) and minimum in 1989 with only 4 articles. The trend lines indicated a continuous

decline in articles published per year from 1985 to 1989 with an average productivity of less than 10 articles per year. A total of 424 authors contributed to the 272 articles published in *MJCS* during 1985 to 2007. The articles productivity of authors indicates that three-quarters (333, 78.5%) of 424 authors had contributed only one article. Only one quarter (91) of authors produced more than two articles between 1985 and 2007 and among the 91 authors, only 13 (2.9%) authors contributed 5 or more articles. The degree of collaboration among authors who published in *MJCS* was determined using the formula proposed by Subramanyam. The longevity of this journal indicates that Malaysian and the Asia Pacific authors in this field recognize this journal as an important channel to communicate their research activities and findings.

[Ramesh Pandita, 2013] conducted a study entitled ‘Annals of Library and Information Studies (ALIS) Journal: A Bibliometric Study (2002-2012)’. The present bibliometric study has been undertaken with the view to understand the latest publication distribution pattern of the articles published in *Annals of Library and Information Studies (ALIS)* journal during the last decade. Present analysis covers the areas like article distribution pattern, authorship pattern, reference, and geographical distribution of authors, etc. The data required for analysis was mined from its home website. Articles published during 2002- 2012 were scanned, and the relevant information, as per the objectives of the study was extracted and analysed. Total 310 articles were scanned from 11 volumes of the journal (Vol. no 49-59). The data retrieved was put to excel format for better analysis and understanding to achieve the set objectives. Individual contribution of authors to the journal has been tabulated as per articles contributed, highlighted in their standing order. Authors have also studied the related literature in the field. Results of the study show that on an average 7.04 articles have been published in each issue of each volume. 34.19 % articles alone have been contributed as single author articles. From the above data analysis on the whole it emerges that there is a growing trend among researchers to carry out research on joint authorship pattern. More than 65 % articles published in the journal have been published on co-authorship pattern. Researchers from 16 different countries across the world have contributed research articles to the journal during the period of study with maximum contribution 87.61 % from India. After analysing 5307 references, on average 17.11 references have been assigned to each article. In the paper, the journal studied has given fair amount of coverage to articles’ on bibliometrics, scientometrics, webometrics, infometrics, etc. but the study of citation pattern of the journal was left out in this paper.

[Thanuskodi, 2011] presented a bibliometric analysis of the journal titled “Library Herald” for the articles published in the journal from the period between 2006 to 2010. The analysis cover mainly the number of articles, authorship pattern, subject wise distribution of articles, average number of references per articles, forms of documents cited, year wise distribution of cited journals etc. All the details such as authors, title, year of publication, pagination, institutional affiliation, etc. of all articles published form 2006 to 2010 were recorded for the above analysis. Methodology applied in the present study is bibliometric analysis which is used to study in detail the bibliographic features of the articles and citation analysis of reference appended at the end of each article, published in the Journal from 2006 to 2010. The journal has published total 138 articles from volume 44 in 2006 to volume 48 in 2010. Then they are tabulated and analysed for making observations. The result showed that out of 138 articles single author contributed 72 (52.17%) articles while the rest 66 (47.83%) articles were contributed by joint authors. The journal on an average has published 28 research papers per year. The present study reveals that the highest numbers of articles have appeared are in the area of library automation. Most of the contributions are from India with 89.85 %



and the rest 10.15 % only from foreign sources. All the point included in this study indicated towards the merits and weakness of the journal which will be helpful for its further development. This study will be helpful for librarians to plan a better collection development in the libraries and framing new subscription policy for future.

[Warrach & Ahmad, 2011] conducted a study entitled 'Pakistan Journal of Library and Information Science: A bibliometric analysis'. A total of 111 publications from 11 issues of PJJIS were published during 1995 to 2010. It has outstanding contribution in the dissemination of LIS research on national and international level as it publishes both in print and electronic format. A bibliometric analysis of contributions published in the PJJIS from 1995 to 2010 has been presented in this paper. Attempt has been made to study all 11 issues of this journal on the basis of different parameters, viz., author productivity, extent of authors' collaboration, authors' institutional affiliation, authors' geographic affiliation, type of publication, language of papers, number of citations used per article, length of papers, and year-wise distribution of papers. A total of 111 publications from 11 issues of PJJIS published from 1995 to 2010 were analyzed to achieve the objectives of the study. Each issue of the journal was carefully consulted to record the exact bibliographic details. A computerized database designed in MS-Access was used in this study. The database includes certain columns for necessary bibliographical details. The same database was used for data analysis as it has the provision of generating the desired reports. For calculation of percentages in various reports MS-Excel was used. Author has reviewed the related literature on the subject which showed that many bibliometric studies on single journal literature in the field of LIS have been conducted but no such study of PJJIS has been conducted. Therefore, author has decided to analyze the literature published in PJJIS. After the analysis authors concluded that the most of the papers were single authored and being Pakistani origin journal majority of the authors belonged to Pakistan. Authors from 12 foreign countries also contributed in this journal as found in the study of 11 volumes. It shows that the journal has been internationally circulated. It needs wider circulation and that is the reason that for the last few years its issues have been made available online. Authors from the University of the Punjab contributed maximum papers followed by the University of Karachi. Majority of the papers were research papers and 70 percent were written in English language. Fifty one papers (45.94%) have 1-20 references which seem to be a good trend in research while 44 contributions (39.64%) were without references. In fact those contributions were essays written on different aspects of librarianship. Almost 60% of papers' length ranged from 6-20 pages and average length of papers was 8.84 pages.

[Kavitha, 2013] conducted a Bibliometrics Study of Indian Journal of Nutrition and Dietetics. This paper examines the articles published in the journal to know the authorship pattern, degree of collaboration and geographical distribution of papers. Bibliometric analysis of 307 articles published in Indian journal of Nutrition and Dietetics from 2007 to 2011 have been done. The data have analyzed to know the various objectives of the study and it was represented through different tables and figures. The analysis carried out for this paper found that majority of papers are multi authored. The geographical distribution reveals that the contribution by Tamilnadu is the highest in India. The year-wise distribution of articles in Indian Journal of Nutrition and Dietetics shows that the highest number 64 (20.85%) total output 307 have appeared in the year 2007 & 2009. Maximum number of articles is 126 (41.05%) have been contributed by Two authors. This shows that single author research work were low among the contribution made to the Indian Journal of Nutrition and Dietetics. This has been further testified with the degree of collaboration. The degree of collaboration in Indian Journal of Nutrition and Dietetics is 0.95. The Geographical distribution of papers

highlights that the journal is dominated by the host country (ie India) as most of the articles are contributed by the professionals from India.

[Thanuskodi, 2010] conducted a study 'Journal of Social Sciences: A Bibliometric Study'. This study aims at analysing the research output performance of social scientists on social science subjects. The analysis cover mainly the number of articles, authorship pattern, subject wise distribution of articles, average number of references per articles, forms of documents cited, year wise distribution of cited journals etc. The issues of the Journal of Social Sciences (JSS) from the year 2003 to 2007 have been taken into consideration for this study. The total number of 273 contributions during the period 2003-2007 has been recorded for the present study. The present study reveals that the highest number of articles have appeared in the area of economics. The journal has published 273 articles during the period of study. The maximum number of contributors are two authors with 44.33 %. Similarly most of the contributions are from foreign 78.39% while Indian contribution is less. Majority of articles 136 (49.82%) have the length of 11 and more pages. The study revealed that majority of articles (55.98 %) contain references which include journals.

[Bakri & Willett, 2008] presented the study entitled 'The Malaysian Journal of Library and Information Science 2001-2006: a Bibliometric Study'. This paper analysed publication and citation patterns in the *Malaysian Journal of Library and Information Science* (MJLIS) from 2001-2006, and compares the results with those obtained in an earlier study by Tiew et al. (2002) covering the period 1996-2000. Study results showed that the number of publications has increased from the 76 articles in the Tiew study to 85 articles here, with statistically significant changes in the types of article, in the numbers of references per article and in the lengths of the articles. The complete set of 161 articles attracted a total of 87 citations, 52 of which were self-citations, with 14% of the MJLIS articles having been cited at least once. The MJLIS publication data for 2001-06 were downloaded via the *WilsonWeb Journal Directory* in March 2007. In all, there were 85 articles, and a range of data was then extracted from each of the downloaded articles. The data extracted were determined in large part by the analyses carried out in the Tiew study, since one of the principal aims of the present work is to compare the period 2001-2006 with the period 1996-2000 surveyed in the earlier study. Authors hence extracted the following data: year, volume, issues, number of authors, author's name, number of pages, number of references, and address of author. A note was also made as to whether the author had included any self-citations or journal self-citations. Finally, each article was then inspected to ascertain its type and subject category. The MJLIS citation data were downloaded via Google Scholar by searching the database using the phrase —Malaysian Journal of Library and Information Science. The search retrieved a total of 216 citations to articles in the journal, and these records then underwent a cleaning process. The resulting publication and citation data were then loaded into a spreadsheet. SPSS was used for statistical comparisons of our data with the Tiew study, using the C<sup>2</sup> test at the 0.05 level of statistical significance. The analysis shows that there have been statistically significant changes in the types of article, in the numbers of references per article and in the lengths of the articles. There is a reasonable spread of types of article, although the editors might consider encouraging the submission of reviews and of articles on information retrieval, information literacy, and cataloguing and classification. Citations to the journal are currently dominated by papers from a small number of authors working in the area of bibliometrics.

[Velmurugan, 2013] conducted a bibliometric analysis with special reference to authorship pattern and collaborative research output of *Annals of Library and Information Studies* for the Year 2007 – 2012'. The present study aims to investigate the bibliometric analysis of 203

articles appearing in Annals of Library and Information Studies journal selected six years for a period between 2007 and 2012. Twenty four issues of six volumes from 2007 to 2012 have been selected six years for the study. For each article, year wise distribution of contributions, number of authorship, volume wise authorship, author's productivity and the single and multi-authored papers were noted down for the study. The data was collected from Annals of Library and Information Studies journal website <http://www.niscair.res.in/> pertaining to period from 2007 to 2012. These data were organized, calculated, tabulated, analyzed and presented by using simple arithmetic and statistical methods for its results. As a result, It was found that the highest number of contributions i.e., 43 (21.19 %) were published in the year 2010. The minimum number of 27 (13.31 %) was published in the year 2012. It was found that the most of the contributions are by two authored i.e., 88 (43.35 %). A total of 72 contributions (35.46 %) out of 203 have been contributed by single author, 131 contributions (64.54 %) by multiple authors. Out of 203 contributions, the highest number of i.e. 167 articles (82.26 %) were from authors affiliated with Academic Institutes whereas the lowest number i.e. 12 (5.92%) has been contributed by Special Institution. The total average number of authors per paper is 1.87 and the average productivity per author is 0.53. The degree of collaboration ranges from 0.57 to 0.82 and the average degree of collaboration is 0.64, which openly indicates its dominance upon multiple contributions and it was calculated by using the formula given by K. Subramanyam.

[Minas, et.al., 2014] presented a paper entitled 'International journal of mental health systems: a bibliometric study'. This study uses bibliometric indicators to review the performance of the Journal against its original stated objectives and aspirations. All articles published in IJMHS since publication commenced were included (n = 158). Selected bibliometric measures indicating Journal productivity, author affiliation, impact, geographic reach, and international collaboration were utilised. All articles published by IJMHS (n = 158) were collected from the BioMed Central (BMC) archives from establishment in August 2007 to July 17, 2013. The following descriptive data were collected for each article: year of publication; all authors' names; authors' institutional affiliations; and authors' countries. All citations and full articles were collected in the citation manager Endnote X6. Each citation was subsequently exported into Microsoft Excel, where counts and calculations were performed. Descriptive analyses were conducted to measure IJMHS' performance: The number of articles published each year was recorded. IJMHS published 158 articles in seven volumes over six years. Authors found that Manuscript submissions to IJMHS increased each year from 2007 to 2011, with a decline in 2012. Articles had an average of 4.7 authors. The highest-ranking journal in the category is Health Affairs, with an SJR of 3.082. The pattern of increase in SJR in the first five years is broadly similar for IJMHS and the other three BMC journals. Articles with three to five authors constitute the dominant authorship pattern, and authors' affiliations are varied. IJMHS has received an impact factor of 1.06 from Thomson Reuters, and the SCImago Journal Ranking shows IJMHS to be well positioned in the four categories in which it is listed, including in comparisons with well-established BMC journals that have similar scientific interests. Geographic authorship patterns show contributions from a large number of countries, including many low- and middle-income countries. IJMHS aims to publish high quality papers from all parts of the world, particularly from low and middle-income countries, which are under-represented in the scientific literature. Half of the 20 papers have a first author from a low- or middle-income country. The mean number of Pubmed citations is 5.6, and the mean number of Google Scholar citations is 29.8.

[Garg & Anjana, 2014] conducted a bibliometric study of Journal of Intellectual Property Rights. This paper analyses 605 papers published in the *Journal of Intellectual Property*

*Rights* during 1996- 2012, which indicates that the inflow of papers has increased during the period of study. 12. The data for the study was downloaded from the CSIR-NISCAIR website for 17 years from volume 1(1996) to volume 17(2012). The data consists of year of publication with its volume number, name of the author with their affiliations and its geographical location, total count of authors, length of the articles in terms of the number of pages, number of references cited by the article. The data was downloaded on MS Excel sheets. Citations earned by the articles from 2002 onwards were examined from *Google Scholar*, and recorded on the same Excel sheet. Data was analysed to meet the objectives mentioned above. Complete count method has been followed for the analysis of the data. Under this method, each country or state or institution or authors in multi-authored papers are given unit credit for their contributions and thus the number of contributions is more than the actual contributions. In the present case also, the actual number of papers published was 605 which have increased to 847 using complete count method. The increasing inflow of articles shows the popularity of journal among the scientific community as well as policy makers. The study shows that number of references per paper is increasing and the average reference per paper is 23. The proportion of single authored papers is decreasing, while the share of multi-authored papers is on the rise. About one-fourth of the papers published in the journal are from abroad and the rest from India. Among foreign countries US is the largest contributor. Among the performing sectors, academic institutions are the largest contributors to the journal followed by research institutions. As an agency, CSIR has contributed the highest number of papers and several of the prolific institutions and authors are also from CSIR.

[Gautam & Verma, 2014] have done a bibliometric analysis of *Srels Journal of Information Management* (2000-2013). The main objectives of this study were to find out year-wise distribution of publication, authorship pattern, volume-wise degree of collaboration, form at dispersion of references in *SRELS journal of information Management* and average number of contributions per volume. A total of 62 issues of the journal from 2000 to 2013 was selected for the study. The details regarding each published article such as title of the article, number of authors, number at reference, number of tables and figures etc. were recorded and analyzed. This study resulted a trend of growth in contributions published during 2000 to 2013 and average number of contribution per volume 44.78. Majority of the library and information scientists prefer to contribute their papers jointly. Majority of the library and information scientists have cited journals in large number 2900 (40.57%) while books comes on second with 2090 (29.24%) citations. Most of the contributions are with citations. Only one contribution is found with citation out of total 627 contributions.

[Panda, et. al., 2013] have done a bibliometric study of the the *Journal of Information Literacy*. This paper analyses publication and citation patterns in the *Journal of Information Literacy (JIL)* from 2007-2012. The *JIL* publication data of all the 6 volumes (2007-2012) published so far were downloaded from the journal site. In all, there were 131 articles including articles, book reviews, conference papers, editorials, etc. scanned and data relating to subject, author, author affiliation, geographic distribution, number of references and the number of pages were extracted. Finally, the resulting publication and citation data were loaded into a spreadsheet and SPSS was used for statistical analysis of data. The results show that the number of research articles 68 (51.9%) is highest among other types of publications such as book reviews 36 (27.49), conference papers 27 (20.61%), etc. A majority of contributions 94 (71.75%) emanating from UK and other countries have very meager contribution. Almost all the papers 124 (94.65%) are from academic institutions and a very few papers 7 (5.35) are from non-academic institutions. The citations demonstrated that

individual research 90 (68.7%) is much higher than collaborative research. So far as profile of the authors concerned, almost equal number of faculty members and professionals contribute to JIL. The journal maintains all the features in terms of content, structure, citations, credibility of authorship, etc. to be considered as an international journal especially devoted Information Literacy. However, there no information regarding the indexing services which include the journal.

[Jena, et. al., 2012] conducted a study entitled ‘Annals of Library and Information Studies, 2002–2010: A Bibliometric Study’. The present study intends to analyze the publication trends in ALIS during the period 2002 to 2010. The key objectives of the study were to study the year wise distribution of articles; citation pattern of articles; bibliographical forms of documents; authorship pattern; length of articles; geographical distribution of authors; and the age of documents. For the analysis of the study, nine volumes (Vol 49 to 57) containing 36 issues published during the year 2002 to 2010 have been taken up for evaluation. The details with regard to each published article such as number of articles in each issue of the journal, number of authors, name of authors, place of authors, number of references and their forms, number of pages, etc., were recorded and analyzed for making observations. The data were collected; organised and analysed using MS-Excel spreadsheets. The tables and graphs were generated in accordance with the objectives of the study. For the sake of convenience, only three major forms of citations comprising of *journals*, *books and web resources* were taken into the purview of the study while proceedings, reports, theses, and such other materials which were found relatively less were clubbed up into *others* category. The gathered data after due scrutiny, were tabulated and processed for analysis and subsequent interpretation. The degree of collaboration (DC) of the contributors was derived using the Subramanyam(1983) formula. The findings of the study were summarized as: the contribution of articles to each volume of journal is constantly increasing from year to year. The average citations per article is 16 and the average number of pages per article is 8. It is found that the *journal* citations are predominant (57.4% of the total citations) followed by *books* (16.5%) and *web resources* (11.6 %). Two authored papers are found to be the highest followed by single-authored and then three- authored papers. The degree of collaboration is found to be 0.676. In regards to country productivity, India topped the list. In regards to states, New Delhi stood first and the half life period of document citations is 11 years. The study has depicted a nice portrait of ALIS which speaks volumes about the publication policy of this journal.

[Santhi & Jeyachitra, 2013] conducted a bibliometric study of the journal ‘IEEE Transactions on Control Systems Technology’. The present study mirrors the actual published results of the work of scientist in the journal during period of the study from 1998 to 2007. The objectives of the study were to find out year-wise publication of articles and citations, continent wise distribution of articles, author productivity, form wise distribution of citations and obsolescence of periodicals. The total papers published in the said period accounted as 935. The bibliographical details of publications were entered in the catalogue cards. Finally the cards were arranged in different ways with a view to identify the scientists of engineering science. The data has been compiled from online journal articles. For each Cited reference, the following data has been noted: a) number of author(s), b) Type of document, c) continent of origin of the document/ journal and other data required for analysis. Study resulted that totally 935 articles have been published for the span of 10 years.. On the whole 2676 authors belonging to 55 countries contributed a total of 935 articles. Out of various numbers of contributions, the highest number of contribution is 21 papers, which is the productivity of one individual scientist. The study has examined totally 20579 citations published for the

span of 10 years. On the basis of analyzed data it is seen that the authors have cited mostly from journals. A total of 20579 citations cited have been arranged up to the age of 30 and above 30. Out of total 20579 citations, half of these citations come to 10289 that are approximately 7 years old. This study has proven to be the useful tool in the assessment of research publication of scientists in Engineering and Technology.

[Sivasekaran & Ragavan, 2014] have done a bibliometric analysis of the Journal of Astrophysics and Astronomy. This study has been undertaken to examine the year-wise distribution of the articles, authorship pattern of the articles, average length of the articles in terms of pages, average number of references per articles, institution-wise distribution of the articles and geographical distribution of the articles. The data collected for the study from the year 2007-2012 (volume 28 to 33). Totally 238 articles published in this study period. All the articles of volumes 28-33 (2007-2012) of the journal were scanned manually and data relating to subject, author, author affiliation, geographic distribution, number of references and the number of pages were recorded and tabulated. Finally, the collected data was analysed for generating information. The subjects of the articles and their facets have been classified with the help of experts. Short communications and book reviews have been excluded. The publishing trend totally depends on the output of contributors, patterns of contributions and the quality of research. The year 2011 exhibited the maximum number of contributions and highest numbers of articles published from India 31.51 % in International Journal of Astrophysics and Astronomy. The study reveals that the categories of article distributions are remarkable in this research journal. The majority of the articles contributed by single author and most authors were affiliated with academic research institutions. India has contributed more articles than any other countries, such China, USA, England and Australia. This journal is notably a scholarly journal that stipulates or induces fruitful research for the Physics.

[Hussain, 2013] carried out a study entitled 'Annals of Library and Information Studies: A Bibliometric Analysis for the period from 2006-2010'. The present study demonstrates and elaborates the various aspects such as year-wise distribution of article, authorship patterns, institution wise distribution of contributions, subject wise distributions, citation patterns, length of article, rank of cited authors, geogaphical distributions of authors etc. have been analysed. The methodology applied in the present study is bibliometric analysis, which is used to study in detail the bibliographic attributes of the articles and citation analysis of the references at the end of each article published in *Annals of Library and Information Studies* from 2006-2010. Five volumes (vol 53 to 57) containing twenty issues of ALIS have been taken up for the study. The details with regard to each published articles, number of authors, name of authors, address of authors, number of references and their forms, number of pages, number of tables and figures etc. Then they are tabulated and analysed for making observations. All the details such as author(s), title, year of publication, pagination, institutional affiliation, etc. of all articles published from 2006 to 2010 were recorded for the following analysis. It is found that the maximum numbers of articles are in the year 2010 contributing 43 articles, which are 25.90 to the total publications. The analysis shows that majority of the articles in the journal are two-authored and majority of the contributions are from New Delhi, the place of publication of *Annals of Library and Information Studies*. On the basis of analysis it found the ranked list that *Scientometrics* occupied first rank with 90 citations (5.35%), second rank occupied by *Annals of Library and Information Studies* with 58 citations (5.45%).

### **2.2.2 Subject area based publications studies:**

[Singh, et.al., 2007] conducted a bibliometric study of literature on digital libraries. Study has been undertaken with the purpose of finding out the growth and characteristics of digital library literature. Over 1000 articles for the period 1998-2004 were collected from LISA Plus and were analysed to study the authorship pattern, authors' productivity and prominent contributors, language-wise and year-wise distribution of articles, country-wise distribution of journals, core journals in the subject area, and indexing term frequency. For collecting the data related to publications in journals, reports, conference proceedings, an advance search was made in the LISA Plus using keywords such as digital, library, libraries, etc. occurring in the title field and combining these with Boolean operators for the date range from 1998-2004. This resulted in 1062 records covering all types of publications in all languages. It was noticed that the authors' name was not mentioned in 46 articles. Therefore, these articles were not included for studying the authorship pattern and author productivity. The collected data were analysed to find out the results for the set objectives. Some bibliometric laws were also applied by authors to find the authorship pattern and authors productivity. Analysis of data prepared in different tables have been done and authors concluded that most of the articles were single-authored; author productivity was not in agreement with Lotka's Law, except in one case where number of articles is three; the maximum number of articles were published in 2003 with English being the most productive language; maximum articles were published in the journal D-lib Magazine; distribution of articles nearly follows Bradford's Law; and USA ranked first for maximum number of journals. This study was relevant to those interested in bibliometrics and it provided a comprehensive overview of authorship in the library and information science community.

[Patra, et.al., 2006] presented a 'Bibliometric Study of Literature on Bibliometrics'. This study aims to find out the growth pattern, core journals, authorship pattern and productive authors in this field. In this work, the data for analysis was downloaded from *LISA (Library and Information Science Abstracts)* produced by Cambridge Scientific Abstracts (CSA). The search terms used were "Bibliometrics" OR "Scientometrics" OR "Webometrics" for retrieval of records. Up to September 2005, 3781 records were retrieved for the bibliometric analysis. The retrieved data contains mostly journal articles and 53 conference proceedings were also found. These records are further analysed using Microsoft Excel and Access for getting further bibliometrics indicators. From the data analysis it has been found that the highest literature growth occurs in 1999 where 208 records were indexed and in 2005 till September 106 records has been indexed, the last few years' trend indicated that there is no definite pattern of literature growth in the field of bibliometrics. Bradford's law of scattering is used to identify core journals and determines '*Scientometrics*' as the core journals in this field, which covers mostly (41%) of the total literature coverage. Lotka's law was used to identify authors' productivity patterns. It is observed that authors' distributions do not follow original Lotka's law. From the data, it has been found that about 4,000 authors publish 3,781 articles, which is 0.94 articles per author which means author with single publication is more predominant and English is the predominant language of publication. Study also identified 12 most productive authors with more than 20 publications in this field. Study was a good attempt of authors to represent the all over picture of literature on bibliometrics studies conducted by different authors and it will help in future research would be carried in this field.

[Nazim & Ahmad, 2008] conducted a bibliometric analysis on nanotechnology research. Paper examines the scientific output in the field of 'nanotechnology' with the aim to offer an overview of research trend in this field and characterize its most important aspects such as, growth of literature, authorship pattern, most productive journals, authors, countries, etc. A

total of 2675 articles for the period of 1991-2006 were collected from Web of Science (WoS), especially via the Science Citation Index and data were tabulated using SPSS. The analysis in the present study focused mainly on the presentation of publications, frequencies and percentages. Citations for the period 1991-2006 were downloaded using EndNote-7 software. Authorship pattern and core journals were examined using Lotka's Law and Bradford's Law of scattering respectively. The yearly analysis shows that there is a rapid growth of nanotechnology research from the beginning of 21<sup>st</sup> century. On an average 167 articles were published each year. 32 journals were identified as core journals in the field which published about one third of the total articles. During 1991-2006, a total of 7917 authors contributed 2675 articles with an average of 2.95 authors per article. English was found the most popular language with 97.5% of the total articles. When applying Bradford's Law of scattering with respect to the identification of core journals, three concentric zones were defined with the ratio of 32:149:639, which are partially in accordance with the Bradford's distribution. With respect to the author productivity through the application of Lotka's law it was observed that the values obtained were widely different from the real values. Present study was taken up to quantify and map the world's strength of scientific output in the field of nanotechnology.

[Mittal, et.al., 2006] have done a bibliometric study on 'Periodical literature on library and information science education'. The study presented an analysis of 536 papers published on library and information science education during the period 1995-2004. Data were collected from online version of Library and Information Science Abstracts (LISA) for the period selected. Advanced search was made in the LISA database using the keywords library and education occurring in the title field and combining these with Boolean operator for the date range from 1995 to 2004 and limited to journal articles only. A database of 555 downloaded records was developed in MS-Excel with the database containing title, author, journal name, publication year, language, keywords, and abstracts. Finally, total 536 papers published in journals in all languages and abstracted in LISA have been selected for the study. The productivity of authors and core periodicals have been determined using Lotka's Law and Bradford's Law. Literature growth, country-wise distribution of papers and language pattern have also been studied by the authors. On the basis of the study, authors concluded that maximum papers were published in the year 1995 and there is a decrease in growth of literature in this area. Most of the papers have been contributed by single authors (72.8%) and 72% literature was published in 72 journals. Authors observed that the difference between observed and expected authors is wide, indicating that Lotka's Law is not applicable in this case. Distribution of periodicals is very close to the Bradford's Law but distribution of papers does not follow the law. USA was the major producer with 26.49% papers published in their 58 well-known journals. All the 536 papers published in journals were in 22 languages and maximum paper i.e. 400 (76%) were published in English language.

[Belter & Seidel, 2013] carried out 'A bibliometric analysis of climate engineering research'. This study provides a summary of existing publications on climate engineering, a perspective on the scientific underpinnings of the global dialogue on climate engineering, and a baseline for quantitatively monitoring the development of climate engineering research in the future. Authors identified and analyzed a total of 750 articles on climate engineering published between 1988 and 2011, with none identified during 1984-1987. Data used in this analysis are derived from article metadata in Web of Science, Science Citation Index Expanded (WoS) for 1984-2011. Authors analyzed the data collected to identify their publication year, article type, and country of origin. Authors then collected the metadata and citation data from these articles and used the Sci2 Tool to create a bibliographic coupling network and a coauthor network from these articles. On the basis of the analysis authors found that



publications on climate engineering are found to be relatively recent (more than half of all articles during 1988–2011 were published since 2008), include a higher than average percentage of nonresearch articles (30% compared with 8–15% in related scientific disciplines), and be predominately produced by countries located in the Northern Hemisphere and speaking English. The majority of this literature focuses on land based methods of carbon sequestration, ocean iron fertilization, and solar radiation management and is produced with little collaboration among research groups.

[Arya & Sharma, 2011] conducted a bibliometric study to find out the collaboration in research and authorship trend in the area of veterinary sciences all over the world with special reference to India. The objectives of the study were to analyze the authorship pattern in veterinary science, identify the proportion of single-authored papers against multi-authored ones, degree of collaboration in veterinary science, growth of literature in different areas of veterinary science and compare the growth of research between India and the rest of the world. *CAB Abstracts* for the period of 2006–2010 were used as a source for data collection in the present study. A total of 98,713 papers published by veterinarians and included in *CAB Abstracts* during the period of 2006–2010 were selected for analysis as per the objectives of the study. The data collected was tabulated and analyzed. Degree of collaboration has been quantified by applying Subramanayam's formula. On the basis of the analysis, authors found that the average degree of collaboration was 0.84, it indicates that the degree of collaboration is high and multi authorship is prominent in the field of veterinary as well as some other disciplines of applied sciences and collaborative research has been preferred by the scientists over that of solitary research. It also indicates dominance of collaborative research over solo research. A comparative study of literature growth worldwide indicates that Indian has contributed a good portion to the veterinary sciences research. Subject analysis showed a good research in the area of animal nutrition and veterinary physiology. Researchers may use this methods of evaluation to determine the influence of a single writer or to describe the relationship between two or more writers or works.

[Karpagam, 2014] conducted a scientometrics study on 'Global research output of nanobiotechnology research'. In this paper author has done an analysis based on SCOPUS database to evaluate nanobiotechnology research output for the period 2003–2012 on different parameters, including the growth, global publications share and citation impact, share of international collaborative papers and contributions of major collaborative partner countries. The objective of the current analysis is to identify 10 years research trend in nanobiotechnology with the aim to: (i) study global research trends related to nanobiotechnology, (ii) identify contribution and citation impact of most productive countries related to nanobiotechnology; (iii) catalogue the international collaboration among top 10 countries, (iv) identify the active performance of the countries using various indices, (v) identify the contribution of top 10 institutions and top 10 journals, (vi) study the authorship pattern, degree of collaboration, highly productive authors in the field of study, and (vii) identify and study the contribution of the most productive journals, institutions, etc. on nanobiotechnology. For the purpose of the study, the Scopus database was searched for all records of papers published in peerreviewed journals and other bibliographical forms. This study is based on the world publication data on nanobiotechnology retrieved from the Scopus citation database for the 10 years (2003–2012). A total of 114,684 papers were published during 10 years, which received 2,503,795 citations with an average of 21.83 citations per paper. It has been observed that during 2003–2012, USA held the first position by number of publications (34,736), h-index (349), g-index (541), hg-index (434.52) and p-index (326.47). Developing countries such as India, China, South Korea and Canada showed increasing trends in their publications and their activity index also showed increasing trends. Top 10

institutions contributed 7.16% share of total publications. Massachusetts Institute of Technology, USA received the highest h-index (120) among the top 10 institutions. Biomaterials (1631) was the top journal of publication output; Nano Letters had the highest impact with an average citation per paper (73.86) and American Chemical Society received the highest h-index (158) among the top 10 journals.

[Cao, et.al., 2013] have done a bibliometric analysis of global laparoscopy research trends during 1997–2011. In this study, authors aim was to evaluate the global scientific output of laparoscopy research, and try to find an alternative statistical approach to quantitatively and qualitatively assess the current global research trend on laparoscopy. Data were based on the Science Citation Index Expanded (SCI-E), from the Institute of Scientific Information Web of Science database. Articles referring to laparoscopy during 1997–2011 were concentrated on the analysis by scientific output characters, international collaboration, and the frequency of author keywords used. Globally, 59,264 papers were published during the 15-year study period, including 15 document types. Among them, there were 40,318 articles, to which a two-phase model was applied to simulate the high correlation between cumulative number of articles and the year. International collaborative publications were more prevalent in recent years, and were more powerful due to the sharing of ideas and workloads. Japan, Sweden, Poland, Canada, the UK, India, France and Spain benefit a lot from the international cooperation. With the comprehensive analysis of distribution and change of article titles, author keywords and abstracts, it can be concluded that research related to ‘morbid obesity’, ‘robotic surgery’, ‘prostatectomy’ and ‘NOTES (natural orifice transluminal endoscopic surgery)’ are the main orientations of all the laparoscopy research in the 21st century. In this study dealing with SCI journal publications, we acquired some significant points on global laparoscopy research trends and performances throughout the period from 1997 to 2011. The exponential model showed that yearly publications had a distinct growth with a high rate during the last decade. Due to nature of clinical research, the vast majority of laparoscopy research papers were from single country. And without doubt, the USA contributed the most in both independent and international collaborative publications. By synthetically analyzing the distribution and change of article titles, author keywords and abstracts, we describe the development of research on laparoscopy during the past 15 years, and predict the future orientation of it. It can be concluded that research in the topic related on “morbid obesity”, “robotic surgery”, “prostatectomy”, and “NOTES” will undoubtedly maintain the hotspots of laparoscopy research in the 21st century. In conclusion, the result analysis by this innovative approach can help relevant researchers map the global laparoscopy research, and establish the further research direction.

[Chen, et. al., 2014] presented a study entitled ‘Alzheimer’s disease research in the future: bibliometric analysis of cholinesterase inhibitors from 1993 to 2012’. In this study, A bibliometric study was performed on the articles related to “cholinesterase inhibitor” published from 1993 to 2012 to find the trend of Alzheimer’s disease (AD) research and the order of drugs which was most tolerated or more effective in AD treatment. Documents considered in this study come from Science Citation Index-Expanded (SCI-E). SCI-E is the most important and most frequently used source database for bibliometric analysis. Two mesh terms “cholinesterase inhibitor” and “dementia” already checked in PubMed mesh database were used to conduct searching titles, abstracts, and author keywords from 1993 to 2012. Articles originating from England, Scotland, Northern Ireland, and Wales were categorized as being from the United Kingdom. All 4,982 articles and reviews were published in 933 journals listed in 81 SCI subject categories by 3,773 institutes. 4,982 articles and reviews from the Science Citation Index Expanded during 1993–2012 were analyzed.

Keyword analyses were carried out by Thomson Data Analyzer. The main results were as follows: The publication of cholinesterase inhibitor research increased overall during 1993–2012. Chinese Academy of Science had most publications, University of California, San Diego and Hebrew University of Jerusalem won first place with the highest average citation per paper and the highest h-index respectively. Neurosciences, pharmacology and chemistry were “raising” subject categories in cholinesterase inhibitors research. With the comprehensive analysis of distribution and change of author keywords in two 10-year-time periods, it can be concluded as follows: (i) the order of drugs which was most tolerated or more effective in AD treatment might be donepezil, galantamine, rivastigmine, tacrine, memantine and huperzine A, and memantine attracted increasing interest recently and might be used more frequently now, especially for moderate to severe dementia. (ii) The pathogenesis of oxidative stress hypothesis attracted extensive attention. The interest to bamyloid cascade hypothesis increased slightly but that of the cholinergic hypothesis decreased during the past decade. (iii) “Oxidative stress”, “b-amyloid”, “neuroprotection”, “memory” and “cognition” are the main orientations in the AD research in the future.

### ***2.2.3 Citation or Index databases studies:***

[Jamdade, et.al., 2013] have done a Bibliometric Study of Directory of Open Access Journals (DOAJ) with special reference to library and information science journals. Author have studied the total 137 free full-text with abstracts online journals were accessed through DOAJ and analysed based on subject headings, languages, country and accessibility of archives of online journals in library and information science. They have also tried to find out the usefulness and applicability of library and information science e-journals to other disciplines. For the study, they have browsed the website of DOAJ, and found out the journals were available in the area of library and information science. Authors have prepared the database of all 137 journals based on subject headings, languages, country and other objectives of the study. Further, they analyzed the same. On the basis of the study, authors have concluded that Unites States was on 1<sup>st</sup> Rank with 37 e-journals, Brazil was on 2<sup>nd</sup> rank with 16 e-journals and Spain was on 3<sup>rd</sup> rank with 10 e-journals in the field of library and information science. Authors also observed that India was on 5<sup>th</sup> rank with 6 e-journals. English was the most common communication language for the scientific communities and computer science and library & information science journals are interdisciplinary in nature. Although this study has depicted the all over scenario related to the library and information science journals available in DOAJ on basis of the set objectives, but, it has been observed that the related literature has not been reviewed for the study which is very important in any research and which could be helpful to find out some other important related factors of the study. Secondly, only few parameters have been studied of the library and information science e-journals of DOAJ in a broad way. Some other important factors like- collaboration between authors of different countries, country-wise authors’ contribution, etc. could also been studied by scanning of journals’ article in depth.

[Bathrinarayanan & Tamizhchelvan, 2014] presented a scientometric study of Indian research output on Mems literature Using scopus database. The study explores the research output of MEMS literature from 1970 to 2013, growth of MEMS research in India, the sources of publications and collaboration in nature. For this study, the publications data commencing from 1970-2013 (44 years) on MEMS research has been downloaded from ‘Scopus’, multidisciplinary online database, which is an international indexing and abstracting database, using the search term “MEMS”. The total number of publications has been identified as 294573 records among Indian contribution were 8050 records during the same period. The collected data has been classified by using Excel and the same was loaded in to SPSS (Statistical Package for Social Sciences) for the purpose of analysis. Statistical tools

such as frequency distribution and percentage analysis and Scientometric techniques such as Authorship pattern, Relative Growth Rate (RGR), Doubling time (Dt), etc has been used for the study. The Authorship pattern has been adopted by Lotka's Law. The authorship pattern were analysed using Degrees of collaboration, Collaborative Index, Collaborative Coefficient and Modified Collaborative Coefficient for the period of 44 years on MEMS literature. After the analysis it has been found that India occupies 9th ranking among the world production of articles on MEMS with 8050 publications by Indian authors, USA contribution is the top comparing with other countries. While comparing with India the USA has twelve time higher production. There was steady growth on the subject from 1991 onwards. The average authors' per article is 3.40 and the degrees of collaboration is 0.885714. The three fourth of publications are from Journals. The overall citations among the Indian authors were calculated and the average per article citations is 12.88. The maximum average citation is 53.12 in the year 1994.

[Mahesh & Wadhwa, 2012] studied 'Web of Science based ranking of Indian library and information science journals' The study has explored the possibility of using the 'cited reference search' feature of the WoS databases to rank the India LIS journals and found that the results corroborate with that of earlier studies with indentifying the citation trend of Indian LIS journals by Web of Science indexed journals and prominent authors and papers. A list of Indian LIS journals was compiled from different sources and based on existing ranking studies, 10 Indian LIS journals were shortlisted. The 'Cited Reference Search' feature of the Web of Science databases, SCI and SSCI, was used to search each of the Indian journal selected in the study. During May 2011, abbreviated titles of each of the 10 journals were used in the "cited work" field in the 'cited reference search' and the resulting data obtained was downloaded in MS-Excel for analysis. Authors concluded that Annals of Library and Information Studies have received the highest number of citations and also has the maximum number of papers cited. DESIDOC Journal of Library and Information Technology have received the most number of citations followed by Annals of Library and Information Studies. It is seen that Dr. S R Ranganathan's papers have received the highest number of citations followed by Neelameghan, Kaula and other well known Indian LIS professionals. It is seen that seven papers have received five or more citations with the paper by Sen and Gan (1983) on a mathematical extension of the idea of bibliographic coupling and its implications that has received the highest number of 12 citations.

[Chen, et. al., 2014] have done a bibliometric investigation of life cycle assessment (LCA) research in the web of science databases. The goal of this bibliometric study is to get insight into publication performance of global LCA research, characterize its intellectual structure, and trace its evolution by using the bibliometric method with visual mapping. Based on the data from the ISI Web of Science databases Science Citation Index Expanded (SCIEXPANDED), Social Sciences Citation Index (SSCI), Conference Proceedings Citation Index—Science (CPCI-S) and Conference Proceedings Citation Index —Social Science & Humanities (CPCI-SSH) in the period of 1998–2013, bibliometric methods are used to investigate general development profiles of LCA research, while knowledge domain visualization technologies are employed to conduct a further co-citation analysis. The results of this research mainly shed light on basic statistics of significant publication performances, research focuses and their intellectual base in LCA research and how the streams of research evolved during the whole period of interest. Study concluded that some salient scholarly journals and institutions are identified that have shown a significant impact during the exponential growth of LCA research in the past 16 years. Biofuel, process design, solid waste management, and livestock production-related LCA researches are the main areas where interest is surging, confirmed by the active citers in each specialty. Furthermore, from the

perspective of science mapping, evolution of LCA research is traced and some pivot publications are identified, which work as structural holes for the LCA-research development in the given time window.

#### ***2.2.4 Country based publications studies:***

[Thirumagal, 2012] have done the bibliometric study of nanotechnology in India. In this study author has taken the publications on nanotechnology from the database of Web of Science and the analysis period was from year 2001 to 2011. Objectives of the study were to find out the individual author's contribution, geographical distribution, year-wise research in nanotechnology in India, Citation of articles, ranking of journals, h-index, g-index and gh-index. Author has also reviewed the related studies based on the similar parameters for this study. Total 451 results on nanotechnology in India were extracted from the database and analyzed based on the set objectives. Author used Histcite and Bibexcel tools for analysis of the data. Study concluded that collaboration research output in nanotechnology in India is very high. Degree of collaboration has been measured with the help of the formula devised by K. Subramaniam. English language is dominating in the scholarly communication. India has produced 332 publications and there is a gradual growth of research in nanotechnology in India. Most of the scholarly communication of scientific research was published as journal articles. The average citation per item was 10.36 and the h-index was 37. 'The Journal of Nonmaterials and Biostructures' with 23 records got first rank. The highly cited reference was by Ahmad A. on the paper Colloid Surface B with 26 records. 403 institutions published research output in nanotechnology in India. IIT's output was 51 records. With the total citation-562, h-index-11, g-index-24, and gh-index-16, it got the first place. Author finally observed that this current research will raise new science and policy questions, which lead to new strategic linkages. The nanotechnology will have a major impact on the future of India.

[Huang, et.al., 2006] have done a Bibliometric Analysis of Nursing Research in Taiwan. This study examined nursing research performance in Taiwan from 1991 to 2004 by conducting bibliometric analysis of papers published by researchers affiliated with nursing institutes in Taiwan. Bibliometric information of papers that were published between 1991 and 2004 and had contact address including the words "Taiwan", and "nursing" were downloaded from the ISI Web of Knowledge website. The information used for this research included number of papers, number of authors, number of references listed, impact factors of publishing journals, times cited, and whether the paper was written through international or domestic collaboration. The information was coded and tabulated. Bibliometric characteristics were compared between 1995\_1999 and 2000\_2004. Furthermore, an exponential model was fitted to show the past growth trend in research outputs. The results showed that there was a significant growth in quantity of papers from 1991 to 2004. In general, recent papers had averaged more authors, more domestic collaboration, more international collaboration, higher impact factors, and more references listed than earlier papers. Papers written with collaboration tended to have a higher average number of authors and more references listed, and tended to be published in journals with higher impact factors. The exponential model proved to be in good fit with the past growth pattern. The authors speculate that the recent increase in research collaboration, both internationally and domestically, may have contributed to the significant increase in output. It is not clear whether the growth in quantity of papers will continue or for how long. Based on past data, however, no sign of leveling off has been observed. More research is needed to understand what societal and individual level factors were involved in fueling such a dramatic increase in quantity in the last decade. Furthermore, as the quantity of papers has increased steadily, more focus can be placed on improving the quality of research papers.

[Ahmadi, et.al., 2014] carried out a bibliometric analysis of Stem Cell Publications in Iran. The purpose of this study is to examine qualitative and quantitative states of stem cell research in Iran in order to extract information production patterns. The data related to research publications and frequency of citations were extracted by searching through the Science Citation Index (SCI) Expanded database of Thomson Reuters related to January 2013. The number of published articles and frequency of their citation were used as indices of the quality and quantity of information production. Microsoft Excel was used to prepare the data and calculate different indices and Pivot Table in Excel was used for drawing the required tables. Study Resulted that Total number of Iranian stem cell articles and proceedings indexed in Web of Science until 2012 was 709. The highest frequency belonged to the multiple institution category (45-50% of the articles during 2005-2012). The highest CPP rate (29.7) belonged to the international articles written by the authors from other countries with Iranian coauthors. Authors finally concluded that although cooperation between more authors from different institutions and countries can increase the quality of scientific articles, results of this research showed that international research must be distinguished in terms of author sequence.

[Zyoud, et.al., 2014] conducted a study entitled ‘A bibliometric analysis of toxicology research productivity in Middle Eastern Arab countries during a 10-year period (2003–2012)’. The main objective of this study was to analyse the research productivity originating from 13 Middle Eastern Arab (MEA) countries with articles published in toxicology journals. Data from January 1, 2003 till December 31, 2012 were searched for documents from Scopus with specific words in the toxicology field as a “source title” in any one of the 13 MEA countries. Data collected from Scopus were exported to Excel and then to the Statistical Package for Social Sciences (SPSS) program for analysis. Research productivity was evaluated based on a methodology developed and used in different bibliometric studies. Research productivity was adjusted to the national population and nominal gross domestic product (GDP) per capita. Study resulted that the quantity of publications has increased by around three-fold from 2003 to 2012. Documents (n = 1,240) were retrieved from 73 international peer-reviewed toxicology journals. The h-index of the retrieved documents was 39. Of the 73 journal titles, 52 (69.9%) have their IF listed in the ISI Journal Citation Reports 2012; 198 documents (16.0%) were published in journals that had no official IF. After adjusting for economy and population power, Egypt (193.6), Palestine (18.1), Kingdom of Saudi Arabia (KSA) (13.0), and Jordan (11.5) had the highest research productivity. Countries with large economies, such as the Kuwait, United Arab Emirates (UAE), and Oman, tended to rank relatively low after adjustment of GDP. The total number of citations at the time of data analysis was 10,991, with a median (inter-quartile range) of 4 (1–11). MEA collaborated more with countries in the MEA regions (16.7%), especially KSA, Egypt, and UAE, followed by Europe (14.4%), especially with the United Kingdom and Germany. This paper’s main goal is to direct attention and to open the doors for a scientific discussion among toxicology professionals and academics. The present data show a promising rise and a good start for toxicology research activity in toxicology journals in the Arab world. Research output is low in some countries, which can be improved by investing in more international and national collaborative research projects in the field of toxicology. This study was limited to 1,240 documents extracted from Scopus, bearing MEA countries affiliation addresses and, therefore, cannot be generalised to the toxicological literature covered by other databases such as Google Scholar. However, the study does give a clear picture about the characteristics of the documents from MEA countries published in foreign indices, especially those indexed by Scopus. Although the number of citations for each publication might differ from one search engine to another, the Scopus search engine remains one of the best available tools for



analysing and tracking citations, and comparing citations among different research groups and different institutions. A study that compared PubMed, Scopus, Web of Knowledge, and Google Scholar has found that PubMed remains an important resource for clinicians and researchers, while Scopus covers a wider journal range and offers the capability for citation analysis.

[Jia, et.al., 2014] given China's Growing Contribution to Global Intracranial Aneurysm Research (1991–2012): A Bibliometric Study. Global and China intracranial aneurysm-related publications were retrieved from the Web of Science database from 1991 to 2012. Excel 2007, Matlab, and Thomson Data Analyzer (TDA) software were used to analyze the search results for number of publications, cited frequency, h-index, and organization contributions. Analysis of the study resulted that 16468 global papers were identified that were cited 273500 times until 2013-08-15. The United States accounted for 31.497% of the articles, 58.64% of the citations, and the highest h-index (127). Japan and Germany followed in frequency. China's articles ranked eighth (third in 2012) in total number, with most of the contributions occurring since 2002 (91.33%). China was at the early stage of the logic growth curve (exponential growth), with the citation frequency and h-index per year increasing. The quality of the publications was low. The main research centers were located in Beijing, Shanghai, Taiwan, and Hong Kong. The main Asian funding body was the National Natural Science Foundation of China. The number of publications and frequency of citations of papers from mainland China was greater than that of Taiwan or Hong Kong.

[Ahmed, et.al., 2014] have done a scientometric study of Cataract research in India from the publications output between 2002-2011. Study analysed the 1293 Indian publications in cataract research during the period, with a focus on contribution and citation impact of 15 most productive countries, India's overall contribution, its growth, citation impact, the share of international collaborative papers, identification of significant countries in India's international collaboration, different types of cataract research, analyses of research by subfields and different population age groups, productivity, and impact of leading Indian institutions and authors and pattern of communication of Indian output in most productive journals. The Scopus Citation Database has been used to retrieve the data for 10 years (2002-2011). Analysis of the data reported that Indian publications increased from 87 papers in 2002 to 195 papers in 2011, witnessing an annual average growth rate of 10.03%, registering an average citation impact per paper of 3.26 and international collaborative share of 21.58% during 2002-2011. Suggest that the government should encourage the decision makers and ophthalmologists and allied persons involved in ophthalmic services to make serious efforts in reducing the burden of cataract disease by increasing the R&D, strengthening of national and international collaboration and improve the existing training programs for ophthalmologic professionals.

[Maharana & Das, 2014] carried out a bibliometric analysis on growth and development of LIS research in India during 1999-2013. The objectives of the study were to examine the growth and development of LIS research in India from 1999 to 2013; calculate the *h-index* for LIS research in Asian countries; determine the degree of collaboration and authorship patterns among Indian LIS researchers; find out the most favored research journals in the Indian LIS research community; identify the most prolific Indian contributors; and reveal the geographical distribution of Indian LIS publications. For the purpose of the present study, data have been collected from *Social Science Citation Index (SSCI)*. For retrieval of information, the advance search options of the *Web of Science* were used. "TS=library science\*" was used as topic/subject, "CU=India" as authors address/affiliation, and "1999-

2013” as the time span of the study. Further, it was refined to English language only. As a result, 140 documents that matched with the query were retrieved. These documents were entered into MS Excel in a logical and statistical order for further analysis. Authors have done the analysis and found that the annual publications of Indian researchers range from 9 to 10 papers with 0.64 degree of collaboration. The most papers were published within the range between 6 to 10 pages and the majority of the publications were articles (125, 89.29%). Lotka’s law of scientific productivity was used to determine authors’ productivity during the period under study. Indian researchers have collaborated with researchers from 19 foreign countries, including England and USA. The most productive Indian researcher is M. P. Satija. It was observed that the author’s contribution pattern during the period is not ideal as the “observed” authors and their respective productivity frequency differ from “expected” frequency of authors and their productivity.

[Manisha & Mahesh, 2014] conducted a study entitled ‘Bibliometric characteristics of champion works of China and India’. The objective of the study was to identify and compare the characteristics of hugely cited papers of India and China. Papers that have received 1,000 or more citations, referred to as champion works here, pertaining to China and India have been studied. The Science Citation Index-Expanded database on the Web of Knowledge platform was searched with two separate search queries, one with India in the address field and another with Peoples Republic of China in the same field. The search covered the period 1945 to the present. The results obtained in each case were sorted on the basis of the citations and records with 1,000 or more citations were downloaded as an Excel file and analyzed. On the basis of analysis authors found that the SCI-Expanded database covered 8,25,168 papers from India and 14,51,410 China for the period 1945 to January, 2013. Out of these, it was found that 38 papers with at least one author from India and 51 papers with at least one author from China have received 1,000+ citations. China had its first champion work 4 years after India had its in 1983. While India was ahead of China in the initial years, China increased its tally of champion works during 2001–2010 and has raced ahead of India during that decade. All the champion works of both the countries have been published in foreign journals except for the one Indian paper that has been published in an Indian journal. Most champion works of India have been in physics whereas it has been in biological/biomedical sciences for China. USA, Japan, Germany, England and France were some of the leading countries that India and China have collaborated with for their champion works. Leading institutions of both countries have also been listed.

[Mamtora, et. al., 2014] conducted a study entitled ‘Environmental sciences research in northern Australia, 2000–2011: a bibliometric analysis within the context of a national research assessment exercise’. This paper reports on a bibliometric analysis of environmental sciences research in northern Australia between 2000 and 2011. It draws on publications data for Charles Darwin University (CDU) and James Cook University (JCU) researchers to present a bibliometric profile of the journals in which they publish, the citations to their research outputs, and the key research topics discussed in the publications. To undertake the bibliometric analysis, bibliographic, abstract and citation data were required for all environmental sciences articles published by researchers affiliated with CDU and JCU. A 12 year period (2000–2011) was used for the analysis. Data were drawn from both Scopus and WoS to compare the databases’ results. The Science Citation Index Expanded, Social Sciences Citation Index, and Arts & Humanities Citation Index comprised the WoS search. Articles were identified using variants of the university names as search terms and retrieved records were limited to articles and reviews, as defined by the respective databases. The searches were constructed to favour recall of records relating to environmental sciences. In



order to identify the primary research areas discussed in the content of researchers' articles, abstract and title data from the retrieved WoS records were mapped using VOSviewer. Framing this analysis, the study explored the relationship between the two universities' publications and their 'fit' with the environmental sciences field as defined by the Australian research assessment model, Excellence in Research for Australia (ERA). The Scopus database retrieved more records than Web of Science, although only minor differences were seen in the journals in which researchers published most frequently and the most highly cited articles. Strong growth in publications is evident in the 12 year period, but the journals in which the researchers publish most frequently differ from the journals in which the most highly cited articles are published. Many of the articles by CDU and JCU affiliated researchers are published in journals outside of the environmental sciences category as defined by Scopus and Web of Science categories and the ERA, however, the research conducted at each university aligns closely with that institution's research priorities.

[Tatry, et. al., 2014] conducted a bibliometric study on EU27 and USA leadership in fruit and vegetable research from 2000 to 2009. This study explores F&V research outputs by using the related literature in the Thomson Reuters Web of Science Database from 2000 to 2009. The EU27 and the USA are the two leading actors in terms of number of fruit and vegetable articles published. This paper compares their publication outputs using bibliometric methods. Authors assessed the fruit and vegetable species, topics, countries and institutions involved. The top species, topics and institutions are ranked according to their number of publications. Collaboration networks between countries were mapped to visualize the intensity of the relationships involved in international fruit and vegetable research and to obtain an overall picture of the fruit and vegetable research landscape. Bibliographical data were collected from four citation databases managed by the WoS, Science Citation Index Expanded<sup>TM</sup> (SCIE), Social Science Citation Index<sub>–</sub> (SSCI), and Conference Proceedings Citation Indexes<sup>SM</sup> for Science (CPCI–S) and for Social Science & Humanities (CPCI–SSH). This study focuses on document types, articles, reviews, meeting abstracts and proceedings papers. References were downloaded and analyzed with Sphinx Survey software using the Lexica option, which allows statistical and text analysis. To display data on geographical maps, authors used C&D 6 software. Collaboration networks were drawn using Gephi with layout algorithm Force Atlas 2. Authors identified some significant points in F&V research where the EU27 predominate in terms of F&V papers, followed by the USA. Authors concluded that the progressive consolidation of the 27 European countries in the EU during the first decade of the 21<sup>st</sup> century has had an effect on the development of intra-EU partnerships, including both EU member countries and joint international programs. Existing scientific forces also are an important element in decision support tools in terms of a potential mobilization of organizations sufficiently large to induce shifts in research topics, resources used, and participation in major international programs. These results can be useful for policy makers.

### **2.2.5 Subject area based multiple journals studies:**

[Long, et.al., 2014] discussed a bibliometric analysis on research productivity and performance of journals in the Creativity Sciences to analyze the creativity studies published between 1965 and 2012. A dataset was constructed using all publications and citations retrieved from four key journals that publish creativity research: Journal of Creative Behavior (JCB), Gifted Child Quarterly (GCQ), Creativity Research Journal (CRJ), and Psychology of Aesthetics, Creativity, and the Arts (PACA). This study collected three sets of data: publication, citation, and impact factor. Publication and citation data were obtained from the online version of the ISI Web of Science: SSCI. Impact factors of the four journals were

generated from journal citation reports. All types of publications available in the databases were collected, including book reviews, articles, editorials, and commentaries. But in the Web of Science, data in CRJ were only available from 1994, so the data from 1988 to 1994 were missing. Data in PACA were available from 2009, so the data from 2006 to 2009 were missing. All the missing data were counted manually and added to the final analysis. After initial retrieval from the databases, all the data were imported into a spreadsheet file and then the data were analysed. Major findings in this study include: (a) During the study period, the four journals have published 1,891 articles on creativity and they have been cited 11,709 times; (b) the impact factors of the four journals increased from lower than .50 in 2002 to over 1.0 in 2012; in 2012 PACA had the highest impact factor, followed by CRJ; (c) JCB published the most creativity papers and CRJ had the most citations; (d) about a third of the articles published in the four journals have never been cited.

[Cartes-Vela'squez & Delgado, 2014] have done a Bibliometric analysis of articles published in ISI dental journals during the period 2007–2011. The aim of this study was to describe the scientific production of original and review articles published in ISI dental journals in the said period, considering qualitative and quantitative measures across countries. In this study documents indexed in Science Citation Index Expanded of Web of Science were reviewed between January 2007 and December 2011. All “Article” and “Review” document types in the “Dentistry, Oral Medicine and Surgery” category were included for the study. Journal data was extracted from journal citation report for each year between 2007 and 2011. Population and income data by country for each year was obtained from World Bank Data Group. Quantitative and qualitative analysis included the main bibliometric indicators for all countries with at least 100 documents over the timespan analyzed. A multiple account approach was used: for every document the authorship considered all countries, institutions, and persons in the address field. Analyze results and Citation report tools available at web of knowledge were used to determine the different indicators for each country i.e. Documents per country, Interannual variation, Dental research per country, Cites per document, Immediate cites, Documents on first quartile, Documents per population, Documents per income, International cooperation, H-index, and other indicators included institution ranking and publication languages. Data were tabulated on an Excel spreadsheet. A total of 37,571 documents were found for the entire period, growing 24.3 % annually from 2007 to 2011. The publication language was mostly English (98.6 %), and 54.5 % of productivity was concentrated in five countries. A total of 44 countries had at least 100 documents and were included in the analysis, representing 36,532 (97.23 %) documents. It was concluded that increasing productivity in some countries, such as Brazil, China, India, and Turkey, was observed. High levels and stability in terms of impact was determined in the Nordic countries. The USA continues to lead in terms of overall productivity.

### ***2.2.6 Institution based publications studies***

[Nagarkar, 2014] carried out a bibliometric analysis of publications of the chemistry department, university of Pune for the period 1999-2012 to analyse the research contributions of the faculty members of the Department of the University. The bibliometric parameters including number of papers, number of citations received, institutional collaborations, productivity of journals, subject categories and authorship pattern have been used to carry out the analysis of the research contributions made by the faculty members of the department of chemistry at University of Pune. The data set was collected from the Web of Science database for the period of about 14 years (1999-2012). The database was searched with necessary refinement and the Chemistry Department Knowledgebase (CDK) was created. Histcite software was used to analyse the collected data. The network figure of international

collaborations is drawn with the help of DOS based IntColl program by Loet Leydesdorff and Pajek – Program for Large Network Analysis tool. The data reveals that thirty faculty members have published 811 papers in 258 journals with 8948 citations. Most of the papers are published in peer-reviewed international journals having high impact factor. These are core journals in the field of chemistry being published in the countries like USA, UK and Germany, etc. The study reveals that there is a continuous growth in publications. About 30% of the papers were published during 2010-2012. The average number of citations received per paper is 11.03. The highest number of citations (905) was received for 41 papers published in the Journal of Physical Chemistry A. This study indicates that majority of the papers published are in the area of physical chemistry. Authorship pattern indicates that highest number of citations received for papers written by four authors in collaboration.

### **3.2.7 PhD Thesis publications studies:**

[Mishra, et. al., 2014] conducted a bibliometric study of Ph.D. Thesis in English. This was an attempt to know the citation pattern of research scholars of English by using bibliometrics techniques. The study has undertaken to identify the type of document used by the researchers in Ph.D. thesis, length of articles, illustration used in citations, authorship pattern, bibliographical form of references, number of chapters in totals thesis and ranking of journals & Periodicals cites. The literature cited in the Ph.D. thesis of English is the basic source of information to assess the information used by the researchers. Accordingly the references cited in the Ph.D. thesis have been taken as the source data. The Ph. D. thesis submitted Vikram University during the Thirty Three years (1975-2007) in English has been studied. There are 55 Ph. D. thesis submitted during these 33 years. Thesis wise various work sheet diagrams have been designed and generated for the purpose of data collection. Initially the data collected in excel sheet in different fields. Data collect on the basis of different factor and analysis of the different aspect such as length of articles, No of tables, graphs, Diagram in the articles, authorship pattern etc. Its presentation of data by different table graph i.e. ranking of author, ranking of journal. The references quoted at the end of thesis have been entered in excel and the data has been analyzed on the different aspects as decided. The data explains thirty three year (1975-2007) total 55 thesis has published during the period 1975-2007 the length thesis is of 1979 having 513 pages whereas lowest papers are covered in the thesis of 2003 i.e.142 pages. During the period 1975-2007 the highest number of thesis is submitted in the year 1991, 1996 and 2002 (i.e.5 Ph.D. Thesis) and lowest is so many year (i.e.1 Ph.D. Thesis). Total number of male and female research scholars of total 55 Ph.D. thesis distribution shows that less number of Ph.D. thesis are submitted by female research scholar i.e.25 in comparison to 30 male research scholar. The data shows table two related with total number of chapters in Ph.D. thesis of English. Thesis has highest number at chapters' i.e.9, where as 4 thesis lowest number of chapter. The study reveals that books are the most preferred of documents by research scholars in English 80.47% citation are taken from books by research scholar. The data show that out of 19 citations. Photos amount to 8 citation having (42.10%). Table account is 7 citation forming (36.84%) in the second rank. Graph the third rank with 4(21.5%) citations. As we can say that English scholars prefer photos For studying the authorship pattern the citations are arranged in number of author as Single author, double author and more than three author. Highest used single 3638 citation (83.70%) and lowest more than three authorship patterns used 103citation (2.37%). Single author is cited mostly. During the study “Tri Quarterly” the first rank with 36 citation (12.72%). During the study it has been found that authors are not using complete reference. It was also found that some of the citations are not correct or not followed the any standards to cite the reference.

[Tunga & Dasgupta] conducted a study entitled 'Horticulture Literature Cited in Doctoral Dissertations: An Obsolescence Study, 1991-2010'. The study focuses on the citations in the horticulture doctoral dissertations awarded from Bidhan Chandra Krishi Viswavidyalay (BCKV), West Bengal and Uttar Banga Krishi Viswavidyalay (UBKV), West Bengal during the period 1991- 2010. The study aims to examine the obsolescence literature in horticulture by citation analysis and find out the chronological distribution of journal citations, currency of journal citations and its obsolescence, half-life period of journal citations, chronological distribution of books, currency of books and its obsolescence and half-life period of books. There were 80 dissertations (75 from BCKV and 5 from UBKV) awarded during the period of study and 10,845 citations were appended. Title pages and reference sections were photocopied from each of the 80 dissertations. Information extracted from each dissertation for determining the bibliographic forms of literature, chronological distribution and currency of cited journals, cited articles and cited books. Data about bibliographic entries listed in the dissertations were collected on a worksheet designed for this purpose. Citation analysis was done by studying the numerical distribution of citations across the bibliometric variables taken up for this study. It is observed that the journals (77.796%) and books (12.236%) are the most preferred bibliographic form of citations used by the horticultural researchers. The most of the researchers prefer 25.198 percent journal citations for the period of 1990-1999 and the highest 25.998 percent books for the period of 1980-1989. Of the citations, journals occupy the first position with 8437 (77.796%) citations. Books are in the second position with 1327 (12.236%) citations and the remaining 9.968 percent citations comprise the rest. The mean year is calculated as 28.703 years for journal citations and 31.056 years for books. The half-life is found to be 24 years for journal citations and 27 years for books.

[Kavitha & Sivaraj] conducted a bibliometric study of Ph.D Theses in Commerce to know about the quantitative growth of Ph.D theses in commerce, to find out the various form of information sources used by research scholars in the subject Commerce, major subject areas of research over a period of 23 years, year wise distribution, authorship pattern, ranking of journals & periodicals, subject wise distribution and trace out the average number of chapters in the total theses. For this study 106 commerce PhD these of Periyar University had been selected since the year ranging from 1989- 2012 as a sample. Data is collected from primary and secondary sources. The selected samples had been physically analyzed for data collection. The data were presented in the tabulated graphical form. On the basis of the analysis it was found that highest numbers of theses submitted in the year 2009 were 21. It is observed that male research scholars are more than female scholars. It is found from the above given table that single authors accounting 1234 numbers contribute highest number of journals and the percentage is 63.25. The first rank is occupied by Yogakshema which has been used as a reference of 147(8.48%) times. The maximum number of Ph D theses are submitted on "marketing" cited as 26 (24.53). The present paper has tracked the development of commerce research doctoral level of 23 years.

## **2.3 Issue wise common findings of Literature review**

### **2.3.1 Single Journal studies:**

- The researchers analyzed the Journal of Indian Library Association , Indian Journal of Marketing, Indian Journal of Agricultural Research, Malaysian Journal of Computer Science, Annals of Library and Information Studies , Library Herald, Pakistan Journal of Library and Information Science, Indian Journal of Nutrition and Dietetics, Journal of Social Sciences , Malaysian Journal of Library and Information Science, International journal of Mental Health Systems, Journal of Intellectual Property Rights, SRELS Journal of Information Management, Journal of Information Literacy,

IEEE Transactions on Control Systems Technology, Journal of Astrophysics and Astronomy, Journal of Information Science and D-Lib Magazine.

- Researchers analysed the different parameters i.e. number of articles published, number of references made, authorship patterns, bibliographic form published & cited documents, Subject-wise distribution, Language-wise distribution, country and rank wise distribution, geographical distribution, forms of documents cited, Degree of Collaboration, publication productivity, author productivity, pattern of citations and core journals and Journal self-citation, etc.
- Researchers collected the data from Journal's website or Web of Science database.
- Researchers prepared the database using different input data parameters like author, title, keywords, country, institution, language, bibliographic form, year of publication, references made, etc.
- Lotka's law for author productivity, Bradford law for scattering of publications in different subject areas, Subarmanyam's formula for degree of collaboration have been used by the researchers.
- MS-Excel, SPSS, MS-Access, Endnote used for preparing the database and analysis.
- Researchers concluded the continuous growth in the research.
- Joint authorship research being done in most cases followed by single authorship.
- English language publications dominate in the research.
- Journals are preferred most in publications cited which followed by book source.
- Country-wise distribution shows that USA produced the highest research and research by USA cited the most.
- Academic institutions or universities contributed the most the publications.

### **2.3.1 Subject area based publications studies:**

- The researchers analyzed the literature on digital libraries, Bibliometrics, Nanotechnology research, Library and Information Science Education, Climate engineering research, Veterinary Sciences, Nano-biotechnology research, Global laparoscopy research, and Alzheimer's disease research.
- Researchers analysed the parameters like- growth of literature, authorship pattern, authors' productivity, language-wise of articles, year-wise distribution of articles, country-wise distribution of journals, core journals in the subject area, Indexing term frequency, most productive journals; authors; countries; institutions; Language, Level of Collaboration, degree of collaboration, and global publications share and citation impact.
- Researchers extracted the data from the databases- Web of Science, Scopus, LISA & LISA plus, and CAB Abstracts.
- MS-Excel, MS-Access, and Endnote used for preparing the database and analysis by the researchers.
- Lotka's law for productivity of author, Bradford's law for scattering of articles and Subarmanyam's formula for degree of collaboration have been used by the researchers.
- Researchers concluded that in some of cases there is no definite pattern of literature growth, some resulted the decrease in growth of publications and in some of the cases there is continuous growth in the research.
- Most of the articles were single-authored but in some of the cases multi authorship is prominent.
- Author productivity was not in agreement with Lotka's Law, and somewhere the Lotka's Law was not applicable and somewhere it partially followed the law.

- Mostly distribution of periodicals was close to the Bradford's Law but distribution of papers does not follow the law.
- Degree of collaboration ranges between 0.84 - 0.99.
- Maximum articles published were in English language.
- Country-wise distribution shows that USA produced the highest research and research by USA cited the most.
- Developing countries such as India, China, South Korea and Canada showed increasing trends in their publications.
- Journals are preferred most in publications cited which followed by book source.
- Academic institutions or universities contributed the most the publications.

### ***2.3.3 Citation or Index databases studies:***

- Researchers studied Directory of open access journals (DOAJ), Scopus and Web of Science Database.
- Library & Information Science, Life cycle assessment (LCA) and Mems literature have been studied by the researchers.
- Database created on the basis of subject headings, languages, country to study the growth of publications, citation trend, prominent authors, collaboration, and sources of publications.
- Researchers studied Authorship pattern by Lotka's Law and Degree of collaboration by Subarmanyam formula.
- The collected data has been classified by using Excel and the same was loaded in to SPSS (Statistical Package for Social Sciences).
- English was the most common communication language for the scientific communities.
- USA contribution is the top comparing with other countries.
- The three fourth of publications are from Journals.
- In the study of Library & Information Science journals, Annals of Library and Information Studies have received the highest number of citations. Dr. S R Ranganathan's papers have received the highest number of citations followed by Neelameghan.

### ***2.3.4 Country based publications studies:***

- Researchers Analyzed the publications of different countries in different subjects i.e. Nanotechnology in India (2001-2011), Nursing Research in Taiwan (1991-2004), Stem Cell Publications in Iran (1996-2012), Toxicology research in Middle Eastern Arab countries (2003-2012), China's Contribution to Global Intracranial Aneurysm Research (1991-2012), Cataract research in India (2002-2011), LIS research in India (1999-2013), Champion works of China and India (1945 -2013), Environmental sciences research in Northern Australia (2000-2011), EU27 and USA leadership in fruit and vegetable research (2000-2009).
- Authorship pattern and productivity, year-wise, geographical & language distribution, Citation of articles and ranking of journals, impact factors of publishing journals, h-index, g-index and gh-index, Degree of collaboration, International or domestic collaboration, India's overall contribution, India's international collaboration, Publication types, Organization contributions, Highly cited papers, Highly productive journals, key research areas have been studied by the researchers.
- Researchers extracted the data from the databases- Web of Science, Scopus, and Social Science Citation Index.

- Researchers analysed the Lotka's law for productivity of author, Bradford's law for scattering of articles and Subarmanyam's formula for degree of collaboration.
- Bibliometric tools - HistCite, Bibexcel, VOSviewer, etc. used by the researchers.
- Researchers used Ms-Excel, SPSS, EndNote, and Thomson Data Analyser for database generation and analysis.
- Mostly publications were from multiple authors.
- Degree of collaboration was 0.11, and 0.64.
- English was the dominating language in the publications.
- Publication rate is slowly increasing.
- Majority publications were journal articles.
- IIT's output was 51 records, with the total citation-562, h-index-11, g-index-24, and gh-index-16.
- Most of the articles written through domestic collaboration in comparison of articles written through international collaboration.
- Highest collaborative papers come from United States.
- Congenital cataract research with 21.81%; highest citation impact (6.33) achieved by cataract associated with central nervous system.
- Highest publications from medicine subject (1104 papers -85.38%); maximum focus was on adults. All India Institute of Medical Sciences contributed most, followed by Dr Rajendra Prasad Center for Ophthalmological Sciences (162 papers); Nine Indian organizations have registered higher citation impact per paper; Four authors have published higher number of papers, Six authors have registered higher citation impact per paper.
- India has six single-author papers while China does not have any single authored paper China published in Nature followed by Science In comparison highest papers from India published in Physical Review D; India's hugely cited papers are in physics whereas China is in biological/ biomedical sciences.
- CDU's research focuses on environment and livelihoods; JCU focused on tropical systems, including coral reef research Scopus produced higher than WoS for both universities -CDU & JCU.
- EU27 research is specialized in pea; USA in sweet corn. USA specialized index in Entomology; EU27 countries in CSIC (Chemistry, Applied & Food Science and Technology).

### **2.3.5 Subject area based multiple journals studies:**

- Analyzed the studies published and citations retrieved in the Creativity Sciences journals (1965-2012) and ISI dental journals (2007–2011).
- Collected three sets of data: publication, citation, and impact factor.
- Publication and citation data were obtained from Web of Science database. Journal data was extracted from journal citation report.
- Different indicators for each country i.e. Documents per country, Interannual variation, Dental research per country, Cites per document, Documents on first quartile, Documents per population, Documents per income, International cooperation, H-index, and other indicators included institution ranking and publication languages.
- Excel spreadsheet have been used for tabulation of data.
- Creativity journals have published total 1,891 articles and they have been cited 11,709 times. A total of 37,571 documents were found in ISI Dental journals.
- The publication language was mostly English.

- USA continues to lead in terms of overall productivity.
- JCB published the most creativity papers and CRJ had the most citations.

#### **2.3.6 Institution based publications studies:**

- Analysed the research contributions of the faculty members.
- The bibliometric parameters including number of papers, number of citations received, institutional collaborations, productivity of journals, subject categories and authorship pattern have been used to carry out the analysis.
- The data set was collected from the Web of Science database.
- Histcite software was used to analyse the data. The network figure of international collaborations is drawn with the help of DOS based IntColl program by Loet Leydesdorff and Pajek – Program for Large Network Analysis tool.
- Most of the papers were published in peer-reviewed international journals having high impact factor.
- There is a continuous growth in publications.
- The average number of citations received per paper is 11.03.
- The highest number of citations (905) was received for 41 papers published in the Journal of Physical Chemistry A.
- Majority of the papers published are in the area of physical chemistry.
- Highest number of citations was received for papers written by four authors in collaboration.

#### **2.3.7 PhD Thesis publications studies:**

- Analyzed PhD thesis in English (55 thesis, 1975-2007), Commerce (80 thesis, 1991-2010) and Horticulture (106 theses, 1989-2012).
- Citation pattern have studied by all the researchers and obsolescence rate studied in one paper given by Tunga & Desgupta.
- Type of document cited, length of articles, illustration used in citations, authorship pattern, number of chapters in totals thesis and ranking of journals & Periodicals cited have been studied by the researchers. Tunga & Dasgupta studied the chronological distribution of journal citations, currency of journal citations and its obsolescence, half-life period of journal citations, chronological distribution of books, currency of books and its obsolescence and half-life period of books.
- Researchers used MS-Excel for collection of data.
- Researchers observed that male research scholars are more than female scholars.
- Books are the most preferred document by research scholars in English thesis. Journals (77.796%) and books (12.236%) are the most preferred bibliographic form of citations used by the horticultural researchers.
- Single author is cited mostly.
- The maximum numbers of Ph D theses are submitted on “marketing” in Commerce thesis.

### **3. CONCLUSION**

The review process was adopted by surveying the research in last 9 years (2006-2014) for extraction of information about 7 sub issues. Review process was adopted in the area of bibliometric and citation studies for various issues like Single Journal studies, Subject area based publications studies, Citation or Index databases studies, Country based publications



studies, Subject area based multiple journals studies, Institution based publications studies, and PhD thesis publications studies.

The reviewed papers covered the analysis of various subject areas like Nanotechnology, Library & information Sciences, Nursing, Climate engineering, Veterinary Sciences, Laparoscopy, Alzheimer's disease, etc. 21 papers are related to the bibliometric analysis of articles published in a single journal. 9 of the papers were related to bibliometric or citation analysis of the publications in a particular subject area, 10 papers' review covered the country based study of publications and 4 papers studied the bibliometric analysis of citation or indexing databases. Remaining some of the studies was related to the institution based publications studies, PhD thesis publications studies & subject area based multiple journal studies. The outcomes of the review process shows that the bibliometric and citation analysis can be done by identifying the different parameters and collecting the data related to the same parameters from different sources according to the objective of study. Thereafter, the collected data may be analysed using different tools and techniques with applying the different bibliometric laws and formulas. Most of the researcher used Subarmanyam formula for testing the degree of collaboration of authors. Most of the researchers used MS-Excel software to record the data. Very few researchers used SPSS and other bibliometric analysis tools i.e. Histcite, Bibexcel, CiteSpace, Pajek etc. Review of the studies shows that in the papers reviewed, researchers studied the authorship patterns; authors' productivity using Lotka's Law; language-wise and year-wise distribution of articles; country-wise distribution of journals; subject-wise distribution of articles; bibliographic form the published documents or the cited documents; core journals in the subject area; Highly productive journals & authors; collaboration between the countries; indexing term frequency; Bradford distribution of articles, and other parameters of bibliometric study.

From review it was found that these studies indicate towards the merits and weaknesses of the journal which will be helpful for its further development. The current research will raise new science and policy questions, which lead to new strategic linkages. It is useful to identify the contribution of the authors in the particular journal and it provides a comprehensive overview of authorship in the particular subject community. Researchers may use this methods of evaluation to determine the influence of a single writer or to describe the relationship between two or more writers or works. This would be helpful for the journal editor to obtain the bibliometric portrait of the studied journal (JIS) and recognize its interaction with other subject disciplines. Obsolescence studies play a vital role for librarians, researchers, and managers as a decision support tools for the retention of the most frequently-used literature, and is also useful for weeding out unused or less-used literature. The studies of the obsolescence of literature help the practicing library professionals in deciding which document is to be kept and which is to be discarded, in order to maintain the need-based collection in the different libraries.

Very few Researchers have done the citation analysis as a part of bibliometric analysis. Most of researchers worked on content analysis but not on the further interrelationship of the parameters. Very few researchers analyzed the each and every parameter of the bibliometric or citation analysis. No particular research was found regarding effect of any bibliometric study over the academic or research community. Researchers did not identify the full coverage of the database or research publications taken for the study. No particular work was found emphasizing the interdisciplinary approach of two or more related subject areas.

Objectives can be taken to analyze a subject literature in total with maximum coverage of publications. Study can be done to analyze the effects of bibliometric and citation studies

over that particular subject community. Interdisciplinary approach can be studied for future scope of the research with other subject areas in that area. Each & every parameter may be studied related to the bibliometric and citation analysis of any subject to understand the trend of literature or publications. Bibliometric and citation analysis both may be studied together. Research can be extended to find out the inter-relationship between the each other and also impact of each other.

## **REFERENCES**

- [1] Gian Singh, Rekha Mittal, Moin Ahmad, "A bibliometric study of literature on digital libraries," *The Electronic Library*, vol. 25 (3), pp. 342–348, 2007.
- [2] Mohan L. Jamdade, Pramila M. Jamdade, "A Bibliometric Study of Directory of Open Access Journals: Special Reference to Library & Information Science," *Asian Journal of Multidisciplinary Studies*, vol. 1 (1), pp. 48-62, 2013.
- [3] Praveen Kumar, "A Bibliometric Analysis of Journal of Indian Library Association," *Information Studies*, vol. 19 (3), pp. 171-180, 2013.
- [4] N. Zafrunnisha, V. Pulla Reddy, "Indian Journal of Marketing: A Bibliometric Study," *PEARL - A Journal of Library and Information Science*, vol. 3 (4), pp. 18-23, 2009.
- [5] A. Thirumagal, "Bibliometric Study of Nanotechnology in India: An Analysis," *SRELS Journal of Information Management*, vol. 49 (5), pp. 577-587, 2012.
- [6] S. Thanuskodi, "Bibliometric analysis of Indian Journal of Agricultural Research," *International Journal of Information Dissemination and Technology*, vol. 2 (3), pp. 170-175, 2012.
- [7] A.N. Zainab, K.W.U. Anyi, N.B. Anuar, "A Single Journal Study: Malaysian Journal of Computer Science," *Malaysian Journal of Computer Science*, vol. 22 (1), pp. 1-18, 2009.
- [8] Swapan Kumar Patra, Partha Bhattacharya, Neera Verma, "Bibliometric Study of Literature on Bibliometrics," *DESIDOC Bulletin of Information Technology*, Vol. 26 (1), pp. 27-32, 2006.
- [9] Ramesh Pandita, "Annals of Library and Information Studies (ALIS) Journal: A Bibliometric Study (2002-2012)," *DESIDOC Journal of Library & Information Technology*, Vol. 33 (6), pp. 493-497, 2013.
- [10] Mohammad Nazim, Moin Ahmad, "A Bibliometric Analysis on Nanotechnology Research," *Annals of Library and Information Studies*, vol. 55, pp. 292-299, 2008.
- [11] Rekha Mittal, Arti Sharma, Gian Singh, "Periodical Literature on Library and Information Science Education: A Bibliometric Study," *Annals of Library and Information Studies*, vol. 53, pp. 224-229, 2006.

- [12] S. Thanuskodi, "Library Herald Journal: A Bibliometric Study," *Research World: Journal of Arts, Science and Commerce*, vol. 2 (4), pp. 68-76, 2011.
- [13] Nosheen Fatima Warraich, Sajjad Ahmad, "Pakistan Journal of Library and Information Science: A bibliometric analysis," *Pakistan Journal of Library & Information Science*, vol. 12, pp. 1-7, 2011.
- [14] T. Kavitha, "Indian Journal of Nutrition and Dietetics: Bibliometrics Study," *Journal of Advances in Library and Information Science*, Vol. 2 (1), pp. 12-14, 2013.
- [15] Ya-Li Huang, Yuh-Shan Ho, Kun-Yang Chuang, "Bibliometric Analysis of Nursing Research in Taiwan 1991-2004," *Journal of Nursing Research Vol. 14 (1)*, pp. 75-80, 2006.
- [16] S. Thanuskodi, "Journal of Social Sciences: A Bibliometric Study," *Journal of Social Sciences*, vol. 24 (2), pp. 77-80, 2010.
- [17] A. Bakri, P. Willett, "The Malaysian Journal Of Library And Information Science 2001-2006: A Bibliometric Study," *Malaysian Journal of Library & Information Science*, vol. 13 (1), pp. 103-116, 2008.
- [18] Christopher W. Belter, Dian J. Seidel, "A Bibliometric Analysis of Climate Engineering Research," *WIREs Climate Change*, Vol. 4, pp. 417-427, 2013.
- [19] C. Velmurugan, "Bibliometric Analysis with Special Reference to Authorship Pattern and Collaborative Research Output of Annals of Library and Information Studies for the Year 2007-2012," *International Journal of Digital Library Services*, vol. 3 (3), pp. 13-21, 2013.
- [20] Chanda Arya, Superma Sharma, "Authorship trends and collaborative research in veterinary sciences: A bibliometric study," *Chinese Librarianship: an International Electronic Journal*, vol. 34, pp. 38-47, 2011.
- [21] Maryam Ahmadi, Shafi' Habibi, Shahram Sedghi, Fateme Hosseini, "Bibliometric Analysis of Stem Cell Publications in Iran," *Acta Inform Med*, vol. 22 (4), pp. 245-248, 2014.
- [22] Bathrinarayanan, M. Tamizhchelvan, "Indian Research Output on Mems Literature using Scopus Database : A Scientometric Study," *Journal of Theoretical and Applied Information Technology*, vol. 67 (1), pp. 90-102, 2014.
- [23] Sa'ed H. Zyoud, Samah W. Al-Jabi, Waleed M. Sweileh, Rahmat Awang, "A Bibliometric Analysis of Toxicology Research Productivity in Middle Eastern Arab Countries during a 10-year period (2003-2012)," *Health Research Policy and Systems*, vol. 12 (4), pp. 1-13, 2014.
- [24] R. Karpagam, "Global research output of nanobiotechnology research: a scientometrics study," *Current Science*, vol. 106 (11), pp. 1490-1499, 2014.

- [25] Harry Minas, Alexandra Wright, Mengxue Zhao, Ritsuko Kakuma, "International Journal of Mental Health Systems: A Bibliometric Study," *International Journal of Mental Health Systems*, vol. 8 (1), pp. 1-10, 2014.
- [26] K.C. Garg, A.K. Anjana, "Journal of Intellectual Property Rights: A Bibliometric Study," *DESIDOC Journal of Library & Information Technology*, vol. 34 (1), pp. 66-73, 2014.
- [27] Haiying Long, Jonathan A. Plucker, Qi Yu, Ying Ding, James C. Kaufman, "Research Productivity and Performance of Journals in the Creativity Sciences: A Bibliometric Analysis", *Creativity Research Journal*, vol. 26 (3), pp. 353-360, 2014.
- [28] Madhuri Gautam, Maya Verma, "Bibliometric Analysis of Srels Journal of Information Management (2000-2013)," *IOSR Journal Of Humanities And Social Science*, vol. 19 (7), pp. 96-102, 2014.
- [29] Jia Z-j, Hong B., Chen D-m, Huang Q-h, Yang Z-g, et al., "China's Growing Contribution to Global Intracranial Aneurysm Research (1991–2012): A Bibliometric Study," *PLoS ONE*, vol. 9 (3), 2014.
- [30] K. K. Mueen Ahmed, Ritu Gupta, Brij Mohan Gupta, "Cataract Research in India: A Scientometric Study of Publications Output, 2002-2011," *International Journal of Medicine and Public Health*, vol.4 (4), pp. 311-317, 2014.
- [31] Ipsita Panda, Bulu Maharana, Durllav Charan Chhatar, "The Journal of Information Literacy: A Bibliometric Study," *International Journal of Scientific and Research Publications*, vol. 3 (3), pp. 1-7, 2013.
- [32] Kamal Lochan Jena, Dillip K. Swain, K. C. Sahoo, "Annals of Library and Information Studies, 2002–2010: A Bibliometric Study," *Library Philosophy and Practice (e-journal)*, 2012.
- [33] J. Santhi, S. Jeyachitra, "A Bibliometric Study on IEEE Transactions on Control Systems Technology," *International Journal of Scientific Research*, vol. 2 (3), pp. 218-219, 2013.
- [34] K. Sivasekaran, S. Srinivasa Ragavan, "Journal of Astrophysics and Astronomy: A Bibliometric Study," *e-Library Science Research Journal*, vol. 2 (6), pp. 1-5, 2014.
- [35] Akhtar Hussain, "Annals of Library and Information Studies: A Bibliometric Analysis," *Journal of Library Metamorphosis*, vol. 1 (1), pp. 1-17, 2013.
- [36] Rabindra K. Maharana, Ashok Kumar Das, "Growth and Development of LIS Research in India during 1999-2013: A Bibliometric Analysis," *Chinese Librarianship: an International Electronic Journal*, vol. 37, pp. 35-46, 2014.
- [37] Ming-Yueh Tsay, "A Bibliometric Analysis on the Journal of Information Science," *Journal of Library and Information Science Research*, vol. 5 (2), pp. 1-28, 2011.
- [38] Ricardo Cartes-Vela'squez, Carlos Manterola Delgado, "Bibliometric Analysis of Articles published in ISI Dental Journals, 2007–2011," *Scientometrics*, vol. 98, pp. 2223-2233, 2014.

- [39] Manjari Manisha, G. Mahesh, "Bibliometric Characteristics of Champion Works of China and India" *Scientometrics*, vol. 98, pp. 1101-1111, 2014.
- [40] Shubhada Nagarkar, "A Bibliometric Analysis of Publications of the Chemistry Department, University of Pune, India, 1999-2012," *Annals of Library and Information Studies*, vol. 61, pp. 85-92, 2014.
- [41] Yang Cao, Sixing Zhou, Guobin Wang, "A Bibliometric Analysis of Global Laparoscopy Research trends during 1997–2011," *Scientometrics*, vol. 96, pp. 717-730, 2013.
- [42] Huaqi Chen, Yuehua Wan, Shuian Jiang, Yanxia Cheng, "Alzheimer's Disease Research in the Future: Bibliometric Analysis of Cholinesterase Inhibitors from 1993 to 2012," *Scientometrics*, vol. 98, pp. 1865-1877, 2014.
- [43] Jayshree Mamtara, Jacqueline K. Wolstenholme, Gaby Haddow, "Environmental Sciences Research in Northern Australia, 2000–2011: a Bibliometric Analysis within the context of a National Research Assessment Exercise," *Scientometrics*, vol. 98, pp. 265-281, 2014.
- [44] S. Thanuskodi, "Bibliometric Analysis of D-Lib Magazine," *e-Library Science Research Journal*, vol. 2 (6), pp. 1-9, 2014.
- [45] Devendra Kumar Mishra, Manisha Gawde, Madhu Singh Solanki, "Bibliometric Study of Ph.D. Thesis in English," *Global Journal of Academic Librarianship*, vol. 1 (1), pp. 19-36, 2014.
- [46] G. Mahesh, N. K. Wadhwa, "Web of Science based ranking of Indian Library and Information Science Journals," *Collnet Journal of Scientometrics and Information Management*, pp. 1-10, 2012.
- [47] Marie-Violaine Tatry, Dominique Fournier, Benoit Jeannequin, Françoise Dosba, "EU27 and USA Leadership in Fruit and Vegetable Research: a Bibliometric Study from 2000 to 2009," *Scientometrics*, vol. 98, pp. 2207-2222, 2014.
- [48] Haibin Chen, Yu Yang, Yan Yang, Wei Jiang, Jingcheng Zhou, "A Bibliometric Investigation of Life Cycle Assessment Research in the Web of Science Database," *Int J Life Cycle Assess*, vol. 19, pp. 1674-1685, 2014.
- [49] Santosh Kumar Tunga, Sabuj Dasgupta, "Horticulture Literature cited in Doctoral Dissertations: An Obsolescence Study, 1991-2010," *e-Library Science Research Journal*, vol. 2 (9), pp. 1-7, 2014.
- [50] E.S. Kavitha, K. Sivaraj, "Bibliometric Study of Ph.D Theses in Commerce," *e-Library Science Research Journal*, vol. 2 (11), pp. 1-9, 2014.