

## **CHAPTER 2**

### **Literature Review**

#### **2.0. INTRODUCTION**

Research is the inquiry of truth. So there must be some basis to search anything new in the dynamics of area under consideration. Literature review is a critical and in depth evaluation of previous research. Keeping in view the previous results and references as guidelines, efforts were made to find out that the research work completed is related to the present study. Here an attempt has been made to review various print and e-resources concerned with the present title. The literature survey pointed out the potentials and strengths of application of conducting the study. The reviews of the literature are presented below under two different subheads:

#### **2.1 NATIONAL LITERATURE REVIEW**

Gupta (1989) in his paper “Lotka’s Law and its Application to Author Productivity Distribution of Psychological Literature of Africa, 1966-1975” had presented a methodological and mathematical study on Lotka’s Law. He analyzed a database consisting of 611 items on African Psychology for the period 1966 to 1975 to study the author productivity pattern and to test the applicability of Lotka’s Law. He concluded that the maximum difference, in the case of generalized form of Lotka’s Law, in the observed and estimated values of the proportions of authors was found to be highly significant at 0.01 level of significant.

Vaishnav and Dharmapurikar (1990) in their study, they had analysed citations provided in the Herald of Library and Information Science. They had done survey of 10 volumes with 202 articles having 1370 citations. They aimed to examine citation pattern prevalent in dispersion by form, author and geographical area.

Hoffman and Holbrook (1993) in their work “The Intellectual Structure of Consumer Research: A Bibliometric Study of Author Cocitations in the first 15 years of the Journal of Consumer Research” they had analysed citations in the Journal of Consumer Research (JCR) for the first 15 years of publications. They mainly focused on the 42 authors published most frequently in JCR in the period and have compiled a set of data based on the frequencies with which those authors have referred to the work of one another (including self-references). Their study indicated the importance bibliometric study in uncovering the intellectual output of consumer research.

Dutta and Sen (2001) conducted a study in paper “Indian Journal of Chemistry: Analysis of citation pattern” with 1011 citations appended to 27 research articles. The number of citations and cited authors per article was found to be 37.44% and 85.19% respectively. On an average, one citing author had cited 38 authors.

Ghai (2001) in his Ph.D. work investigated the citation analysis of Doctoral thesis submitted in the subject library and information science to the eight universities of Madhya Pradesh and Punjab during the period 1975 to 1999. It was observed from author dispersion that few authors were highly productive and large numbers were with lower profiles. He also applied Lotka’s law. It was also found

that the solo research was more significant than collaborative research. It was also observed that journals were the most highly cited literature.

Bhopapurkar (2003) in his Ph. D. thesis entitled “A Bibliometric Analysis of Citation of Doctoral Dissertation in Economics: A Comparative Study of Universities of Madhya Pradesh” analysed doctoral thesis in economics in Madhya Pradesh universities in terms of types and areas of research, productivity of universities. He had taken total number of 38,663 references cited. He analysed the data and found the highest number of citations accounting for books 47.76%, and Journals stands second with contribution of 22.1 % of total citations, 30.12% of total citations were distributed in other bibliographic forms like report, and reference books with 7.85% and 7.07% respectively.

Jeevan (2003) in his study analyzed the printed weekly issues of ‘Employment News’ from the year 1998 to 2001 to assess the job opportunities in the library and information science profession. They analyzed data to reflect the major employers - the central/state governments and/or its allied institutions and the private sector; nature of job whether it is permanent, deputation or temporary; reservation trends; state in which the job is advertised; essential and desirable qualifications; prior experience; and the prominent employers and categories of jobs.

Kumar and Kumar (2005) analyzed 743 research papers comprising 435 main articles and 308 short communications published in nine volumes (1993-2001) in Journal of Oilseed Research. They analyzed papers into year wise distribution, length of articles. They also found prolific contributors, subject wise

and crop wise distribution. They also ranked periodicals and applied Bradford's law in their study.

Vijay (2005) in his work revealed that collaborative research was preferred to solo research in the area of food science in India and the degree of collaboration was to be 0.91%. The average number of authors per paper also showed an upward trend from 4.89% in 1994 to 8.2% in 2003. The publication pattern from different institutions had also been studied to determine the pattern of contributions from the different organizations and institutions.

Mahapatra and Padmanav (2006) in their study described the growth of scientific research literature on Orissa published during 1985-2004. The study includes 875 research papers from 40 different journals. They analysed the data by their authorship pattern, year wise growth, and subject wise break up of papers, category of journals, place of origin, length of papers, and productivity of journals.

Kaur (2006) in his article "Bibliometric Study of Malayan Law Journal Articles" examined the characteristics and trends of articles published in Malayan Law Journal (MLJ) by analyzing a total of 479 articles by using SPSS software package.

Tiwari (2006) in his book examined 30 Indian library and information science journals in English language published during 1995 to 1995. He investigated total of 2752 articles. He identified the author contribution, subject dispersion, professional background of the contributors, authorship pattern, form dispersion in the field of library and information sciences.

Keshava and Kontikal (2007) in their article "Bibliometrics of Economics Literature as Reflected through Indian Journals" studied the bibliometrics of

articles published in Indian Economics journals during the period 1999 to 2004. They identified that total of 1153 articles were published in the said period. They found that out of 1525 authors contributed a total of 1153 articles, 1086 (71.21%) were geographically affiliated to India followed by 128 (8.39) authors are geographically affiliated to USA. Single authored contributions were found slightly higher contributed 62.42% or 720 paper out of a total of 1153.

Santhi (2008) had conducted bibliometric examination of all the journal articles published in IEEE Transactions on Control Systems Technology from 1998-2007. She had analysed 935 articles with 20579 citations. She had identified country, year wise distribution, authorship pattern, ranking of most prolific author and most productive institution, etc. She had investigated the different dimensions of citation studies. The study revealed the range of articles published per volume was between 69 (7.38%) to 115 (12.3%), the average number of references per article was 22, the average length per article is 10 pages, journals contribute the highest number of citations 10066, (48.91%), 40% of authors are geographically affiliated to USA, 1416 (52.91%) of authors are affiliated to continent of America; the percentage of multi authored papers was slightly higher at 94.11% or 880 out of 935, the most prolific author contributed 21 articles, the most productive institution was University of California, Santa Barbara, USA with 98 out of 2676 authors affiliation, 78.29%(2095) of authors were from academic institution, 86.42% (808) of articles were contributed by exclusively male authors and 71.94% (1925) of authors are Non IEEE Member.

Yeoh and Kaur (2008) analyzed the publication output of Research in Higher Education for subject support in collection development in the light of

growing interest in diversified domains of research in higher education. They made analysis on 40 issues of publications and revealed a diversified usage pattern of bibliographic reference sources by contributing researchers, with a cumulative total number of citations being 8,374. A positive trend in-research collaboration of contributing authors and a steady growth in the use of reference sources, periodicals and web documents in the citations signified the trend of scholarly communication of research works in the electronic age.

Mahapatra (2009) in his book had done bibliometric study in different forms of literature in the subject library and information science. He had analysed core author, core subject and core document forms.

Zafrunnisha and PullaReddy (2009) in their paper they had done empirical investigation of the scientific literature which were published in Information Science journals. They had presented the difference between bibliometrics and scientometrics and had also they given the overall description of scientometrics.

Dhananjaya (2010) in his Ph D work, analysed doctoral theses/dissertations in Engineering and Technology submitted to the universities in Karnataka. He found that journal contributed 43.54% of total citations and book with 11.74%. He also observed that 41.37 % documents cited references represent single authored documents and 38.95% documents were authored by two authors. 19.17 % of citations were authored by multiple authors and 0.52 % documents were either corporate or anonymous. It is found that Journal of Materials Science published from USA was cited more times. Then second and third ranks respectively had been occupied by Journal of Bio Chemistry (USA) and Industrial Engineering Journal which was published from India.

Thanuskodi (2010) in his study found out that the majority of articles of bibliometric study contain bibliographic references to journals, books, conference proceedings, dissertations, etc. he had analysed the research outputs in the social science discipline.

Mukherjee (2011) in his paper “Bibliometrics to Webometrics: The changing Context of Quantitative Research” categorically divided the era of quantitative research in two area before the World Wide Web and post World Wide Web. Under pre World Wide Web era, the concept and development of terms librametry, bibliometrics, scientometrics, informatics and in post World Wide Web era, the concept webometrics & cybermetrics had been discussed. He diagrammatically presented the relationship of both the terms. He also explained in details various domain of webometric research and further mention the tools & techniques used in webometric researches.

Jasmine (2011) in her research study “Bibliometric Analysis of Earthquake Literature: 1998 – 2007”, she had analyzed Earthquakes literature as covered by the ISI Thompson’s Web of Science during the period 1998 and 2007. She identified the scattering of literature on earthquakes published from various countries. It was found that Earthquake literature is available in 18 languages and English ranked first contributing 86.90 %. The document type, journal articles were ranked first covering 83.67 % of the total output. Author from USA contributed more earthquake literature covering 26.80% out of 109 countries. ‘Journal of Geophysical Research – Solid Earth’ published from USA ranked first contributed 5.83 % of the total outputs.

Panda, Mohanty and Sahoo (2011) in their article “Mapping of the Publication Pattern in IASLIC Bulletin: A Decade’s Analysis (2000-2009)”, they studied the publication pattern in IASLIC Bulletin publication in a decade from 2000 to 2009. Their study was based on 205 articles with 1970 citations with an average no. of articles per year is 20.5 during the said period. The collaborative research (51%) was found to be more than the single authorship pattern. Their study revealed that the maximum contribution 19.4% are from the state West Bengal and Aligarh Muslim University (A.M.U) found to be post productive institute contribution (13) followed by Jadavpur University with 11 contribution.

Dhanakar (2011) in his research study entitled “Bibliometric Analysis of Literature on Wireless Communication (1970-2009) Based on Bibliographic Database” presented the research on wireless literature collected from two databases such as COMPENDEX and INSPEC during the period 1970 to 2009. He analyzed the parameters like author, journals, language, country wise distribution etc. He had taken 31882 data from COMPENDEX and 29614 from INSPEC i.e., total data collected is 61496. It was observed that USA stood first in contributing more literature in the field. The literature on wireless communication was mostly in English language (89.35%) followed by Chinese contributing 7.6%.

Balasubramanian and Ramanan (2011) in their study presented a scientometric analysis of scientific output in the area of agriculture in the last 66 years. They provided an overview of research trends in the agriculture publications and evaluated the quality of the research. The results indicated that the global agriculture research is presently showing upward trend. The country-wise distribution of publications in ‘Agriculture research’, the USA tops, and among the



journals the most preferred is Agriculture Ecosystems & Environment which published 533 papers. Among the contributions, National Science Foundations has made the highest contribution (91%) of the publications written in English.

Thanuskodi (2011) in his paper entitled “Library Herald Journal: A Bibliometric Study” he analysed citations appended in the 138 journal articles during the year 2006-2010. He observed that contribution in the subject library automation 31 (22.46%) was highest. It was also found that solo author contributed 72 (52.17%) articles while the rest 66 (47.83%) articles were contributed by joint authors. In country wise contributions, India ranked first accounting for 89.85% and the rest contributed 10.15%.

Kumar, Mathurajothi and Kaliammal (2011) in their study described the picture of research interest and formal communication pattern in the chest disease field by analysing the Indian Journal of Chest Diseases and Allied Sciences. It also pointed out the indexing gap between the print and online version and pointed out its reason. This study revealed that such indexing gap in future, if the study results were brought into the sight of journal publisher as well as to the United States National Library of Medicine authorities.

Nandi & Bandyopadhyay (2011) in their article “Research Productivity Of Mathematics Department, the University of Bardwan During 1960-2000: A Bibliometric Study” they had analysed 73 theses submitted in the department of mathematics of University of Bardwan during the period 1960-2000. They had also analysis 269 article produced based on them to find out the research trend in the particular subject in that region. The result revealed that journal which got first rank is Bull Cal Math Soc (14.126%) followed by Indian Journal of Pure Appl

Math (12.639%). Most articles were published from India 175(65.05%) followed by U. S. A. 26 (09.66%).

Karpagam, Gopalakrishnan and Natarajan (2011) in a paper “Scientific Measures and Tools for Research literature output” they made an Analysis based on Indian contribution on nanoscience and nanotechnology research with the 338 total number of publication and 2223 total citations for the period 2006 to 2010. They retrieved data from Web of Science on the topic Nanoscience and Nanotechnology When they compared g index, e-index, p-index and hg-index it is observed that for the year 2006 and 2007 it was  $g > e > p > hg$  and for the year 2008, 2009 and 2010 it is vice versa.

Varaprasad, Ramesh and Mitali (2011) in their paper “Scientometrics of India’s Chemistry during 1987 to 2007,” they aimed to highlight the impact of chemistry research through study of citations received by India during 1987-2007 using SCOPUS database. They observed that Indian scientists mostly preferred to publish their research outputs in journals published from the scientifically advanced countries like UK and USA. It was also identified that quality of chemical science research performed by India during 1992-1996 and 1997-2001 periods was high.

Jalal, Biswas and Mukhopadhyay (2011) in their article, they compared bibliometrics and webometrics. They had done case study with webometrics parameters of 13 Indian Institutes of Technology (IITs) and Indian Institute of Management (IIMs). Their analysis was based on web-based data. The data were collected from the Web using either commercial search engines or Personal Web

Crawler. They had found that the IIT-Bombay occupies the first place among the 13 IITs and the IIMs based on both absolute and logarithm values.

Arya (2012) in her study “Authorship Trend and Collaboration Research in the field of Veterinary Medicine” investigated the authorship trend and collaborative research in the field of veterinary medicine. The study revealed that multi authored research paper were more dominant (i.e. 95.55%) than solo authored paper (i.e., 4.45%). It was also identified that the degree of collaboration in the field of veterinary is 0.96.

Deshmukh (2012) in his research paper, he had done the citation analysis of ILA Bulletin during the period 1997-2010. He identified the different form of literature used in the field of Library and Information Science. He investigated the citation pattern used by the researchers, rank list of core journals, half life period of journal, book citation and authorship pattern. It was observed that journals were the significant forms of literature and single authorship found more prevalent in the subject Library and Information Science.

Rajendiran, Parihar and Pattnaik (2012) in their paper “Information use Pattern of Laser and Technology Researchers: A Cited Reference Study” identified literature use pattern in the field of laser science and technology by researchers. They used Scopus online database and citation database as the main source of investigation. They identified types of document used, frequency of used journals and the age of cited references. It was found that the researcher in this field used primary sources, mainly the journals.

Kumbhar (2012) in his article presented the details about the recent trends in publication of classification literature during the period 2000 to 2009. He has

collected the data from LISA abstract for the period 2000 to 2009. The study aimed to identify the year wise distribution of articles in journals having more papers on subject classification and authorship pattern. The solo authorship pattern was found more significant. Goler Inan was the first rank author found in the subject classification.

Thanuskodi (2012) in his paper 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 data were downloaded from the journal's website and analysed the research output performance of agricultural scientists on agricultural science subjects. The analysis covered 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 studies point towards the merits and weaknesses of the journal which would be helpful for its further development. 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 revealed that most of the contributions were from India with 98.67% and the rest 1.33 were from foreign sources.

Swain and Panda (2012) in their paper "Journal of Intellectual Property Rights, 2002-2010: A Bibliometric Study", analysed 332 articles carrying 1,541 journal citations during the period of 2002-2010. They found, 471 authors contributed articles during the 9 years. Solo contribution was found more prevalent and collaborative contribution was found remarkably less. They identified the five ranked cited journals viz Journal of Intellectual Property Rights, European

Intellectual Property Review, Research Policy, World Patent Information, Trademark Reporter, and Current Science.

Panda, Maharana and Chhatar (2013) in their paper “The Journal of Information Literacy: A Bibliometric Study,” they had done bibliometric analysis of the citation pattern of the open access journal for the period 2007-2012. They observed that research article were highest i.e., 51.9% among other types of document forms and contributions from United Kingdom were highest. It was also revealed that individual research found significant than collaborative research.

Dhiman (2013) in his paper “Bibliometrics to Bibliomining: Do Not Confuse!” he had presented the concept of bibliometrics and bibliomining. He had described bibliometrics as based on the quantitative exploration of document-based scholarly communication, where the data consist of works - authors, collections; and connections - citations, authorship, common terms, other aspects of the creation and publication process and also bibliomining as the application of data mining and bibliometric tools to data produced from library services.

Bansal (2013) in her article, she had collected the citations from 391 articles of the DESIDOC Journal of Library and Information Technology during the period 2001-2012. The study aimed to analyse the authorship pattern, identify the growth pattern of article and Indian and foreign contributions. It was observed that 148 (38%) articles out of 391 articles were contributed by single author and 62% from co-authorship. She also identified the author productive, significant document type, geographical distribution during the said period.

Dhuldhule (2013) in his Ph.D. work “A Bibliometric Study of Indian Journal of Engineering and Materials Sciences”, he had studied the pattern of

literature in of Engineering and Materials Sciences from 2008 to 2012 with 6317 citations. He observed that Journals had the highest percentage i. e., 81.95% as compared to books contributing 7.84% which confirms journals were most favoured category of documents of the researchers in the said fields. He found that out of total 5177 cited journal's Mater Processing Technology with 162 citations (3.13%) ranked first, followed by Cem Conce Res with 149 citations (2.88%) ranked second and Journal Applied Phys with 83 citations (1.6%) got ranked third. These three journals were published in USA which revealed that researchers were more dependant on journal's from USA. He also measured others parameters of documents cited.

Rahman and Bhattacharya (2013) in their paper entitled "An Analysis of Citation Frequency of Doctoral Theses in Zoology: A Case Study of North Bengal University" analysed 43 doctoral theses submitted during 1987-2007 and found that the authorship trend is towards team works rather than a work in single authorship. They observed that this type of study was helpful in libraries for collection development model to identify the primary source, financial management etc.

Saha, Das and Sharma, (2013) in their article "Contribution in proceedings of PLANNER (2006-2010). A bibliometric study," they analysed bibliometrically the research publication in Proceeding of PLANNER during the period 2006-2010. They identified the year wise distribution of citations, authorship pattern, ranking of document highly cited. It was found that 66 nos. of contributions in 2006 which is highest that was hosted in Mizoram University. The total of 213 paper with 2015

citation were identified during the period. It was also revealed that 39% of citations were taken from electronic/ online source and 60% from the print source.

Kumar (2013) in his study “Scientometrics study of Department of Atomic Energy Institute: A Picture From Scopus Database,” he presented various output pattern of publication productivity of the Department of Atomic Energy Institutes of India. Data were collected from Scopus database and a number of parameters of Scientometrics were analysed. There study revealed that the Bhabha Atomic Research Centre (BARC) leads other DAE Institutes with systematic growth in number of production from the year 2008 to 2011.

Thirumagal (2014) in his article “Bibliometric Investigation of Wind Energy in India: An Analytical Study”, he had made a bibliometric analysis on wind energy from India for the period 1999 to September 2011. He studied authorship pattern, period wise distribution, geographical distribution, form wise analysis etc. The total of 488 articles found in the said period. It was cited 3295 times and 3090 times without self-citation. The average citation per item was 6.75 and h-index was 27.

Reddy and Reddy (2014) in their study entitled “ Bibliometric study of citations in Ph. D. Theses in Mathematics accepted by Sri Venkateswara University, Tirupati” carried out a study with 15,380 citations appended in 138 doctoral theses in the subject Mathematics during the period 1965 to 2011. They had identified the form wise distribution, rank list journals, rank list of book and authorship pattern. They also applied Bradfords law to identify the usage pattern of journals.

Ghosh and Mondal (2014) in their paper entitled “Bibliometric Analysis of Research Publications of UGC-DAE consortium for Scientific Research, Kolkata Centre” presented the study between 2006-2010. They observed that 94% of publication published in foreign journals of repute and 87% published in SCI journals which revealed of high quality research work. They found that collaborative research was more which also reflected high quality research.

Maharana (2014) in his study entitled “Malaria Research in India During 2003-2012: A Bibliometric Analysis”, he had focused on the research publications of Indian researchers on malaria research during 2003 to 2012. He analyzed Indian researchers’ publications on malaria research which may serve as a guide to libraries to collect information on malaria. They also compared malaria affected Asian countries of global rank with their publication and death rates.

Thirumagal (2014) in his research paper “Osteoarthritis Research Growth During 2001-2012: A bibliometric Study” he made an analysis of publication of subject Osteoarthritis. The data were collected from PubMed resource MEDLINE during the period 2001 to 2012. They identified the authorship pattern and degree of collaboration in Osteoarthritis research and other facets of bibliometrics. They applied Zipf Law and Latkas Law in Osteoarthritis research publication.

Sivasubramanian & Vijayakumar (2015) in their study “Bibliometric Analysis of Indian Journal of Psychiatry (2009-2013)” they had done bibliometric analysis of 512 articles published in journal ‘Indian Journal of Psychiatry’ for the period of 2009 to 2013. They had identified period wise distribution of articles, average number of citations per volume, authorship pattern of the contributions and the international geographical distribution of contributions. The number of



contributions of article found was 149 (29%) during the year 2013 was the highest and 86 (16%) in the contribution in 2009 which was the lowest.

Dhiman (2015) in his paper “Bibliometrics to Altmetrics: Changing Trends in Assessing Research Impact” discussed about the altmetrics and its implication in libraries and librarians. He observed from the study that print journals became obsolete and web publication became gaining momentum and altmetrics study found very important for present digital age.

Gopalakrishnan, Gopalakrishnan, Bathrinarayana and Tamizhchelvan (2015) in their paper “Uncited Publications in MEMS Literature: A Bibliometric Study” worked in the field electronics and identified the uncited publications in Macro Chemical System (MEMS) literature during the period 1970-2013. They had worked with 2,94,573 records out of which 85146(29%) of publications to be found uncited in the MEMS literature. It was found that MEMS publications in China were 44.56%, India 31.44%, Japan 24.40% and France 19.44%.

## **2.2 INTERNATIONAL LITERATURE REVIEW**

Alfonso, Albert and Juan (2005) aimed to carry out a bibliometric analysis of the use of statistical methods in tourism research. They have taken a group of 12 tourism journals published within a 5 year period (1998–2002). 1,790 articles were reviewed by means of taxonomy with 24 statistical categories. The results showed the percentage of articles that applied statistical techniques as compared to those that do not, and a ranking of the techniques most often used and their distribution according to journal.

O'Connor and Voos (1981) in their study entitled "Emperical Laws, Theory Construction and Bibliometrics" described that bibliometrics became a prevalent research technique in the field of Library and Information Sciences. They also identified that the measurement of bibliographic information offers the theory which will solve many practical problems. They attempted to examine the properties of bibliometric distributions in a nontechnical manner and described about three bibliometric laws.

Jarvelin and Vakkari (1993) in their study "The Evolution of Library and Information Science 1965–1985: A Content Analysis of Journal Articles", they had done content analysis of research trend in the field of library and information science published in core journals. They had identified the research done in LIS in topic and the methods used to investigate this topic. They had studied samples consist of 142, 359, and 449 full-length research articles published in 1965, 1975, and 1985, respectively, in core LIS journals. They also observed the most remarkable changes from 1965 to 1985 are the lost of interest in methodology and in the analysis of LIS and the change of interest in information storage and retrieval from classification and indexing.

Jarneving (2005) in his Ph. D. Thesis "A Bibliometric Study of the Literature Related to Research on Public Libraries", he found that the formal channel of scholarly communication were monograph though the research article also played an important role. Journal citation in the field of Library and Information Science was found as important contribution as compared to other fields.

Young (2006) in his study entitled “Library quarterly, 1956–2004: an exploratory Bibliometric analysis”, he had analysed journal’s bibliometric dimension, including contributor attributes, various author rankings, and citation impact of the journal “Library quarterly” at its seventy-fifth anniversary for the period 1956-2004. He used Thomson Scientific’s Web of Science as a core database for analysis and a total of 4,226 publications were covered. The contributors had significantly given emphasis on subjects of information retrieval and bibliometrics. He also compared the journal “Library Quarterly” and “College & Research Libraries.”

Cosanici (2007) in his study “Bibliometric Study in the Heartland: Comparative and Electronic Citation Practices of the Indiana, Kentucky, Michigan and Ohio Supreme Courts (1994–2004),” he observed that the Indiana Supreme Court has cited to federal judicial opinions a little more than 10% of the time while the Kentucky Supreme Court and the Michigan Supreme Court cited to federal cases 12% and 19% of the time respectively. The Ohio Supreme Court, on the other hand, had cited to the federal judicial authorities only some 7% of the time. His study suggested that those courts still preferred to cite to traditional materials, despite increasing availability of electronic resources.

Lundberg, Brommels, Skar and Tomson (2008) had aimed to assess whether publications of importance for improving the health system and its technologies were highly cited intra scientifically. They had done Bibliometric assessment of 596 publications used as sources in the fifty SBU Alerts from 2001 to 2004 from the Swedish Council on Technology Assessment in Health Care. The study was carried out by using the Thomson Scientific Citation Indexes. SBU Alert

were highly cited, eight times more than the world average ( $cf = 7.79$ ). They had found that the co-authorship pattern of the publications cited in SBU Alerts 2001–2004 most frequently. It had an affiliation in the United States (31%) or the United Kingdom (12%). They also observed that the New England Journal of Medicine was the most frequently. It used source for information, followed by Circulation and the Lancet.

Casey and McMillan (2008) in their paper “Identifying the “Invisible Colleges” of the Industrial and Labor Relations Review: A Bibliometric Approach,” analyzed the Industrial and Labor Relations Review (ILRR) journal for three decades 1974-1984, 1985-1995, and 1996-2006. They used co-citation and network analysis, the authors identified the “invisible colleges.” They also identified that, human resource management had a growing importance. It was observed that Economic oriented journals were highly cited by the authors. American Economic Review (AER) and Journal of Political Economy (JPE) were the two highest-cited journals during that period.

Leiser, Aventurier, Fournier, Dosba and Jeannequin (2009) in their study “Tools for Producing Indicators from a Bibliometric Study of Scientific Production: The Case of fruit and Vegetable Publications by the French National Institute for Agricultural Research (INRA)”, they worked on fruit and vegetable sector group of the French National Institute for Agricultural Research (INRA). They had done a bibliometric analysis of INRA scientific academic literature on fruits and vegetables for the period of 2000–2006. They had identified quantitative and qualitative indicators that will shed light on the institute's scientific position in relation to the fruit and vegetable sectors. They analysed 1463 articles published by

INRA authors between 2000 and 2006 which represented 8% of the total number of INRA publications during this period. They identified that in the “fruit and vegetable corpus” constituted, 54% of the articles concern only vegetable species and 39% only fruit species, while 7% are dedicated simultaneously to species of both groups. Also found that the annual number of publications increased by more than 80 % over the said period.

Silverman (2009) in his article “Comment: Bibliometrics in the Context of the UK Research Assessment Exercise”, he had done bibliometric analysis on United Kingdom's Research Assessment Exercise (RAE), where every university may submit its research in every discipline for assessment. He concluded that citation statistics, impact factors, the whole parameters of bibliometrics study might be useful in their research but not utterly.

Wardhaugh (2009) in his paper “Mathematics in English Printed Books, 1473-1800: A Bibliometric Analysis”, he had statistically analysed the corpus of early modern English works that mentioned mathematics by using bibliometrics in new digital full-text databases. Early English Books Online and Eighteenth-century Collections Online.

Schaer (2013) in his paper, he had presented an overview on the intersections of digital libraries, information retrieval and informetrics. He outlined two examples of recent systems but they showed the general feasibility and performance of alternative retrieval techniques which were based on informetric methods.

Regolini and Jannes-Ober (2013) in their research article “A Bibliometric Study of Informing Science: The International Journal of an Emerging

Transdiscipline” they had done bibliometric analysis of the InformSciJ. The data were collected from Scopus database between 1997 and 2012.

Berger and Baker (2014) in their article “Bibliometrics: An Overview” they had presented a detail and impact of bibliometric study in the field of science and medicine.

Mayr and Scharnhorst (2015) in their paper “Combining Bibliometrics and Information Retrieval” discussed bibliometrics, scientometrics and informetrics on the one side and information retrieval on the other. The idea of this special issue started at the workshop “Combining Bibliometrics and Information Retrieval” held at the 14th International Conference of Scientometrics and Informetrics, Vienna, July 14–19, 2013. Both the fields were different, that communities were only partly overlapping and from the belief that a knowledge transfer would be profitable for both sides.

Pasadeos (1985) in his work “A Bibliometric Study of Advertisement Citation,” had done bibliometric investigation on advertisement related articles for the period from 1981 to 1983 from a number of core journals, conference proceedings and marketing, consumer research and communication.. He had analysed the total of 6312 citations and identified that out of total citations, advertising publication contributes 52.4%, 22.4% in marketing publications, 21.1% in interdisciplinary publications and 4.0% in communication publications.

Grant, Cottrell, Cluzeau and Fawcett in their study ‘Evaluating "Payback" On Biomedical Research from Papers Cited in Clinical Guidelines: Applied Bibliometric Study’, they had identified the impact of bibliometric research in the field of health and medicine through the bibliometric study.

Hood and Willson (2001) studied the literature of bibliometrics, scientometrics and informatics. They had commented that the terms bibliometrics, scientometrics and informatics referred to component fields related to the dynamics of disciplines as reflected in the production of their literature. The origin and historical survey of the development of each of these terms presented in the study.

Takahashi, Hoshuyama, Ikegami, Itoh, Higashi and Okubo (1996) in their article “A Bibliometric Study of the Trend in Articles Related to Epidemiology Published in Occupational Health Journals,” they had evaluated 9024 articles published in eight occupational health journals during the period 1980-1983 through the bibliometric method and used MEDLINE database.

Navarro and Martin (2004) in their research paper “Scientific Production and International Collaboration in Occupational Health, 1992-2001,” they had done bibliometric study identify the international scientific production in occupational health and to examine international collaboration in this field. They used Science Citation Index and evaluated the articles published for the period 1992-2001 in eight representative occupational health journals. They identified that United States contributed highest publications and collaborated research was found to be risen.

Ramos-rodriguez and Ruiz-navarro (2004) in their paper they had done bibliometric study to find out the impact of strategic management research. They used co-citation technique strategic management journal during the period 1980-2000 to explore intellectual structure of Strategic change research.

Fourqurean, Duarte, Kershaw and Threlkeld (2008) examined the research output in the field of Estuaries and Coasts. They found that 81% contributions of work were from USA and only 15% of contributors were from non-English speaking countries. They also worked out on impact Factor of research publications.

Lazarev and Safonenko (1994) in their study, they had attempted to identify specific feature of biomedical applications of magnetic fluids as a scientific research papers published in the Abstracts and Proceedings of the 6<sup>th</sup> International Conference on Magnetic Fluids. They used bibliometric methods such as counts of documents forms, content analysis and citation analysis were applied to the papers on magnetic fluids biomedical applications.

Richards, Batty, Edwards, Findla et al (2008) had made a study was based on analysis of the research published by UK geographers during the period 2001-2007. They had analysed by using bibliometric method the best research outputs submitted in Geography and Environmental Studies in Research Assessment Exercise (RAE) in 2008.

Sandstrom (2009) had done the bibliometric study based on citations to publication from SEPA Research Program such as AGREE, COPE MARBIPP, Naturvardskedjan, ReproSafe and SNAP. Web of science was mainly taken as the source of data for quantitative analysis of scientific articles.

Pertriz and Bar-Ilan (2002) in their study they had examined the references of articles published in scientometrics in the course of two year, 1990, 2000. They aimed to examine the extent to which the field of bibliometrics and scientometrics made use of sources outside the field. The result showed that in 2000, 56.9% and



47.3% in 1990 of references originated from three fields i.e., scientometrics and bibliometrics, library and information science and sociology, history and philosophy of science.

Uzun (2002) in his study examined 21 core journals with 10,400 articles in the field of library and information science during 1980-1999 for articles with either principal or co-author from developing countries and formerly socialist Eastern European countries. It was identified that 826 (7.9%) of total articles were published from developing countries and formerly socialist Eastern European countries.

Moppett & Hardman (2011) in their study “Bibliometrics of Anaesthesia Researchers in the UK”, they had calculated bibliometric indices of anaesthesia researchers article in the UK during period 2004-2008 covered by the database Web of Science. The bibliometric indices which were identified were total number of publications, total number of citations (total cites), and number of citations per publication (citation rate), h-index, g-index and modified impact index (MII).

Gaffney (2004) in his paper “Mapping the Literature of Food Science Using Co-Citation Analysis”, he had done co-citation analysis to map the literature to found out relationship within the literature. He used random sampling of the article published during 2000 to 2002 in the Journal of Food SciScience online database and standard statistical package (SPSS). He observed that the field of food science was an interdisciplinary nature drawing contribution from many fields such as chemistry, microbiology, engineering, and agricultural science.

### **2.3. CONCLUSION**

After going through the literatures of the related studies, it was observed that many studies were done in the area of bibliometrics. The methods already used frequently in investigation of research trend in different discipline. The method have been used in the present study for analysis of authors productivity, core literatures, prolific authors, application of Bradfords Law of Scattering etc. in the field of Life Sciences. The results of this study will help the librarian and information professionals to develop a need based acquisition policy for collection development in the library.