2. REVIEW OF LITERATURE

The review of literature is very important not only to understand the nature and scope of the problem but also the lacuna that exist, if any in the work already done by earlier workers. An overview of review of literature pertinent to the present problem has been made. The literature has been collected from books, journals, published and unpublished material, local, national and international journals and websites etc.

The concept of measuring the eminence of journals by citations originates from Gross and Gross (1927). They used the technique of citation counting in the selection of journals in the field of chemistry. Mandal and Sain (1933) studied the collaborative research patterns among scientists of different countries and among scientists of a particular country in the field of Geo-science. Their study was based on the citations in the journal of Geological society of India for the period 1987 to 1991. Broadman (1944) prepared a list of journals in Psychology. Brown (1956) worked out the cited publications in Mathematics, Physics, Chemistry, Geology, Botany, Zoology and Entomology.

Price (1963) noticed that the proportion of multiple authored papers has accelerated steadily since the beginning of the 20th century, and that, if the same trend continued, there would be no single authored paper by 1980. Obviously, this has not happened. Although the extent of collaboration in research has steadily increased, individual research effort has not become extinct. Owing to the pressures of information explosion, authors these days do not hesitate to co-operate and conduct collaborative research.

Kennan and Atherton (1964) have found that solid state Physics and Nuclear Physics published almost identical proportion of single authored papers. A study conducted by Clarke (1964), based on the authorship data collected from biomedical papers presented at the Annual Meetings of the Federation of American Society for
Experimental Biology for the period 1934-1963, revealed that the average number of authors per papers had remained almost constant at about 2 and 3.

According to Brookes (1970) Obsolescence is defined as decline overtime in the validity or utility of information. Such decline may occur for several reasons.

- The information is valid, but incorporated in later work.
- The information is valid, but is in a field of declining interest.
- The information is no longer considered valid.

The growth of usefulness of any literature is a function varying exponentially with time, a period often called the half-life of the discipline. According to Line (1970), the common meaning of half-life as used in most studies is inaccurate and of limited value.

Verma and Murthy (1971) analysed the citations in the fields of Political Science and Economics. Jones and Chapman (1972) studied the ‘Characteristics of the literature’ used by Historians. Sen Gupta (1974) prepared extensive lists of journals in the fields of Microbiology and Pharmacology. Singh (1974) prepared a rank list of periodicals in chemical literature. Vlachy (1974) investigated the multiple authorship trend in Czechoslovakian Physics Literature. According to Line and Sandison (1974) if something is less and less used it is said to be obsolescence and when its use ceases it is obsolete. Liborie and Helperin (1976) studied the citation pattern in Library Science Dissertations. Obsolescence implies a relation between use and time and the effect of time which are effects of time past, time present and time future that can be investigated in two main ways. These are Synchronous Studies and Diachronous Studies.

Bever and Rosen (1978) studied the history of research collaboration from the 17th century onwards. They showed that research collaboration was related to professionalization of the scientific community. Collaboration generally leads to greater productivity and mobility. The limits of collaborative authorship in science publishing especially for Chemistry Division, DSIR, Newzeland has been reported by Hodder
Balog (1979) has studied the authorship and author collaboration in Agricultural publications based on the papers published in ‘Newzeland Journal of Agricultural Research’ for the period 1958-78. During the above period single authored papers declined from 65.6% to 34.3%, two authored papers increased from 28.1% to 41.4% and three authored papers from 4.2% to 16.2%. Over the same period, the average number of authors per paper increased from 1.43 to 1.99.

Literature growth is directly related to the scattering of articles on given subject in many journals. The main problem of growth is complicated by the scattered nature of literature. According to Subramanyam (1979) the proliferation of journals and the consequent exponential growth of journal literature have laterally jeopardized their capacity to transmit information effectively and rapidly.

Garvey (1979) pointed out that authors would seek to publish their articles in certain journals and not in others.

Gupta and Nagpal (1979) appraised the Citation Analysis and its Applications. He traced briefly the origin and development of this technique and reviewed some of the important developments in the application of this technique by categorizing the main contributions under the heads: Information and library oriented studies; source-oriented studies; and management-oriented studies. They investigated the correlations between people’s choice and various other measures of scientific contributions in the field.

Julia Lawson Barbara Kostrewski and Oppenheim (1980) carried out a bibliometric study on energy analysis. The literature which is characterized by heavy emphasis on English language journal articles and reports after an initial exponential growth rate is now growing more slowly. An examination of the titles of articles reveal that even after ten years there is no standard terminology in the area which naturally casts doubt on the value of searching by title terms for new interdisciplinary subjects. On the other hand, secondary services employing controlled language indexing were found to index the articles under a variety of headings.
The authorship pattern in the field of Physiopathology has been studied by Maheswarappa and Nagappa (1981)\textsuperscript{24} and they found out that two authored papers were maximum while single authored papers represented 31.48\% of the total papers. Omuruy (1982)\textsuperscript{25} analysed the citations mentioned in social science dissertations. The relationship between funding and research collaboration in the field of Bio-Chemistry has been studied by Subramanyam and Stephans (1982)\textsuperscript{26}. The individual and multiple authorship of papers in Chemistry and Physics were studied by Stefaniak (1982)\textsuperscript{27}. Subramanyam (1983)\textsuperscript{28} in his paper on research collaboration, indentified several types of collaboration and reviewed the earlier works on research collaboration.

Devarajan and Vijayalakshmi (1982)\textsuperscript{29} analysed the citations cited in Applied Economics dissertations. Maheswarappa and Prakash (1982)\textsuperscript{30} studied the literature use pattern by the researchers in the field of botany. Two thousand, seven hundred and twenty six references from 15 doctoral dissertations were analyzed. The average rate of self-citation was found to be 3.22\%. Half-life of botanical literature was 12 years.

\begin{itemize}
\item Synchronous studies are made on records of uses or references at one point in time and compare the uses against the age distribution of the material used or cited
\item Diachronous studies follow the use of particular items through successive observations at different dates.
\end{itemize}

Mahapatra (1983)\textsuperscript{31} analysed 17,802 journal citations in botany from 1950 to 1980 and prepared a rank list. Eto (1984)\textsuperscript{32} tested the applicability of the Bradford’s law to the R and D expending of firms and successfully identified core firms, peripheral firms and minor firms.

De Oliveria (1984)\textsuperscript{33} examined the citation pattern in Veterinary medicine dissertations. Hemasundar Naidu (1984)\textsuperscript{34} analysed the citation pattern in poultry Science Dissertations. Kabir (1984)\textsuperscript{35} analysed the citations in the dissertations of Agricultural Sciences.
Maheswarappa et al., (1984) on the basis of data collected from the Indian Science Abstracts for the period 1965-1983, have studied the authorship trend in the field of Science and Technology as a whole in India. Maheswarappa (1984) studied in details the multiple authorship trends in the field of Phytopathology based on the data collected from ‘Review of Plant Pathology’ covering the period 1952-1985. The percentage of single authored papers has decreased from 74.45% in 1925 to 24.98% in 1985. Two authored papers have increased from 16.79% in 1925 to 39.72% in 1985. The proportion of multi-authored papers have increased from 19.67% in 1925 to 74.50% in 1985.

Sridhar (1985) has examined the authorship pattern among Indian Space Technologists and found that 80% of the papers have two and more than two authors. Only 19% of the papers were single authored. Diamond (1985) has studied the money value of citations to single authored and multiple authored articles. A citation to multiple authored articles is worth more to its authors than a citation to a single authored article. Multiple authorship of series and non-series papers in an Agricultural Journal has been studied by Balog (1985). The differences in authorship were found among the different subjects of Agricultural Sciences.

Arunachalam and Garg (1985) have studied 258 papers published from Singapore and covered Science Citation Index (SCI) during the period 1979-980. From the results it is clear that much of R&D in Singapore pertains to medical research and nearly all the papers published in English language periodicals are from the western world. The University of Singapore accounts for two-thirds of Singapore publication output and large number of papers from Singapore are rarely cited, even though many of them have appeared in journals having impact factor greater than one. Sridhar (1985) studied the citing pattern of Indian Space Engineers. He found that 35% of citations were self-citations and the average number of self-citations per article was 3.44.

Sangam (1986) has conducted a study on Citation Analysis of Doctoral Dissertations in History Doctoral theses have been examined to find out the literature – use – pattern by the researchers in the field of History. Gives the principal bibliographic forms, the titles of journals used and their distribution according to the country of origin and language. Citation analysis is shown as a useful tool in
assessing actual and potential use of journals by the scholars at the Karnataka University Library, Dharwad (Karnataka). Such studies may not prove to be conclusions. However they do provide guidelines for the selection of periodicals.

Maheswarappa and Vinutha (1989) based on the authorship data collected from the ‘Genetics Abstract’ for the calendar years 1970, 1975, 1980, 1985, have reported the multiple authorship trends in different research fields. Gupta (1989) in this paper he has made a methodological and mathematical study on Lokta’s Law. He analysed a databased consisting of 611 items on African Psychology for the period 1996 to 1975 to study the author’s productivity pattern and also to test the applicability of Lokta’s Law. He can to the conclusion that the maximum difference, in the case of generalized form of Lokta’s Law, in the observed and estimated values of the proportions of authors was found to be highly significant at 0.01 level of significance.

Gupta (1989) in part II paper has discussed the application of Lokta’s to the psychological literature of Africa for the period 1966-1975. Lokta’s Law was not applicable to the data in its original form as inverse-square but in its generalized form with the value of \( \alpha \) equal to 2.8 Chi-square and K-S statistical tests were applied to test the applicability of Lokta’s Law.

Lal (1990) has made ‘ranking of periodicals in the field of Soil Sciences’. Bonzi and Sydner (1990) compared self-citation patterns in Chemistry and chemistry and Geology to those in Economics and Sociology. Klaic (1990) studied the research activity of chemists from “Rugjer Boskovic” Institute (Zagreb, Yugoslavia) for the period 1976-85, covering 1149 SCI registered papers. The papers were published in 235 different journals, most of it in the international croatica chemical Acta (171 papers). The publication was grouped into 2 divisions: for the period’s 76-80 and 81 to 85 and for the each paper citation collected in the respective time period. An average publication had 2.58 citations. Chemical papers from the second period had 2.73 citations per paper, which was considerably more than Yugoslav papers, in general. The distribution of citations was analyzed. Hart et al., (1990) examined the characteristics of authorship in Library and Information Science journals which were published in the year 1986.
Authorship trends in the field of Plant Breeding based on the data collected form ‘Plant Breeding Abstract’ for the period 1934-89 has been reported by Maheswarappa and Savadatti (1990)\textsuperscript{51}. Patel (1991)\textsuperscript{52} in his paper gave definitions and descriptions about bibliometrics, its laws and scope and citation analysis. He also explained the importance of science citation index (SCI), Journal Citation Report (JCR) and their various parts; discussed the methodology used to retrieve information using SCI CD-ROM and brought out various search carried out.

Kannappanvar and Nulvi (1991)\textsuperscript{53} made an attempt to study the authorship pattern in Rural Transformation literature and inferred that the solo research is more favourable than collaborative research. Mishra and Mishra’s (1991)\textsuperscript{54} study revealed that papers with two and three authors constitute a major part (52.42\%) of literature and the degree of collaboration ranges between 0.85 to 0.89 during 1979-89. They studied the authorship trends in the field and found that the single authored papers were the maximum. The proportion of single authored papers showed consistently declining trend from 58.86\% to 30.57\%, in 1970-1990, while for the same period, the multi-authored papers steadily increased from 41.14\% to 69.43\% and with an average increase in number of authors per paper from 1.62 to 2.3 for the same period.


Maheswarappa and Savadatti (1993)\textsuperscript{56} analyzed the multiple authorship trends and collaborative research in ‘Entomology Abstracts’ for the period 1970-90

Norris (1993)\textsuperscript{57} studied the authorship pattern in the ‘Canadian Journal of Nursing Research’ for the period 1970-1991. Munshi et al., (1993)\textsuperscript{58} studied ‘Research Collaboration in Agricultural Sciences’ by analyzing 9,500 papers published during the period 1982-86 by six Agricultural Universities in India. Multi-authored papers were more in number compared to single authored papers.

Humayoon Kabir (1993)\textsuperscript{59} has investigated the characteristics of bibliometrics literature by analysing the issues of LISA from the year 1964 to 1990. The study
reveals that single author contributions are maximum and team research is not popular among the researchers in bibliometrics. The ratio between single and multi-authored paper is 2.2:1. Multi-authored papers are increasing slightly. It is found that there was not even single entry of bibliometrics in LISA up to 1968. The world literature of bibliometrics has been growing exponentially at a doubling rate of 10 years since 1969.

English language was the predominant language of communication accounting for more than 76% of all. Other languages of publication included Russian, Spanish, French, Japanese, German, Portuguese, etc. More than 90% of bibliometrics literature was published in journals with scientometrics occupying the first rank (published elsewhere). The use of conference proceedings monographs and theses/ dissertations media of bibliometrics literature publishing increased, while reports decreased. It is also found that the articles on library and information science studies come to approximately 40 percent. Joshi and Maheswarappa (1994) \(^60\) examined authorship trends in different subjects of Science and Technology.

Kademani Kalyane and Kademani (1994) \(^61\) analysed Raman’s publications by year collaboration pattern, channels of communication used etc. The results showed that the temporal variation of this productivity and the types of paper published by him were eminently qualified to be taken as a ‘role model’ for the younger generation to emulate. He had to his credit 94 papers in “Scattering of Lights”, 55 papers in “Acoustics”, 66 papers in “Optics” and 85 papers in “Floral Colour and Visual Perception”. The highest collaboration coefficient was 1.0 during 1936 to 1940 and self-citations rate for his publication was 15.05.

Sinha and Md. Furqun Ullah (1994) \(^62\) quantitatively went through the articles of Dr. I.N.Sengupta, also analysed 102 publications of Dr, I.N.Sengupta covering the period 1969-1992. In 1988 which was considered as the peak period of his writing. Dr. I.N. Sengupta wrote 14 papers. According to them Dr. I.N.Sengupta preferred to publish 11 articles in Indian Journal of Information Science followed by 10 articles published in IASLIC Bulletin.
Kanungo (1995) studied the citing patterns of Indian political scientists in the Indian Journal of Political Science for the period 1990-1993. 3509 citations were cited for 119 articles. It was found that 88.37% authors were Indians; only 11.63% belong to Foreign Countries. They were 89.08% single authors and 10.92% had two or more authors. The score of self-citation constituted 1.82% and author self-citation 24.03%. Periodicals as source of information were 18.97% out of which 41.86% were Indians and 58.14% were foreign.

Vimala and Pulla Reddy (1996) examined authorship and collaborative research by analyzing the citations cited in doctoral theses in Biology. Their objectives were to examine the nature of authorship pattern in the literature of Biology, to determine the degree of collaboration and average number of authors per paper, to determine the proportion of single vs. multi-authored papers. The findings reveal that two authored papers were maximum (40.39%). Single authored papers constituted 26.73% of the total cited papers. Three authored papers accounted for 20.98% and the rest 11.90% were contributed by four and more than four authors. Thus multi-authored papers accounted for 73.27% of the total cited papers.

Cheng Huanwen (1996) analysed formally published journal articles in library and information science (LIS) in China from 1985 to 1994. He aimed at the study of how research articles were distributed over various topics, the research methods applied and the similarities and differences between LIS research in China and worldwide. The study samples comprise 1930, 2447 and 2665 articles published in the core LIS journals respectively in 1985, 1990 and 1994. The largest groups of articles from each year were concerned with the basic theory of LIS (26% to 32%) and information service (20% to 25%). The most popular research strategies were historical method (25% to 19%) and not applicable (16% to 14%), whereas the least popular were experiments (0.2% to 0.5%) and survey method (4% to 1.6%). The main difference is that LIS research in China tended towards theoretical research, but in the world towards applied research.

Bandhyopadhay (1996) in his Bibliometric study of the citations in 27 doctoral dissertations in mathematics submitted at the Burdwan University from 1981-1990 presented the bibliographic forms of literature used, ranked list of journals
in pure mathematics, applied mathematics and statistics, normalized ranking of journals with corrected citation number according to Sengupta’s formula. In the source-wise distribution, journal articles constituted 78.58% and books 16.31%. A list of 384 journals cited with 35 ranks was generated.

Mubeen (1996)\textsuperscript{67} conducted a study of citation of 22 doctoral dissertations in chemistry submitted to Mangalore University since its inception. The study has identified 60 score journals, out of total 418 journals, referred to by the researcher. Of the citations 73% pertained to journals, 11.84% to books, 9.24% to patents and the restr 6.28% to technical bulletins, theses etc,. Out of all the countries, USA stood top most for 30.2% citations, Indian followed net with 20%, UK occupied 19.31% and rest by other countries. Single author contributions constituted 27.49% citations, two authored contributions 22.66% and three-authored contributions 15.36%.

Leta and Meis (1996)\textsuperscript{68} found out in their study that the Brazilian contribution to publications in science and humanities had an increase of 0.29% of the worldwide total in 1981 to 0.46% in 1993. In science, but not in humanities, Brazilian publications tended to follow the world publication trend; thus during the period 1981-93, 57.9% of Brazilian publications were in life sciences, 35.4% in exact sciences, 3.9% in earth science and 2.9% in humanities, which account for half of all the Brazilian publications. The total number of authors on the Brazilian 1981-1993 publications was 52,808. Among these 57.8% appeared in only one publication and 17.5% had their publications cited more than 10 times.

Mete and Deshmukh (1996)\textsuperscript{69} conducted a citation analysis of 1824 citations from 202 articles published in Annals of Library Science and Documentation for the period of 1984-1993. Bradford’s Law of Scattering was testified with the journal citations and it was seen that 23.13% of the total journals could meet 67% of the requirements. The half-life of LI literate is found to be 8 and 12 years of journals and books respectively. It was observed that 40.63% of the cited journals came from India, 24.76% from USA and 21.27% from UK and rest by other countries.

Despande and Rajyalakshmi (1997)\textsuperscript{70} carried on a study of 65 dissertations in Library and Information Science submitted to Nagpur University during the period
1990-94. Citation analysis had been carried out to find the types of cited source materials, authorship pattern and chronological distribution of cited references. The ranked list of journals indicated that the Annals of Library Science and documentation was the most cited journal constituting 3.23%, IASLIC Bulletin and college and research libraries 2.67% each. Journal source material shared 68.74%, books shared 16.4% and rest shared by thesis, reports etc.

Sudeir (1997) made a quantitative study of the characteristics and behavior of scientific research output in Kerala during 1979-94 to find out the growth rate of literature, subject-wise distributions of publications, authorship pattern, relative contribution of institutions and scientific productivity of different districts in the state. Examining the subject-wise distribution, agriculture and related fields 27.22% had majority of the contributions followed by medical sciences (16.11%) in 1979. It had been observed that two-author papers retained their supremacy in all four years. Vikram Sarabhai Space Centre of ISRO, Thrivananthapuram was the leading research centre in the state having more number of publications with an average of 14.67% of the total contributions in 4 years.

Kiran Kaur Lily Lee, Tiew Wai and Sin Sen (1997) made a bibliometric study on Titles of LIS Textbooks and Research articles. The number of Keywords in 100 titles of LIS textbooks came to a total exactly 500 and those in 100 research articles 770. On an average the number of keywords in the titles of research articles and textbooks are 7.7 and 5 respectively which prove the hypothesis that the number of keywords in textbooks titles is less than that of the research article titles.

Biradar and Vijayalaxmi (1997) analysed the pattern of information used by researchers in the field Neurology. They identified the average number of references per dissertation as 93, the use of different source of information and stated the obsolescence of literature. Source-wise distribution showed a that 80.20% of citation belonged to the periodical.

Biradar and Premalatha (1998) conducted a bibliometric study of Psychiatric (Alcoholism) literature cited in 14 MD psychiatric dissertations submitted to the Department of Psychiatry, NIMHANS, Bangalore, during the period, 1974-1995. Most
of the citations (73.22%) are articles in periodicals. The other bibliographic forms are books (16.32%), reports (4.35%), Seminar / conference proceedings (2.32%), manuals (0.94%) and other forms (1.8%).

Devaraai Rajasekhar, Ramesh and Husain (1998) studied M.N. Srinivas’s publications year domain, authorship pattern, channels of communications used etc. At the end of 1995, Srinivas had to his credit 144 papers constituting 33 broad papers in Sociology and Anthropology; 18 papers in social change, 28 papers on village studies; 12 papers on religion; 17 papers on caste and 36 papers on general popular interest. Indian publishers published 119 (82.64%) articles; foreign publishers published 22 (15.28%) articles and 3 (2.08%) articles by both.

Kumbar and Akhtary (1998) studied 7451 citations appended to 322 articles published in the American Journal of Ophthalmology Vol.117-120 during the years 1994-1995. The average number of citations per article, types of literature authorship pattern, obsolescence of literature, and a ranked list of cited periodicals were observed. Results show that major type of document cited was periodicals constituting 682 (91.63%); authorship pattern showed the highest contribution made by 3 authors (72%). Taking into account the past 25 years in this field of research out of 6192 citations (90.17%); the US journal of Ophthalmology had the highest overall number of citations at 998 (14.62%).

Hajudin (1998) conducted a study on articles published in the journal of Plantation Crops during the period 1973-1996 to find out the nature of communication, geographical distribution, authorship pattern and citations. Indian authors had contributed 89.96% and foreign authors had contributed 10.04% articles. The highest number of contributions was on coconut 167 (29.93%). Central Plantation Crops Research Institute constituted 42.83% of the total contributions. Two author papers constituted 38.17% followed by the three-author papers 26.34%.

Tiew and Wai Sin (1998) analyzed the articles published in the Journal of Natural Rubber Research during the period 1987-1996 to find out the authorship pattern, the range and frequency of references cited, the extent of acknowledgement and appendix and the type of collaborative research, Multiauthored research paper.
constituted 72.1%. The range of references cited was 16.49%; 74.81% contained formal acknowledgement and 7.75% of research articles contained appendix. The collaborative paper among natural rubber researchers was as high as 72.09%.

Damodharan (1998)\(^79\) made an observation of the results of a bibliometric study of doctoral thesis on aspects of the growing use of Groundnuts in India, which aimed to find out Doctoral Dissertations in India in terms of year-wise, crop-wise and discipline-wise growth during the period 1948-1996. Total state agriculture Universities published 70% thesis and 20% by the conventional Universities of India. The study revealed that around 45% of the total theses were generated in the two important disciplines of crop production and crop improvements.

Khan Ahmed Munshi and Akhter (1998)\(^80\) presented the results of statistical and bibliometric analysis of the articles published on various aspects of Library and Information Science (LIS), emanating from Bangladesh during the period 1966 to 1997. The results of the study revealed that during 1966-1997 a total of 308 articles authored by 116 libraries were published in various periodicals with the highest number 256 (83%) from Bangladesh, followed by India 21 (6.823%). All these papers were published in 37 periodicals originating from 14 countries. About 92% of the articles were credited to the single authorship and only 25 articles were co-authored.

Aruna Prasad Reddy (1999)\(^81\) analysed the citations appended to 186 doctoral dissertations in the field of Chemistry submitted to Sri Venkateswara University, Tirupati. The Bibliographic form-wise distribution of citations revealed that journals literature was the most referred source of information (85.03%), followed by books (10.44%), patents (1.25%), dissertations (1.12%) and others (2.18%). Researchers of Chemistry preferred documents published in the English language (73.86%), followed by Russian (4.44%), Japanese (1.46%), German (0.89%), French (0.79%) and Chinese (0.64%). The country-wise scattering of citations showed that USA alone covered 35.51% of total citations, followed by UK (17.91%), India (11.04%), Netherlands (6.11%), Germany (5.67%) and Russia (5.44%). The study of the authorship trend showed that papers with multi-authored were the highest in number (77.50%) and single authored papers constituted 22.50% of the total cited papers. The half-life period for journal citations was found to be 17.84 and 17.68 years for book citations.
Rajeev Vij and Bedi (1999)\textsuperscript{82} studied on Defence Science Journal: A Ten-year Bibliometric Study. Defence Science Journals (DSJ) published by the Defence Scientific Information & Documentation Centre (DESIDOC) since 1949, has played a key role in the dissemination of Defence R&D information all over the world. The paper brings out the results of a bibliometric study carried on the issues of DSJ brought out during 1989-98. It examines yearwise, countrywise and institutionwise distribution of papers, authorship pattern, range of references cited, extent of acknowledgement, and number of appendices detailing supplement information included in the research articles of DSJ. The study also analyses the types of collaborative research in Defence R&D and the international collaboration scenario portrayed in the Journal. The results indicated that the trend is towards multi-authorship.

Ian Rowlands (1999)\textsuperscript{83} made a bibliometric investigation into the structure and dynamics of the information policy Journal Literature. The unit of analysis constituted document test collection of 771 articles published between 1972-1996. The investigation focused on patterns of growth, knowledge accumulation, ageing and obsolescence, documentary scatter and knowledge production. It concluded that the structure and dynamics of the information policy journal literature diverges in several respects from typical social science literature. Information policy is characterized by very rapid growth, high immediacy (in Price’s sense), rapid reception and ageing processes and relatively low documentary scatter.

Barooah Begum and Sharma (1999)\textsuperscript{84} conducted a bibliometric analysis on 4253 citations collected from doctoral dissertations submitted to various universities by the S & T workers working in the area of Organic chemistry during 1977 to 1997. It was found out that major citations were from journal literature (85.42%) although citations from books, proceedings, patents reports and thesis were also found. The half-life of literature in the field of organic chemistry was found to be 27 years.

Wolfgang GlaEnzel Urs Schoep (1999)\textsuperscript{85} identified fields where the role of non-serial literature is considerable or critical in terms of bibliometric standard methods, the totality of the bibliographic citations indexed in the 1993 annual cumulation of the SCI
and SSCI databases, have been processed. The analysis is based on three indicators, the percentage of references to serials, the mean references age, and the mean reference rate. Applications of these measures at different levels of aggregation (i.e. to journals in selected science and social science fields) lead to the following conclusions. 1. The percentage of references to serials proved to be a sensitive measure to characterize typical differences in the communication behavior between the sciences and the social sciences. 2. However, there is no overlap zone, which includes fields like mathematics, technology oriented science and some social science areas. 3. In certain social sciences part of the information seems even to be originated in non-scientific sources; references to non-serials do not always represent monographs, pre-prints or reports. Consequently, the model of information transfer from scientific literature to scientific (journal) literature assumed by standard bibliometrics requires substantial revision before valid results can be expected through its applications to social science areas.

Haaland (1999)\textsuperscript{86} presented results of a bibliometric study to identify the core periodicals in the field of dental hygiene and the extent to which these periodicals were indexed. Percentage periodicals were found to provide one-third of all references studied. 42 periodicals yielded an additional one-third of the references.

Sivasubramanian (2000)\textsuperscript{87} presented the results of a bibliometric study of articles published in the journal of Indian coffee, published by the coffee board. On analyzing the authorship pattern, the range and frequency of references cited and year-wise distribution of papers he observed that most of the articles dealt with topics on plantation, cultivation and processing in the first order i.e. 22.46\% followed by standards and quality 15.26\%. The average length of papers ranges from 1 to 6 pages, which constituted 92\% of the whole. Results indicated that the trend was towards single authorship as 64.08\% and there exists a high degree of collaboration in coffee research.

Mahapatra and Das (2000)\textsuperscript{88} analysed the nature of growth of literature on geology between 1987-1996. He examined the type of collaboration among authors and the trend of growth, the degree of collaboration among various categories of authors, correlation of the growth of various categories of authors, and the impact of collaboration on the growth of literature. In the year-wise publication analysis the
year 1989 attained the peak value of 551 (11.45%) publications. Regarding the authorship pattern 36.58% were contributed by two authors, 29.165 were contributed by single authors and the rest by three and more than three authors.

Jonathan Grant Robert Cottrell Francoise Chuzean Gail Fawcett (2000) aimed at developing a methodology for evaluation the impact of research on health care and also to characterize the paper cited on clinical guidelines. The bibliographic details of the papers cited in 15 clinical guidelines, developed in and for the United Kingdom, were collected and analysed with applied bibliometric techniques. The median age of papers cited in clinical guidelines was eight years and most papers were published by authors living either in the United States (36%) or in the United Kingdom (25%) which is two and a half times more than expected as about 10% of all biomedical outputs are published in the United Kingdom; and clinical guidelines do not cite basic research papers. Analysis of the evidence base of clinical guidelines may be one way of tracking the flow of knowledge from the laboratory to the clinic. Moreover, such analysis provides a useful, clinically relevant method for evaluating research outcomes and different strategies in research and development.

Biradar and Mathad (2000) conducted a study based on the references appended to articles appearing in the journal ‘annual review of ecology and systematic’ for the year 1995-1996 and identified the major forms of literature, core journals, authorship patterns, obsolescence of literature etc. Results indicated the information that the largest number of citation were from American Literature (63.96%); Single author papers amount to 34.69%; more than 80% of the citations had been published in the past 15 years; and 23 of the 85 journals account for 50% of cited journal articles.

Tiew (2000) studied the extent of periodical self-citation and author self-citation in the research articles and short communications published in the ‘Journal of Natural Rubber Research’ from 1988 to 1997. Results showed that 535 of articles contained periodical self-citations and the rate of periodical self-citations per article ranged from 1 to 12. A high percentage of authors 6.145 who contributed articles to the periodical cited the articles themselves. Furthermore there was a tendency for authors, affiliated to the institution publishing the periodical, to cite the periodical. A
total 214 papers (64.08%) out of 334 had been contributed by single authors, 55 papers (16.46%) by two authors; 39 papers (11.68%) had been contributed by three authors and 26 papers (7.78%) were contributed by more than three authors.

Garg and Padhi (2000)\textsuperscript{92} analysed 766 publications by prolific authors in scientific journals which indicate that prolific authors produce about 25.5 of the total scientific output in periodical literature in laser science and technology. The average productivity per author was about two. Prolific authors from most of the countries belonged to either academic or research institutions except in USA and Japan. Prolific authors on average made more impact than non-prolific authors. However, there was variation from country to country.

Suryanarayana (2000)\textsuperscript{93} presented the results of a bibliometric analysis of the contributions of the periodical ‘Tobacco Research’ to the literature for the years 1987 to 1997. He discussed the type of contributions and their distribution over these years, with an analysis of the contributing institutions and authorship pattern, the types of citations in the periodical and the preparation of core list of periodicals. It was observed that Central Tobacco Research Institute and its research stations constituting 52.6% ranked first. Residence proved that Tobacco Research Journal from India cited 382 times occupied first position followed by Tobacco Science from foreign countries which cited 157 times. Papers on different subjects under flue-cured occupied 41.4% followed by bide tobacco 29.3%.

In their papers Kademani Kalyane and Vijai Kumar (2000)\textsuperscript{94} analyzed the citations to the publications of Vikram Sarabhai, using Science Citation Index 1944-1991. The extent of citations received, in terms of the number of citations per paper and the categories of citing documents and the distribution of citations among them were found out. Vikram Sarabhai had received total 533 citations in the domain; ‘Cosmic Ray’ (518) and ‘Science Policy and National Development’ (15). Journal articles had cited publications of Sarabhai 391 times, which was 73.36% of total citations. Reviews had cited 62 times which was 11.64%. Mean citations per year were 12.11. Total team self-citations were 37.07%. Highest total team self-citations were found in 1971, 1972 and 1970 having 2916 and 15 citations respectively.
Ramesh Ramana and Hussain (2000)\textsuperscript{95} studied the papers published in the quarterly International Rice Journal ‘Oryza’ from 1986-1995. The yearly distribution of papers, authorship patterns, geographical location of contributors, subject covered, average length of articles etc., were also studied. Author affiliations stressed on the dominance of Indian authors as 96.8% and the multiple authors as 87.82% belonging to academic institutions. The degree of collaboration was 0.95% in 1995 and 0.84% in 1989.

Doraswamy and Pulla Reddy (2001)\textsuperscript{96} in their study analysed 2471 citations appended to Geographical theses submitted to Sri Venkateswara University for the award of doctoral degree during the period 1991-2000. Books appeared to be the most preferred source of information contributing the highest number of citations (41.89%). Most of the citations (76.12%) are single authored papers. The articles are the first rank. The researchers in Geography mostly depended on the journals of their own subject i.e., (69.19%). Geographical researchers heavily cited Indian journals. The country-wise scatter of citations showed that India occupied first position with 32.41% of the total citations, followed by USA (8.63%) and UK (7.64%).

Bidyarthi Dutta and Sen (2001)\textsuperscript{97} conducted a study on Indian Journal of Pure and Applied Mathematics as Analysis of Citation Pattern. This study covered 427 citations appended to 30 articles published from January to March 2000. In all 622 authors on average there are 14 citations per article and 1.46 authors per citation. The authorship pattern shows that single-authored citations amount to 51.40 per cent of total citations. The High percentage single-authored citations clearly indicate the dominance of individual research in mathematics unlike physics, chemistry, biosciences and medicine where single-authored contributions cover around 20 percent of the total citations. Team research in the subject is found to be less than 50 percent and team size is also small usually restricted to two or three members. As in other subjects, here also journal articles account for about 79 percent of the citations. Monographs rank second with a tally of 17 percent, which is pretty high compared to other scientific subjects. As far as self citations are conceived author self citations account for 15 percent, and journal self citation 2.6 per cent. The articles involved in this study have been contributed by 59 authors including 28 foreign authors; this makes the journal really
international. The predominance of single-author contributions is observed in citing papers as well.

Bandopadhyay (2001) studied authorship patterns by analyzing the citations appended to 92 doctoral dissertations submitted to University of Burdwan for the period 1981-1990. The results revealed that the average number of authors per paper in Physics was 2.25 followed by Mechanical Engineering (1.48%), Mathematics (1.44%), Philosophy (1.15%) and Political Science (1.05%).

Jyotshna Sahoo (2001) studied on Conservation of cultural property in India: A Bibliometric Appraisal. He analysed to understand the various characteristics of literature on the subject. On the basis of collected data, the study attempts to examine the year wise distribution of articles, authorship patterns, length of articles subject wise breakup of articles, leading authors etc. Some inferences are also suggested based on the output of the analysis. He concluded that from the present study:

- Distribution of articles from 1993-1997 in CCPI is not consistent as the difference between the maximum and minimum is 16. So the number of articles is varied from volume to volume.
- Maximum number of articles was published in 1996 (36) and minimum in 1993 (20).
- Out of 129 articles 46 papers have no citations and on an average, around 5-6 citations appear per paper in this journal during the period of study.

Pantelis Kalaitzidakis Theofanis Mamuneas and Thanasis Stengos (2001) have done a worldwide ranking of academic institutions that produce research in a list of 30 top research journal sin economics. Among the main contributions of the present study is the computation of the ranking of journals for the same period for which the researchers conduct the ranking of institutions. The study revealed that one should not rely on weights that were computed for research carried in the past. Updating the ranking of journals to agree with the period over which the ranking of universities takes place avoids possible biases that may arise in journal weights that
do not take into account the current trends in the economics profession. Also, a trend has been noted worldwide for a more evenly distributed generation of academic research in economics. European academic institutions are well represented in the group of the top 200 universities in the world and so do universities from Asia and the Far East in particular.

Kannappanavar (2001)\textsuperscript{101} reported the results of a bibliometric study investigating the author patterns involved in the International Monetary Fund (IMF) literature. Authorship data were collected from research activities of the IMF from January 1991 to December 1998 prepared by the inter-departmental working group of Fund Policy Advice of the IMF. The total number of entries collected was 1,704 and each item was analyzed and tabulated. The results showed that the team research is more favourable than the solo research and then degree of collaboration in IMF research ranged from 0.45 to 0.623 during the study period with an overall average of 0.56.

Parameswaran and Smitha (2001)\textsuperscript{102} studied a total of 60 issues of LISA published from January 1994 to 1998 using a specially prepared data sheet. The subject headings listed in LISA were further grouped into 16 classes on the basis of their mutual relations which was used to analyze the subject-wise breakup easily. The data collected manually using the data sheet was compared with the data available from the CD-ROM. The extent of collaborative authorship was measured using Subramanyam’s formula and the result helped the investigators to prove the hypothesis that the research papers by single authors were greater in number than collaborative work as covered by LISA.

Das and Sen (2001)\textsuperscript{103} analysed 1049 citations appended in 34 research articles pertaining to issues nos. 2 to 4 volume 20 of the journal of Bioscience for the year 2000. The authorship pattern of citations revealed that 18.68% papers were single-authored, 52.71% were doubled and triple authored and the remaining 28.61% were joint contributions of four or more authors. Of the cited articles 53% were Indian and the rest by foreign authors. Author self-citation shared 10.87% and journal self-citations shared 0.57%.
Sinha and Dhiman (2001)\textsuperscript{104} studied research articles published in Indian and foreign journals by Sinha. Out of 97 papers published in different journals and a book chapters, one is in Indian journal, 78 in foreign journals and 18 as book chapters. Single author published 30 articles and joint author 67 articles.

Barooah and Sharma (2001)\textsuperscript{105} analysed the journal collection in the library of Regional Research Laboratory, Jorhat (RRLJ) through a study of use of journal titles or publication of research by the scientific community of the laboratory. Journals ranked on the basis of their use for individual groups and percentage of used journals were noted. Observed data revealed that 79 papers published in the year 1992 ranked first and in the year 1978, 20 papers were published which showed neither increasing nor decreasing order.

The study made by Shukla Saksena and Riswadkar (2001)\textsuperscript{106} study aimed at applying Bradford’s Law of Scattering and Lotak’s Law of Productivity to bio-energy literature to verify if the law holds good for ten Abstracting Services. Results of linear regression showed that Lotka’s distribution holds good for bio-energy literature and the value of n ranged between 205 and 4.5. Dutta and Sen (2001)\textsuperscript{107} studied 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 each citing author had cite 38 authors.

Omkar Murthy (2002)\textsuperscript{108} examined the authorship pattern of books and journal articles. The results reveal that the publications with single authors were more in number in Geography compared to the two authors, three authors and more than three authors. Dhiman (2002)\textsuperscript{109} carried out a study of self-citations in the ‘ILA Bulletin’ for the years 1996-2000. The results showed that out of 71 articles published during the period only 11 had self-citations.

Sen Bidyarthi Dutta and Anup Kumar Das (2002)\textsuperscript{110} in their article on Insdoc's Contribution to Bibliometrics traced the history of bibliometric research, and related training activities in INSDOC. They described briefly the objectives, facilities, services, research activities, and publications of National Centre on Bibliometrics.
Ramesh (2002)\textsuperscript{111} expressed that Fifty Years of Library and Information Science Research in India. There must be a national funding agency to finance the research programmes in Library and Information Science. This can be on the pattern of ICAR. No university should start or continue doctoral degree programme if it is not receiving at least 100 journals titles on the subject. The quality of Research activity would be boosted if a national level examination on the pattern of GC or CSIR is conducted to regular candidates for Ph.D. Every student going for doctoral programme should be familiar with the research methodology. It would be better if he/she has a minimum two research publications to his/her credit. Only these teachers/Librarians be permitted to supervise research scholars who are holding the Ph.D. degree with at least three years of experience. If the above suggestions are implemented, localized politics prevailing in the University set up, would become quite ineffective and then better research environment would emerge. Augmentation of the research facilities together with several quality checks in the research process would always ensure a meaningful research output. In turn, this would give a positive contribution to the profession and the country at large would be benefitted.

Monique Gomez (2002)\textsuperscript{112} analyzed references cited in the articles published by authors also the kinds of publications and the journals which are mainly used. He also studied the period of the cited journals and their cost-effectiveness. The author compared two sets of data; articles published over the period 1991-3 as pre-www period and from 1997-9 as WWW period. 6,351 (205 articles) and 12,937 (459 articles) cited references were obtained during 1991-3 and 1997-9. The average of cited references per article is 33 and 32 respectively. Articles were published in 27 different journals. More than 70\% were published in the core astronomical journals; most of the journals cited are less than 10 years old. The cost-effectiveness of astronomical journals is high whereas that of the physics journals is very low.

Leonard Ponzi (2002)\textsuperscript{113} explores the intellectual structure and interdisciplinary breadth of Knowledgement Management in its early stage of development. Intellectual structure is established by a principal component analysis applied to an author co-citation frequency matrix. The author co-citation frequencies were derived from the 1994-1998 academic literatures and captured by the single
search phrase of Knowledge Management. Four factors were labeled Knowledge Management. Organizational Learning, Knowledge-based Theories and the Role of Tacit knowledge in organizations. The interdisciplinary breadth surrounding knowledge management mainly occurs in the discipline of management. Empirical evidence suggests that the discipline of computer science is not a key contributor as originally hypothesized.

Dutta Das and Sen (2002)\textsuperscript{114} in their study covers 2800 citations appended to 152 articles published in 2001 in eight scholarly journals published by National Institute of Science Communication and Information Resources. In all, 7426 authors are figuring in the citations. On an average, there are 18 citations per article and 3 authors per citation. There is the dominance of team research in the concerned fields since the percentage of multi-authored citations are high. On an average, journal articles account for about 79% of the citations. Monographs rank second with a tally of about 12%. Indian Journal of Marine Science receives high percentage of journal self-citation compared to others whereas Indian Journal of Chemistry Section B receives high percentage of author self-citation compared to others. Indian citations received by all journals figure only 10% on average.

Tiew Abrizah Abdullah Kiran and Kaur (2002)\textsuperscript{115} made a bibliometric study of all the journal articles published in the Malaysian Journal of Library and Information Science from 1996-2000. The range of articles published per volume is between 14 and 17, average number of references per articles is 22.5; the average length per article is 41.2 pages, 69.74% of the articles are research oriented, the percentage of multi-authored papers is slightly higher at 52.6%. The most prolific author contributed 12 articles, 45% of the authors are geographically affiliated to Malaysia, the most productive institution is Faculty of Computer Science and Information Technology, 39.5% articles contained author’s self-citation, while the rate of journal self-citation is found to be 27.6% and most of the articles 67.1% contained no formal acknowledgement.

Pichappan and Saravady (2002)\textsuperscript{116} viewed author self-citation as a blend of experience and cognition of authors, supported placing emphasis on the consciousness and cognition of authors while assessing author self-citations.
Macias-Chapula and Mijangos-Nolasco (2002)\textsuperscript{117} study of AIDS\textsuperscript{line} 1980-2000 was used to conduct the literature search. Seven countries and 1052 records were identified. Main participating countries were Democratic Republic of the Congo and Cameroon. Results show that there is a high pattern of collaboration through multiple authors.

Ajay Kumar Srivastava (2003)\textsuperscript{118} worked on Citation pattern in Anthropology: A trend Study of An S.I. Calcutta’s Anthropologists. He expressed that citation study and use of information resources has been made from anthropologist’s papers published during 1980-85 to find out trend in citation pattern in Indian Anthropologist. The study records that the author consults mostly English language literature and cited mostly Indian journals. He concluded that the journal articles are cited more frequently than any other form of documents. The second position was occupied by books, other information resources, viz conference papers, census etc. The language of articles documents mostly consulted and cited by the user in English of all the languages. However, English still remains the most popular medium in expressing ideas and of all foreign language documents. English language documents are most easily accessible to the scientists. About the subject areas of information the physical anthropology (Biological & Medical) science are mostly used. The cultural anthropology comes next, though other subjects are also consulted less.

Citation analysis revealed that in many cases document published even a decade back and in a few cases fifty years back have been cited. It is important to mention here that the anthropological study is multi disciplinary. About the making of cited journals from the stand point of use, journal of Indian Anthropological society comes first. Next to it comes man in India and then Eastern Anthropologist. This study shows that Indian scientists depends heavily on Indian journals and naturally in their citations Indian journals are frequently cited. Most of the fruits of research of the Indian scientists are published in Indian journals and this may be another cause of their popularity to Indian scientists.

Naidu Pawan Chouhan and Praveen Parashar (2003)\textsuperscript{119} have conducted Bibliometric Study of the Literature Cited in the Doctoral Dissertations in the Faculty of Biological Sciences (1999-2003). This study describes the need for information and
the methods of assessing the information needs of the users in libraries. Traces the history of bibliometric studies and explains the importance. Analyses the literature cited in the Ph.D. Dissertations in the faculty of Biological sciences during the years 1999-2002. Summarizes the list of core periodicals, country distribution of journals and the form of documents used by the researchers. The major findings from the study are as follows:

- The researchers in the field of Biological Sciences are mainly consulting the "Journals" for their research work, which is the premier mode of scientific communication.

- The periodical 'Journal of Plant Physiology', 'Plant Cell Report' and 'Plant Cell,- Tissue and Organ Culture.' occupies the first three ranks respectively. Their contribution are 5.48%, 3.65% and 3.15% respectively among total citations.

- It has been found that most of the citations cited from the journals are from USA followed by U.K., India and Germany.

- The list of core journals (foreign and Indian) is given in Annexure.

- It has been found that the back volumes (i.e. from 1990-1999) of the journals used by the researchers for their research works in the field of Biological Sciences have been cited mostly. In the decade 1990-1995 the references cited are 47.44% of the total citations. Also from the decade 1980-1989 the references cited from the journals by the researchers in their theses are, accounting for 31.14% of the total citations.

Ramesh and Naga Raju (2003) in their work on Potentialities In Use Of Internet By Social scientists - An Informative Analysis Discussed the potential use of Internet by social scientists in their research activity and the relation between social science research and Internet in the larger context of emerging electronic Information technology. It also seeks to raise certain issues regarding the impact of Internet and certain deeper changes brought by it, in order to sensitize researchers. This is not a manual. The focus is on research issues and not on Information technology. Research requires information. The Process of procuring Information and scholarly
communication has undergone a change because of developments in IT. These developments, particularly the Internet, has transformed not only the functions and activities of the various intermediaries. But the entire process, from literature search to publication for storage, retrieval and dissemination.

Devendra Kamble and Suresh Jang (2003) studied on “Citation Analysis of English Doctoral Dissertations : A case Study of Gulbarga University”. They citation analysis of dissertations accepted in the Department of English at Gulbarga University generated total of 2,198 citations. Distribution of citation by forms of documents, distribution by subject core Journals, country and subject wise distribution of Journal articles and books cited were all analyze the study reveals that books forms the most preferred sources of information used by the researchers in the field of English accounting for 83.25% and essay is the most popular literature form than any other literary forms. 'Journal of Indian writing in English has ranked the highest 13 citations accounting to 3.95% while 98.21% documents has emerged from three major Countries namely UK, India, and USA. Thus, the results of the study may be used as a means of evaluate tool for quality collection of the Gulbarga University Library. The important feature of research environment in the universities of U.S is that there has been a special staff designated, as ‘Theses Editor or Thesis Co-ordinator’ whose responsibility is to set and maintain theses standard. This becomes more relevant in this context as there is a lack of uniformity among the entire thesis in the format of citations. The citations indicates that book form the highly cited and essays are the most popular form of literature. The acquisition policy of the Gulbarga University library has to be revamped further to procure more Indian and Foreign Journals to keep them up-to-date in their field. Besides, organizing regular orientation programme and research workshops to the research scholars will enable them to exploit the available resources in the library.

Kannappanavar Chidananda Swamy and Vijay Kumar (2004) identified Publishing Trends of Indian Chemical Scientists: A Bibliometric Study. They highlighted authorship trend and collaborative research in chemistry in India during 1996-2000. The study found that team research is preferred in the field of chemistry rather than solo research. The degree of collaboration is calculated and found to be 0.76. The degree of collaboration varies from year to year and is found to be 0.72 to
Average number of authors per paper has increased from 7.52 to 8.39. They concluded that publishing trend totally depends on the productivity pattern of the authors. Today we see that team research is visible in almost all the branches of knowledge, especially in science and technology and particularly in chemistry. The present study also reveals that the trend towards collaborative research is increasing in the chemical science discipline.

Monawer Eqbal and Masoorn Raza (2005)\textsuperscript{123} in their paper on Literature on Personnel attitudes and Job satisfaction: A study dealt with bibliometric study on personnel attitudes and Job Satisfaction. The aim of this study was to identify country, language, form, year wise distribution authorship pattern, ranking of authors and journals. Data was collected from Psychological Abstracts published from 1992-2001. The study reveals that USA has contributed highest number of papers, i.e., 59.53\% and most Dominant language, was English and maximum number of articles were written by two authors. Most productive journal was Journal of organisational behaviour and maximum number of articles were published in 1992 and most of the article dealt with Organization Behavior. The subject description analysis shows explosion of 'knowledge and new subjects are being developed leading to 'scattering of subjects.

Rajendran Ramesh Babu and Gopalakrishnan (2005)\textsuperscript{124} have conducted study on Bibliometric Analysis of 'Fiber Optics' Literature. They analysed the global output of 'fiber optics' research. Articles covered in the El- Tech Index database covering the period 1999-2003 have been considered for the study. Growth of literature year wise, country wise, authorship pattern, bibliographic forms, ranking of core journals and nature of research have been analysed. Based on the study, it can be concluded that about 1500 to 1700 articles on fiber optics are produced each year. Majority of the articles are published in English language. About 45\% of the articles published as in Conference Proceedings. The number of articles contributed by the Indian authors is insignificant with just about 2\% of the total literature and India ranks thirteenth. A ranked list of the articles shows that maximum numbers of articles in the database are from USA. Journal of Light Wave Technology is the top ranked journal which publishes the maximum number of articles.
Surendra Kumar and Kumar (2005) have analysed 743 research papers comprising 435 main articles and 308 short communications published in nine volumes 10 to 18, (1993 - 2001) in the Journal of Oilseed Research. This study gives status of oilseed research and importance of oilseeds in India and also gives objectives and methodology of the study. Analyses papers into year wise distribution, length of articles, use of tables, graphs diagrams etc. Also finds out prolific contributors, location of a papers, subject wise distribution and crop wise distribution. The paper analyses in details citations given in these articles in various tables viz number of citations per article and types of documents used for citations. It is clear from the study that this is an era of collaborative research and trends of it is increasing year by year. Journals are still the most favorable form term of documents in research. There are few titles of journals, which are cited by most researchers, and libraries must recognize them to save money. Actual use of documents is a better basis for selection than occasional use by some scientists. Often, it is seen that scientists wish subscription of a title for very small purposes, which is very costly now a days. It has been observed during the practice that researchers recommend titles of their area of research without much use and often referring one or few articles only from many volumes of the journals so purchased. Thus huge amount of money is wasted at the cost of other research requirements. This bibliometric studies provide a data based analysis to peruse such matters. Occasional needs can be catered by indexing, also abstracting and reprography services .The use of e-journals and CDs may be the trends of the next decade in agriculture research in India.

Neena Singh and Dominic (2006) in their study on Analysis of citation Pattern of Allelopathy Journal: A Case Study covered 687 citation appended to the 30 research articles published in four issues of Allelopathy Journal. From the citation count it appears that sole research in Allelopathy is quite substantial only 35.52. About 64.48 % of the research work contribution is the result of team research, the team wise is small, ranging from two to five of the citation count 89.69% relate to Journal article, 6.11% to Theses and 3.79 to conference papers Indian citation have been found to be more with 65.65% and foreign citation 34.35% of the total citation. The study reveals that 30.57% of the total citation are author cell citation and 16.16% are journal self citation. The highest percentage of year wise journal caution was found to be 33.18% in the period of
1981-1990. On the basis of the analysis, it is observed that the journal carried articles mostly of team research, however individual research has been found to be substantial. Contributors have cited fairly good number of foreign authors researches in their research papers. The percentage of journal self citation is low indicating that the journal may not be popular amongst its research community, although it is indexed in two major Indexing periodicals, it has failed to Attract research work of high standard. It is also likely that the journal is not widely circulated. Further, it is noted that the journal is hardly a decade old and sponsors have many scope for improving its quality and raising its standard to that of a reputed journal. Ramakrishna and Ramesh Babu (2007) in their paper on Literature on hepatitis (1984-2003): A bibliometric analysis. This paper presents a bibliometric analysis of the literature output in the field of Hepatitis covered in three bibliographic databases namely MEDLINE, CINAHL and IPA.

Swapan Kumar Patra and Prakash Chand (2006) have presented a bibliometric study of library and information science research literature emanating from India based on the data abstracted in Library and Information Science Abstracts. Standard bibliometric techniques are employed to analyse the collected data and accordingly get indicators. Bradford’s law of scattering is used to identify core journals of library and information science wherein Indian authors publish their research output. To understand the productivity pattern of authors, Lotka’s Law has been applied.

Mahapatra and Padmanav Jena (2006) studied on scientific research productivity on Orissa: A Bibliometric analysis. They described the growth of scientific research literature on Orissa published during 1985-2004 which includes 875 research papers from forty different journals and they analyse the data by their authorship pattern, year wise growth, subject wise break up of papers, category of journals, place of origin, length of papers, and productivity of journals. They concluded that development of a state like Orissa depends on the scientific and technological research. The present study reflects the growth of scientific research in and on Orissa. It is seen that there is a positive growth of research papers published from 1995 to 2004. It was found that majority of authors prefer to publish their papers in collaboration with others. It was also found that research on agricultural science is more compared to others subjects. It is interesting to note that nearly 31% of the
scientific literature is published in non-scientific journals. This may result in the scientific papers going unnoticed by scientific workers. More papers are published in Indian journals compared to foreign journals. It was found that majority of papers were six pages long.

Shafi and others (2007) in their paper on D-LIB Magazine: A Bibliometric Study examined the articles published in on-line D-Lib magazine for authorship trend, contribution of teaching and professionals, country-wise contribution, degree of collaboration and productivity within different facets of digital electronic libraries. The study found that collaborative research is given priority over solo research. The degree of collaboration is found to be 0.66. The study further reveals more contribution from teaching community compared to professionals. Country-wise distribution reveals that most of the contribution comes from the USA and Germany while facet-wise distribution of articles depicts that most of the articles cover digital libraries and preservation followed by metadata/cataloguing. The trend towards collaborative research is gaining currency day by day. The research in the field of library and information science has become a collective entity wherein more and more researchers help to make it innovative.

Nazim and Ahmad (2007) in their article on Research Trends in Information Literacy: A Bibliometric study presented a bibliometric analysis of scientific output in the area of 'Information Literacy. The main aim of the study was to know the overview of research trends in this field and characterize its most important aspects and their evolution over the last quarter of the 20th century. The various analyses focus on the presentation of publications; frequencies and percentages, as well as the application of Bradford's law of Scattering and Lotka's law.

Nabi Hasan and Sewa Singh (2007) in their paper on Agricultural Research in Himachal Pradesh: A Profile Based on AGRICOLA, AGRIS, CAB and FSTA, presented an assessment of contributions on Himachal Pradesh to agriculture and allied based on publications indexed in AGRICOLA, AGRIS, CAB abstracts and FSTA CD-ROM databases, during 1990-1994. They attempted to provide detailed analysis of 2,451 contributions on Himachal Pradesh covered by the databases of the study period.
Parvatharruna and Gobbur (2007)\textsuperscript{132} in their work on Mapping of Plastics Literature (1998-2002): A Bibliometric Study appraised that plastics is a product of Polymers, which finds a wide variety of applications. Bibliometric analysis of 6444 publications related to Plastics, as indexed in Biological Abstracts on CD, during 1998-2002 was undertaken. On an average, 1289 papers were published every year. Two and more authored papers constitute majority of the contributions and degree of collaboration amounts to 0.81. This shows that team research is prevalent in the area of Plastics. USA produces largest amount of literature related to Plastics and English is the most predominant language used for publishing the literature related to Plastics during the study period. Plastics are a product of Polymers, which finds a wide range of application. Bibliometric analysis of 6444 papers related to plastics, published during 1998-2002, as indexed in biological Abstracts on CD revealed many interesting findings. An average of 1289 papers are published every year related to plastics and it was highest during 2002. Collaborative research is more prevalent in the area of Plastics, which is confirmed by 81.62\% of publications contributed by two or more authors. Degree of collaboration, which amounts to 0.81\% further confirm the trend (Table 4). USA tops the list of countries by publishing 25.06\% of total literature related to Plastics. India contributes only 2.14\% of the total literature (Table 6). English is the most dominant language with 5940 publications, followed by Russian, Japanese & Portuguese languages publishing more than 1\% of literature.

Rajendiran and Parihar (2007)\textsuperscript{133} conducted a bibliometric study on laser literature in India, 1995-2005. They identified various bibliometric indicators of articles published by the Indian researchers in the field of laser science and technology during the period 1995-2005. The Scopus - the indexing/abstracting online database is the main source for this study. The bibliometric techniques, such as Bradford's law, Lotka's law and the Subramanyam formula were employed respectively to measure quantitative distribution of literature in sources/journals, author productivity, and the degree of collaboration among authors. The study found that the literature growth has steadily increased and the growth rate over the period of time was 22.436 articles per year. Of the total literature, 97.32\% appeared as research articles. Literature was found to be published in eight different disciplines, and the percentage of multi-disciplinary articles was 18.93. The log-log plot drawn for
distribution of literature in various sources/journals fits the typical Bradford S-shaped curve. The study identified 20 core sources and 23 core journals. It was found that majority of authors contributed only one article (65.04%), which is larger than the 60% of original Lotka's data. The degree of collaboration among authors is 0.94. The average length of an article is 7.09.

Neena Talwar (2007) carried out a study on Information Use Pattern of Social Scientists: An Analysis of Citations of Journal of Asian Studies. He analysed the citation pattern of the citations appended in the articles covered in volume numbers 59-63 of Journal of Asian Studies to determine the information use pattern of the social scientists. The study has covered 108 articles with total of 9111 citations contributed by 714 authors. The results indicate that books are highly cited followed by periodical literature, Government publications, newspapers and conference proceedings, etc. The less number of electronic citations suggest that print literature is still the most preferred source of information for the social scientists.

Vijay and Raghavan (2007) in their work on Journal of Food Science and Technology: A bibliometric study studied the Bibliometric analysis of 779 articles published, along with citations in five volumes 37(2000) to 41(21)04) has been carried out. A similar study was also carried out for the maiden volume of the same journal for the year 1964. the number of contributions and their distribution in different volumes, authorship pattern, foreign and Indian authored contributions, institution Wise contribution, citations, types of publications cited, geographical distribution of contributions national and International as well as physical growth of the journal have been studied. Results indicated an increase in the number of contributions in successive volumes with India being the major contributor both in the maiden volume as well as in the five volumes studied. The highest number of contributions is by the joint authors (two). The growth and popularity of the journal is showing a steady upward trend, though contributions from the developed nations form only 15% of the total.

Ramakrishnan and Ramesh Babu (2007) in their literature covered in three databases for the period 1984-2003 was considered in the study MEDL1NE covered the maximum of 75750 records during the study period, i.e., 1984 to 2003. This is
followed by CINAHL and IPA databases. There are a total numbers, of 82617 records in three databases in the field of hepatitis during the study period. The total number of duplicate records among the three databases is 3305 (4%). Total number of records after removing duplicate records is 79312(96%). One-third of the citations indexed with the term 'hepatitis' for the period of this study have more than five (32.91%) authors. 85.17% of the total contributions are tending to be collaborative research with different degrees of collaborations ranging from 0.82 to 0.86. The collaborative research tends to be more in the field of Hepatitis. In the field of science in general and medicine in particular, collaboration in authorship pattern is prevalent. In the present study on hepatitis, literature was drawn from three databases viz., MEDLINE, CINAHL and IPA and it was found that maximum number of records on hepatitis is covered by MEDLINE. The percentage of year wise coverage of the literature output in the field of hepatitis in three databases shows a gradual increase in IPA and CINAHL although there are fluctuations, where as MEDLINE database is steady in its coverage. The degree of research collaboration on average comes to 0.85.

Sevukan Nagarajan and Jaideep Sharma (2007) in their work on Research output of faculties of plant sciences in Central Universities of India: A bibliometric study appraised the research output in plant sciences of the faculties in Central Universities of India has been analysed bibliometrically. The study analyses a total of 348 bibliographic records of plant sciences retrieved from ISI Science Citation Index-Extended (SCIE) for a period of 10 years from 1997 to 2006. The output of plant sciences literature has been analysed by year, document type, authorship pattern, and collaboration pattern at different levels viz., international, national, and local. The laws of Bradford and Lotka have also been tested. Results of the study reveal that: i) the plant sciences literature has grown steadily during the study period except for 1997 and 2002; ii) articles play a predominant source of publications of plant sciences literature; iii) the plant sciences research in central universities of India is fairly collaborative; and iv) the productivity of authors fits Lotka's distribution while scattering of journal articles does not fit into Bradford's distribution. The analysis of literature in plant sciences contributed by Faculties in central universities of India brings to light some interesting facts about the literature as well as the authors. The
pattern of year-wise output is much skewed. It registers an increase in one year and
goes down the next year. Research output of BHU Faculties is on the top followed by
that of JNU, AMU and PU. It goes down for other universities having very
insignificant contributions. Pal of 47.40% for BHU shows its share in the literature
contributed by its faculty. Collaboration in research is evident by the fact that 30.41%,
29.86%, and 21.37% of articles have been written by two, three and four authors
respectively. Though the contributions of faculties are fairly collaborative, the nature
of collaboration is most of the time at local level. There is no upward sight of
collaboration at national and international levels. Major individual contributions are
from BHU. Faculties prefer to publish their papers in international journals from
foreign countries. Their preference is more for journals from Germany which also
happens to be one of the countries publishing maximum journals. Majority of the
journals related to plant sciences is published from Netherlands (22.95%), UK
(19.67%) and USA (18.03%) whereas majority of the articles is published from
Germany (83%), Netherlands (19.54%), and England (16.09%).

Swati Dixit and Katare (2007) has highlighted the research trend of cotton
scientists by studying the patterns of articles published in the Journal of the Indian
Society of Cotton Improvement for the period 1995-2004. This studies Patterns
related to authorship, bibliographic forms, citations, contributing institutions, and
subjects were analyzed based on these details, ranking of core journals in the field of
cotton science has also been done.

Mini Devi (2007) has studied A New Derivation for Bradford’s Law of
Scatter and highlighted the significance of Bradford’s law in today’s information age.
The classical law is applied to the toxicology literature collected from the international
database, Toxicology information online and its validity on that data was tested. The
data was found unfit for the law. Hence a new formula is derived and applied which
was found fit for the study.

Asha (2007) examined the Bibliometric properties of ‘Demography India’.
She identified core areas of demographic studies, institution-wise contribution of
articles and geographical area pertaining to the articles. Determines the trend-line and
five yearly moving average of the year-wise distribution of collaboration coefficients
for ascertaining the trends in the distribution of single and multi-authored articles. Obtains slight inclination of authors towards collaboration. Using regression analysis formulates Lotka’s relationships and hence determines the values of constant k and index ± in the relationship. Finds that Lotka’s relationship is valid for authors with more than three publications only. Determines some closer relationship than Lotka’s by using regression ranking. Identifies most-cited journals, examines bibliographic forms of cited documents, average age of citations and rate of citation per article. The findings of this study are compared with the results of similar studies.

Sathiyamurthy and others (2008) 141 conducted a study on Citation Analysis of Ph.D. Theses in History, Annamalai University, during the period of 1995-2005 has been carried out A total of 3352 citations were analyzed for identifying their bibliographic form, year-wise distribution of theses, authorship pattern, types of documents used, ranking of core journals, and country-wise distribution of cited documents and subject analysis of cited journals. The year-wise distribution of theses and citations reveals the following facts. Out of 3352 citations from 17 Ph.D. theses were analysed by using Bradford's method for identifying core journals in the ranking list and citation analysis techniques the following conclusions are drawn. The average citations per theses were 197.17 during the period of study.

Sevukan and Jaideep Sharma (2008) 142 have presented a detailed analysis of research performance of biotechnology faculties in central universities of India from 1997-2006. The data used for the study were retrieved from two database sources, namely, PubMed, National Centre for Biotechnology Information and ISI Web of Science database—Science Citation Index Expanded (SCIE). Bibliometric techniques have been employed to analyse the data.

Mohammed Esmail Dhanavandan and Sumathi (2008) 143 carried out a Bibliometric analysis of the journal "ACM Transactions on information Systems" (1997-2006). The trend of publication such as the year wise distribution of articles, bibliographical distribution citations, authorship pattern, citation pattern, average length of article, chronological distribution, geographical distribution of authors and subject analysis have been studied. They concluded that the result of ranking analysis of cited journal shows that ACM Trans; Info. System occupied the first rank in the
lists which have 200 citations. The first three journal yield 2213 citation that form around 20% of total citation and 50% of the total Citation cited by 10 journals. The result of average length of article shows that the highest average page per article is 41.18 in the year of 2005 and lowest average page per article is 31.75 in the year of 2001. The result of self citations shows that Engineers interested in specific information, storage and retrieval engineers made use of their self-citations is the first order of priority (36.19%) with respect to total number of self citation reported in computer engineering. The result of age citation frequency shows that more than 50% of documents are cited within 15 years.

Kulkarni Balaji Poshett and Narwade (2009) examined that journals are the predominant citation source followed by books. Analysis shows that majority of the scientists preferred to publish research papers in the multiple authorships.

Krishnamoorthy Ramakrishnan and Devi (2009) have indexed the MEDLINE database for the period 1995-2004 shows that maximum number of records (13244) was during 2003, followed by 12690 in 2002 and 11061 in 2001. Relative Growth Rate (RGRO was found to be decreasing year wise. The Doubling Time was found to increase every year. Ranking of the journals based on the quantum of research output on diabetes during 1995-2004 shows that USA in the largest contributor of literature on diabetes research. The research productivity of diabetes conforms to Bradford's Law of Scattering.

Manjunath and others (2010) have analysed 10553 citations appended to 538 papers published during 2004-2008 in the journal Applied Engineering in Agriculture. This study examines year-wise distribution of papers, authorship pattern, length of papers, degree of collaboration among authors, year-wise appearance of citations, form-wise distribution of resources used by the authors and ranked list of authors by geographical location. This study has highlighted the variety of bibliometric measures that can be used to understand the characteristics or portrait of the journal which in turn reflect the characteristics of the literature and the communication behaviour.

Prathap and Nishy (2010) on $E = Pi^2$ – the energy of ideas approach to bibliometric research assessment studied the performance index is a composite
indicator which can effectively combine size and quality of scientific papers. It is able
to complement the h-index and give it better resolving power and the same time is
free of the many limitations that the h-index has. The curious structure of the p-index
allows it to be interpreted using an energy argument and here, borrowing from
electrical analogy, the power/energy basis for bibliometric research assessment is
proposed. The proxy for the energy of ideas turns out to be \( E = P I^2 \). Where \( P \) is
measured in the unit in which ideas are conveyed (here, the number of papers) and \( I \) is
a measure of the rate at which ideas are transmitted as citations (here, a proxy for
quality). The energy assessment technique is demonstrated by applying it to the
research assessment of the laboratories belonging to the Council of Scientific and
Industrial Research.

Narendra Kumar (2010)\textsuperscript{148} studied on Applicability to Lotka’s law to research
productivity of Council of Scientific and Industrial Research (CSIR), India. He
examined the applicability of Lotkas’s Law as a general inverse power (\( \alpha=2 \)) and as
an inverse square power relationship (\( \alpha=2 \)) to the distribution of the research
productivity in Council of Scientific and Industrial Research, India. Two datasets of
the research papers (6076 and 17681) contributed by CSIR’s scientists during the
period of 1988-1922 and 2004-2008 were collected from SCI-CD-Rom and web of
science respectively. A K-S Test was applied to measure the degree of agreement
between the distribution of the observed set of data against the inverse general power
relationship and the theoretical value of \( \alpha=2 \). It was found that the inverse square law
of Lotka did not conform as such.

Ghouse Modin and others (2011)\textsuperscript{149} carried out — A bibliometric study
analysed articles in Baltic Astronomy published during the years 2000 to 2008
with regard to distribution of contributions, authorship pattern of contributions,
distribution of references, analysis of length of papers etc.

Asma Khatun and Zabed Ahmed (2011)\textsuperscript{150} in their research work on: “A
bibliometric analysis of diarrhoeal disease research in Bangladesh”, carried out
quantitative analysis to identify the literature growth, authorship pattern,
collaboration and journal distribution on diarrhoeal disease research in Bangladesh
based on data obtained from PubMed, Web of Science and Scopus databases. Well-
-established biometric laws, such as Lotka's law and Bradford's laws are employed to further explore the characteristics of diarrhoeal literature. Bradford-Zipf distribution is applied to determine the core journals on diarrhoeal disease research in Bangladesh. Moreover, a comparison was made to determine the strength of diarrhoeal research in Bangladesh using h-index on bibliographic data from Scopus. The result shows increasing R&D activities on diarrhoeal research in Bangladesh. Lotka's law and Bradford distribution do not apply to diarrhoeal disease research in Bangladesh. The h-index count indicates that Bangladesh tops the diarrhoeal research impact list in South Asia region.

Manoj Kumar and Moorthy (2011)\textsuperscript{151} carried out a study on Bibliometric Analysis of DESIDOC Journal of Library and Information Technology during 2001-2010 and they opined that DESIDOC Journal of Library and Information Technology (DJLIT) is one of the premier journals of library and information science being published in India. It is brought out by Defence Scientific Information and Documentation Centre (DESIDOC), a constituent establishment of Defence Research and Development Organisation (DRDO). DJLIT has just completed 30 years of its publication. This paper presents bibliometric analyses of DJLIT during 2001-2010. This study analysis covers various parameters like growth pattern, content coverage, authorship patterns, subject-wise distribution of articles, etc.

Jayaraman Krishnaswamy and Nataraja Moorthi (2011)\textsuperscript{152} studied on Library Philosophy and practice (E-Journal): Bibliometric Study from 2005-2010. They analysed the research output performance of library philosophy and practice on library science subjects. The analysis covers 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.

Shri Ram (2011)\textsuperscript{153} examined on Research output on Artemisia (Artemisia annua): a bibliometric study. He opined that artemisisqa is an herb that yields a natural component known as ‘Artemisinin’ which is being used for the treatment of Malaria worldwide. This paper uses data indexed in the pubmed database for the period of fifteen years (1996-2010) to study the research on Artemisia. It has been found that publications on this subject grew to 712 percent in 2010 as compared to
1996. China is one of the countries that has contributed a number of publications in this area. In India, Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, Uttar Pradesh is a leading contributor of literature on Artemisia. He concluded that Artemisia is one of the important medicinal herbs yields ‘Artemisinin’ compound. It has been used in China in the treatment of fevers for more than 1000 years. Artemisinin has a high therapeutic index in treatment of the malaria. This compound is gaining importance as it is now being administered globally and research in Artemisia in growing as reflected in this study.

Manivannan and Sanjeevi (2011) made a research on A Bibliometric study on Research output in Medical Science Research (2007-2011). They opined that the research publications in the field of Medical Research are increasing year by year. In this paper the authors have studied bibliometrics analysis of the Indian Journal of Medical Research (IJMR) for the period of five years between 2007 and 2011. The authors analyzed the year-wise publication of the journal, authorship pattern, country-wise publication by educational institution and research centre, etc. They concluded that the medical practitioners are also interested to publish their research work through research articles, case study, reports, etc. in reputed journals. The Medical Research centres also concentrate to publish their research findings through the reputed journals for the benefit of the users in Medicine field.

Kannappanavar (2011) opines that, information is recognized as a vital source and the basic need for the progress of humanity and the development of a nation as a whole. It means that every piece of information should be extracted from, wherever it is available and provided to the users at the right time, in the right proportion, without delay of time. Only then, can that piece of information be put to its maximum use. Information is everywhere, we have to categorize it, organize it and at the same time let the users know about which source contains what information. Only when the research scholars know about the contents and whereabouts of information they can use it at ease, without having someone to assist them. Now-a-days, subjects are multi-disciplinary in nature, because of which, they have become complex.
Kamal Lochan Jena and others (2012)\textsuperscript{156} in their paper on Annals of Library and Information Studies earlier published as Annals of Library and Documentation that brought out its maiden issue in the year 1952, is identified as one of the best referred journals in the field of Library and Information Science in India with a publishing history of 58 years. Due to its standard editorial policy, ALIS has felt its presence in the academic arena by bringing out quality publications that have been highly appreciated by teachers, students, research scholars and authors as well. Moreover, authors feel proud of having a rich publishing experience with ALIS. The study has depicted a nice portrait of ALIS which speaks volumes about the publication policy of this journal. Nevertheless, it has gradually promoted its value through its global readership as it is indexed in DOAJ as an open access journal. It is expected that ALIS will further grow in its stature in the days ahead.

As Sabuj Dasgupta (2013)\textsuperscript{157} states, bibliometrics has established itself as a viable and distinctive research technique for science of science based on citation data. Citation analysis is one of the most important bibliometric techniques involving analysis of the references forming part of primary communication. Citations are the formal explicit linkages between publications that have particular points in common. Citation studies of doctoral dissertations, which are the products of research activities, form an important source of information.

According to Janet Dagenais Brown (2013)\textsuperscript{158} another common use of data from the citation indexes, and the subject of this paper, is to require faculty applying for tenure and/or promotion to provide “counts” of the number of times their papers are cited. Again, these counts represent a quantitative evaluation of the work rather than a qualitative one. There is a misunderstanding that the number of times a paper is cited is an accurate representation of impact or value. Papers are cited for a variety of reasons, some of which are not related to the quality of the research. For example, their are gratuitous citations (citing friends or colleagues), honorific citations (citing certain authors to show respect for their work), negative citations (a paper with errors may be cited heavily), and excessive self-citations (to inflate personal citation counts).

Dattatraya (2013)\textsuperscript{159} et al., say that citation analysis is a major area of bibliometrics research, which use various methods to establish relationship between
authors and their work (Ane’s Encyclopedic Dictionary of Library and Information Science, 2006). Citation analysis is a technique of bibliometrics. It is an important research tool understanding the subject, which we analyse the structure and direction of the subject. It measures the utility of documents and relationship between their author and their documents.

Zainab Abrizah and Raj (2013)\textsuperscript{160} of Department of Library & Information Science, Faculty of Computer Science & Information Technology, University of Malaya, Kuala Lumpur, Malaysia, and Department of Artificial Intelligence, Faculty of Computer Science & Information Technology, University of Malaya, Kuala Lumpur, Malaysia, have opined that; the use of citation indices initially published by the Institute for Scientific Information (ISI) (Science Citation Index Expanded, Social Sciences Citation Index, the Humanities Citation Index and Journal Citation Report) and currently packaged in the web of Science (WoS) by Thomson Reuters is widespread and has outgrown its original purpose as initiated by Eugene Garfield. Further they have strongly supported the postulates of Ranganathan and Garfield.

Subba Rayudu and Surendra Babu (2014)\textsuperscript{161} have studied 7,444 citations of 43 PhD theses in philosophy of the University of Hyderabad during 1986-2012. This study reveals that 80.62% were book citations, 53.16% were geographical distribution, 92.60% is language wise distribution. Based on the data collection and analysis, it is drawn that most of research scholars in the department of philosophy have used books for their research studies than other sources.

Veerabasavaiah and Padmavathi (2014)\textsuperscript{162} have analyzed 42 doctoral theses of Department of Education, Bangalore University, Bangalore. It is found that there were 6688 citations in 42 doctoral theses. The major findings of the study are that journals were the most preferred sources of information by the researchers, i.e. 2637 (39.43%) citations, followed by books with 2537 (37.93%) citations, theses and dissertations with 615 (9.20%) citations and so on. The Journal of Applied Psychology was ranked first with 137 (5.20%) citations followed by the Indian Educational Review with 97 (3.68%) and the Journal of Educational Research with 75 (2.85%) citations, single-author articles were the most cited with 1425 (54.04%) citations. USA contributed 22 (63.94%)
out of 37 journals that were cited, followed by India with 10 (24.70%) and UK with 5 (11.36%) journals.

Rajneesh and Rana (2015) have analyzed and evaluated the citation behavior and use pattern of computer scientists / researchers. In the bibliographic document types referred by the authors, the primary research literature i.e. journals and proceedings dominated most. The citing literature ‘half-life indicates the dominance of current citations / literature. This study concludes that the most recent document are being referred in the computer science. The overall half-life of computer science literature indicates that new libraries on computer science can consider acquiring 14 years back literature. Only 3926 citations (36.88%) have been authored by single author whereas 6719 citations (63.12%) were authored by more than one author i.e. multiple authors. It is evident that computer science being one of the emerging disciplines, most of the studies have been cited which were collaborative in nature.
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