CHAPTER II
REVIEW OF LITERATURE

This chapter examines the review of works relating to various aspects of bibliometric studies. It could be observed that there are various research studies highlighting the importance of bibliometric analysis and their applications to library management and administration. This type of analysis enables the researcher to identify the research gap in the previous studies.

Review of related studies further avoids the duplication work that has already been done in that area. It also helps the researcher to study the different aspects of the problem. It enables the researcher to identify the unexplored areas, in order to create new grounds for research. By considering this efficiency of various dimensions of bibliometric studies, the researcher has presented the review literature on the basis of chronological order.

1. Eugene Garfield (1983) carried out the first major analysis of world research output, with particular reference to third world science publications in 1973, using SCI database and their citations received from 1973 to 1978. India and Argentina were the only two developing countries ranked 8th with 7888 papers and 15515 citations, and 25th with 1526 papers and 4110 citations, respectively finding place among top 25 countries. Out of the 353000 articles indexed in the 1973 SCI file, only 16000 articles were authored from the 93 third world countries. India accounted for half of all the articles from the developing countries displaying evidences of its upward research trends. Though India has been numerically raising its output in
various disciplines, the distinction it enjoyed during 1970s and 1980s has been lost or shared to many developing countries.

2. Gupta, D.K. (1989)\(^2\) in this part II paper has discussed with the application aspect of Lotka’s to the psychological literature of Africa for the period 1966-1975. Lotka’s law did not apply to the data in its original form as inverse-square law 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 Lotka’s law.

3. Gupta, D.K. (1989)\(^3\) in this paper had presented a methodological and mathematical study of Lotka’s law. Analyzed a database consisting of 611 items on African psychology for the period 1966 to 1975 to study the author productivity pattern and to test the applicability of Lotka’s law. Concluded that the maximum difference, in the case of generalized form of Lotka’s law, in the observed and estimated values of the proportions of authors was found to be highly insignificant at 0.01 level of significance.

4. Klaic (1990)\(^4\) the research activity of chemists from ‘Rugjer Boskovic’ Institute (Zagreb, Yugoslavia) was analyzed for the period 1976-85, covering 1149 SCI registered papers. The papers were published in 235 different journals, most frequently in the national Croatica Chemica Acta (171 papers). The publications were divided into 2 groups: for the periods 76-80 and 81-85, and for each paper citations were 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
for Yugoslav papers, general. The distribution of citations was analyzed. A database consisting of 25,669 items was analyzed to study the growth of literature.

5. Vaishnava, A. and Deo, V.N (1993) and subject wise growth, while a database of 15287 items was analyzed to study authorship trend, author's publishing outlets, journal literature, its distribution and application of Bradford's Law. Growth of literature was found in two stages: Maximum literature is covered in the area of computerized information storage and retrieval, cataloguing, information services, etc. Financial management, and classification, are the evolving subjects and computerized citation indexes, printed catalogues, etc. seem to be decaying. Works were found to be contributed in a highly individual manner at the initial stage (88.44%) while at the stage of maturity the tendency of increasing co-operation and team work is becoming popular. Lotka's law in its original form as inverse square law does not apply to this set of data but however, it does apply in its generalized form. The K-S test was carried out applied to test the applicability of generalized form of Lotka's law.

6. Kademani, B.S., Kalyan, V.I., and Kademani, A.B, (1994) were analyzed Dr. C.V. Raman’s publications by year, collaboration pattern, channels of communications used, etc. The results indicated that the temporal variation of his productivity and of types of papers published by him was 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 light’, 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 1936-40. Self-citations rate for his publication was 15.05.

7. **Kanungo, N.T. (1995)** conducted a study on citing patterns of Indian Political Scientists in the journal ‘Indian Journal of Political Science’ for the period 1990-93, 3509 citations were cited for 119 articles. The analysis revealed that 88.37% authors were Indian; only 11.63 belong to foreign countries. There were 89.08% single author 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 Indian and 58.14% were foreign.

8. **Zhang Hq. (1995)** analyzed the references of articles on acupuncture searched by the Medline during the period from 1988 to 1992. The 1457 articles distributed in 382 periodicals were illustrated in order to identify reasonably a hierarchical ranking of periodicals according to the number of articles and to evaluate objectively a distribution of countries where those articles were contributed and languages in which those articles were written. Over this period, the numbers of authors ranged from one to 10+ and the mean number of authors is 2.68.

9. **Bandyopadhyay, A.K. (1996)** conducted a Bibliometric study of the citations in 27 doctoral dissertations in mathematics submitted at the Burdwan University from 1981-1990. 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 were presented. In the source wise distribution, journal articles shared 78.58% and 16.31% by books. A list of 384 journals cited 35 ranks was generated.

10. Leta, J and Meis, L.D. (1996)\textsuperscript{10} the Brazilian contribution to publications in science and humanities increased from 0.29 percent of the worldwide total in 1981 to 0.46 percent 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 percent of Brazilian publications were in life sciences, 35.4 percent in exact sciences, 3.9 percent of in earth sciences and 2.9 percent in humanities. The 10 institutions with the largest number of publications were Universities, which account for half of all the Brazilian publications. The total number of authors on the Brazilian 1981-93 publications was 52,808. Among these 57.8 percent appeared in only one publication and 17.5 percent had their publications cited more than 10 times.

11. Cheng Huanwen, (1996)\textsuperscript{11} analyzed formally published journal articles in library and information science (LIS) in China from 1985 to 1994. The aim is to study how research articles were distributed over various topics, what research methods were applied, and what the similarities and differences between LIS research in China and in the world are. 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 concerned the basic theory of LIS (26%-32%) and information service (20%-25%). The most popular research strategies were historical method (25%-19%) and not applicable (16%-14%), whereas the least popular were
experiments (0.2%-0.5%) and survey method (4%-1.6%). The main difference is that LIS research in China trended towards theoretical research, but in the world towards applied research.

12. **Mete, M.V. and Deshmukh, P.P. (1996)** observed citation analysis of 1824 citations from 202 articles published in ‘Annals of Library Science and Documentation’ for the period 1984-1993. Bradford’s Law of Scattering was testified with the journal citations and it was found that 23.13% of the total journals meet 67% of the requirements. The half-life of LIS literature is found to be 8 and 12 years for journals and books respectively. It was observed that 40.63% of the cited journals were from India, 24.76% from USA, and 21.27% from UK and rest by other countries.

13. **Mubeen, M.A. (1996)** analyzed citations of 22 doctoral dissertations in chemistry submitted to Mangalore University since its inception. The study has identified 60 core journals, out of total 418 journals, referred to by the researcher. Of the citations 73% pertained to journals, 11.48% to books, 9.24% to patents and the rest 6.28% to technical bulletins, thesis etc. Of all the countries, USA dominated for 30.2% citations, India followed next with 20%, and U.K occupied 19.31% and rest by other countries. Single author contributions aggregated 27.49% citations, two authored contributions with 22.66% and three authored contributions with 15.36%.

14. **Biradar, B.S. and Vijayalaxmi, T. (1997)** discussed the pattern of information used by researchers in the field of Neurology. They identified the
average number of references per dissertations as 93, the use of different source of information and stated the obsolescence of literature. Source-wise distribution revealed that 80.20% of citation belongs to periodical articles followed by books 17.36%. The published sources had contributions with more than two authors as 79.35%.

15. Deshpande, M. and Rajyalakshmi, D. (1997) conducted 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 indicates that the Annals of Library Science and documentation was the most cited journal shared 3.23%, IASLIC Bulletin and college and research libraries shared 2.67% each. Journal source material shared 68.74%, books shared 16.47% and rest of thesis, reports etc.,

16. Humayoon Kabir, S. and Kemparaju, T. D. (1997) studied the languages and the format of publication in the field of Bibliometrics, based on the data collected form LISA from the year 1964 to 1990. The study revealed that English shared 76.28% and journals shared 91.41% dominated language and format respectively.

17. Siddiqui, M. A (1997) examined the authorship characteristics in four major information science journals. In this study he determined the details of their authors, such as sex occupation, affiliation, geographic distribution, and institutional affiliation. A total of 163 articles written by 294
authors were analyzed. Findings indicate that males (206 or 70.0%) publish 3.0 times more compared to females (69 or 23.5%), and the school of library and information science contributed the most male (39 or 78%), and female (11 or 22%) authors. Maximum numbers of authors (148 or 50.3%) were located in the U.S.A. with the Midwest (37 or 25.0%) region claiming the largest share. Academic libraries (110 or 37.4%) account for the major share of publication. Thirteen library and information science schools from the U.S.A. contributed 32 authors (50.0%). Assistant professors (25 or 39.1%) publish the most in library schools. Male library and information science school authors publish 1.6 times more in comparison to their female counterpart.

18. Zhang, H.Q. and Zhang, Y.H. (1997) analyzed the research performance in China. Research performance in China has increased appreciably during the past few years, both in regard to relative output of publications and in their impact on the international research productivity. The purpose of this survey, based on the data recorded in the Science Citation Index (SCI) database between 1987 and 1993, is to study the research performance in the People's Republic of China. The 35,087 papers published in domestic or foreign periodicals were selected for analysis and evaluation of the distribution of publications and citations, for the numerical characterization of research performance in China. The findings indicate that 17,687 papers covered by the Source Indexes of the SCI in the period 1990-1992 had received 7944 citations in the year 1993 and that the mean citation
rare is 0.45. The number of cited papers is 4491 and the proportion of cited papers to the total is 0.25.

19. Sudhier, K.G. (1997) conducted a quantitative treatment of the characteristics and behaviour of scientific research output in Kerala during 1979-94 to find out the growth rate of literature, subject wise distribution of publications, authorship pattern, relative contribution of institutions and scientific productivity of different districts in the state. In the subject wise distribution agriculture and related fields (27.22%) had majority of the contributions followed medical sciences (16.11%) in 1979. It had been observed that two-author papers retained their supremacy in all the four years. Vikram Sarabhai Space Center of ISRO, Thiruvananthapuram was the leading research center in the state having more number of publications with an average of 14.67% of the total contributions in 4 years.

20. Damodaram, T. (1998) reported results of a bibliometric study of the doctoral theses on aspects of the growing and use of groundnuts in India, which aimed to find out Doctoral Dissertations on groundnut in India in terms of year wise, crop wise and discipline wise growth during the period 1948-1996. Total state agricultural universities were published 70% theses and 20% by the traditional universities in India. It is observed that around 45% of the total theses were generated in the two important disciplines of crop production and crop improvements.

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 showed that, during 1966-1997, a total of 308 articles, authored by 116 librarians were published in various periodicals with the highest number (256, 83%) in Bangladesh, followed by India (21, 6.82%). All these papers were published in 37 periodicals originating from 14 countries. About 92 percent of the articles were credited to the single authorship and only 25 articles were coauthored.

22. Kumbar, M. and Akhtary, S. (1998) analyzed 7,451 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, and obsolescence of literature and the ranked list of cited periodicals were observed. Results indicated that major type of document cited was periodical as 682 (91.63 percent); authorship pattern showed the highest contribution made by 3 authors (72 percent). Research going back 25 years in this field accounts for 6,192 citations (90.17 percent): the US journal Ophthalmology had the highest overall number of citations at 998 (14.62 percent).

23. Devarai Rajasekhar, S., Ramesh, L.S.R.C.V and Hussain, M.V. (1998) analyzed M.N. Srinivas’s publications by year, domain, authorship pattern, channels of communication used, etc. By the end of 1995, Srinivas had to his credit 144 papers which included 33 broad papers in sociology and anthropology; 18 papers in social change; 28 papers on village studies; 12 papers in religion; 17 papers on caste and 36 papers of
general popular interest. Indian publishers published 119(82.64%) articles; foreign publishers published 22(15.28%) articles and 3(2.08%) articles by both.

24. Rodriguez, S.M., and Moreno, A.S. (1998) presented a bibliometric analysis of the journal "Psicothema" from the time of its first appearance in 1989 until July 1997. The principal findings were as follows: a total of 342 articles were published in 20 volumes, with an average of 17.1 articles per journal edition. 38.81% of the articles were the work of 2 authors, 28.94% were by one author and 19% by three authors, this being an average of 2.272 authors per article. The most prolific author was P.J. Ferrando Piera, who was responsible for 8 articles, followed by M.C. Luciano with 7 articles, and by 4 authors with 6 articles each. 94.35% of the authors of the articles were based at universities. 17.19% of them at the University of Oviedo and 11.54% at the Complutense University of Madrid. In accordance with their thematic content we found that 28.36% of the articles corresponded to the category of "Basic Psychology", 23.97% to "Methodology" and 23.09% to "Personality, Evaluation and Treatment".

25. Thajudin, S. (1998) analyzed articles published in the Journal of Plantation Crops during the period 1973-96 to find out nature of communication, geographical distribution, authorship pattern and citations. Indian authors had contributed 89.96% and foreign authors had contributed 10.04 % articles. The maximum number of contributions was on coconut 167(29.93%). Central Plantation Crops Research Institute had contributed
42.83% of the total contributions. Two author papers had accounted 38.17% followed by three author papers 26.34%.

26. **Tiew, W. S (1998)** he selected the ‘Journal of Natural Rubber Research’ during the period 1987-1996 for Bibliometric analysis. His aim is to find out the authorship pattern, the range and frequency of references cited the extent of acknowledgement & appendix and the type of collaborative research. Multi authored research paper is 72.1%. The range of references cited 16.49%, 74.81% contained formal acknowledgement and 7.75% of research articles contained appendix. The collaborative paper among natural rubber researchers is quite high at 72.09%.

27. **Arkhipov, D.B (1999)** reviewed 300,000 reports in Nature during the period 1869-1998. The distribution of articles by subfields was determined. Additional sources of information were several journals on analytical chemistry and papers at the Pittsburg conference series during 1950-1999. The methodology used is based on the analysis of the average age of employed instruments. The agreement between scientometric data from various sources of information depends on the development stage of the field of science. Calculated and measured scientometric curves were compared. One of the key trends in the development of basic sciences, namely, the increase of articles dealing with instrumental analytical chemistry, in Nature is revealed.

28. **Barooah,P.K.,Begum,D. and Sharma,N.N.(1999)** conducted a Bibliometric analysis on 4253 citations collected from doctoral dissertations
submitted to various universities by the S&T workers worked in the area of organic chemistry during 1977 to 1997. It was observed 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.

29. **Ian Rowlands (1999)** conducted a bibliometric investigation into the structure & dynamics of the information policy journal literature. The unit of analysis is a document test collection of 771 articles published between 1972-1996. The investigation focuses on patterns of growth, knowledge accumulation, ageing and obsolescence, documentary scatter and knowledge production. It includes that the structure and dynamics of the information policy journal literature diverges in several respects from typical social science literatures. Information policy is characterized by very rapid growth, high immediately (in Price’s sense), rapid reception and ageing processes and relatively low documentary scatter.

30. **Hook, S.A. and Wagner, C.F. (1999)** three original periodicals selected for analysis using the prescribed methodology, Dental Assistant (DA); Journal of the CDAA (JCDAA) (Canadian Dental Assistant’s Association); and Dental Teamwork (DT). DT ceased publication in December 1996; however, it was considered a necessary part of the analysis due to its extensive coverage of dental assisting as well as its numerous scientific articles with references. In DA, there were 16 source articles, containing 206 citations. In DT, there were 31 source articles with 308 citations.
there were only 3 source articles with 14 citations. Bradford’s Law of Scattering was applied to the periodical citations.

31. Ramakrishna, N.V. and Pangannaya, N.B. (1999) in this study identified core and significant literature for animal cell culture technology based on citations culled from the serial publication Animal cell Biotechnology. In addition to determine country, subject, physical format, chronological distribution of core journals in animal cell culture technology, the obsolescence and citation peak of journals in animal cell culture technology had also been worked out. The degree of collaboration in animal cell technology was 0.839%, which cleared the prevalence of non-solo research in the field. In the geographical analysis USA contributed 56.81% followed by UK with 28.41%. The half-life of animal cell culture technology literature had been identified as 10 years.

32. Adithya Kumari, H. and Shivaram Rao, K. (2000) studied the most frequently cited periodicals by biological scientists in India, analyzed articles published during 1992-1995 in the journal ‘The Nucleus’. Using bibliometrics methods identified the type of publications cited, together with authorship patterns of contributions and countrywide distribution of these periodicals. It was clear that major channel of communication was mostly by journal articles 66% of the total citations. Books contributed 14% and the rest by conference proceedings, reports, thesis and dissertation. 37.79% of cited documents were from USA and 13.38% from UK, 10.03% from India. Nearly 23.6% of the cited documents were from Genetics and 18.9% from Geology.
33. **Garg, K.C. and Padhi, P. (2000)** analyzed 766 publications by prolific authors in scientific journals indicates that prolific authors produce about 25 percent of the total scientific output in periodical literature in laser science and technology. The average productivity per author was about 2. Prolific authors from most of the countries belonged to either academic or research institutions except in the USA and Japan. Prolific authors on the average made more impact than non-prolific authors. The situation varied from country to country.

34. **Biradar, B.S. and Mathad, S. (2000)** conducted a study based on the references appended to articles appearing in the journal ‘Annual Review of Ecology and systematics’ for the year 1995-1996. Identified the major forms of literature, core journals, authorship patterns, obsolescence of literature etc. Results included the information that the largest number of citation were from American literature (63.9666 percent); single author papers amount to 34.694 percent; more than 80 percent of the citations had been published in the past 15 years; and 23 of the 85 journals account for 50 percent of cited journal articles.

contributions were 87, which were published in 1997. Over 83 percent of the articles were published in periodicals from the UK, USA, Netherlands and Malaysia.

36. Kademani, B.S., Kalyane, V.L., and Vijai Kumar (2000) in their paper analyzed the citations to the publications of the 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 distributions of citations among them were determined. 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 percent of total citations. Reviews had cited 62 times which was 11.64 percent. Mean citations per year were 12.11. Total team self-citations were 37.70%. Highest total team self-citations were found in 1971, 1972 and 1970 having 29, 16 and 15 citations respectively.

37. Kim, M.J. and Kim, B.J. (2000) reported the results of a bibliometric study to examine the research performance of chemists at Seoul National University (SNU). Using the numbers of articles appearing in periodicals and the number of citations received by those articles covered by the Science Citation Index (SCI) during the seven-year period were considered. US and Korean periodicals published in English were utilized predominantly, followed by UK periodicals. Among 651 publications, 388 were cited 2,376 times.
38. Mahaputra, G. and Das, B. (2000) analyzed the nature of the growth of literature on geology between 1987 and 1996. 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 of value 551 (11.45%) publications. In the authorship pattern 36.58% were contributed by two authors, 29.16% were contributed by single authors and the rest by three and more than three authors.

39. Ramesh, L. S. R. C. V., Ramana, P. V. and Hussain, M. V. (2000) analyzed the papers published in the quarterly International Rice Journal ‘Oryza’ between 1986-1995. The yearly distribution of papers, authorship patterns, geographical location of contributors, subjects covered, average length of articles etc, were analyzed. Author affiliations emphasized 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.

40. Saptarshi Ghosh (2000) analyzed 1374 citations from 117 contributions published in ‘Library Science with a slant to documentation and Information Studies’, vol.32-36, showed that the contributing authors were mainly working librarians or professionals that that of the teaching faculty. Average number of citations appeared as 11.74. Out of contributions 6 had no citations. Total number of journals cited was 664 (48.33%), which was nearly half of total citations. Eugene Garfield appeared as the most productive author.
i.e. 45 citations, in the trend of contributing articles was mainly on bibliometrics or citation analysis during 1995-1997. ‘Library Science with a Slant to Documentation and Information Studies’ was the most cited journal was cited 55 times (8.28%) followed by th ‘Current Content’.

41. Sivasubramanian, V. (2000) reported the results of a bibliometric study of articles published in the Journal of Indian Coffee, which has been published by the Coffee Board. Analyzed the authorship pattern, the range and frequency of references cited and year-wise distribution of papers. Most of the articles dealt with topics plantation, cultivation and processing in the first order i.e. 22.46% followed by standards and quality as 15.26%. The average length of papers ranges between 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.

42. Suryanarayana, Y. V. (2000) reported results of a bibliometric analysis of contributions of the periodical ‘Tobacco Research’ to the literature for the years 1987-1997. 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 a core list of periodicals. It was observed that Central Tobacco Research Institute and its research stations contributed 52.6% ranked first. It was evident that Tobacco Research journal from India cited 382 times occupied first position followed by Tobacco Science from foreign which was cited 157 times. Papers on different subjects under flue-cured tobacco occupied 41.4% followed by bidi tobacco 29.3%.
43. Tiew, W.S. (2000) analyzed the extent of periodical self-citation and author self-citation in the research articles and short communications published in ‘Journal of Natural Rubber Research’ during 1988 to 1997. Results showed that 53 percent 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 (61.4 percent) who contributed articles to the periodical cited 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.

44. Bandyopadhyay, A.K. (2001) collected references appended to 92 Doctoral theses submitted to Departments of Mathematics, Physics, Mechanical Engineering, Philosophy and political science, University of Budwan, India from 1981 to 1990 were taken as the object of the study. Extent of multiple authorship and degree of authorship collaboration were studied. Within broad subjects, multiple authored articles were found to be highest in physics (62.24%). While 36.6% of articles in Mechanical engineering, 36.3% of the articles in mathematics, 12.3% of the articles in philosophy and 3.85% of the articles in political science were multiple authored. The degree of collaboration was the highest in physics (0.62%) and the lowest in political science (0.04%).
45. **Das, A.K. and Sen, B.K. (2001)** analyzed 1049 citations appended to 34 research articles pertaining to issue nos.2 to 4 volume 20 of ‘Journal of Biosciences’ for the year 2000. The authorship pattern of the citations showed that 18.68% papers were single-authored, 52.71% were double and triple authored and remaining 28.61% were joint contributions of four or more authors. Of the cited articles 5.53% were Indian and the rest by foreign authors. Author self-citations shared 10.87% and journals self-citations shared 0.57%.

46. **Dutta, B. and Sen, B.K. (2001)** conducted a study with 1011 citations appended to 27 research articles. The number of citations and cited authors per article was found to be 37.44% and 85.19% respectively. On average one citing author had cited 38 authors.

47. **Lewison, G. (2001)** examined that the output of female researchers in Iceland, relative to that of males, can be investigated because typically their "surnames" end in "dottir" whereas the names of males end in "son". Over the 21 years from 1980 to 2000, there has been a rise in female: male output from 8% to about 30%. It is higher in the life sciences (biomedical research, biology and clinical medicine) but lower where there is also foreign co-authorship, suggesting that females are less able to make overseas contacts through travel. There appears to be no difference in the quality of female and male research output, as measured either by journal impact categories or by citations.
48. Parameswaran, M. and Smitha, K.G. (2001) all of the 60 issues of LISA published from January 1994 to 1998 were analyzed manually using a specially prepared data sheet. The subject headings listed LISA were further grouped into 16 classes on the basis of their mutual relations. This helped to analyze the subject wise break up easily. The data collected manually using the datasheet was compared with the data available from the CD-ROM. The extent of collaborative authorship was measured using Subramanyam’s formula and the results 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.


50. Sinha, S.C. and Dhiman, A.K. (2001) observed research articles published in Indian and foreign journals by Dr. R.C. Sinha. Out of 97 papers published in different journals and as book chapters: 1 as Indian journal, 78 as Foreign journals and 18 as Book chapters. As a Single author, he published 30 articles and as joint author 67 articles.

volume is between 14 and 17; average number of references per article was 22.5; the average length per article is 41.2 pages; 53 (69.74 percent) of the articles are research oriented; the percentage of multi-authored papers is slightly higher at 52.6 percent or 40 papers out of a total of 76; the most prolific author contributed 12 articles; 36 (45 percent) of the authors are geographically affiliated to Malaysia; authors affiliated to library schools were well represented (55.2 percent); the most productive institution was faculty of Computer Science and Information Technology, University of Malaya with 26 out of 80 author’s affiliation; the most popular subject is Scientific and Professional publishing; 30 (39.5 percent) articles contained author’s self-citation, while the rate of periodical self-citation is found to be 27.6 percent and most of the articles (67.1%) contained no formal acknowledgement.

52. Dutta, B., Das, A.K. and Sen, B.K. (2002) covered 2800 citations appended to 152 articles published in 2001 in eight scholarly journals published by National Institute of Science Communication and Information Resources. On average there were 18 citations per article and 3 authors per citation. Journal articles accounted for about 79% of the citations. Monographs ranked second with 12 percent. Indian Journal of Marine Science received high percentage of journal self-citation compared to others whereas Indian Journal of Chemistry received high percentage of author self-citation compared to others. Indian citations received by all journals figured only 10% on average.
53. Monique Gomez (2002) analyzed references cited in the articles published by authors, kinds of publications and which journals are mainly used. He also studied the ages of the cited journals and their cost-effectiveness. 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.

54. Macias-Chapula, C.A. and Mijangos-Nolasco, A. (2002) conducted a bibliometric study on AIDS literature from 1980-2000. Seven countries and 1052 records were identified. Main participating countries were Democratic Republic of the Congo and Cameroon. Results indicated a high pattern of collaboration through multiple authors. Most documents were published in English and French. Over 57 percent corresponded to journal articles.

55. Nalini, J.K. (2003) analyzed a total of 43 articles published during 1999-2000. These articles received 3 citations in the year 2001. The calculated impact factor for IJOH was found to be 0.07 for the year 2001. Since all the citations were journal self-citations, the calculated impact factor was an Internal Impact Factor.
56. Pelzer, N.L and Wiese, W.H. (2003) analyzed the citations from 2,159 articles published in twelve core veterinary journals in 2000, to determine the portion of citations from grey literature. Those citations were further analyzed and categorized according to the type of publication. Results: Citation analysis yielded 55,823 citations, of which 3,564 (6.38%) were considered to be grey literature. Four veterinary specialties, internal medicine, pathology, theriogenology, and microbiology, accounted for 70% of the total number of articles. Three small-animal clinical practice journals cited about 2.5-3% grey literature, less than half that of journals with basic research orientations, where results ranged from almost 6% to approximately 10% grey literature. Nearly 90% of the grey literature appeared as conferences, government publications, and corporate organization literature.

57. Senthil Kumaran, P. and Vadivel, V. (2003) conducted a Bibliometric study of the ‘Spice India’ Journal for the period 1997-2001. Based on collected data, the year-wise distribution of articles, year-wise distribution of citation, authorship pattern, length of articles, subject wise breakup of articles and leading authors were analyzed.

58. Susanta Koley, and Sen, B.K. (2003) examined 457 citations appended to 26 research articles published in the four issues of the quarterly Indian Journal of Physiology and Allied Sciences, vol. 55 (2001). The articles are contributed by 75 authors (74 - Indian). From the citation count it appears that the solo research in physiology is quite substantial (about 24). Though about 77 of the work is the result of team research, the team size is found to be small ranging from 2 to 5. Of the citations, 76.81 per cent relate to journal
articles, 18.59 to monographs, and the rest to conference papers, theses, etc. The ratio of Indian to foreign citations is found to be almost 1:6. Of the total citations, 4.59 per cent are author self citations, and 2.84 per cent are journal self citations. Of the citing articles one is single-authored, 10 are two-authored, 9 three-authored, 4 four-authored, and one each five-authored and six-authored. No collaboration was noticed in the case of 23 citing articles. The remaining 3 articles were the results of two-institution collaboration

59. Asha Narang. (2004) analyzed 8396 citations appended to 737 articles published in the Indian Journal of Pure & Applied Mathematics, volumes 29 to 33 during the years 1998-2002 and 470 citations appended to 70 articles published in the maiden volume 1 published in 1970 has been carried out to observe the distribution of contributions, authorship pattern, citation analysis, geographical distribution of contributions and number of pages used in each volume. A comparative study of articles published in five volumes vis-à-vis those in volume-I have been made. Results indicate that the number of contributions is increasing in successive volumes. Highest number of papers has been written by joint authors. There was clear predominance in of single authored contributions in vol.1 (92.86%) as compared to those in the five volumes (35.14%). The most cited documents are articles from the research journals. The contributions in this journal from India and other countries are almost equal. Among the Indian states, Uttar Pradesh is the top contributor whereas among the Indian universities/institutes, University of Delhi is at the top. At the International level, India is the top contributor
followed by China. The growth and popularity of this journal is found to be showing an upward trend.

60. Ashu Shokeen and Kaushik, S.K. (2004) is aimed to find out the authorship pattern and citation pattern of articles that appeared in Indian Journal of Plant Physiology. The study covers issue nos. 1 to 4 of volume 7 published between January to December 2002, covering 61 articles published in these issues. Overall 1149 citations featuring 2770 authors have been made during the year. The results indicate that 39 articles published (citing articles) in these issues are three-authored. However, it is found that two-authored citations (cited articles) are more common which is followed by single-authored papers. The results reveal that journal articles are predominant with 81 of total citations. The ratio of author self citation to total citations is 1:16.65. The ratio of Journal Self Citation to total citation is 1:31.91. The results also highlight that 398 citations are below 10 years old, whereas 358 citations are below 20 years but more than 10 years old. It is clear that a majority of documents cited in these issues were published not more than twenty years ago.

61. Biradar, B.S. and Thippeswamy, K. (2004) the study was based on 3401 references appended to the 61 M.D. Pediatric dissertations. Authors had attempted to determine the average number of references per dissertation, forms of documents, authorship pattern, and obsolescence of literature and percentage of cited periodicals available in the library. Results indicate that periodicals (79.12%) are the highly utilized source. Three authors (25.3%)
wrote major percentages of articles. 25.98% and 76.70% cited journals and journal articles respectively.

62. Kannappanavar, B.U., Chidananda Swamy and Vijay Kumar, M. (2004) in their highlighted the 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 0.83. Average number of authors per paper has increased from 7.52 to 8.39.

63. Krishna, K.M. and Kumar, S. (2004) analyzed citation analysis of 68 doctoral theses on Agriculture and Veterinary Sciences during 1996 to 2000. The subject wise authorship pattern and trend graph for books and journals were observed. Joint authors had contributed 61%, single 37% and corporate authors 2% of the total citations.

64. Protap Chandra Roy. (2004) conducted a study based on 1637 research papers in Library and Information Science (LIS) published in 10 Indian LIS journals during 1991 to 2000. The single authorship was much in vogue in LIS research work in India. Collaborative work was not much popular among the library information scientists. Here it was found that single author was 66.7%, two authors were 26.45%, three authors were 5.68%, and four authors were 0.97% and six authors were 0.06%. So we could say that single author was dominating in the field of LIS research.
65. Mahapatra, R.K. and Jyotshna Sahoo. (2004) carried out a research programmes at the Ph.D level in Library and Information Science during the period 1997-2003 to find out the trends and areas of research, growth pattern and productivity of universities along with broad and narrow subject areas in the discipline. It presents the analysis of the study with the primary goal of appraising the perspective LIS research community to make them aware of the direction of research.

66. Rao, M.K.D and Gupta, B.M. (2004) analyzed Indo-German collaboration in S&T, through the co-authored publications during the period of 1996-2000. The analysis showed that the bilateral papers was highest in biomedical followed by physics, chemistry, etc. As many as 88 percent of all bilateral papers had been reported in journals having impact factor less than 1.38, the average impact factor of all bilateral papers. Similar result of analysis was shown for the multilateral papers.

67. Senthil Kumaran, P. and Vadivel, V. (2004) analyzed the journal ‘Journal of Spices and Aromatic Crops’ for the period 1992-2000. Based on collected data, the study examined the year wise distribution of articles, authorship pattern, length of articles, subject wise breakup of articles and leading authors. Results on subject wise distribution of articles revealed that the maximum numbers of articles were related to small cardamom 24.35%, pepper and ginger occupied the second and third position shared 14.50% and 13.98% respectively. Data on contribution of research articles by the Institutes/Universities revealed that the scientists of Indian Institute of Spices Research, Calicut contributed the highest number of research articles 40.93%.
68. Cimmino, M.A, et al. (2005) evaluated the distribution and scope of papers published in the world in otolaryngology (ORL) journals and to compare the impact of this research among different countries. Papers published in the 29 ORL journals screened by the Institute for Scientific Information (ISI, Philadelphia, PA, USA) in the 6-year period 1995-2000 were considered. The journal impact factor (IF), the source country population, and gross domestic product (GDP) were recorded. The total number of papers in the ORL literature during the period 1995-2000 increased from 2036 to 3705. A percentage varying between 47.7% (1995) and 36.1% (2000) was published by EU authors whereas the USA accounted for a percentage varying between 28.1% (1995) and 38.8% (2000). In 2000, the leading countries were the USA, the EU, Japan, Canada, and Australia. In Europe the UK (28.5% of papers), Germany (26.2%), Italy (7.2%), Sweden (5.8 %), France (5.5%), and the Netherlands (4.9%) showed a very good performance trend. In the same year, the mean IF of EU papers was 0.8 in comparison with 1.1 for Australia and the USA and 0.9 for the world. In 1997, 1341 key words attributed by the authors and 696 attributed by ISI appeared in the ORL literature. Less than a tenth of them were cited more than twice. The leading key words were "cancer" for disease and "surgery" for treatment.

69. Anil Kumar Dhiman and Yashoda Rani Y.(2005) analyzed five year issues of Journal of Indian Botanical Society. As it was an Indian publication, obviously Indians preferred to write for this journal yet one article reported to come from Utah. On average, around 17 references
appeared per paper and the average length of papers comes to 4 pages per article.

70. Goel, K. (2005) analyzed 1942 Indian papers to know: authorship pattern; productivity of Indian institutes; core journals; scattered papers and chronological research trend in discipline by using bibliometric techniques. It was observed that joint authorship was prominent with a 72% contribution; while single author made only 28% contribution. Indian universities and colleges were at the first rank with 42.84% papers and the Indian Institute of Management was to the bottom with 1.18% papers. The Indian Journal of Psychiatry was at the first rank with 13.90% in the list of core journals. 73.94% papers were produced by Indian Psychologists published in Indian journals in comparison to 26.06% were published in journals from the rest of the globe.

71. Monawwer Eqbal (2005) observed in year wise distribution of items that the highest number of document were produced in the year 1992 with 286 items, i.e., 13.39% on the subject. The most dominating subject in which literature on Personnel Attitude and Job Satisfaction had been produced Organizational Behaviour with 823 items, i.e. 38.54%. In the analysis of core journals, it was found that ‘Journal of Organizational Behaviour’ published from USA was most productive, reporting, 214 articles i.e.10.02% followed by ‘Journal of Business Research’ published from USA with 117 items, i.e. 5.48% and ‘Journal of Vocational Behaviour’ published from USA with 80 items, i.e. 3.74% respectively.
72. **Kademani, B.S., et al. (2005)** analyzed quantitatively 475 papers published by the Bio-Organic Division of Bhabha Atomic Research Centre during 1972–2002 in various domains like Synthesis (202), Bio-organic Chemistry (100), Biotechnology (70), Natural Products (53), Waste Management (30), Supra-molecular Chemistry (18) and Organic Spectroscopy (2). The highest number of publications in a year were 38 in 2001. The average number of publications per year was 15.3 and the highest collaboration coefficient 1.0 was found in the years 1972, 1976-1977, 1980-1985, 1987, 1989-1990 and 1993. The most prolific authors were: A. Banerji (125), V. R. Mamdapur (93), S. Chattopadhyay (86), M. S. Chadha (61), S. K. Nayak (37), A. Chattopadhyay (30), L. P. Badheka (26), G. J. Chintalwar (26), S.K. Ghosh (25), and N. B. Mulchandani (25). The core journals preferred by the scientists to publish their papers include: Indian Journal of Chemistry-B (56), Tetrahedron Letters (20), Synthetic Communications (15), Journal of Organic Chemistry (14), Biotechnology Letters (12), Phytochemistry (12), Tetrahedron Asymmetry (11), Journal of Chemical Society- Perkin Transactions –I (10) and Molecules (10).

73. **Rajendran, P., Ramesh Babu, B., and Gopalakrishnan, S. (2005)** analyzed the global output of ‘fiber optics’ research. Articles covered in the Ei-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 analyzed. The year 2001 had recorded highest number of articles 1761(21.2%) followed by 1731(20.9%) in 2002. The lowest numbers
of articles 1548(18.6%) were in 2003. In the core journal analysis 581 papers (17.69%) had been published in ‘Journal of Lightwave Technology’, 483 (13.33%) in ‘Optics Communication, and 303 (9.22%) in ‘Electronics Letters’.


75. Tilak Hazarika. (2005) analyzed the citation pattern of research papers published during 2000 to 2002 in the Indian Journal of Forestry. Of the total 3798 citations appended to 252 research papers, the highest of 60% citations are from journals followed by that from books and monographs (28%) and from technical reports (5%). The obsolescence factor of forestry literature is found to be 17-18 years. Forestry literature complies with the Bradford’s Law of Scattering. Based on the number of citations received, rank list of forestry journals published from India as well as abroad is prepared.

76. Vijay, K.R. (2005) highlighted the collaborative research and authorship trend in the area of food science and technology in India. The present study has revealed that collaborative research was preferred to solo research in the area of food science in India and the degree of collaboration was found to be 0.91. The average number of authors per paper also showed
an upward trend from 4.89 in 1994 to 8.2 in 2003. The publication pattern from different institutions has also been studied to determine the pattern of contributions from the different organizations and institutions.

77. Biradar, B.S. (2006) examined the references appended to the articles published in Indian Journal of Environmental Protection volumes. 14, 19 and 24 published in the years 1994, 1999 and 2004 respectively. Study highlights the authorship trend and collaborative research in environmental science during 1994, 1999 and 2004. The study found that team research is preferred in the field of environmental science rather than solo research. The degree of collaboration varies from year to year and is found to be 0.78 to 0.95. The overall degree of collaboration is calculated and found to be 0.85. The study also found that on an average 11.595 references are referred to by each article. Major contribution is made by universities (31.622%) followed by colleges (24.054%) and research institutions (23.784%). It is also observed that the proportion of single authored papers have decreased from 20.290% in the year 1994 to 4.762% in 2004.

78. Kamal Lochan Jena. (2006) analyzed the journal “Indian Journal of Fibre and Textile Research” for the period 1996 – 2004 has been carried out. The trend of publications such as the year wise distribution of articles, bibliographical distribution of citations, authorship pattern, citation pattern, average length of articles, number of tables and figures used, time lag, geographical distribution of authors and subject analysis have been studied. There were a total of 8114 citations distributed among 35 journal issues having 507 articles. Out of total citations, journals constituted 73.92%
whereas books constituted 11.61%. The average length of articles was observed as 6 pages. In the geographical distribution the highest numbers of contributors were from India with 1167(85.87%). Rest from foreign authors from 21 countries.

79. Mahapatra, R.K. and Padmanav Jena. (2006) described the growth of scientific research literature on Orissa published during 1985-2004. Includes 875 research papers from forty different journals. Analyses 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.

80. Neena Singh and Dominic ,J.(2006) analyzed 687 citation appended to 30 research articles published in four issues of Allelopathy Journal. From the citation count it appeared that sole research in Allelopathy was quite substantial only 32.52%. About 64.48% of the research work/contribution were result of team research. Of the citation count 89.69% relate to journal article, 6.11% to Thesis and 3.79% to conference papers. Indian citations had been found to be more with 65.65% and foreign citation 34.35% of the total citation was author self-citation and 16.16% were journal self-citation.

81. Rekha Mittal, Arti Sharma and Gian Singh.(2006) analyzed 536 papers published on library and information science education during the period 1995 to 2004. The productivity of authors and core periodicals has been determined using Lotka’s and Bradford’s law. Literature growth, country-wise distribution of papers and language pattern has also been
studied. Literature growth in this area of LIS has been found to be negative. Most of the papers have been contributed by single authors (72.8%) and two authors (20.69%) and 72% of literature is published in 72 journals.

82. Swapan Kumar Patra, Partha Bhattacharya and Neera Verma (2006) analyzed the growth pattern, core journals and author’s distribution in the field of bibliometrics using data from Library and Information Science Abstracts (LISA). Growth of literature does not show any definite pattern. In language of publication English occupies (82.25%) first place. Bradford’s law of scattering is used to identify core journals and determines 'Scientometrics' as the core journals in this field. Lotka’s law was used to identify authors’ productivity patterns. About 3,106 (77.65%) authors have only one publication and 470 (11.75%) authors have two publications. It is observed that authors’ distributions do not follow original Lotka’s law. Study also identified 12 most productive authors with more than 20 publications in this field.

83. Swapan Kumar Patra and Prakash Chand.(2006) conducted a bibliometric study on Library and Information Science research literature emanating from India based on the data abstracted in Library and Information Science Abstracts(LISA). Standard bibliometric techniques are employed to analyze 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. The identified core journals are mostly published from India. Indian author’s contribution in
international journals is very low. A list of authors who have published 10 and more papers during 1967-2004 is drawn and presented. Such authors are 37 (1.35%) in number and authors with single publication have major share (74.63%). The author’s productivity pattern is in conformity to Lotka’s law.

84. Biswas, Bidhan,C.h., Roy, Amit. and Sen, B.K.(2007)\(^8^4\) conducted bibliometric study with 358 original contributions published in the journal Economic Botany during 1994-2003. Contributions by single author and small teams comprising two or three authors account for about 80% of the papers. Among the citations, books accounted for 59%, and articles 41%. Citations started appearing from 1998 are still negligible in number. Charts, diagrams, photos and tables included in the articles total 396, 427, 859 and 925 respectively. The length of maximum number of articles (38%) ranges from six to 10 pages. Articles occupying 11 to 15 pages rank next accounting for 31%. The highest number of articles totaling 217 (60.61%) has emanated from academic institutions such as universities. The articles originate from 45 countries. The first four countries are responsible for 51.7%, the first ten countries for 67.8%, and the first 15 countries for 78.6% of the articles.

85. Cosanici,Dragomir.(2007)\(^8^5\) conducted a comparative study of the citation practices of the state supreme courts in the common law jurisdiction of Indiana, Kentucky, Michigan and Ohio, USA during recent ten-year span (1994-2004). It focuses on the type of legal materials most frequency cited as authority, examining the importance of both primary and secondary sources. It specifically analyses the growing usage of electronic citations by the four supreme courts.

S. Ramaseshan has contributed for the better understanding of various subjects in which he specialized during his years at the Indian Institute of Science, University of Madras and the Raman Research Institute. In this paper we would like to emphasis on his scientific contributions in various journals and some classic papers. In his entire career as a scientist he has collaborated with 47 eminent scientists and students and has published a total of 178 papers during the years 1944-2000. His field of interest has been varied and thus classified into 4 main area, i.e.: Crystallographic studies, Magneto-optics & Optics, Solid State Physics and Miscellaneous topics.

87. Sudhier Pillai, K.G. (2007) A case study of the trends in authorship pattern and collaborative research in Physics with a sample of 11,412 journals and 1,328 book citations appended in the Physics doctoral dissertations awarded by the Indian Institute of Science, Bangalore during 1999-2003. The study found that team research is preferred in the field of Physics rather than solo research. The average number of authors per journal articles was 3 and for books it was 1.69. The degree of collaboration in different years was calculated and the average value of it for journals was 0.08 and 0.44 for books. The authorship collaboration is more in journal articles than in books. The study concluded that authorship pattern, the degree of collaboration and the average number of authors were different in journals and in books.

Library & Information Studies’ published during 1999-2005. It examines year wise, institution wise, state wise distribution of contributions, authorship pattern, citation analysis, length of the contributions etc. The study shows that most of the contributions of this journal are contributed by single author and state wise distribution shows the most of that most of the contributions are contributed from New Delhi. Citation analysis of 1456 citations includes finding out average number of citations per contribution, types of publications cited and preparing of ranked list of cited journals in contributions of this journal. The study reveals that journals are the most cited publication amongst the library and information scientists and the source journal i.e. Annals of Library and Information Studies is the most cited journal in the contributions of this journal.

89. Singh ,G., Mittal, R. and Ahmad, M.(2007) aim is to find out the growth and characteristics of digital library literature. Over 1,000 articles for the period 1998-2004 were collected from LISA Plus and were analyzed to study authorship patterns, authors' productivity and prominent contributors, language-wise and year-wise distribution of articles, country-wise distribution of journals, core journals in the subject area, and indexing term frequency. Some of the important findings are that most articles (61 percent) are single-authored; author productivity is not in agreement with Lotka's Law, except in one case where number of articles is three; the maximum number of articles were published in 2003 with English being the most productive language; maximum articles were published in the journal D-fib Magazine; distribution of articles nearly follows Bradford's Law; and USA ranked first for maximum
The paper is relevant to those interested in bibliometrics and provides a comprehensive over-view of authorship in the library and information science community.

90. Rajendiran, P. and Parihar, Y.S. (2007) 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, were 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.

91. Anil Kumar, E. R., Prakasan, V.L., Kalyane and Vijai Kumar (2008) focused on publishing trend; impact factor; authorship pattern; types of articles; institutional collaboration of authors; affiliated institutions of
authors; countries of contributing authors; keyword analysis; and referencing pattern. The number of articles being published in Pramana and its ISI impact factor are increasing. There is an upward trend in number of collaborated papers. Authors from University of Delhi, Delhi; Bhabha Atomic Research Centre, Mumbai; Physical Research Laboratory, Ahmedabad; Institute of Physics, Bhubaneswar; IIS, Bangalore; Tata Institute of Fundamental Research, Mumbai etc, contributed most number of articles. One fourth of the total articles published in Pramana are from out side India, the host country of the journal and the number of articles submitting from other countries is also increasing. Cosmology; super symmetry; chaos; quantum chromo dynamics; phase transition; and quark-gluon plasma are the leading micro-fields of physics to which maximum number of articles published in Pramana. The average number of references per article is found as 21.85 and it is 104.4 when the average is taken only for review articles.

92. Aryati Bakeri. and Peter Willet. (2008) analyzed publication and citation patterns in the Malaysian Journal of Library and Information Science (Mjlis) from 2001-2006, and compares the results with those obtained in an earlier study by Tiew et.al. (2002) covering the period 1996-2000. Our results show that the number of publications has increased from the 76 articles in the Tiew study to 85 articles here, with statistically significant changes in the types of article, in the numbers of references per articles and in the lengths of the articles. The complete set of 161 articles attracted a total of 87 citations, 52 of which were self citations, with 14% of the Mjlis articles having been cited at least once.
93. Bhat, Veena, R., and Sampath Kumar, B.T. (2008) examined Citation analysis of research articles from scholarly electronic journals in the field of library and information science published during the years 2000 to 2006 shows that 81.49% of articles published during the period have web references. Out of 25,730 references, 56.54% of references are print journal references and 43.52% of them are web references.

94. Chaurasia, Kamal Kumar. (2008) analyzed the journal “Annals of Library and Information Studies (2002-2006)” shows a trend of growth in contributions and average number of contributions is 21.4 per volume. Majority of the library and information scientists prefer to do collaborative research and contribute their papers jointly. Most of the contributions are on Bibliometrics (36.45%). IT & Digital technologies in Libraries have also got sufficient papers. The institutional and geographical distribution of contributions is calculated. Most of the contributions are with citations. Majority of the library and information scientists have cited journals in large number (50.15%) while books comes on second with 273 (19.96%) citations. ‘Annals of Library & Information Studies’ cupies the 1st rank & ‘Scientometrics’ occupies the 2nd rank in the ranked list of cited journals.

95. Surendra Kumar and Kumar, S. (2008) analyzed 8093 citations given in the Journal of Oilseeds Research (JOR) published during 1993 to 2004. Out of 8093 citations, 5642 are given in main articles and 2551 in short communications of the JOR. It also analysis types of documents cited and identifies core journals. The paper also covers the analysis of authorship patterns of citations along with calculation of collaboration coefficient.
Geographical distribution of cited references has also been analyzed. Concludes that 20 core periodicals cover more than 50% references and also indicates that collaborative research is prevalent in oil seeds research.

96. Zainab Awang Ngah. (2008) observed the internationalization characteristics of two Malaysian journals, Bulletin of the Malaysian Mathematical Sciences Societ(indexed by ISI) and the Malaysian Journal of Computer Science(indexed by Inspec and Scopus) . All issues for the years 2000 to 2007 were looked at to obtain the following information, (i) total articles published between 2000 and 2007; (ii) the distribution of foreign and Malaysian authors publishing in the journals; (iii) the distribution of articles by country and (iv) the geographical distribution of authors citing articles published in the journals. Citation to articles is derived from information given by Google scholar. The results indicate that both journals exhibit average internationalization characteristics as they are current in their publications but with between 19% -30% international composition of reviewers or editorials, publish between 36%-79% of foreign articles and receive between 60%-70% of citations from foreign authors.

97. Zabed Ahmed,S.M. and Anisur Rahman.(2008) presented the results of a bibliometric analysis of nutrition literature of Bangladesh. A list of periodical articles on various aspects of nutrition research of Bangladesh published during 1972-2006 was compiled for analysis. A total of 636 articles by 998 authors were identified. The articles were published in 100 local and foreign journals. The five-yearly distribution of nutrition literature from 1987 onwards. Lotka’s law is found to be applicable to nutrition literature of
Bangladesh. Bradford-Zipf distribution also appears to be applicable to the literature.

98. Vinitha et al. (2010)\textsuperscript{98} have attempted to analyse quantitatively the growth and development of water resource management research in India in terms of publication output as reflected in Web of Science database for the period between 1982-2009. Scientometrics is concerned with the quantitative features and characteristic of science. Large scale scientific research has become a major impetus of scientific advances.

99. Li and Hou (2010)\textsuperscript{99} have reviewed the changes of 5 Finance and Economics universities based on the analysis of a series of scientometric indicators. The following indicators are calculated for each university: Peer Review, the quality of research output, the quality of academic staff, Foreign content and faculty/student ratio. The stakeholders of higher education institutions use these scientometric indicators to determine the rankings. For more just and impartial, the main emphasis of this paper uses the h-index to grade or rank journals for evaluating university researcher’s performance. The result of ranking of 5 Finance and Economics universities shows that although the method provided in this paper is considered inherently controversial for not being absolutely objective, they are still used as reference to assist in making certain crucial decisions for many research institutions, government funding agencies.

100. Mulla (2012)\textsuperscript{100} has described the bibliometric analysis of 998 articles of on information science and scientometrics (ISS) that appeared in
different journals during the period of 2005-2009. The study reveals that, most researchers preferred to publish their research results in journals; as such 91.98% of articles were published in journals. More numbers (329, 32.97%) of articles were published in 2009. The authorship trend shows that, out of 1703 authors who contributed a total of 998 articles, out of which more number of (376, 40.96%) articles were two authored papers. The degree of collaboration in ISS was 0.78, and the country wise contribution of articles, India would contribute more documents i.e., 83.99% of the total publications. It also further examines year wise distribution of articles, distribution of types of documents, length of the papers, authorship pattern, degree of collaboration among authors, degree of collaboration among co-authors, degree of collaboration among different category of authors, rank wise distribution of collaborators, institution wise distribution of articles, country wise distribution of contributions, state wise distribution of contributions, journal wise distribution of articles.

101. Karpagam et al. (2011) have analysed the growth pattern of Nanoscience and Nanotechnology literature in India during 1990-2009 (20 years). The Scopus international multidisciplinary bibliographical database has been used to identify the Indian contributions on the field of nanoscience and nanotechnology. The study measures the performance based on several parameters, country annual growth rate, authorship pattern, collaborative index, collaborative coefficient, modified collaborative coefficient and subject profile. Further the study examines national publication output and impact in terms of average citations per paper, international collaboration output and
share, contribution and impact of Indian Institutions and impact of Indian journals.

102. Zheng, Yanning et al. (2011) have identified the list of highly-productive countries, institutions, authors, and fields in physics. Based on the analysis, it is found that the USA is the world leader in physics, and Japan has maintained the highest growth rate in physics research since 1990. Furthermore, the research focus at Bell Labs and IBM has played vital important roles in physics. A striking fact is that the five most active authors are all Japanese, but the five most active institutions are all from the USA. In fact, only University of Tokyo is ranked among the top 11 institutions, and only American authors have single-author articles ranked among the top 19 articles. The highest-impact articles are distributed across 25 subjects categories. Physics, Multidisciplinary has 424 articles, and is ranked at No. 1 in total articles; followed by Physics, Condensed Matter. Citations are a way to show how researchers build on existing research to further evolve research. The citation count is an indication of the influence of specific articles. The importance of citations means that it is valuable to analyze the articles that are cited the most. This research investigates highly-cited articles in physics (1979-2008) using citation data from the ISI Web of Science. In this study, 1544205 articles were examined.

103. Jeyachitra.S, Santhi.J, and Rajkumar.B(2013) in this paper, the bibliometric analysis has been conducted with 457 contributions published in ‘Journal of Biomedical Sciences’ during the year 2003-2007. It reveals that the biomedical scientists are heavily influenced by the
collaborative research. From the geographical distribution, the articles originate from 34 countries and the majority of contributions from foreign countries. Totally 19,376 citations have been recorded in 457 contributions; therefore the average number of citations per contribution is 42 which is good enough. The form wise distribution shows that the journal is leading source in all the sources cited by the authors and it is calculated as 15,402.

104. Santhi.J and Jeyachitra.S (2013) The bibliometric studies are frequently used to assess the research publications and to generate information that could be used by policy makers and experts. This study has proven to be the useful tool in the assessment of research publication of scientists in Engineering and Technology. Taking into account the Scientist’s participation in scientific collaboration, publication and productivity pattern have been calculated. The wider application of bibliometric techniques is leading to the development of a new and more precise technique hopefully; the ongoing theorist work would point the way to more innovate techniques. Moreover this study mirrors the actual published results of the work of scientist in the journal ‘IEEE Transactions on control systems Technology’ during the study period.
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