

**ANALYSIS OF CONTRIBUTION BY HUMANITY
AND SCIENCE FACULTY MEMBERS IN NORTH
MAHARASHTRA UNIVERSITY JALGAON DURING
1990-2007: A BIBLIOMETRIC STUDY**

A

MINOR RESEARCH PROJECT

SUBMITTED TO

UNIVERSITY GRANT COMMISSION

Western Regional Office, Pune.

BY

MR. B. T. CHAUDHARI

Librarian

G.V.S. Arts college Bamkheda T.T.

Tal-Shahada, Dist-Nandurbar (M.S.)

(2015-2016)

DECLARATION

I hereby declared that the Minor Research Project entitled “**Analysis of Contribution by Humanities and Science Faculty Members in North Maharashtra University Jalgaon during 1990—2007: A Bibliometric Study**” being submitted to University Grant Commission, Western Regional Office, Pune.(New Delhi) for the fulfilment of Minor Research Project it is my original work and the conclusions drawn therein are based on the data and information collected by myself. To the best of my knowledge and belief, this work has not formed the basis for the award of my Degree or Diploma of similar title.

Place : Bamkheda T. T.

Date :

Mr. B. T. Chaudhari

Librarian
GVS Arts College
Bamkheda T.T.
Tal.-Shahada, Dist.- Nandurbar

CERTIFICATE

This to certify that the work incorporated in this Minor Research Project Report entitled “Analysis of Contribution by Humanities and Science Faculty Members in North Maharashtra University Jalgaon during 1990—2007: A Bibliometric Study” is the original research work carried out by Mr. B. T. Chaudhari , Librarian , GVS Arts College Bamkheda T. T. , Tal-Shahada , Dist-Nandurbar. The text of this project or any part of that text has not been published previously at anywhere for any degree or diploma. Present Minor Research Project is submitted through GVS Arts College Bamkheda T.T. ,Tal- Shahada , Dist-Nandurbar (M.S.).

Principal

GVS Arts College Bamkheda T.T.
Tal-Shahada , Dist- Nandurbar

ACKNOWLEDGEMENT

I express my sincere gratitude to Dr. A. S. Bagul, Principal, GVS Arts College Bamkheda T.T.

I would like to mention a special thanks to H. G. Hosamani, Scientist, INFLIBNET, Gandinagar for giving me a helping hand during this project work.

I would like to thank all the colleagues of my college for their valuable guidance, continuous support throughout this Minor Research Project.

I would like to thank god and my family who are my pillars of strength and encouragement. Their contributions cannot be put in words and I cannot thank them enough.

And last but farthest from the last, I would like to thank all persons who have helped me directly or indirectly with apologies for my inability to identify them individually.

Place: Bamkheda T.T.

Date:

Mr. Bhagwan Tukaram Chaudhari

Principal Investigation

Table of Contents

Chapter No.	Title	Page No.
	Declaration	II
	Certificate	III
	Acknowledge	IV
	Content	V
I.	Introduction	1
II.	Review of Literature	9
III.	Bibliometrics : An Overview	17
IV.	About University	51
V.	Data Collection and Analysis	62
VI.	Findings Conclusion and Suggestions	99
VII.	Bibliography	103

Chapter-1

INTRODUCTION

1.1-Introduction

In the Information and Technology era there is lot of material published in Various form such as books, journals eBooks', e-journals etc. in the information Explosion era information creation rate is increased. But student of library science, Library science professionals, and professor of library science nor aware of what has been published. The Bibliometrics is a quantitative study of patens of written communication of various books, journals & various printed and non-material. Bibliometrics are used for different scientific product & communication, it is called Scientometrics. Bibliometrics term was coin by Derek de solla price in 16th century, Eugene Garfield and Maurice Goldsmith also use the Bibliometrics term in various Scientific production. The main source of factual data for this analysis is the science Citation index & social science citation index. To application of this intellectual Structure for science, Scientometric methods was developed & applied. Further Information of open access Scholarly Publication on the World Wide Web will be Useful for citation and data mining. Kousha, K. (2008)

1.2-Librametrics

Application of quantitative techniques to library and bibliographical work was until recently known as statistical bibliography. Witting (1978) stated that the term 'statistical bibliography' was traced and found used by Hume in 1923. Ranganathan (1948, 1969) announced the term 'Librametry' on the lines of biometry, econometric, and psychometric and illustrated with a few examples of the application of statistics to library science. P.C. Mahalanobis, the founder of the Indian Statistical Institute, Calcutta, stated that the statistics was the 'key technology' for all development and forecasting studies. The 'Bibliometric' term was coined by Pritchard (1969) who described that Bibliometrics was a simple statistical method of bibliography used to evaluate and quantify the growth of a subject. He also described the scope of the Librametry and defined Bibliometrics as the "statistical distribution of the processes relating to establish a theory for the structural aspects of a library". Garfield (1970) and he indicated that proper Bibliometric analysis could identify the present focus of scientific research. Ravichandra Rao (1981) stated that

the information process and handling of information in libraries and information centres were done by quantitatively analyzing their characteristics and behaviour of documents by library staff and library users. The British Standards Institution defines 'Bibliometrics' as the study of the use of documents and patterns of publications in which mathematical and statistical methods have been applied. According to Howkins (1981) the term Bibliometrics implied the "quantitative analysis of the bibliographical features of the body of a literature". More recently Sengupta (1973) has defined this term as the "organization, classification and quantitative evolution of publication pattern of all micro and macro level communication along with the authorship pattern by mathematical and statistical calculus".

1.3-Bibliometrics

Bibliometrics means literally "book measurement" but the term is used about all kinds of documents (with journal articles as the dominant kind of document). What are measured are not the physical properties of documents but statistical patterns in variables such as authorship, sources, subjects, geographical origins, and citations. "The definition and purpose of Bibliometrics is to shed light on the process of written communications and of the nature and course of a discipline (in so far as this is displayed through written communication) by means of counting and analyzing the various facets of written communication. (Pritchard, 1969.)" (Here quoted from Nicholas & Ritchie, 1978). Egghe & Rousseau (1990) write: "Historically, Bibliometrics developed mainly in the West, and arose from statistical studies of bibliographies. Earlier to the term "Bibliometrics" proposed by Pritchard (1969), the term "statistical bibliography" was in use. According to Prichard (1969), it was Hulme (1923) who initiated the term "statistical bibliography". Hulme used the term to describe the process of illuminating the history of science and technology by counting documents. Pritchard's timely proposal caught on immediately, but the content of the term remained somewhat of a problem (Broadus, 1987). According to Prichard, "Bibliometrics means the application of mathematics and statistical methods to books and other communication media". Bibliometrics is particularly related to research in scientific communication. Schmidmaier (1984) discusses the history of Bibliometrics and demonstrates its relation to the concept "the science of science", which is traced to lectures given by Carl Christian Friedrich Krause in 1829. In the former USSR it was G. M. Dobrov's investigation of the science of science from 1966 a pioneer work. Cole and Eales, who analyzed books published between 1550 and 1860 with

regards to developments in subject matter, published the first genuine Bibliometric investigation in 1917. Investigations by P. L. K. Gross in 1927 and H. H. Henkle in 1938 on biochemical literature together with later works by S. R. Ranganathan (1969) and Solla Price (1976) belong to the foundational literature of Bibliometrics (Ranganathan proposed the term 'librametrics' in 1948). In European information science journals Bibliometric investigations began to be popular in the 1970's and 1980's. Hungary, Eastern Germany and Switzerland belong to the countries, which early started to do research in Bibliometrics Bibliometrics is an LIS research method. It is a quantitative study of the literature on a topic and is used to identify patterns of publication, authorship, and secondary journal coverage to get an insight into the growth of knowledge on that topic. This leads to better organization of information resources which is essential for effective and efficient use. Bibliometrics has attained a sophistication and complexity, and has a national, international, and interdisciplinary character. The present study focuses attention on the Bibliometric analysis of publication in the area of ecology. The term "Bibliometrics" was coined by Pritchard in 1969, and its practice can be traced back to the second decade of the 20th century. A very early example of a Bibliometric study was a "statistical analysis of the literature" of comparative anatomy from 1543 to 1860, which counted books and journal article titles, and grouped them by countries of origin within periods. In 1923, Hulme conducted a study on the history of science. His analysis was based on the seventeen sections of the English International Catalogue of Scientific Literature. A third study was the pioneering work of Gross and Gross, reported in 1927. They counted and analyzed the citations in articles in the Journal of the American Chemical Society, and produced a list of significant journals in chemical education. Another prominent work was Bradford (1934) on the distribution of lubrication research. This research formed the backbone of the theoretical foundation of the Bibliometric study, known as the "Bradford's Law of Scattering." Bibliometrics has been known by other names, including "statistical analysis of the literature" (Cole and Eales 1917), while Hulme used the term "statistical bibliography" in 1923. In 1948, the great library scientist S.R. Ranganathan coined the term "librametry", which referred to measurement used to streamline library services. "Bibliometrics" is analogous to Ranganathan's librametrics, the Russian concept scientometrics, FID's Infometrics, and to some other well established subdisciplines such as econometrics, psychometrics, sociometrics, biometrics, technometrics, chemometrics, and climetrics, where mathematics and statistics have been systematically applied to study and solve problems in a given field. The term

“Scientometrics” is currently used for the application of quantitative methods to the history of science, and obviously overlaps with Bibliometrics to a considerable extent. Bibliometrics is a type of research method used in library and information science. It utilizes quantitative analysis and statistics to describe patterns of Publication within a given field or body of literature. Researchers may use Bibliometric methods of evaluation to determine the influence of a single writer, for example, or to describe the relationship between two or more writers or works. One common way of conducting Bibliometric research is to use the Social Science Citation Index, the Science Citation Index or the Arts and Humanities Citation Index to trace citations. The term Bibliometrics was derived from "biblion" (Gr.): book and "metron" (Gr.): measure: and introduced by Pritchard in 1969. Pritchard's article "Statistical Biography or Bibliometrics" appeared in the December issue of the Journal of Documentation in 1969. He stated, "The term (Statistical bibliography) is clumsy, not very descriptive, and can be confused with statistics itself or bibliographies on statistics and defined as "The application of mathematics and statistical methods to books and other forms of written communication". In the same issue of Journal of Documentation appeared Robert A. Alan Pritchard, who first used the word "Bibliometrics," described it as the "application of mathematics and statistical methods to books and other media of communication" This was paraphrased by Robert A. Fairthorne as "quantitative treatment of the properties of recorded discourse and behavior appertaining to it" In a later article. "Bibliometrics and Information Transfer." Pritchard explained Bibliometrics as the "' metrology' of the information transfer process and its purpose is analysis and control of the process". He based his interpretation upon the fact that measurement is "the common theme through definitions and purposes of Bibliometrics" and "the things that we are measuring when we carry out a Bibliometric study are the process variables in the information transfer process" William Gray Potter, editor of the issue of Library Trends devoted to Bibliometrics, followed suit with "Bibliometrics is, simply put. The study and measurement of the publication "patterns of all forms of written communication and their authors" In the same issue. Alvin M. Schrader said it even more simply, "Bibliometrics, is the scientific study of recorded discourse Bibliometrics is tremendous changes of transformation of information in recent era by various new techniques. Which develop and opened the wider scope of webometrics? Bibliometrics is offered a systematic way of information and knowledge accessibility & model retrieval system to modern Library & information science. The terminology of Bibliometrics, webometrics, cybermetrics, informetrics, are

some standard tools of science policy and research management that was transform the time in the last f dacades.it will require details & through some selected study. To complete the analysis upon the terms Bibliometrics and webometrics before entering into the information transmission part. Bibliometrics is a nothing but set of method use to study and measure text & information .Husain (2011). The Bibliometric techniques has includes frequency of word analysis, citation analysis and document measurement, such as number of publication by particular author or research group in a particular country. In the practice of Bibliometrics use is applied to science related document Bibliometrics is tremendous changes of transformation of information in recent era by various new techniques. Which develop and opened the wider scope of webometrics.bibliometrics is offered a systematic way of information and knowledge accessibility & model retrieval system to modern Library & information science. The terminology of Bibliometrics, webometrics, cybermetrics, informetrics, are some standard tools of science policy and research management that was transform the time in the last f dacades.it will require details & through some selected study. To complete the analysis upon the terms Bibliometrics and webometrics before entering into the information transmission part.Bibliometrics is a nothing but set of method use to study and measure text & information .Hussain (2011). The Bibliometric techniques has includes frequency of word analysis, citation analysis and document measurement, such as number of publication by particular author or research group in a particular country. In the practice of Bibliometrics use is applied to science related document.

1.4-Webometrics

Webometrics is a scientific study of the quantitative and qualitative content of information sources & their use.webometrics is use to measure that World Wide Web. in current scenario webometrics research has been focus on the evaluation of web pages without previous information and Knowledge of that particular area.Webometrics is a concern quantitative aspects of how various types of knowledge and information are create, organize & use by various type of users in various context. In the context of different domain of webometrics from other concepts.Bjorneborn and Ingwersen described the webometrics as a quantitative measure that concern four major areas of analysis as follows 1. Web page content analysis 2. Web usage analysis (Including log files of user searching and browsing behavior) 3. Web technology analysis (Including search engine performance) 4. The web link structure analysis

1.5-Objective of the Present study

1. To study yearwise, subjectwise, institutewise, distribution & category wise classification of paper
2. To study the authorship pattern & most prolific contribution of papers,
3. To identify and classify the domain of the website of the open access Electronic Journals.
4. To calculate the number of web pages (S) and external link pages (V) of the website of the open access Electronic Journals.
5. To Calculate the number of Rich Files (RF) and scholar (Sc) by using Google of the website of the open access Electronic journals
6. To rank the open Access Electronic Journals website as per web rank (WR)

1.6-Hypothesis

These objectives set clear goals to present study. There are still chances that the study may deviate from the objectives as it progresses. Hence, it is necessary to have a hypothesis which runs through the objectives. The present study is based on following hypotheses.

1. The Library & Information Science Researcher use more and more electronic Journals
2. A Research trends in Library & Information Science is Changing tremendously.
3. The domain name structures of websites of Open Access Electronics Journals
4. Number of Web pages, Number of link pages, the visibility , Website Rank

1.7-Methodology

The methodology will be applicable in this study is Bibliometrics and webometrics scrutiny. Which is used to analyze in details the bibliographic attributes of the articles published in open access electronic journals of Library & Information science. The researcher will be extracted the information from the open access journals website. The data for this study will be drown from open access electronic journals available through the web without subscription or registration in order to know the authoritative URLs of Open Access Electronic journals in LIs discipline. Directory of Open Access

Electronic Journals. Those e-journals will be selected for the study from the directory of open access electronic journals. Of which all the following criteria, the e-journals should have publication in the English Language only. Data concerning total no of articles this is an analytical and description research is carried out. The research method used in this study is content analysis using indicators such as size(S), Visibility (V), Rich Files(RF), Scholar (Sc). This criteria is an accepted in world by several scientific for webometrics analysis. In order to collect data, researcher is going to use list of open Access Electronic Journals Provide by Directory of Open Access Journals website (<http://www.doaj.org/>)

1.8-Scope and Limitation of the Study

This Study gives an integrated picture of research trends in the field of Library and Information Science by Providing Bibliometrics and Webometrics Study. The Present research is Limited only for open Access Electronic Journals published in English Language in the field of Library and Information Science.

1.9-Organization of the study

The entire research study has been organized into six different chapters. The brief content of each chapter is given below.

Chapter-I-Introduction

This chapter covers basic concept of Bibliometrics and Webometrics, objective of the study, hypothesis, scope and limitation of the study, organization of the study.

Chapter-II: Literature Review

The information published in various forms of literature, which are related to the study, has been collected, evaluated and discussed in this chapter. The researcher has consulted and studied various types of information sources published in printed, digital or web media This chapter gives details review of literature, researcher has gone through the various database and took review of related literature which is available online such as Shodhganga, Vidyanidhi, Directory of Open Access Journals, Dictionaries, Encyclopedia, Handboks, and various Reference books related to Bibliometrics, Webometrics, Open Access Electronic Journals.

Chapter-III: Bibliometrics

This Chapter gives details introduction of Bibliometrics, Concept of Bibliometrics, Definition of Bibliometrics, Historical Background of Bibliometrics, Laws of Bibliometrics, Issues and Limitation of Bibliometrics.

Chapter-IV: About University

This Chapter Start with the mission of the university, Achivments of university, Departments of university and MOU's with international and National level

Chapter-V-Data Analysis

This chapter gives details information about the research work, actual fact of research researcher has collected the data from DOAJ website by using various tabulated form and use Microsoft excel software for data interpretation. Researcher has also represent research work with the help of graphs.

Chapter VI: Findings, Suggestions, Conclusion

This is the concluding chapter and presents the observations and suggestions made under various chapters. Here it is emphasized that use of open source tools in libraries is very essential.

Chapter 2

Literature Review

2.1 Introduction:-

Literature review is an objective analysis of contributions made by authors, researchers, experts including technical specialists on a particular subject area or research topic. It is a chronological presentation of growth and development of literature in a particular field over a period of time. The very purpose of a literature review is to understand the experimented methods, techniques and skills of a phenomenon and its procedural presentation. This is believed to guide the researcher to formulate and identify the objectives, hypothesis, methods for collection and analysis of data. Literature review enables the researcher to restructure, reorganize and recast the presentation in light of work done at various levels. Therefore a literature review is considered as an integral part of research studies (Dahibhate, 2011). The review covers research articles, theses and dissertations, projects, reports etc. The present review is grouped in following facets:

2.1.1. Bibliometrics and Bibliometric analysis:-

Sen (1990), Sengupta (1988) have clearly expressed their views in respect of bibliometrics and stated that bibliometric analysis is used as a research technique and used to study the literature used in performing research by scholars in various subjects. Sengupta (1988) is of the opinion that the literature has grown tremendously and author felt that a survey is necessary to find out the trends of use of literature in biomedicine and find research trends. His article presents a review of different studies which includes themes like explosion of literature, identification of core journals, subject dispersion and geographical dispersion of literature. The findings of the present study is used to identify the core journal titles in librarianship as well as to evaluate the existing library collections to decide which journal titles to keep, discard, or relegate to off-site storage areas. Chaurasia (2008), in his article —Bibliometric Analysis of Annals of Library and Information Studies (2002-2006)|| highlighted the fact that Bibliometrics is an emerging thrust area in research and has now become a well established part of information research and a quantitative approach to the description of documents. Bibliometrics has grown out of the realization that literature is growing and changing out of a rate with which no librarian equipped with traditional bibliographic skills and methods could keep

abreast. In his study author shows that journals are most cited form of communication amongst the library and information scientists and the source journal is the most cited publication. The bibliometric analysis study of the journal —Annals of Library and Information Studies (2002-2006)|| indicated trend of growth in contributions and on an average number of contributions of articles are 21.4 per volume. Majority of the library and information scientists prefer collaborative research and contribute their papers jointly. Most of the contributions are on bibliometrics.

Summary: - Bibliometric studies and citation analysis is used as a research technique for finding out trends in the subject and use of literature by the researcher as well as gaps in research hence laws of bibliometrics, citation analysis play the very prominent role in deciding different patterns. In LIS, citation studies are also proved beneficial for finding core journals and formulating collection development policy.

2.1.2. Bibliometrics law:-

Askew (2008), in his study used Lotka's law of scientific publication productivity using the methodology outlined by Pao (1985), in the field of Library and Information Studies (LIS). A data set of 1,856 citations was collected using *ISI Web of Knowledge* databases. In the study values of n and c were calculated i.e. 2.1 and 0.6418 (64.18%) respectively. This study finds the amount of literature in the field of library and information studies and conforms to Lotka's law with reliable results. Lotka's law can be used in LIS as a standardized means of measuring author publication productivity. Pillai (2009), used bibliometric techniques and laws especially Bradford's Law of Scattering and a reviewed scholarly contributions. A study of five-year data from journals (2004-2008) cited by the physicists at the Indian Institute of Science (IISc), Bangalore was carried out to examine the applicability of Bradford's Law of Scattering, which include 690 periodicals containing 11,319 references collected from 79 doctoral theses during the period 2004-08. In the results presented ranked list of journals and four Physical Review-B with 9.53% citation, followed by Physical Review-A with 7.69% and Astrophysical Journal with 5.47% citations were the most preferred journals. Applicability of Bradford's Law in various methods was tested. Zabed Ahmed and Rahman (2009), in their paper examined the validity of Lotka's law to authorship distribution in the field of nutrition research of Bangladesh. A list of periodical articles on different aspects of nutrition research published during 1972-2006 was compiled for analysis. Using —full

productivity|| of authorship, a total of 998 personal author names were identified. Lotka's law was tested using both generalized and modified forms, The results suggest that author productivity distribution predicted in Lotka's generalized inverse square law is not applicable to nutrition research of Bangladesh. Using least-squares excluding high productive authors and maximum likelihood methods, Lotka's law is found to be applicable to nutrition research in Bangladesh.

Summary: - Bibliometric laws like Bradford, Lotka are very popular and used to find different patterns including half-life literature in every subject area.

2.1.3. Citation Analysis Studies:-

Janakiramaiah and Doraswamy (2011), in their study examined the conference papers published, in the convention on automation of libraries in education and research institution (CALIBER) in the year 2005 and 2006. The analysis of paper cover different bibliographic forms used, average number of citations per paper, authorship pattern, different websites used, types of conference proceedings, geographical distribution and ranked list of cited journals. Das and Sen (2001) analyzed 1049 citations from 34 research articles of Journal of Biosciences; 2000. In their study it was found that out of the total citations, journal articles comprises 85.89% and monographs 10.1%. Ramesh and Nagaraju (2000) analyzed the citations from articles of Indian journal of Information, Library and Society. From 138 citing articles total citations were 901 i.e. on an average 7 citations were cited per article. About 67.5% of articles had 1-20 citations. More citations were from the books and periodicals than the other type of materials. Similar type of study was also performed by Koley and Sen (2003) covering 457 citations appended to 26 research articles published in four issues of the quarterly journal "Indian Journal of Physiology and Allied Sciences". From the total citation study it was noticed that about, 76.81% citations relate to journal articles, and 18.59% to monographs, and the rest to conference papers, theses, etc. Rethlefsen (2007) analyzed citation of journal articles authored by Minnesota Department of Health staff. Information on each cited reference was recorded, including reference type, relative age of citation, and journal name etc. The outcome of the study was that journals were the most heavily cited resource by the researchers (63%). Bhat & Sampath Kumar (2008) studied a citation analysis of research articles from scholarly electronic journals published in 2000-2006. The analysis focused on the extent to find which scholars are using web-based sources in scholarly electronic

journals. Results of the study shows that 81.49% of articles published in selected 9 electronic journals during 2000-2006 had web references. Out of 25,730 references 56.54 % of references were for print journal and 43.52% of them were for web references. 437 citations from 32 research articles from two issues of the —Rawal Medical Journal" were collected by Javed and Shah (2008). The study revealed that 49.52 % citations pertained to journal articles and rest to other resource types. All the above studies except the last one reveals that journals are heavily cited and preferred source of information. In the above studies citations of journal articles were analyzed. Slutz (1997) in his citation analysis study of 16 master's theses, analyzed the data based on gender of authors; documents used (book, article within book, journal article, thesis, dissertation); and place of publications etc. The research findings indicated that more male authored citations were appeared and most of information sources used were books, articles within books, and journal articles. Chikate and Patil (2008), indicated in their research paper citation analysis is a worthwhile area of research. According to them citation analysis is useful for understanding subject relationships, author effectiveness, publication trends, and so on. The first recorded citation analysis was Gross and Gross (1927) who looked at citation patterns to determine the journals to be subscribed to and back volumes to be acquired for the library of Pomona College. They studied the citation frequency in the references given in the Journal of the American Chemical Society (Amudhavalli 1997). With citation analysis one can evaluate and interpret citations received by articles, authors, institutions, and other indications of scientific activity (Ravichandra Rao 1993). Jadhav et al (2011), in their study using citation analysis analyzed all the journal articles published in 'University News' from January 2004 to December 2008. The citations gathered for the study were 5968. The study related that the maximum number of citations were referred publications 2007 to 2008 published from that is 2950 (50.6%), books are most cited type of document 1549 (26.39%), and maximum number of citations were from India i. e. 3675 (62.61%). In authorship pattern single author citations are dominant than others (3011 [51.30%]).Swanepoel (2010), used citation analysis technique to analyze the reference listed in 480 Master's and Doctoral (M & D) theses and dissertations submitted at the TUT between 2004 and 2007. The purpose of this study was to determine types of information sources used by Master's and Doctoral students at TUT, different patterns of uses across the 7 faculties of the university, and access to the journals that are mostly used by Master's and Doctoral students. More than 37,000 citations were analyzed in this study over the 4-year period. The study found several similarities but also some distinct

differences in the use of information sources across the 7 faculties of TUT. It also identified more than 60 different information sources used by Master's and Doctoral students. With regard to journal use, the study found that out of 3,641 different journals cited, most journals were only cited once over a period of 4 years. Denick (2010), used citation analysis for the information literacy standards and assessment in higher education. This study explores the assessment of first-year engineering design students' information literacy skills in order to refine existing methods and library instructional strategies. A citation analysis is representing references cited in first-year engineering design reports from —Drexel University's Introduction to Engineering Design|| program during the 2008-2009. Citation style was evaluated and identified as per resource type, and currency of each citation reported. From a sample of 234 citations, 38% of references were classified as websites, 28% of references were journal articles and 12% of references were books. The results of this study were compared to previous assessment efforts and aligned to the ALA/ACRL/STS Task Force on Information Literacy for Science and Technology's Information Literacy Standards for Science and Engineering/Technology. The methods and findings of this study demonstrate an evidence-based approach, focusing on standards-based assessment of engineering information literacy, specifically in how best to serve students, new to engineering research, design and communication. Haddow and Genoni (2010), conducted a study of social science journals using citation analyses, for Australian journals to determine the differences between data collected from Web of Science and Scopus. The data was compared with the tier rankings assigned by disciplinary groups to the journals for the purposes of a new research assessment model, Excellence in Research for Australia (ERA). In addition to citation-based indicators analysis include an extended journal impact factor, the h-index, and a modified journal diffusion factor, to assess whether subsequent analyses influence over the ranking of journals. The study concluded with findings that the Scopus database provides higher number of citations for the journals. However, there appears to be very little association between the assigned tier ranking of journals and their rank derived from citations data. Duzyol et al (2010), studied the mapping of co-citations in open access which is one of the major research trends and hottest topic in electronic publishing. Authors maps the intellectual structure of open access based on 281 articles that appeared in professional literature on the topic between 2000 and 2010. Using bibliometric and co-citation analyses, co-citation patterns of papers presented cocitation maps. Cite Space software was used to analyze and visualize co-

citation maps. Maps show major areas of research, prominent articles, major knowledge producers and journals in the field of open access. From the study most frequently cited journals by the authors are listed. The most recent research topics appear to be institutional repositories, open access publishing/open access journals and scientific communication. The preliminary findings show that open access is an emerging research field, and this study is used to identify landmark papers along with their impact in terms of providing different perspectives and engendering new research areas. The results of the study conformed to Bradford's law of bibliographic distribution. The reference scattering coefficient was determined to be 0.504, which indicated a high concentration of articles in relatively few journal titles. A rank order list of sixty-one journals was given as an appendix. The study noted that English is the most important language in all the literature in terms of productivity. The results of the study may be used as acquisition tool for developing journal collection in tropical medicine.

Summary: - Many authors used citation analysis method to find the productivity in different subjects. All the studies pointed out that Journal articles are more used followed by books and other literature. The study reflected less use of e-publication but its use is increasing slowly since past few years (Jan Rosy, 2009). The authors also tracked geographical, chronological and authorship pattern in different subject areas. Citation analysis study is also useful for judging by scholarly publication published based on the citation analysis technique science, citation index, Scopus, Web of Science are generated, now a days for a article or patent pre and post citations are also made available in the databases.

2.2 Webometrics and Scientometrics Studies:-

Moradi et al (2006), compared role of web 1.0 and web 2.0. Authors studied the activities of Iranian librarianship weblogs using webometrics methods. The results of study indicated that only 28 weblogs are active out of 46 Iranian librarianship blogs which are updating day in and day out. This study also indicates that there are only three cooperated weblogs and almost all of them use Iranian hosts, mostly Blogfa. There is only one weblog which is hosted by Blog sky. The language assessment of the survey shows 25 Farsi weblogs, two English weblog and only one bilingual (English and Farsi) among those 28 active blogs. The survey ranked aforementioned weblogs using total links, self-link, inlinks and web impact factor (WIF). Meho and Rogers (2008), in their study

authors examines the differences between Scopus and Web of Science and analyzed citation counting, citation ranking, and h-index of 22 top human-computer interaction (HCI) researchers from EQUATOR (a large British Interdisciplinary Research Collaboration project). Results indicated that Scopus gave more coverage to HCI literature than Web of Science. No significant differences were found between the two databases when citations in journals are only compared. The study concludes that Scopus can be used as a sole data source for citation-based research and evaluation in HCI, especially when citations in conference proceedings are sought. Meho and Yang (2006), in another study examines the effects of using Scopus and Google Scholar (GS) on the citation counts and rankings of scholars as measured by World of Science (WoS). The paper discussed the strengths and weaknesses of WoS, Scopus, and GS, and brought out their overlap and uniqueness, quality and language of the citations, and the implications of the findings for citation analysis. The study involved citation searching for approximately 1,100 scholarly works published in about 200 articles. More than 10,000 citing documents were examined in the study. Boell (2007), used scientometrics method of analysis scientifically from academic disciplines, journals plays an important role in disseminating findings of research among the disciplinary community members. In this study he analyzed six databases focusing on LIS literature: INFODATA, Current Contents, Library and Information Science Abstracts, Library Information Science Technology Abstracts, Information Science and Technology Abstracts, and Library Literature and Information Science, and listed the core journals in areas of LIS. Journals were also ranked by the number of occurrences in multiple databases in order to identify 'core' publications. The number of journals overlapping among databases is estimated and a matrix giving the overlap is visualized using multi dimensional scaling. In his study he prepared a comprehensive master list of 1,205 journals publishing articles of relevance to LIS. About 968 active journals were published in English, in which one third of the journals and published from the US and another one third from the UK and Germany. Nearly 16% of all journals are open access, 11% have a ISI/JIF, and 42% are peer reviewed. Fifteen core journals are identified and a list of the top fourteen journals published in Germany was reported. The aim of compiling a comprehensive list of LIS journal was achieved by author.

Summary: - From this search literature is observed that along with citation analysis, bibliometric studies now webometrics and scientometrics studies are being conducted to analyses, the trends (WOS and GS are playing major role).

Chapter-III

BIBLIOMETRICS

3.1-Introduction

Bibliometrics is a branch of scientometric that focuses. Principally on the quantitative study of written products of research. In 1969. Alien Prichard First coined the term biliometrics stating that the definition and purpose of bibliometrics is to shed light on the process of written communication and of the nature and course of discipline (in so far as this is displayed through written communication counting and analyzing the various facts of written communications. Bibliometrics is also simply defined as the quantitative analysis of the bibliographic features of a body of literature. A bibliometric study allows identification of pattern in the literature Today, bibliometrics is one of the rare truly interdisciplinary research fields to extend to almost all scientific fields. Bibliometric methodology comprises components from mathematics, social sciences, natural sciences, engineering and even life sciences. The following pages will provide a systematic description of the research structure of the field and a detailed overview of the state-of-the-art in bibliometric methodology. Bibliometrics encompasses the measurement of 'properties of documents, and of document-related processes'. The range of bibliometric techniques includes word frequency analysis citation analysis co-word analysis and simple document counting, such as the number of publications by an author, research group or country. In practice, however, bibliometrics is primarily applied to science-related documents and hence has considerable overlap with scientometrics, the science measurement field. Although recognizably bibliometric techniques have been applied for at least a century, the emergence of bibliometrics as a scientific field was triggered (in the 1960s) by the development of the Institute for Scientific Information (ISI) Science Citation Index (SCI) by Eugene Garfield as a logical continuation of his drive to support scientific literature searching. The SCI was created as a database of the references made by authors, to earlier articles, in their articles published in the top scientific journals, originally focusing on general science and genetics. The underlying idea, still highly relevant today, is that if a scientist reads an article, then s/he would benefit from knowing which articles cited it, since They may cover a similar topic and might update or correct the original article. The importance of the SCI is also consistent with Bradford's law of scattering: although a scientist may keep up-to-date with a research specialism by reading

all relevant journals when they appear, a minority of relevant articles will be scattered throughout other journals. Hence citation searching protects researchers from missing relevant articles in non-core journals. Almost a by-product of the SCI, and later also the Social Sciences Citation Index (SSCI) and the Arts and Humanities Citation Index (AHCI), was the ability to generate easily a range of new statistics: not just the number of citations to any given article but also, using other fields in the SCI database, aggregated publication and citation counts. These aggregated statistics include the number of citations to all articles in a journal or all articles by an author, research group, or country. Some were further developed into named indicators with supporting theories and reasonably well accepted standard interpretations. Perhaps the most well known is the journal impact factor (JIF), defined below. Since the publication of the SCI, two types of bibliometric application have arisen: evaluative and relational. Evaluative bibliometrics seeks to assess the impact of scholarly work, usually to compare the relative scientific contributions of two or more individuals or groups. These evaluations are sometimes used to inform research policy and to help direct research funding. In contrast, relational bibliometrics seeks to illuminate relationships within research, such as the cognitive structure of research fields, the emergence of new research fronts, or national and international co-authorship patterns. In 1969, Pritchard coined a new term - "bibliometrics" - for a type of study that had been in existence for half a century. The fact that Pritchard felt the need to redefine the scope of an area hitherto covered for fifty years by the term "statistical bibliography" Hulme, (1923) demonstrated that a new field of quantitative research had emerged. For Pritchard, bibliometrics was defined as the application of mathematical and statistical methods to books and other means of communication Pritchard, (1969), Bibliometrics has become a generic term for a whole range of specific measurements and indicators; its purpose is to measure the output of scientific and technological research through data derived not only from scientific literature but from patents as well. Bibliometric approaches, whereby science can be portrayed through the results obtained, are based on the notion that the essence of scientific research is the production of "knowledge" and that scientific literature is the constituent manifestation of that knowledge. Patents indicate a transfer of knowledge to industrial innovation and a transformation into something of commercial and social value; for this reason, they constitute an indicator of the tangible benefits of an intellectual and economic investment. The idea that to publish their work (see the discussion below on what is considered a published work in bibliometrics) is the paramount activity of

scientists has long been contented by science analysts. According to Price, a scientist is "...any person who has ever published a scientific paper" Price, (1963). "Whenever a man labors produces something new and the result is a publication, then he has been doing what I call science" Price, (1969). His catchphrase "publish or perish" would suggest that publication of research findings is at the forefront of scientists' activities. To publish the results of their research is an obligation that scientists are compelled to fulfill Merton, (1957b). New knowledge, updated by researchers, has to be transformed into information made available to the scientific community. Not only do scientists have to make their work available to the public at large, but they in turn are supposed to have access to the work of their peers. Research is carried out in a context of "exchange". Even so, the fact that the system of scientific publication has survived in modern science is due, paradoxically, to scientists' desire to protect their intellectual property. New scientific knowledge is a researcher's personal creation, and claim to its discovery can be laid only through publication Merton, (1957a). The "reward system", based on the recognition of work, merely underscores the importance of publication: the only way to spread the results of research throughout the world is to have them published. Publication therefore has three objectives: to spread scientific findings, protect intellectual property and gain fame. Scientists are obliged to publish their work, and publication justifies their existence. "A scholarly publication", remarks Price "is not a piece of information but an expression of the state of a scholar or group of scholars at a particular time. We do not, contrary to superstition, publish a fact, a theory, or a finding, but some complex of these. A scientific paper is at the same time more and less than a concept or a datum or a hypothesis. If the paper is an expression of a person or several persons working at the research front, we can tell something about the relations among the people from the papers themselves" Price, (1963). The word bibliometrics first appeared in print in 1969 in Alan Pritchard's article Statistical Bibliography or Bibliometrics in the December issue of the Journal of Documentation, Pritchard's article was the result of his judgment that the expression statistical bibliography should be replaced with a better term. He used statistical bibliography in his unpublished Computers, Statistical Bibliography and Abstracting Services and again in his Statistical Bibliography: An Interim Bibliography, published in May of 1969 In December 1969. in Statistical Bibliography or Bibliometrics he stated, The term statistical bibliography is clumsy, not very descriptive, and can be confused with statistics itself or bibliographies on statistics As a result of the prompting of his friend, M. G. Kendall, Pritchard suggested that the word "BIBLIOMETRICS, i.e., the

application of mathematics and statistical methods to books and other media of communication" be substituted for "statistical bibliography' In the same issue of Journal of Documentation appeared Robert A. Fairthorne's classic article Empirical Hyperbolic Distributions Bradford-Zipf- Mandelbrot for Bibliometric Description and Prediction, in which the author used the word bibliometric and acknowledged Alan Pritchard as the donor of the term. Fairthorne, a close friend of Pritchard, admitted that a phrase in the article—this term bibliometrics resuscitated by Alan Pritchard incorrectly suggested previous use, but in personal correspondence, he definitely verified that "Alan Pritchard did coin the word 'Bibliometrics Bibliometrics is a new branch of information science. It is a quantitative evaluation of publication patterns of all macro and micro communications along with their authorship by mathematical and statistical calculus. Bibliometrics can be applied to any subject area and to most of the problem concerned with written communications. Bibliometrics was first coined by Pritchard in paper on Statistical Bibliography or Bibliometrics, published in Journal of Documentation. This is an umbrella term used for many studies where quantitative methods are used to investigate scientific communication process by measuring and analyzing various aspects of written documents. He defined bibliometrics as the application of mathematical methods to books and other media of communication. Bibliometrics is a set of techniques devoted to the quantitative analysis of scientific and technical activities. These techniques implement statistical and mathematical tools to measure the data that measure researcher's contributions to science and technical development.¹ the data used for bibliometric studies mainly stem from information produced by the activity of researcher's communication. These quantitative studies of researcher's communication activities tend to have a better understanding of phenomena of construction, dissemination and use of scientific and technical knowledge. Bibliometrics is considered as a standard tool of science policy and research management in the last decades. All significant compilations of science indicators heavily rely on publication and citation statistics and other, more sophisticated bibliometric techniques. The aim of bibliometric studies was to measure national research performance in the international context or to describe the development of a science field with the help of bibliometric means. ² Today, bibliometrics is one of the rare truly interdisciplinary research fields extended to almost all scientific fields. Bibliometric methodology comprises components from mathematics, social sciences, natural sciences, engineering and even life sciences. Both bibliometrics and scientometrics are a set of methods used for measuring the production and

dissemination of scientific knowledge. Derek de Solla Price and Vasilij Vasilevich Nalimov were the originators of the discipline, which they developed for the purpose of providing research tools to historians and sociologists of science. The present study focuses attention on the scientometric analysis of the pattern of publication, authorship and citation analysis by Engineering scientists contributed in the journal IEEE Transactions on Control systems Technology.

3.2-Concept

The term bibliometrics was first used by Alan Pritchard in (1969) to denote a new discipline where quantitative methods were employed to probe scientific communication process by measuring and analyzing various aspects of written documents. P.S. Kwatarra, (2000) Bibliometrics is an emerging thrust area of research from different branches of human knowledge. Bibliometrics has now become a well established part of information research and a quantitative approach to the description of documents and examination of services is gaining ground both in research and practice. Bibliometrics is a quantitative evaluation of publication patterns of all macro and micro communication along with their authorship by mathematical and statistical calculation. Bibliometrics can be applied to any subject area and to most of the problems concerned with written communication. In fact bibliometrics has grown out of the realization that literature is growing and changing out of a rate with which no librarian or information worker equipped with traditional bibliographic skills and methods could keep abreast. The term bibliometrics is extraordinarily to the point and easy to understand, because not only comparable designations are known in other scientific disciplines but for comparison the super-ordinate term 'scientometrics', 'naukometriya' and 'WissenschaftsMetrik' used in the English, Russian and German languages can also be referred to. In the international library science literature the term 'bibliometrics' has been generally used for about three years; it has also entered lexica and abstract journals. In (1969) it was used for the first time by Pritchard as 'application of mathematical and statistical methods to books and other means of communication (strongly restrictive)' and replaced the restrictive term 'bibliographic statistics', which was probably first used by Hulme in (1923) and which was also used by Gosnell and Raising. The term "bibliometrics" already generates confusion. It does not measure a researcher's production but citations to his/her publications. It is based on the calculation of various indices (number of citations;

integrated factors, such as the h factor; and others) based on bibliographic databases that cover all, or almost all, scientific publications and citations in most disciplines

3.3-Bibliometrics definition

A Bibliometric is a branch of information theory that attempts to analyze quantitatively the properties and behavior of recorded knowledge. Bibliometric is the statistical or quantitative description of literature. Nicholar and Ritehic, Bibliometric is the quantitative treatment of the properties of recorded discourse and behavior pertaining to it.Fairthron. The study and measurement of the publication patterns of all forms of written communications and their authors. The study of the use of documents and patterns of publication in which mathematical and statistical methods hereby applied. Bibliometric studies can be considered from the standpoint of the field of Information Sources. This discipline, as we have argued, constitutes its principal basis. In this way, researchers select the sources most appropriate for the development of their work. In addition, catalogues of journals and sources that contain summaries of the books or articles analyzed may be used, in order to locate references made of the authors1 work. This is the method of measurement proper to Bibliometrics: citation analysis. The possibility of interpretation of these quantitative measures opens up new ways for the study of the different sciences. Keeping these premises in mind, as well as the reasoning that has been put forward in this paper, we propose the following definition of our discipline: Bibliometrics is the ensemble of methodological knowledge that will serve the application of quantitative techniques in order to evaluate the processes of production, communication and use of scientific information. Its goal is to contribute to the analysis and evaluation of science and research Bibliometrics, or better bibliometric evaluation, usually refers to a series of procedures that contribute to evaluating the scientific production of a scientist (or a group of scientists) on the basis of the number of publications, the prestige of the journals in which articles are published and citations to these publications. Clearly, bibliometrics does not measure the quality of a researcher's work but only citations to the work, without prejudging the reasons that Ted to the citation. As will be seen in this report, several indices have been suggested to serve as a base to individual bibliometric evaluation. It is not important to state at the outset that no single index can by itself lead to an adequate evaluation of a researcher's work nor does reliance on several indices. The term bibliometrics itself is even somewhat regrettable since it includes the root metric which implies a concept of measure while the

bibliometric unit of measure varies according to disciplines and sub-disciplines. Everyone agrees that all scientific activity must eventually lead to an adequate dissemination of its results. This usually takes the form of publications in peer-reviewed scientific journals and, in some disciplines, other forms (such as open archives, conferences, books) that reflect the contribution of a researcher to the scientific progress of his/her field. With time, it has become evident over the years that the hierarchy established between scientific journals has led researchers to preferentially submit their articles to journals with the greatest prestige. Publishing in these "good journals" has become an objective that has in turn given notoriety. Therefore, quite naturally in the case of equally good articles, those published in these journals will be cited more often than those cited in less prestigious ones. Similarly and closely linked to the preceding observation is that the best articles usually give rise to a high number of citations easily counted by current computing means? This has led to the hypothesis that the number of citations correlates to the importance of an article. These concepts form the basis of bibliometrics use, which historically was designed to define scientific fields and later to evaluate journals. Bibliometrics generated great enthusiasm within most of the scientific community. Its use seemed easy and allowed for a rapid and therefore less expensive evaluation of a researcher's work than qualitative examination. However over time, due to its ease bibliometrics came to be excessively utilized at the expense of qualitative evaluation. Sometimes it was used in a hidden and improper way because users were unfamiliar with its many shortcomings and used non-validated data this report treats all these topics with the retrospection needed to consider bibliometrics within the context of scientific evaluation. It puts forward recommendations for a better use of bibliometrics and for technical improvement of the procedures regarding its use.

3.4-Scope of Bibliometrics

1. Quantify, evaluate research and growth of different areas of knowledge.
2. Drew up rank list of the scientists belonging to same discipline
3. Estimate comprehensiveness of secondary periodicals .
4. Identify users and authorship of documents on various subjects.
5. Find-out growth of literature in particular subject field.
6. Indicate obsolescence of literature in particular subject field.

7. Experimental models correlating or by passing the existing models.
8. Initiate effective multilevel network system. (i) Identification of core periodicals of different disciplines to

3.5-Historical Background of Bibliometrics

The terms bibliometrics and scientometrics were almost simultaneously introduced by Pritchard and by Nazimova and Mulchenko in (1969). While Pritchard explained the term bibliometrics as the application of mathematical and statistical methods to books and other media of communication", NalJmov and Mulchenko defined scientometrics as Lthe application of those quantitative methods which are dealing with the analysis of science viewed as an information process". According to these interpretations the specialty scientometrics is restricted to the measurement of science communication, whereas bibliometrics is designed to deal with more general information processes. The anyhow fuzzy borderlines between the two specialties almost vanished during the last three decades, and nowadays both terms are used almost as synonyms. Instead, the field informetrics took the place of the originally broader specialty bibliometrics- The term informetrics was adopted by VINITI Gorkova, (1988) and stands for a more general subfield of information science dealing with mathematical statistical analysis of communication processes in science. In contrast to the original definition of bibliometrics, informetrics also deals with electronic media and thus includes topics such as the statistical analysis of the (scientific) text and hypertext systems, library circulations; information measures run electronic libraries, models for Information Production Processes and quantitative aspects of information retrieval as well. Alan Pritchard, who first used the word bibliometrics, described it as the application of mathematics and statistical methods to books and other media of communication this was paraphrased by Robert A. Fairthorne as quantitative treatment of the properties of recorded discourse and behavior appertaining to it in a later article. Bibliometrics and Information Transfer. Pritchard explained bibliometrics as the metrology of the information transfer process and its purpose is analysis and control of the process" He based his interpretation upon the fact that measurement is "the common theme through definitions and purposes of bibliometrics" and "the things that we are measuring when we carry out a bibliometric study are the process variables in the information transfer process William Gray Potter, editor of the issue of Library Trends devoted to bibliometrics,

followed suit with Bibliometrics is, simply put. The study and measurement of the publication patterns of all forms of written communication and their authors in the same issue. Alvin M. Schrader said it even more simply, Bibliometrics, the scientific study of recorded discourse.

3.6-Object of Bibliometrics

As we pointed out in the Introduction, Bibliometrics finds its epistemological basis in Bibliography; it works as a measurement factor of the information sources and, finally, it appears as a method (or ensemble thereof) to be used by the scientific inquiry. Hence: Bibliometrics studies the organization of technological sectors from the standpoint of the information sources. It measures scientific growth by applying statistical methods to the production of scientists. In this way, it establishes the degree of development of the different disciplines. It performs studies on information consumption based on the documents used by scientists. These analyses are carried out by use of bibliographic references of publications contained in bibliographies and information sources, during a set time period. These bibliographic instruments provide enough data about the primary documents to allow for meaningful bibliometric research.

3.7-Typical bibliometric measures

Many bibliometric studies use one or several of the following measures. However, they all have some advantages as well as some disadvantages.

- 1. Number of publications:** measures productivity, but does not report anything about the impact
- 2. Number of citations:** gives information about the impact, but can be inated due to many reasons, for instance incorrect or incomplete citations, as well as biased citing behavior (authors citing well-known authors rather than young, unknown ones)
- 3. Mean or median cites per paper:** this measure is better suited for comparisons of scientists or facilities that have been active for different numbers of years, but it seems to reward low productivity
- 4. High-impact papers:** this metric has been introduced in astronomy by Juan P. Madrid, then at the STScI, a few years ago. Basically, Madrid used the ADS to retrieve information about the 200 most-cited papers in a given publication year,

identified those that were based on observational data and calculated the impact of facilities (telescopes, observatories) of each paper. The results per paper were added, and the facilities ranked by contribution to this set of Top 200 papers. The drawback of this method is that so-called hot topics are favored and can outnumber all other facilities for instance in a year of data release. The method is also time-consuming and, to a certain extent, subjective as the contribution percentage is assigned by the bibliometric researcher

5. **H-index:** the h-index is meant to combine metrics for productivity and impact (Hirsch 2005); h itself is not suited for comparisons as it does not contain information about the number of years of operation. For comparisons another value, the so-called m parameter, also described by Hirsch, should be used. All measures have to be applied with greatest care and never in an isolated way as they only shed light on a very limited area of performance of research output. If used for comparisons, several metrics should be applied in parallel to get a more complete picture.

3.8-Bibliometric Measurements

The bibliometric measurements are derived from the concept of citation indexing. It was based on English Legal System which operates under doctrine of stare desis precedent on the basis of which Garfield developed Science Citation Index, Social Science Citation Index and Arts and Humanities Citation index. Direct Citation Counting Citation counting is a technique that determines how many citations are given document, author, journal etc., how received over a period of time originally used by gross and gross. The rationale for this is that citation objective indicator of use and therefore an article, author, journal is less frequently cited. In order to offset the limitations of citation counting some modified measures have been suggested. The impact factor and immediacy index are two such measures.

3.9-Bibliographic Coupling

The concept of bibliographic coupling was first suggested by Fano but Kessler elaborated, tested and coined the term. It is the number of common references cited in two documents that indicate the degree of similarity of content of the citing papers. Two source documents containing a large number of common references are said to have a high coupling strength and are likely to be on the same topic. It is observed that the

concept of relationship has certain drawbacks and not seems to be a valid of measurement because if two papers are citing a third paper, they may or may not be citing an identical piece of information of 3rd paper being cited. Co-citation The concept of cocitation was for the first time suggested independently by Small and Marshakova almost simultaneously in 1973 and later developed by Small, who proposed a new method of analyzing citations to generate cluster of related papers. The number time two papers are cited together in subsequent literature that determines the co-citation strength of two cited papers.

3.10-Bibliometric Models

These bibliometric laws, many bibliometric models have been developed so far. Some of the important bibliometric models are: Logarithmic model of Brookes; Cumulative Advantage Distribution Model by Price; Booksteins Model linking Laws of Bradford; Lotka and Zift into a single law that seem capable of describing phenomenon in a vast variety of subject area. Mandelbrots Model structure of language expending and restating Zipf's law; Firethorn's Model linking Lotka's law with the distribution of Bradford ; zipfs and Mandelrot Rickery's model extending Bradford's distribution and showing that the relation should hold for any number of zones of equal yields not just for high, medium and low yielding zones as proposed by Bradford graphical models.

3.11-Application of Bibliometrics

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

1. To identify research trends and growth of knowledge;
2. To estimate comprehensiveness of secondary periodicals;
3. To identify users of different subjects;
4. To identify authorship and its trends in documents on various subjects;
5. To measures the usefulness of adhoc and retrospective SDI services;
6. To develop experimental mode correlating existing ones
7. To identify core periodicals in different disciplines;

8. To formulate an accurate need based acquisition policy within the limited budgetary provision
9. To adopt an accurate weeding and sticking policy;
10. To initiate effective multilevel network system;
11. To study obsolescence and dispersion of scientific literature;
12. To predict productivity of publishers, individual authors;
13. To organizations, country or that of an entire discipline;
14. To design automatic language processing for and abstracting and auto classification;
15. To develop norms for standardization.

Bibliometrics also has the following applications:

To improve Bibliographic Control Perhaps to the most obvious use for bibliometric data is to improve bibliographic control as it is clearly not possible to provide efficient secondary services without knowing the size and character of a literature to access the coverage of consisting services. The size and growth of the primary literature has or should have direct effects on the structure of the secondary literature. Thus computed growth rates and directions of change may be of considerable assistance to editions of secondary services in determining their future approach and coverage.

Subject Interrelationships It is shown by analysis of classification of documents or by reference/citation the use studies can suggest desirable general patterns of secondary service coverage. Such studies can also help to establish the framework for a service in a particular sub-area

In planning Retrospective Bibliographies Data analysis both of citation and of volume or publication year can be useful in planning retrospective bibliographies, giving some indications both of the age of material used in a discipline and of the extent to which more recent publications supersede the order if at all.

Comparative assessment of the coverage of secondary services, particularly when related to overall figures on size of literature and to subject links can provide publishers with an idea of their achievements and competition and could be useful for marketing purposes.

Management Decisions although there is no substitute for this in house statistics on the performance of a library, there are some management decisions for which general bibliometric data is often relevant. For instance, therapists are clearly useful to librarian in choosing which to buy.

Policy Decisions Lists of highly cited journals or books derived from reference/citation analysis have dangers if used uncritically in policy decisions, on selecting and discarding stock but they can be helpful if used to identify candidates for selection or cancellation.

Areas of Acquisition Subject interrelationships and journal families, e.g. as shown by document classification or citation analysis can suggest titles desirable to support a given discipline of relevance to a particular library. Similarly studies of the rate of other literature forms may suggest areas of acquisition for particular situations. Data analysis, although again risky unless linked with information pertaining to the particular library, does nevertheless provide a starting point for the development of a policy on discarding out housing or acquisition of order material. (h) Information for teaching the result of research investigation provides valuable information for teaching in view of the paucity of published statistical sources. This is particularly the case with bibliographical studies, where changes in the methods of teaching have resulted in a considerably increased demand for bibliographic statistics. The history of science, where it elucidates the development of scientific disciplines by tracing the historical movements that are revealed in the results obtained by researchers; The social sciences, where, by examining scientific literature, it underpins analysis of the Scientific community and its structure in a given society, as well as the motivations and Networks of researchers; Documentation, where it can count the number of journals per library and identify the Journals that constitute the core, secondary sources and periphery of a discipline (by Analyzing the quantity of journals needed to cover 50 per cent, 80 per cent or 90 per cent of The information in a given area of science; Science policy, where it provides indicators to measure productivity and scientific quality,

Thereby supplying a basis for evaluating and orienting R&D. Bibliometric techniques have evolved over time and are continuing to do so: the counting of papers with attribution by country, by institution and by author; the counting of citations, to measure the impact of published work on the scientific community; the counting of co-citations (the number of times that two papers are cited together in a single paper); etc.

All of these techniques combine to give more detailed and more effective measurements. Results are presented in various forms, such as mapping, in order to depict the relationships between participants and expand the means for analysis. The popularity of bibliometrics probably resides in the fact that the information is highly compact, easy to handle, and likely to be objective.⁴ Nonetheless, bibliometric methods have their critics among experts (and, naturally, among researchers as well). The criticisms concern general methodological challenges that call into question the appropriateness of the measuring instrument per Adler, Ewing, and Taylor (2009), Froehlich (1999), Jokic and Ball (2006), Moed (2005), Neuhaus (2010). In particular as far as the humanities and social sciences are concerned (and other disciplines such as law), there are additional difficulties involved in measuring the quality of research performance, as publication and citation practices in these areas differ significantly from customary practice in other academic disciplines, which casts even more doubt on the validity, and fitness for purpose, of bibliometric evaluation (Hicks (1999), Moed 2005, Meyerhof 2006). As a result, comparisons of research performance across different disciplines and, in some cases, even within one and the same discipline (regional language disparity, differences between subdisciplines, cohort effects), always need to be analyzed in light of the differences in the importance and evaluation of research performance by bibliometric techniques. Bibliometrics as defined by Pritchard (1969) refers to, "The application of mathematics and statistical methods to books and other media of communication". Scholars and Scientists expand the scope of the definition to incorporate other aspects that are important and relevant to the field. Borgman and Furner (2002) define the term that, "Bibliometrics encompasses the measurement of documents and of document related processes". In another dimension, Daisy (2006) says that, "Bibliometrics is a quantitative assessment of men's cultural progress, including science and technology as may be revealed through bibliographic data. Bibliographic data are those that can be collected, derived or deciphered from different parameters as can be assign to a document". In addition to this, Claro and Costa (2011) offer that, "Bibliometrics of research performance currently use a divert set of indicators, focusing on attributes of journals, publications and citations". The above view is silent on the producers of the intellectual contents of given documents, despite the reason that they occupy a very important and strategic position in advancing the course of knowledge. Behrens and Luksch (2011) share the opinion that, "It is also of interest to consider the size and growth rate of the community of authors who published the literature. Many Bibliometrics researches using

databases were conducted. Moed (1988) expresses similar view that, "Databases containing Bibliometrics information on published scientific literature, play an important role in the field of quantitative studies of science and in the development and application of science and technology indicators". There are many ways to assess research output, for instance by investigating how many research grants have been received, when and where research has been presented at conferences, or how many students graduated under the supervision of specific researchers. Another common tool is bibliometric studies, i.e., using metrics to measure productivity and impact through publications and citations. Bibliometric studies have quite some history; studies go at least back to the 1960s when the Science Citation Index was issued. A large number of papers have been published on this topic in general and more specially in the context of astronomy. In this paper, we will focus on the following aspects: Bibliometric studies - what are they and who is interested? Linking publications and data - how does this happen and where can interested users get access? Telescope bibliographies - who compiles them, and how? What are the current tools and methodologies? Finally, we will take a look ahead to see what might be coming next.

3.12-Advantages and potential drawbacks of bibliometrics

Bibliometrics is seemingly easy to use and provides an evaluator with numbers that are attractive for their simplicity and factual nature. It involves nevertheless numerous biases. It is important to mention that in order to carry out bibliometrics in an unquestionable fashion, time, rigor and experience are necessary. It is also essential to remember that no index or set of indices alone can summarize the quality of a researcher's scientific production. Moreover, the importance of bibliometrics in some disciplines may encourage researchers to adapt their publications and even their work to the journal in which they wish to publish their articles rather than engaging in original and creative research

3.13-Bibliometrics as a Research tools

Since the early 1980s, bibliometrics has evolved into a distinct scientific discipline with several subfields and the corresponding scientific communication structures. (The international journal *Scientometrics*, the first periodical specializing in Bibliometric topics, was published in 1979; International conferences started in 1983.) (Wormell, 1998) Bibliometrics is used as a research tool in various disciplines and it has several

applications in research field. Mahmood and Naseer (2009) in their article "Use of Bibliometrics in LIS Research" discussed that the bibliometric studies are helpful in evaluating library services, collection development, policy refinement, decisionmaking, resource allocation and even weeding. Data produced by bibliometric methods provides a scientific basis to library administrators for decision-making. Bibliometrics has been considered useful for curriculum analysis and for appraisal of research output quality

3.14-Approach to Bibliometric Studies

This is an 'Umbrella term', which is used, for many studies where quantitative methods are used to investigate the scientific communication process by measuring and analyzing various aspects of written documents. But the first recorded study of bibliometric topic was in 1917 by Cole and Bales being a so-called 'Statistical analysis of literature' of History of comparative Anatomy. They study the fluctuations of interested and the distribution of literature among countries and analyzed comparative anatomy papers by counting the number of publications country wise from 1543 to 1860. This was the first attempt in counting the publications, and it served as a model for applying the counting technique in the evaluation of international activities. Due to the application of quantitative approach to the bibliographies in literature, they called this technique "Statistical Literature Analysis". Besides this, the earlier attempt in using the statistical methods for the study of subject scattering was made by Campbell in 1896. He applied statistical method to ascertain subject scattering of articles covered in some national and international bibliographies. In 1923 Hulme studied the journal entries in "English International Catalogue of Scientific Literature rank orders and so on and used the term Statistical Bibliography and later it was used by many others. He used this term to mean "the illumination of the process of science and technology by means of counting documents". Gross and Gross (1927) considered the third study in the field based on citations. They used citation count to rank the journals in Chemistry.

3.15-Modern Approach to Bibliometric Studies

Physicist subsequently in 1913 combined the insight provided by the Rutherford experiment with the quantum hypothesis of Planck and Einstein to make the first quantitative model of the atom. In 1924 a new approach to atomic phenomena was opened by deBroglie and the concept of wave mechanics was come into being by Schrodinger in 1926 Much of the Nuclear Physics is concerned with particles moving

slowly relative to light for which Einstein's celebrated energy mass relation of special relativity $E=mc^2$ was involved in deBroglie's proposition of material waves. The cosmic radiation was discovered in 1932 and in 1934 Curie and Joliot first demonstrated the artificial radioactivity. A detail chronological main advance in the growth of Nuclear Physics is described by W.E.Burcham in his book Nuclear Physics. After the full growth of Nuclear Physics scientists, are engaged in sub-nuclear activity i.e. the study of particles. A piece of matter is called an elementary particle when it has no other kinds of particles inside of it and no parts can be identified. How does one know whether a particle is elementary only by experimenting with it to see if it can be broken up or by studying it to determine if it has an internal structure or parts? Molecules are not elementary because they can be broken into atoms by chemical reactions, heating or other means. Nor the atoms are elementary. They can be broken into proton and neutron. For about fifty years, physicists considered the neutron and proton to be elementary, but in the last two decades it was found that they are made of simpler particles called quarks. Hence the neutron and proton are not elementary particles, but to the best of knowledge the quarks are elementary. With respect to the other constituent of ordinary matter the electron, no experiment has succeeded in breaking it up or in finding an internal structure for it. Hence, the electron is an elementary particle as considered today. Therefore, separate studies

3.16-Use of Bibliometrics:

Evaluate the journal's quality

Follow up on the evolution of a research subject

To have an idea of the principal actors of one theme

Identify the article's impact

Evaluate one researcher, their work, their research unit and their institute.

3.17-Components of bibliometrics

(I) Bibliometrics for bibliometricians (Methodology)

This is the domain of basic bibliometric research and is traditionally funded by the usual grants. Methodological research is conducted mainly in this domain.

(ii) Bibliometrics for scientific disciplines (Scientific information)

The researchers in scientific disciplines form the bigger, but also the most diverse interest-group in bibliometrics. Due to their primary scientific orientation, their interests are strongly related to their specialty. This domain may be considered an extension of science 10 information by metric means. Here we also find joint borderland with quantitative research in information retrieval.

(iii) Bibliometrics for science policy and management (science policy)

This is the domain of research evaluation, at present the most important topic in the field. Here the national, regional, and institutional structures of science and their comparative presentation are in the foreground

3.18- Bibliometrics as Inter-disciplinary and Multi-disciplinary Science

A subject is interdisciplinary when it borrows material from disciplines of its same scientific branch; it is multidisciplinary when it lends or borrows knowledge or techniques to, or from, beyond its general field. Bibliometrics, as an interdisciplinary subject, takes on an auxiliary or instrumental role in measuring the different fields that make up its general branch of science, that is, disciplines integrating the curriculum of Library and Information Science. These subjects act like links of a chain, in that, should one of them fail, the others could hardly function together in a satisfactory way. Let us clarify this point by means of an example. Bibliometrics collaborates regularly with the field of Information Sources, in order to detect lacunae in bibliographic collections, maintain the collections, and facilitate corrections and the occasional removal of objectionable materials. Moreover, its analyses rely on descriptive fields of primary documents that have been developed by the area of Documentary Analysis: cataloguing, classification or indexation. When unable to find a given document -due to the increasing quantity of them- it has recourse to bibliography and information sources, either printed or mechanized, in order to obtain the necessary documents needed to analyze a given topic or its researchers. Recent developments in the methods of Library and Information Science have contributed significantly to the consolidation of Bibliometrics. In turn, the latter has also played an important role in the exposure and application of Information Science, thus establishing a symbiosis between the two sciences. Bibliometrics is also a multidisciplinary science. It borrows statistical methods to carry out its analysis; it serves itself of the surveys and tests elaborated by sociologists and, finally, use computer science

to process data by means of spreadsheets, statistical applications and databases. Originated in other fields of study, all these tools serve Bibliometrics in its goal of analyzing the work of scientists and researchers in the different branches of knowledge.

3.19-Methods of Bibliometrics

- **Citation analysis** - examines how often an academic paper has been cited in future papers.
- **H-index** (Hirsch number) - is a graph based on the set of a researcher's most cited papers and the number of citations each has received in other papers
- **Impact factor** - measures the number of citations to academic journals and is used to indicate the importance of a journal to its field.

3.20-Bibliometric indicators

Universities and others seeking measures of research performance face problems around what data to use and how that data should be generated and stored. Assessments of quality are fundamental to the scholarly communication system. Institutions also use research metrics to allocate funding and in setting policy and guiding strategic direction. Measures are important for benchmarking, allocating budgets, substantiating accreditation, promoting achievements and attracting investment. Measures are also applied to the performance of researchers, to assess individual productivity and for promotion decisions. These require that data can be standardized. In the search for metrics that can be easily generated, universities have sought to quantify basic information such as

- Numbers of papers produced/published
- Numbers of conference presentations
- Frequency of citation
- Patents and commercial spin-offs
- External funding generated and success in attracting grants
- Awards and presentations
- Number of PhD completions
- Success in attracting research students

Other bibliometric indicators that could be used are

- Total number of publications produced by a publishing entity
- Citation analysis - number of citations received by a publication in a given time period. Proven to work as well as more complicated approaches such as peer assessment, but not always reliable
- Citation impact rate - average number of citations per publication
- Journal impact factor -journal rating, used to weight the h-index
- Normalized citation rates - a more effective measure that looks at the average number of citation scores for publications in the corresponding journal over a period of time e.g. UQ publications were cited 17% more times than the average for this set of journal titles

3.21-Bibliometric Distribution

According to Morse, a distribution is defined as a segregating of items according to their productivity. Many bibliometric process such as the distribution of papers in a discipline over journals, the distribution of citations over papers or over authors, the distribution of circulation transactions over library items and over library users and the distribution of publications over authors are claimed to be the results of a 'Success-Breeds-Success phenomenon. It is common in bibliometric analysis and in many diverse social phenomena where success seems to breed success. De SollePrice and many others have argued that the success-breeds-success phenomenon characterizes the bibliometric distributions as they do in other social process. For this, he has given some examples where such phenomena occur in bibiiometrics.

The Yule distribution in Statistics is characterized by De Solla Price as a Cumulative Advantage Distribution (CAD). Such phenomenon is generally described as a skew or hyperbolic distribution function. The Yule distribution provides a sound basis to the Lotka's distribution for scientific productivity, Bradford's law of scattering and the Zipf's law for word frequency. It has been observed that, the top ranked, frequency occurring items are relatively less in number but account for a relatively large share of overall occurrence and on the other hand, the lower ranked and less frequent items are much in numbers and constitute the 'tail' in the distribution. Due to the occurrence of

some items only for once, the 'tail' becomes too lengthy and the distribution becomes hyperbolic. The few top ranked items, the more numerous and lesser to least ranked items constitute the 'core' of the distribution. Finally, it can be said that distribution is of various types and describes various diverse phenomena like the use of books within a library to describe a set of books, distribution of funds among the states or organizations and many more examples like these. Normally, the distribution is used in statistics that describes the distributions of random variables, distribution of discrete probability, distribution of discrete random variables, distribution of continuous probability. Besides, Special probability distribution includes the Binomial distribution, the Normal distribution, the Multinomial distribution, the Hyper geometric distribution, the Uniform distribution, the Cauchy distribution, the, e Gamma distribution, the Beta distribution, the Chisquare distribution, the Students't' distribution, the 'f distribution and Miscellaneous distribution. In their analytical forms, they provide precise statements of regularities that have been noticed informally and with surprise. These bibliometric distributions refer to a variety of regularities taken from different fields and exhibit a variety of forms. Though these distributions differ greatly in appearance, still they can be conceptualized as the versions of a single regularity, so that we can properly spell out the bibliometric law and its manifestations. The differences in appearance are largely due to different applications, which cumulate data in different ways and also examine the relationships between different variables as has been observed by Bookstein. The social sciences, in which many (but not all) of these regularities are found, do not deal with these concepts which are well defined in physical sciences, due to the lack of conceptual precision and ambiguity. In order to get uniformity it is important to reduce the restriction and ambiguity, so that our choice can be made easily. For this, Bookstein has argued that the bibliometric laws do satisfy this uniformity very often further he has argued that the place of statistics in bibliometric laws.

3.22-Web Applications of Bibliometrics

Recently, a new growth area in bibliometrics has been in the emerging field of webmetrics, or cybermetrics as it is often called. Webmetrics can be defined as using of bibliometric techniques in order to study the relationship of different sites on the World Wide Web. Such techniques may also be used to map out (called "scientific mapping" in traditional bibliometric research) areas of the Web that appear to be most useful or influential, based on the number of times they are hyperlinked to other Web sites.

3.23-Bibliographic Coupling

Bibliographic coupling occurs when two works reference a common third work in their bibliographies. It is an indication that the two works treat a related subject matter. Measuring bibliographic coupling can be useful in a wide variety of fields since it helps researchers find related research done in the past, though its exact interpretation may vary depending on the field, since different fields have different citation practices. There are various metrics of bibliographic coupling, usually calculated using citation indexes. The coupling strength of two given documents is higher the more citations they have in common. The co-citation index is the number of times two works are cited together in subsequent literature. The concept of "bibliographic coupling" was first introduced by M. M. Kessler of MIT in a paper published in 1963, and has been embraced in the work of the information scientist Eugene Garfield. Others have questioned the usefulness of the concept, pointing out that the two works may reference completely unrelated subject matter in the third.

3.24-Issues & Limitations

- In some fields it is not the tradition to cite extensively the work that your scholarship and research is building upon - yet this is the whole principle of the citation analysis system Seminal research is also often taken for granted and not cited
- Where citation is common, the data sources often do not index the publications where research in a field is typically published - local publications, non-English, monographs, conference and working papers are poorly indexed
- Negative citations, critical of a work, are counted as valid Manipulation of the system by such means as self-citation, multiple authorship, splitting outputs into many articles and journals favoring highly cited review articles
- Defining the degree of specialty at which to benchmark. An individual's metric score may be high in relation to the broad discipline, but in fact low in relation to their particular sub-specialty's citing pattern
- Inappropriate use of citation metrics, such as using the Journal Impact Factor of a journal title to evaluate an individual researcher's output, or comparing hindex across fields, ignoring the citation pattern variations found

3.25-Evaluative bibliometrics

Most evaluative bibliometric techniques use citations as their raw data. The theory for this stems from Robert Merton's sociology of science, which postulates that citations are the way in which scholars acknowledge influential prior work. On this basis, citation counting could be used as an indicator of scientific value because more influential work would tend to be more frequently cited. In fact the term 'impact' is now accepted as appropriate for that which citations measure or indicate. Subsequent research has shown that Merton's perspective is simplification of reality: there are many different reasons to cite articles as well as many influences on which articles to select, when multiple options are available. From an alternative perspective, de Solla Price showed that a cumulative advantage process could be at work for highly cited papers, where papers that are initially well cited then tend to continue to be cited partly because they have been cited rather than for their intrinsic worth. This is similar to Merton's 'Matthew effect' in science, whereby recognized scholars tend to be awarded a disproportionate credit for their research. Despite complications such as these, indicators based upon citation counts have been widely adopted. The journal impact factor, introduced in the early 1960s is the number of citations from ISI-indexed articles published in the year X to articles in the journal published in years $X-1$ and $X-2$, divided by the number of (citable) items published in the journal in the years $X-1$ and $X-2$. On the basis of Merton journals with higher JIFs tend to publish higher impact research and hence tend to be better regarded. Nevertheless, there seems to be general agreement that, even within discrete subject fields, ranking journals based upon JIFs is problematic. Moreover, as the JIF has gained in popularity, there seem to have been attempts by journal editors to recommend authors to cite other articles in the same journal to improve its JIF. A second common application is tenure and promotion decisions which may take into account the JIFs of the journals in which an academic has published, or the citation counts of their publications. This is not recommended by many bibliometricians, however, since citation counts at the level of individual authors are unreliable and those making the decisions may be unaware of field differences. A third application, usually conducted by expert bibliometricians, is comparing academic departments through citations to their publications. Even carefully constructed bibliometric indicators, which are reasonably robust because of aggregation over the publications of entire departments, need to be combined with other sources of

evidence (e.g. funding, sources of esteem, peer review, narrative) in order to give solid evidence for major decisions, such as those involving funding.

3.26-Relational bibliometrics

There were several early attempts to develop bibliometric methods to examine relations within science through ISI data, although the growth of relational analysis methods was probably constrained by the lack of sufficient computing power in the early days, especially for visualizations. Nevertheless, early relational analyses produced interesting insights into the structure of science through simple means, such as network diagrams of the flow of citations between key sets of articles. This idea was apparently invented by the geneticist Dr Gordon Alien in 1960, who sent his citation diagram to an enthusiastic Garfield. Journal citation diagrams were another early invention: these can illustrate the connections between journals within a field, detect journals that cross field boundaries and identify central or peripheral journals. One important relational method, sometimes attributed to Garfield, is co-citation as a measure of similarity. The basis of this is that pairs of documents that often appear together in reference lists (i.e. are co-cited) are likely to be similar in some way. This means that if collections of documents are arranged according to their co-citation counts then this should produce a pattern reflecting cognitive scientific relationships. Author co-citation analysis (ACA) is a similar technique in that it measures the similarity of pairs of authors through the frequency with which their work is co-cited. ACA operates at a high enough level of aggregation to be a practical tool for mapping the structures of fields

3.27-Bibliometrics Today

Mainstream bibliometrics has evolved rather than undergone revolutionary change in response to the web and web-related developments. The core citation-based impact measures are still in place, but are now supplemented by a range of complementary techniques. In addition, there is now a body of theory and case studies to draw upon so that an experienced bibliometrician can be reasonably sure of finding good ways to generate indicators from citations for any common task and also of how to interpret the results. In particular there has been an ongoing debate about the validity of using citations to measure impact, in parallel with the development of theories of citer motivations, which have recently been extensively reviewed. Aside from the core citation analysis methods, the biggest change in bibliometrics stems from the availability of new

significant sources of information about scholarly communication, such as patents, web pages, and digital library usage statistics. Of course, the wider field of scientometrics has never been exclusively interested in academic papers and has also used other data such as funding as well as qualitative indicators, such as peer review judgments. There are perhaps three main trends in the recent history of bibliometrics, and citation analysis in particular. These are to improve the quality of results through improved metrics and careful data cleaning, to develop metrics for new tasks, and to apply bibliometrics to an increasing range of problems, particularly in descriptive relational contexts (see the knowledge domain visualization section below for examples of the latter).

3.28-Bibliometrics Laws

One of the principal aims of Science is to trace, amidst the tangled complex of the external world, the operation of what are called laws to interpret a multiplicity of natural phenomena in terms of a few fundamental principles. Natural laws describe patterns which are regular and recurring. The scientific point of a law is twofold. First, a concrete statement of a law may give us the ability to better predict events or to shape our reactions to them. Second, a physical law may help in the development of theories which explain why a particular pattern occurs. This was emphasized in the work of Pranas Zunde and John Gehl where they wrote that it is important not only to describe the phenomena of a science but to try to establish tenets to explain and predict the phenomena. Abraham Bookstein has set specifications for laws. When a new law is proposed, it may be reasonable to demand of it. On intuitive grounds, that it remain true under a variety of circumstances differing from those in which it was discovered. Should it satisfy these demands, we may increase the validity of the law; if it does not, and yet we still wish to maintain the validity of the law, we ought to feel an obligation to explain the discrepancy. There occur in bibliometrics three regularities to which have been given the name law. Lotka's Law of Scientific Productivity (authors publishing in a certain Discipline), Bradford's Law of Scattering distribution of publications and Zipf's Law of Word Occurrence ranking of word frequency. Although claims have been made that the three laws are basically the same, one of their differences lies in the type of data. Lotka's law dealt with authors publishing and the number of papers published; Bradford observed the scattering of articles on specific subjects Jan various journals; Zipf counted frequencies of words. Each of these distributions was empirically derived, and they are similar to each other as special cases of a hyperbolic distribution. Although many and various proofs have

been offered by important scientists supporting the theory of relatedness and similarity of these laws the reader is advised to keep John Hubert's comment in mind: literature contains many models, and some are erroneously referred to as laws as if they predicted occurrences without error In this section, each law is analyzed from the viewpoint of its literature, and some of the literature of the three empirical laws explaining each one's importance is noted.

3.29-Bradford's Law

S.C.Bradford in 1934, proposed a law on the basis of two bibliographies prepared in the Science library (Britain) on Applied Geophysics (1928-31) and Lubrication (1931 - 32) and he prepared lists of journals arranged by decreasing order of source items contributed by the journals to the bibliographies. He noticed that in each subject there were a few very productive sources, large number of sources which were moderately productive and still a large number of sources of constantly diminishing productivity. The whole range of periodicals was thus seen as 'a family of successive generations of diminishing kinship' each generation being greater in number than the preceding and each constituent of generation producing inversely according to its degree of remoteness In the list of periodicals ranked by diminishing productivity, Bradford identified three groups of periodicals that produced approximately the same number of articles on the subject, but the number of periodicals in these three productive zones increased by a constant factor. Based upon the occurrence of a statistical law frequently found in so called success breed - success' phenomena he stated his law as follows: 'If scientific periodicals are arranged in order of decreasing productivity of articles on a given subject that may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus when the number of periodicals in the nucleus and succeeding zones will be as $1 : n : n^2$ In other ways, it has been stated that' the aggregate number of articles in a given subject, apart from those produced by the first group of large producers In 1934 mathematician and librarian Samuel C. Bradford came up with the bibliometric formula $1: n: n^2$, which basically states that most articles are produced by few sources and the rest are made up of many separate sources. This law can also be referred to as Bradford's Distribution, The Law of Scatter, and The Law of Scattering or simply core and scattering Diodato, (1994),The reason for this labeling is that when the data are demonstrated visually, there is a cluster (or nucleus) near the journal that produces the most articles on a given topic. When

displayed in relation to the topic, the distribution for the remaining data tends to be scattered among the many journals that produce significantly fewer articles. Bradford gives these data their own mathematical equations and designates them to fall within certain "zones." To enter these data into a graph would result in what is called a Bradford Curve, which looks like the letter "J" or "S" when displayed on a chart. Bradford's law is thought to be the basis of the 80/20 rule in librarianship—80% of the items used are 20% of the library's collection Raber, (2003),

3.30-Lotka's Law

Alfred J. Lotka was a mathematician, supervisor of mathematical research in the Statistical Bureau of the Metropolitan Life Insurance Company from 1924 to 1933 It was during this time, 1926, that his definitive work, later called Lotka's Law, was produced His investigation was a productivity analysis described in the preceding section. Counting names and the number of publications listed for each, the coverage was for only A and B names in Chemical Abstracts for 1907 to 1916 and for Auerbach's *Geschichtstafeln der Physik* from its beginning through 1900 The data were tabulated and plotted, from which Lotka developed a general formula for the relation... between the frequency v of persons making x contributions" as $ux^y = \text{const}$. Finding the value of the constant when $n = 2$, he observed that: the number of persons making contributions is about one-fourth of those making one; the number making 3 contributions is about one-ninth, etc.; the number making n contributions is about of those making one, and the proportion, of all contributors, that make a single contribution, is about 60 per cent Notice that Lotka's observation deals with the least number of productions. Since the publication of Lotka's original article in 1926. Much research has been done on author productivity in various subject fields. The publications arising from this research have come to be associated with Lotka's work and are often cited as proving or supporting his findings. However, a review of this literature reveals that Lotka's article was not cited until 1941. that his distribution was not termed "Lotka's law" until 1949. And that no attempts were made to test the applicability of Loika's law to other disciplines until 1973

3.31-Zipf s Law

Zipf developed and extended an empirical law, as observed Zips by Estoup, governing a relation between the rank of a word and the frequency of its appearance in a long text of natural language of sufficient strength. The words were ranked from high to

low frequency of occurrence in the text i.e. from common to rare. His law states that in a long textual matter, if words are arranged in their decreasing order of frequency, then the rank of any given word of the text will be inversely proportional to the frequency of occurrence of the word. In other words, if 'r' is the rank of a word and T is its frequency, then mathematically Zipf's law can be stated as: $r, 1/f$, or $r.f = c$, where 'c' is a constant. This law represents only an approximation of the relationship between rank and frequency, which is hyperbolic. Zipf's formulation has been further refined and many generalized forms have been derived later the rationale behind the rankfrequency phenomenon has been stated by Zipf as the 'Principle of least effort'. In any language, the words which have a high frequency of occurrence are those that cost less in usage or require less effort in communication. A feature of Zipf's law is that it highlights the phenomenon that once, by chance, a group has achieved a dominant position it retains that position for a long time and indeed is more likely to be promoted than the less fortunate groups This feature is also known as 'success-breeds success' phenomenon i.e. success increases the chances of further success. Zipf came to the conclusion of the 'principle of least effort' from an analysis, which had been made on the frequency of the 26,530 words used by James Joyce in composing Ulysses. He found that the rank order of the word in the frequency list multiplied by frequency remained relatively static along the entire distribution. The tenth word in the list, for example, was used 2,653 times and the word, which ranked 1,000, was used 26 times. The law represents only an approximation between rank and frequency, which is hyperbolic. A second law proposed by Zipf is for words of very low frequency of occurrence. Because of the abundance of words, which occur infrequently, many words will have equivalent ranks. Zipf devised a technique for ascertaining the number of words having the equivalent rank 'r'. The graphical expression of this law is a straight line. Combination of Bradford's curved initial portion with Zipf's straight-line portion produces a curvilinear graph or a bibliography, which is popularly known as the Bradford-Zipf bibliography. Though the law has been applied to the study of length of monograph in Harvard University college library through the measure of the number of pages and in vocabulary control in the design of IR systems, its real significance to a library is yet to be brought out. Against this, the least effort principle has significance for all areas of library activities.

3.32-Bibliometric Laws vis-a-vis Literature Analysis

One of the principal aims of science is to trace, amidst the tangled complex of

external world, the operation of what are called 'laws' to interpret a multiplicity of natural phenomena in terms of a few fundamental principles. Natural laws describe the patterns, which are regular and recurring. The scientific point of a law is two folds. First, a concrete statement of a law may give us the ability to predict better events or to shape our reactions to them. Second, a physical law may help in the development of theories that explain why a particular pattern occurs. This was emphasized in the work of Zunde and Gehl, where they mentioned that it is important not only to describe the phenomena of a science but also try to establish tenets to explain and predict the phenomena. Bookstein has set conditions for accepting a particular law. According to him when a new law is proposed it is subjected to further verification on intuitive grounds. If it remains true under a variety of circumstances, we may increase the validity of the law, if it does not, and yet we still wish to maintain the validity of the law, we ought to feel an obligation to explain the discrepancy.

3.33-Overview of the major developments in bibliometrics

Mainstream bibliometrics has evolved rather than undergone revolutionary change in response to the web and web-related developments. The core citation-based impact measures are still in place, but are now supplemented by a range of complementary techniques, such as visualization Thelwall, (2008). For the past halfcentury, the impact factor has been the most prominent of these citation metrics as a measure of the impact that individual articles have on the research community. The impact factor was originally intended as an objective measure of the ranking of a journal Garfield, (1996), but it is now being applied to measure the productivity of scientists. The Impact factor is essentially a measure of the average number of citations that a journal's articles receive over the two calendar years following publication. Now it is more commonly used across all articles published by a journal to provide a measure of a journal's impact on the research community rather than the impact of an individual article. Medical journal editors and publishers (for instance, Journal of the American Medical Association and FLOS Medicine) use the impact factor as a means of attracting prospective authors to submit their work to these journals. Journal Citation Reports provides quantifiable statistical data that offer a systematic, objective way to evaluate the world's leading journals Thomson Reuters, (2009). The way it is customarily used is to examine the impact factors of the journals in which a scientist's articles have been published. The impact factor can be one measure of productivity, but other measures, such as awards and

memberships, commercial applications, supervision of research students and grant income are other tangible measures of research impact. Even carefully constructed bibliometric indicators, which are reasonably robust because of aggregation over the publications of entire departments, need to be combined with other sources of evidence (e.g. funding, sources of esteem, peer review, narrative) in order to give solid evidence for major decisions, such as those involving funding Thelwall, (2008). Over the years, many issues about the use of impact factors have surfaced. The numbers of citations to articles during the two years after publication varies considerably across different subject fields. Medicine and science have higher citation rates than arts and social sciences, such as history or education, where more citations go to books than journals. In computing and engineering, conference proceedings are cited rather than journal articles. Impact factors cannot be used to compare journals from different subject areas; what the impact factor indicates is the relative ranking of a particular title within a defined subject category. Original research and review articles are citable but editorials, letters, news items, and meeting abstracts are usually not included in article counts because they are not generally cited. Journals published in non-English languages or using non-Roman alphabets may be less accessible to researchers worldwide, which can influence their citation patterns. This should be taken into account in any comparative journal citation analysis. A range of other measures have been developed which complement the impact factor; one gives weighting to the citation source (Eigenfactor), and the other measure (h-index) was developed as a way to evaluate authors

3.34-Citations Analysis

Martyn has defined citation analysis as “the analysis of citations or references or both which form part of the scholarly apparatus of primary communications. The techniques used for putting items of references in some kind of rank or order, whether they are journals or author cited”. A citation is a reference to a document given by a more recently published document. The document citing is the citing document, and the document that receives the citation is the cited document. 14 Citation analyses involves counting The number of citations to a particular document for a period of time after its publication (this is sometimes called direct citations). 15 The traditional understanding of the citation function is that the frequency with which a document is cited can be taken as a measure of the impact or influence of that document on the citing literature. 16 Citation analysis leads to more sophisticated methods, such as cocitation analysis, mapping of the

literature, bibliographic coupling, 17 and co-word analysis. These methods, individually and in combination, strides to find information patterns, by analyzing reference and citation patterns as well as word use frequencies, combined with statistical analysis. According to Aina, citation analysis is a research method in which references cited are statistically analyzed to find what journals are cited by researchers in a particular discipline. When one author cites another author, a relationship is established. Citation analysis uses citations in scholarly works to establish links. Many different links can be ascertained, such as links between authors, between scholarly works, between journals, between fields, or even between countries. Citations both from and to a certain document may be studied. One very common use of citation analysis is to determine the impact of a single author on a given field by counting the number of times the author has been cited by others. (Osareh 1996). Citations are used in scholarly works to give credit to or acknowledge the influence of previous works, or to refer to authorities. Citations permit readers to put claims to the test by consulting earlier works. Authors often engage earlier work directly; explaining why they agree with, or differ from, earlier views. Ideally, sources are primary (first-hand) and recent. In the second phase of this study citation appended to 935 articles (source paper) have been taken and analyzed separately. The 935 articles have cited a total of 20579 citations. The Number of citations available in a paper depends upon several factors like the nature of a field, the size of it's and the citation characteristics of both the discipline and the length of the research papers and so on.

3.35-History of Citation Analysis

Although citation Analysis was first used in 1848 or 1927, depending on the sources, historically, it is a by- product of citation indexes. Gross and Gross in 1927 used citation count to rank the periodicals in chemistry which was regarded as the first user study of any significance based on a more systematic citation count that later became that basis and a methodological direction to the Bradford's Law of Scattering. The Institute of International Scientific Information (ISI) produces these indexes that originate in the 1960s. The subject Coverage of citation Indexes has been expanded from the initial Science Citation Index (SCI) to include the Social Sciences Citation Index (SSCI) and the Arts and Humanities Citation Index (A&HCI). Citation coupling techniques are used in the evaluation of scientific activities for a few decades. The main objectives of the citation analysis are to evaluate and to interpret citation received by articles, authors,

institutions and other aggregates of scientific activities. It is also used as a tool for measuring communication links in the sociology of science.

3.36-Kinds of Citation Analysis

The most used bibliometric methods are Co-citation analysis, Bibliographic coupling and Coword analysis. Co-citation Coupling Bibliographic Coupling Coword Analysis

3.37-Co-citation Coupling:

Citations are often used in bibliometric analysis, and they are also the base for Co-citation analysis and bibliographic coupling. In Co-citation analysis the data compiled are counts of the number of times two documents are jointly cited in later publications. The fact of having been cited together in the same news paper establishes a quantifiable link between the earlier papers, the strength of the link depending upon the number of times that pair of documents is cited together. Cocitation analysis can also be based on authors or journals as units of analysis. Journals can thus be used for studying the organization of a subject literature through Cocitation analysis. Co-citation of the published articles link the journals in which they were published and the journal title then represents the subjects of all articles included.

3.38-Bibliographic Coupling:

In bibliographic coupling the hypothesis is that two articles which both cite the same previously published article, have something in common. Analysis of the bibliographic coupling results in clusters of citing documents, when the Co-citation analysis groups cited documents. In bibliometric terminology the citing articles create a research front, when a cluster of cited documents is called an intellectual base.

3.39-Coword analysis:

Coword analysis is based upon the analysis of the co-occurrence of the keywords used to index articles and other documents. This method emphasis's the existence and evolution of networks of problems (so called problematic networks) (Courtial, 1984). The method is useful for mapping the content of research in a field.

3.40-Importance of Citation Analysis

The importance of citation analysis includes the following:

1. Giving credit to related work
2. Homage to pioneers
3. Identifying methodology, equipment, etc.
4. Correcting one's own work
5. Correcting the work of others
6. Providing broad background to the topic.
7. Criticizing the previous paper.
8. Alerting to forthcoming work
9. Quoting earlier papers that offer collaborations for one's ideas or claims.
10. Drawing attention to previous work that is not well known, but ought to be.
11. Identifying an earlier publication from which the author obtained the original idea for his or her work.
12. Identifying original publications in which an idea or concept was discussed
13. Citing a major figure because it makes the research work more respectable.
14. Citing articles that fit the author's perceptions of the journal's readers and what they are expecting. In other words, to fit the characteristic and status of the journal that the author is submitting the paper to.

3.41-Application of Citation Analysis

Bibliometrics is the recently developed field. Field in the sense that many of the applications made in the last two decades citation counting relating to the form of the document, country, language, age distribution of document are helpful to determine the scope of document. Their data are further helpful to identify the strength and weakness of the collection. The ranked list of journals derived from the citation counts are used for the selection and reflection of individual items. Statistical analysis of citation studies is a better measurement compared to the bibliometric description. Citation studies can be much more wide based than the library records and hence findings of certain studies can be said to be valid within a broader context. Time, money and expertise needed to

conduct certain studies are on the lower side compared to any of the direct methods. Martyn & Gilchrist used to rank British Scientific Journals. Lawani 22 has prepared a ranked list of 681 journals according to their productivity and this has been used as a guide for the acquisition of titles on Tropical and Subtropical agriculture by a number of libraries. Garfield 23 has reported an analysis of more than 5 million citations in the references of the journal articles covered by Science Citation Index during 1974 and he has presented a ranked list of highly cited journals by the total citation received, by 'Impact Factor' and by 'Immediacy Factor'. Wade has successfully applied this method for evaluating the University and government officials administering scientific research programmes. Mirsky has provided a brief overview of science studies in the Soviet Union. Lal 24 and Ray have used the bibliometric techniques to measure the relative scientific activity of the nations of the world in the field of horticulture. Sengupta has presented a list of areas where these techniques are profitably used.

3.42-Usefulness of Citation Analysis

Citation analysis is used to study the citation links between scientific papers, technical notes and reviews; for example it may be used by the periodicals librarian for study of the structure of literature and to identify core journals. Citation analysis provides relevant measures of utility and relationships of journals where primary function is to communicate research results. Citation analysis helps in identification of key documents and creation of core lists of journals. It helps in clustering of documents according to common references and citations; and Provides study of the attributes of literature including growth rate, obsolescence, and citation practices.

3.43-Limitations of Citation Studies

A number of factors combine to limit the various values and applications of the information system.

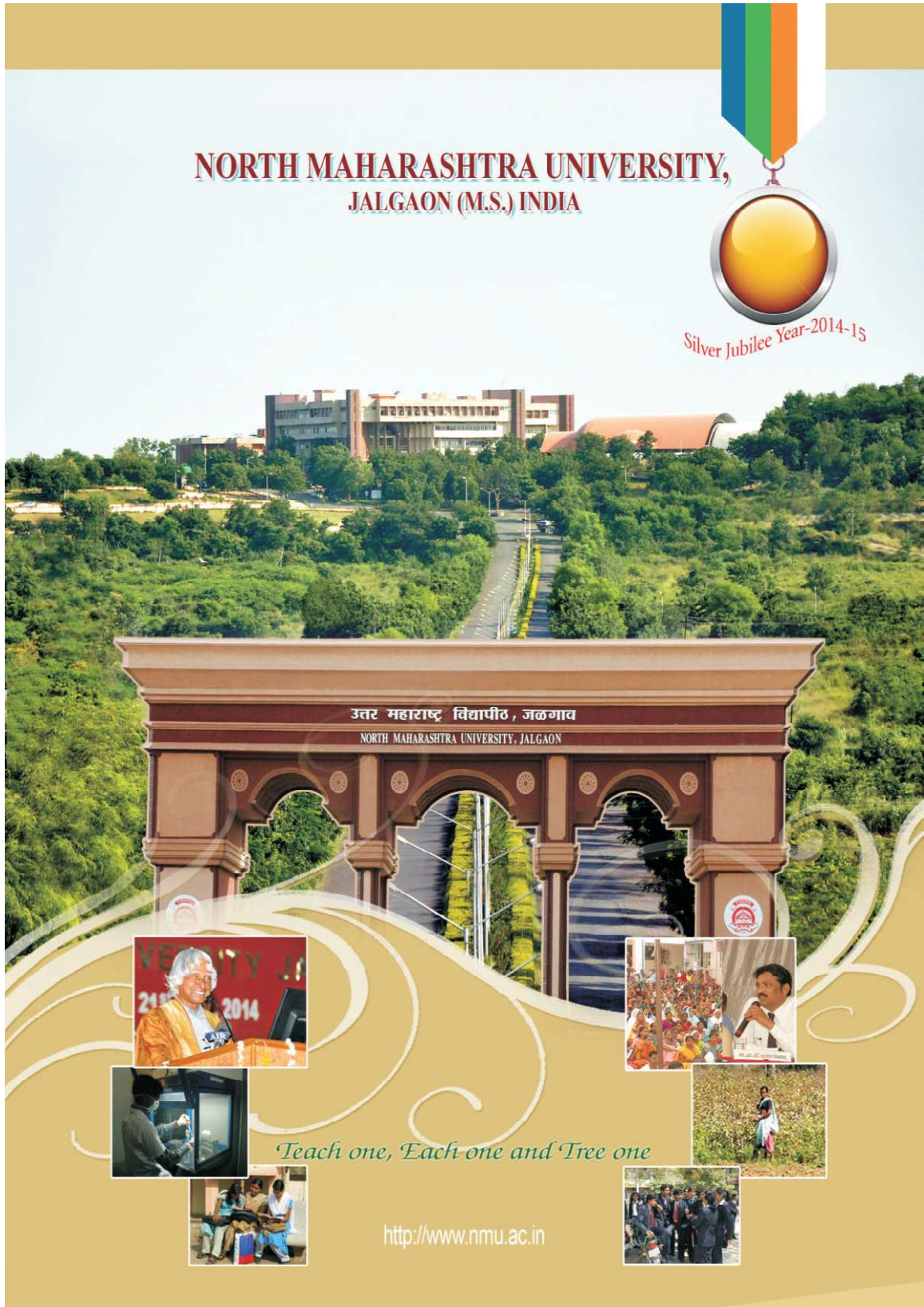
- They provide only an incomplete and biased record of the working of the information system.
- Data have largely to be collected by hand although citation indexes published by the institute for scientific can sometimes are used.
- Insufficient research has been conducted into the rationale behind citing to enable direct (and confident) application of the data.

Chapter-IV

About University

**NORTH MAHARASHTRA UNIVERSITY,
JALGAON (M.S.) INDIA**

Silver Jubilee Year-2014-15



4.1 Introduction:

The North Maharashtra University, Jalgaon, established on 15th August, 1990 under the Maharashtra Universities Act, XXIX of 1989, started its academic and administrative functioning from the academic year 1991-92. Within the span of 3 years, the University is recognized under section 2 (f) in 1991 and 12 (B) in 1994 under the University Grants Commission (UGC) Act, 1956. The jurisdiction of the University is extended over three districts i.e. Jalgaon, Dhule and Nandurbar, a pre-dominantly tribal and rural area of Khandesh region. The University has opened its doors of higher education to mostly “**first generation learners**” of this area. **Access, equity and academic excellence are the thrust areas of the University’s educational endeavor.** Presently, **Prof. S. U. Meshram** is the Vice-Chancellor holding the position since September 08, 2011. Following Vice-Chancellors have successfully shouldered the responsibility of the University in the past. **Dr. N.K. Thakare (August 15, 1990 to August 14, 1996) Prof. S.F. Patil (August 14, 1996 to August 14, 2001) Prof. R.S. Mali (August 14, 2001 to August 14, 2006) Prin. K.B. Patil (August 22, 2006 to August 21, 2011)** The University was awarded with **FOUR STAR** grade in the year 2001, **B grade** with **2.88 CGPA** in the year 2009 and **A Grade** in 3rd Cycle re-accreditation in year 2015 by National Assessment and Accreditation Council (NAAC), Bangalore. The main campus of the University is located about 8 km away from Jalgaon and 1.5 km away from the Asia Highway No. 46 and is spread over an area of **660 acres** on a hilly terrain (above mean sea level 810 ft.), which is conducive to teaching, learning, research and extension of know-how. The campus has been beautified with a massive plantation drive of more than **2 lactrees** which earned it the recognition of ‘**Vanshree Award – 2000**’ by Government of Maharashtra and ‘**Indira Priyadarshini Vrikshmitra Award-2002**’ by Ministry of Environment and Forest, Government of India, New Delhi. There are three satellite campuses namely - Pratap Regional Post-graduate Center, Amalner, Mahatma Gandhi Tatwadnyan Kendra, Dhule and Eklavya Training Center, Nandurbar. There are **220** affiliated colleges and **04** University recognized Research Institutes/Centres under the jurisdiction of University. Out of these, **01** college is recognized as **College of Excellence**, **05** colleges have been identified as **College with Potential for Excellence** and **01** college has been granted autonomous status by the UGC, New Delhi Board and Government of Maharashtra. A climate of research, teaching, learning, student development, value education and community

outreach programmes is nurtured through vital links between the University Schools/Institute and all affiliated colleges. There are eight faculties namely, Arts and Fine Arts, Commerce and Management, Science, Engineering and Technology, Pharmacy, Law, Education and Mental, Moral and Social Sciences covering various UG/PG/M.Phil./Ph.D. programmes on the University Campus as well as in the affiliated colleges. The University has successfully adopted the **'School Concept'** with academic flexibility for the optimal use of infrastructure and resources. There are **13 Schools** and **01 Institute** imparting education in **11-UG, 62-PG** and **37-Ph.D.** Programmes. The University has implemented **Cumulative Grade Point Average System** from the academic year 2009-10 and **Choice Based Credit System** from the academic year 2014-15 to all the P.G. courses on the campus. **Total 06 Schools/Institute** of the University has been recognized for their research activities by **National/International agencies like UGC SAP, DST-FIST, UGC Innovative, UGC-NON-SAP, MHRD-TEQIP-World Bank etc.** The University is well equipped with excellent physical infrastructural facilities like – majestic administrative, examination and library buildings, separate buildings for each School/Institute, adequate classrooms, well-equipped laboratories, state-of-art research facilities, a senate hall, convocation auditorium, sports facilities with indoor stadium, health center, guest house, Shikshak Bhavan, VVIP guest house, Hostels, Staff quarters, Central School (Kendriya Vidyalaya), Library, Post Office, Bank, ATM, Shopping Complex which are sufficient enough to satisfy almost all kinds of needs of teaching/non-teaching staff, students, researchers and stakeholders. This physical infrastructure is the asset of the University which is created within a short span of 24 years. The University has signed various **MoU's** with national/international organizations as well as Maharashtra Knowledge Corporation Ltd., to take a step towards a digital University. Campus Area Networking, SAP-ERP and BI software for smooth functioning of finance and administration, INFLIBNET programme, EduSat, generation of patents, a model examination system, e-suvidha, students facilitation center, emphasis on value education through the Department of Ambedkar Thoughts and School of Thoughts, focus on research and community outreach programmes are some of the steps that we have initiated to make our students sustainable global citizens. The University looks upon itself as a centre of excellence and envisages a path finder towards innovation and dynamic transformation through the Rajiv Gandhi Science and Technology Commission, NMU Centre, Dr. Babasaheb Ambedkar Competitive Examination Training Center, Mobile Science Exhibition Unit (Van), Central Training and Placement Cell (CTPC), University-

Industry Interaction Cell, Tribal Academy and Women's Studies Center. Three new Schools i.e. School of Social Sciences, School of Arts and Humanities, School of Thoughts and Khandesh Archives and Museum have been established for instilling value education, heritage consciousness and national pride amongst the students. The concept of **Finishing School** has been recently implemented by the University for overall academic and professional development of students. The University's efforts to bring the unreached in the mainstream of higher education have been realized through the **Institute of Distance Education Learning (IDEAL)** which runs **16 UG/PG** courses and caters to the needs of nearly **2500** students. A unique **community outreach programme** namely - "**Lab to Land Programme**" has been launched by the University to reach to the farmers of Khandesh region, providing training, consultancy and quality bio-inputs know-how adoption for improving productivity and yields in their agricultural land especially in remote areas of rural and tribal region of Khandesh. The University has implemented an **exclusive education programme** under Right to Education Act for **children of labourers** working on campus at **Day Care Center and Central School**, North Maharashtra University, Jalgaon. The reputed national weekly '**India Today**' (June 3, 2013, Vol. XXXVIII, No. 22) has conducted a country-wide survey through **Nelson Research and Consultancy Company** and ranked North Maharashtra University at **40th position among 620 universities in India and first position in Maharashtra State based on factual data**. Reputed "**Careers360's**" Magazine (March, 2014, Vol. 6 (3)) has listed this University amongst **top 100 Universities in India**, wherein the North Maharashtra University, Jalgaon has been rated at **27th position and 1st position in the Universities of Maharashtra State** and ranked this University in March, 2015 at **28th position amongst the outstanding universities in India and 1st position amongst the State Universities in Maharashtra**. *The academic year 2014-15 is a great milestone in the history of North Maharashtra University as it is celebrating its **Silver Jubilee**, a twenty five years voyage of higher education.*

4.2 Achievements :

Year 2015 North Maharashtra University awarded '**A**' **Grade** by NAAC in 3rd Cycle re-accreditation with excellent achievements as per the NAAC report.

North Maharashtra University, Jalgaon ranks 28th amongst the outstanding universities in India and 1st amongst the State Universities in Maharashtra as per the

survey conducted by "Careers360" magazine, India's Outstanding Universities 2015, (March 2015).

Year 2014 University has organized an International Conference on Innovations in Biotechnology and their Applications titled as 3rd Global Sustainable Biotech Congress (GSBC) – 2014 on 1-5 December 2014 University has organized International Conference on Global Opportunities for Latest Developments in Chemistry and Technology (GOLD-CT 2014) on 06-08 February 2014 Inauguration of Digital Knowledge Center (DKC) at the Central Library to provide the different information services and resources in digitized forms like e-resources, open access sources, repository services and database services. MoU with M/s. Jain Irrigation System Ltd., Jalgaon has been signed on January 23, 2014 to develop co-operation and collaboration in research, training and other agreed activities. MoU with Tokushima University, Japan for Engineering Courses. MoU with NEERI, Nagpur for collaborative research programmes and training M.Sc. students. MoU with Rajiv Gandhi Science and Technology Commission, Mumbai for assistance for science and technology applications through University system. MoU with Bourns College of Engineering, University of California, Riverside, U.S.A., for joint research programme and collaborations. MoU with Jain Irrigation, Jalgaon. Inauguration of Community College at Nandurbar sub center Under Tribal Academy. **Year 2013** MoU with Mhyco seeds, Jalna. MoU with CSIR-National Environmental Engineering Research Institute, Nagapur has signed on October 14, 2013 to provide higher educational opportunities for faculty, support staff and students, to promote institutional linkage and explore other avenues for possible collaboration where expertise exists. Collaboration in Engineering, Management and Education Courses with CETYS University, Mexico on January 13, 2013 MoU with Institute of Chemical Technology (ICT), Mumbai has been signed on June 6, 2013. Foundation Stone Laying Ceremony of Building of Minority Girl's Hostel. Inauguration of Khandesh Historical Museum. Honorary Colonel Rank to Hon'ble Vice-Chancellor Prof. Sudhir U. Meshram. Inauguration of Training and Central Placement Cell office. University establish Quality Improvement Control Committee. Foundation Stone Laying Ceremony of Proposed Karmachari Vasahat 'Uttamvidya Nagari'. **Year 2012** Special Convocation ceremony was organized on 24th March 2012, and conferment of D. Litt. to Hon'ble President of India, Smt. Pratibha Devisingh Patil.

Year 2011 University was purchased 'Mobile Science Exhibition Van' and open for College & Schools students from February, 2011. Various Bodies of the University were constituted by Election process. University has been awarded with 'ISO 9001-2008' by DNV, Netherland branch Chennai. Department of Computer Science and Department of Chemical Technology got recognition under SAP DRS (I) 1 Gbps Connectivity is commissioned by BSNL under NME-ICT Project. **Year 2010** Pratap College, Amalner, P.O.Nahata College, Bhusawal, P.S.G.V.P. College, Shahada these three colleges were awarded 'College with Potential for excellence' by University Grant Commission, New Delhi.(Bringing the number C.P.E. college to 6) University was started 'Khandesh Vastu Museum ' from 18 may 2010. New 5yr. course M.Sc. in Actuarial Science, Master in Social Work (M.S.W)., M. Phil (History & Education), Diploma in Tourism Management, Advance Diploma in Banking, M.A. in Sociology, Defence Studies were started from academic year 2010-11. University has started 'Women study Centre' from 27 Aug. 2010. University started 'Online Affiliation Process' from Nov.,2010. Distance Education Council, New Delhi has given permission to start Institute of Distance Education & Learning in University Campus. **Year 2009** University has been Re-accredited with Grade B (2.88) duly honored by National Assessment Accreditation Council (NAAC). **Year 2008** University was awarded with 'Purushottam Puraskar' duly honoured by P.K.Patil Foundation, Shahada. The University has signed the agreement with SAP-ERP CMC Ltd. Tata Group on 6th may, 2008 for Finance & Administration department. **Year 2007** Inter University West Zone Basketball Tournament was successfully organized on 1-5 Nov.2007. The University has decided to tie-up the agreement with SAP Software on 31st Dec.2007. The University has signed MoU with Maharashtra Knowledge Corporation Ltd.(MKCL) to provide 'E-Suvidha' to the students from academic year 2007-08. The University was introduced 'Bar Code System' from Nov.2007 examinations. The University has signed MoU with CYTES University, Mexico. School of Chemical Sciences, School of Physical Sciences, School of Life Sciences were approved on National level under SAP/DRS project from U.G.C., New Delhi. These Schools received grant of Rs.60 lacs. New Courses M.Tech. in Chemical Engineering, M.Tech.in Polymer Tech., P.G. Diploma in Actuarial Sci. were started from Academic Year 2007-08. **Year 2006** Computer Centre up-gradation proposal was cleared by UGC, New Delhi & the funds of the tune of Rs.25Lacs were sanctioned for the up-gradation. Prin.Dr.K.B.Patil took over as the 4th Vice Chancellor of the University on 22 Aug.,2006. Successfully organized the Inter University Annual Sports meet

'Ashwamedh'. First University level research festival 'Avishkar-2006' was organized on 15-16 Dec.,2006. University established 'Gandhi Research Foundation' on the Birth Anniversary of Mahatma Gandhi on 2nd Oct.,2006. New Courses M.Tech. in VLSI Tech, M.A.Mass communication, Political Science, M.Sc.Organic Chemistry, M.Ed. were started from Academic Year 2006-07. **Year 2005** University level best teacher/employee/college awards for the campus as well as affiliated colleges were given during this year. University received the Indira Priya Darshini Vruksh Mitra award of Government of India at a grand award presentation ceremony at New Delhi on 16th Sept. 2005. Campus Area Network project implementation started this year. Inauguration of Examination building and Life Science building by Honourable Shri. Sharad Pawar Union Minister Of Agriculture And Consumer Affairs on 26th January, 2005. **Year 2004** 512 Kbps SCPC VSAT Internet Access facility under UGC Infonet project, for browsing E-Journals was started from this year. Following events were organized during this year : West Zone and All India Level Inter University Level Kabaddi tournament. West Zone Inter University Youth Festival. Following buildings were inaugurated during this year : Central Library building, at the auspicious hands of His Excellency the Vice President Of India Shri Bhairon Singh Shekhawat. School Of Environmental & Earth Sciences by Honourable Shri Suresh Dada Jain Minister Of Technical & Higher Education, Government of Maharashtra. Following seminars were organized during this year : One day, C. V. Raman Memorial Seminar(RMS) was organized on the occasion of National Science Day. " Developments in Biotech Emerging Trends and Challenges" on 25 & 26 November 2004. "Antar Bharati Seminar" by Sane Guruji Sanskar Kendra on 24 & 25 December 2004. **Year 2003** The University obtained the 512 Kbps VSAT connectivity under UGC Infonet Program of the UGC. Also the in-house training program on "Computer Operations" for non teaching staff of the University was started in this year. **Year 2002** Under the able guidance of Honourable Vice Chancellor Prof. Dr. R. S. Mali, University Expert System Project was initiated, as a first step, towards, becoming a paperless office. **Year 2001** NAAC awarded the prestigious 4 Star Status to the University. Prof. Dr. R. S. Mali took over as the third Vice Chancellor of the university. **Year 2000** The National Assessment and Accreditation Council's Peer Review team visited the university. **Year 1999** This year, three new Schools/Departments including Department of Information Technology, Department of Comparative Languages & Literature and School of Environmental & Earth Sciences were established. **Year 1998** Computerization of Administration was the major highlight of this year. **Year 1997** In

this year, University established the Pujya Sane Guruji Sanskar Kendra, for observance of philosophy of reverend Shri Sane Guruji, for maintaining an equilibrium between cultural values and technological progress. **Year 1996** Prof. Dr. S. F. Patil took over as the second Vice-Chancellor of this University on 14th August, 1996. **Year 1995** Within a span of 2 years, of its campus foundation stone laying ceremony, the University was shifted to its own campus in 1995. **Year 1994** In this year, university obtained the prestigious 12(B) recognition of the University Grants Commission (UGC), New Delhi. **Year 1993** Historical event : Foundation stone laying ceremony of the Administrative building was done in 1993, at the auspicious hands of then Chief Minister of Maharashtra Shri. Sharad Pawar. **Year 1992** 1992 was a special year for the University because in this year University got the 2(f) recognition from UGC. **Year 1991** The University has adopted "School" concept to encourage interdisciplinary teaching / research activities under one roof so that limited human resources, equipment and infrastructure are optimally utilized by creating the culture of team work. This year, 5 Schools/Departments were established for conducting teaching, research and extension activities on the campus **Year 1990** The North Maharashtra University was established on 15th August, 1990 under the Maharashtra University Act No. XXIX of 1989 as a teaching and affiliating University, for the purpose of socio - economic development of the region. The jurisdiction of the University is spread over three districts of North Maharashtra: Jalgaon, Dhule and Nandurbar. It actually started its academic and administrative activities from academic year 1991 - 92, under the leadership of Prof. Dr. N. K. Thakare, the founder Vice-Chancellor of the university.

4.3 Awards:

North Maharashtra University, Jalgaon ranks 28th amongst the outstanding universities in India and 1st amongst the State Universities in Maharashtra as per the survey conducted by "Careers360" magazine, India's Outstanding Universities 2015, (March 2015). The Best University Award at Avhan 2014: Chancellor's Brigade Disasters Management Camp. Rashtrasant Tukadoji Mahaj Nagpur University, Nagpur North Maharashtra University, Jalgaon ranks 27th amongst 742 universities in India and 1st amongst the State Universities in Maharashtra as per the survey conducted by "Careers360" magazine, India's 100 BEST Universities 2014, (March 2014). According to a survey carried out by India Today in June 2013 North Maharashtra University, Jalgaon was ranked 40 amongst universities in India The Teak Plantation program was

awarded with Vanashree award in the year 2002, by the State Govt. of Maharashtra. University received the state level N.S.S. award for the Best University in the state in the year 2002. According to a news report of Hindustan Times, the Department of Computer Science was ranked as 10th Best Department , at National Level.

4.4 Foreign Collaborations and Others:

4.4.1 Foreign Collaborations:

Joint Bachelor Degree Program (Microbiology, Computer Science, Chemistry and Business Administration) between North Maharashtra University and Cayuga Community College (CCC), Auburn, New York on 26 March, 2012.



Collaboration in Engineering, Management and Education Courses with CETYS University, Mexico has signed on January 13, 2013.



MoU with Technological Education Institution of Athens, Greece has been signed on March 14, 2014. MoU with Graduate School of Advanced Technology and Science, Tokushima University, Japan for collaboration in Engineering Courses has been signed on May 4, 2014. MoU between School of Life Sciences and G.K. Skryabin Institute of Biochemistry and Physiology of Micro-Organisms, Pushchino, Russia for joint research projects has been signed on May 6, 2014. MoU with Bourns College of Engineering, University of California, Riverside, U.S.A., for organization of joint conferences, exchange of faculty and research students and joint research programmes has been signed on June 5, 2014. MoU with Pacific Ag Research, Inc. Company, San Luis Obispo, CA, California, USA for joint production of pesticide, fertilizer, growth regulator, crop enhancer, seed, drip system etc. has been signed on July 02, 2014.

4.4.2 National Collaborations:

MoU with Indian Institute of Geomagnetism (IIG), Navi Mumbai for academic level activities related to Space Physics, Environmental and Earth Sciences endeavors has been signed on September 20, 2010. Mou with Ground Water Surveys and Development Agency, Water Supply and Sanitation Department, Government of Maharashtra, Mumbai for active participation and conduct of training programmes on the Rajiv Gandhi Drinking Water Mission has signed on January 22, 2011. MoU with Maharashtra Hybrid Seeds Company (MAHYCO), Jalana, Maharashtra State, India signed on September 1, 2012 for Testing and Analytical services, Transfer of Technology, utilization of land under the possession of NMU for trials, collaborative research activities.



MoU with CSIR-National Environmental Engineering Research Institute (NEERI), Nagapur has been signed on October 14, 2013 to provide the higher educational opportunities for faculty, support staff and students, to promote institutional linkage and explore other avenues for possible collaboration where expertise exists.



MoU with Institute of Chemical Technology (ICT), Mumbai has been signed on June 29, 2013 to promote the exchange of doctoral students and faculty members for research and courses, exchange of information, joint research and supervision of research students at doctoral level and transfer of audit and credit courses for masters and doctoral students in respective institutes. MoU with M/s. Jain Irrigation System Ltd., Jalgaon has been signed on January 23, 2014 to develop co-operation and collaboration in research, training and other agreed activities. MoU between School of Chemical Sciences and Institute of Chemical Technology (ICT), Mumbai has signed on March 18, 2014. MoU between North Maharashtra University and Inflibnet Center, Gandhinagar, and IUC of UGC, New Delhi has been signed on March 29, 2014 in reference to repository of Ph.D. Thesis and Dissertations under the scheme of 'SHODHGANGA/SHODHGANGOTRI'. MoU with Rajiv Gandhi Science and Technology Commission (RGSTC), Government of Maharashtra, Mumbai under the scheme "Assistance for science and technology applications through University system" has been signed on May 13, 2014. MoU with CSIR-Indian Institute of Petroleum, Dehradun on October, 2014. MoU with Department of Biotechnology, New Delhi on December, 2014. MoU with Visvesvaraya National Institute of Technology, Nagpur on January, 2015. MoU with Nirmal Seeds, has been signed to provide the training to students and research students. A joint proposal has been submitted by North Maharashtra University and Nirmal Seeds to Indo-French funding agency for Tri-Party collaboration in the field of research.

Chapter-V

Data Collection and Analysis

5.1 Abstract:

The present study attempts to map the trends of research in field of library and information science for past one decade, i.e. from 2005 to 2014 using various bibliometric methods such as publication trends, citation analysis, collaboration and co word clustering. It provides visual overview of distribution of publications in various topics and sub-topics of library and information science. The study demonstrates applications of co-word analysis in identifying most eminent and emerging topics in LIS. The study also demonstrates international collaboration as a variable approach for identifying research trends and emerging topics in library and information science.

5.2. Introduction

Understanding and evaluating research is essential for research planners, policy makers and researchers. One of the most efficient methods in evidence-based research assessment is the use of bibliometric and scientometric approach for examining scientific output covered by global citation databases. There are abundant techniques developed for bibliometric analysis. A widely adopted methodology is to analyse networks of documents, keywords, authors, journals and institutions using various mapping and clustering techniques such as co-citation analysis, bibliographic coupling, co-word analysis, etc .

Considering the distinct status of information and library science in modern age and its vital role in the process of advancement of society, visualizing structure of the scientific publications produced by researchers in this area could effectively provide insights into growth, development and trends in LIS research.

The present study attempts to map research trends in area of library and information science. Various bibliometric techniques such as publication trends, citation analysis, collaboration, co-word clustering have been used for mapping research trends. Research collaboration is an important parameter to measure emerging trends and topics that attracts international attention. It reflects general tendencies towards internationalization of various sectors of modern society (Melin, G. 1996). Identifying most high-lighting, productive and emerging topics from research domain is also crucial

for intellectual and policy reasons. Co-word analysis is one of the methods that counts and analyzes the co-occurrences of key-words in publications on a given subject and establish relation among ideas and concepts within the subject area. In this study, we have taken a practical approach for analyzing scientific collaborations and co-word clustering in library and information science. Sci2 and Bibexcel tools were used for generation of science maps emphasizing their structure. VOS Viewer was used to visualize the map.

5.3 Source of Data

Three citation indices namely, Science Citation Index (SCI), Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (AHCI) hosted on the Web of Knowledge platform were used to collect the data on source articles published in the field of library and information science. All articles indexed in these three indices were grouped into a total number of 251 WoS Subject Categories. Web of Science reassigns documents published in multidisciplinary journals to their most relevant Web of Science Subject Categories. The aim of using Web of Science Subject Categories was to consider all papers published in library and information science including articles published in multidisciplinary journals. WoS Subject Category (field tag “WC”) named “Information & Library Science” was used to retrieve data on all articles published in LIS for this study.

5.4 Mapping Research Trends

To map the data, we have analysed research productivity, citation analysis, collaboration and co-word occurrence. Further, cluster analysis was applied for more focused and structured analysis. International collaboration were analyzed using Bibexcel tool and visualize the network using VOS viewer. Co-word occurrence network was analyzed using Sci2 tool and visualize the map using GUESS algorithm.

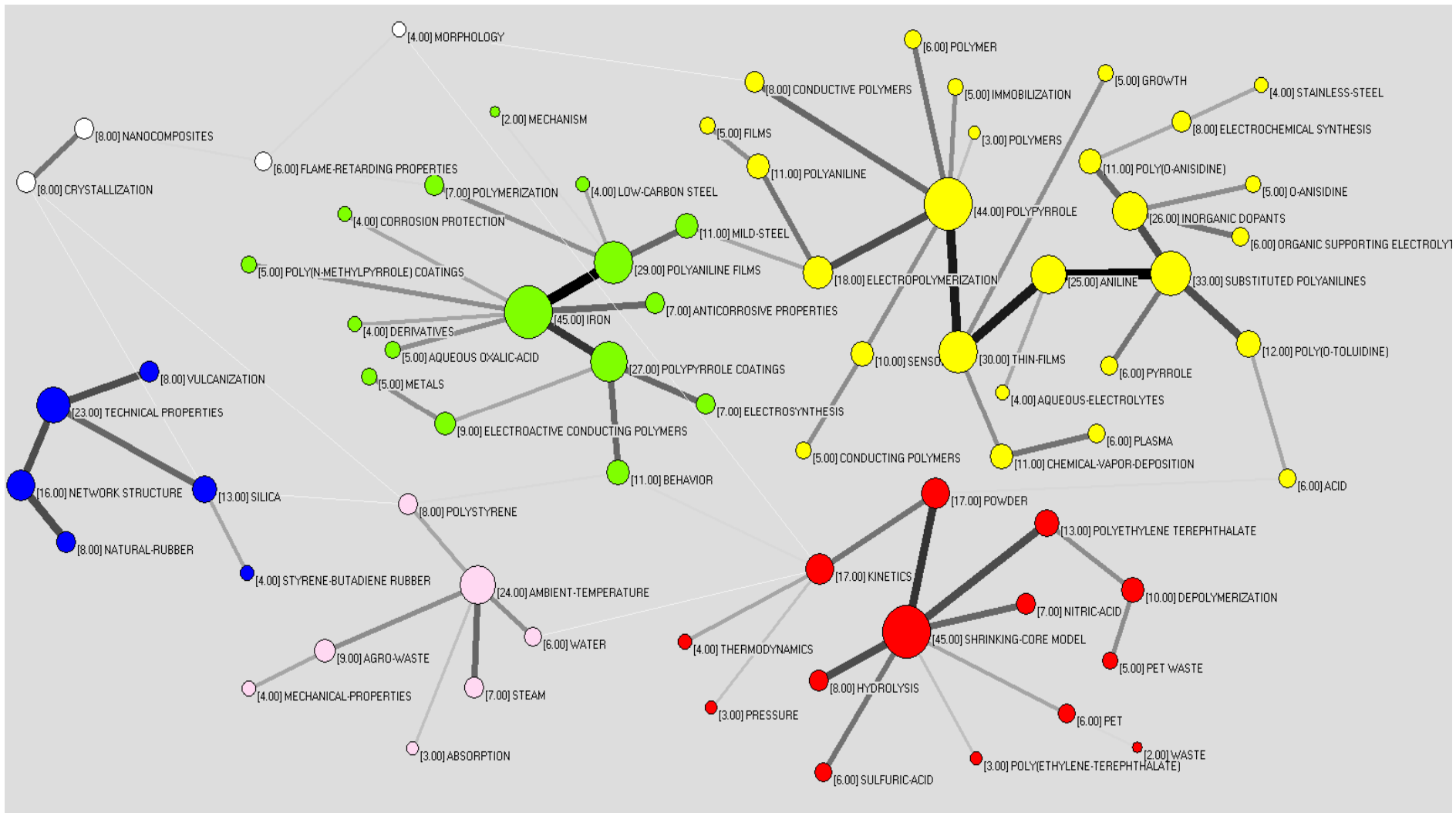


Fig:1- Co-word Analysis of Subject.(1990-2007)

5.5 Co-word Analysis

Identification of most productive topics has important implications for strategic planning in research. The study demonstrates applications co-word analysis as a variable approach for identifying research trends and emerging areas of research.

Co-word analysis represents structures of keywords in form of networks of edges and vertices. In this study, we have applied co-word occurrence analysis for mapping topics in area of library ad information science.

Due to the complexity of co-occurrence word network extraction process, we focused on top 20 keywords. The extracted data was analysed for 17 time periods, i.e. 1990 to 2007.

The resultant maps are network representation of keywords. Figures 01 depict co-word occurrence networks. The size and darkness of the node represents frequency of each keyword, edge represents the relationship between two keywords, and thickness and darkness of the lines represents strength of relation.

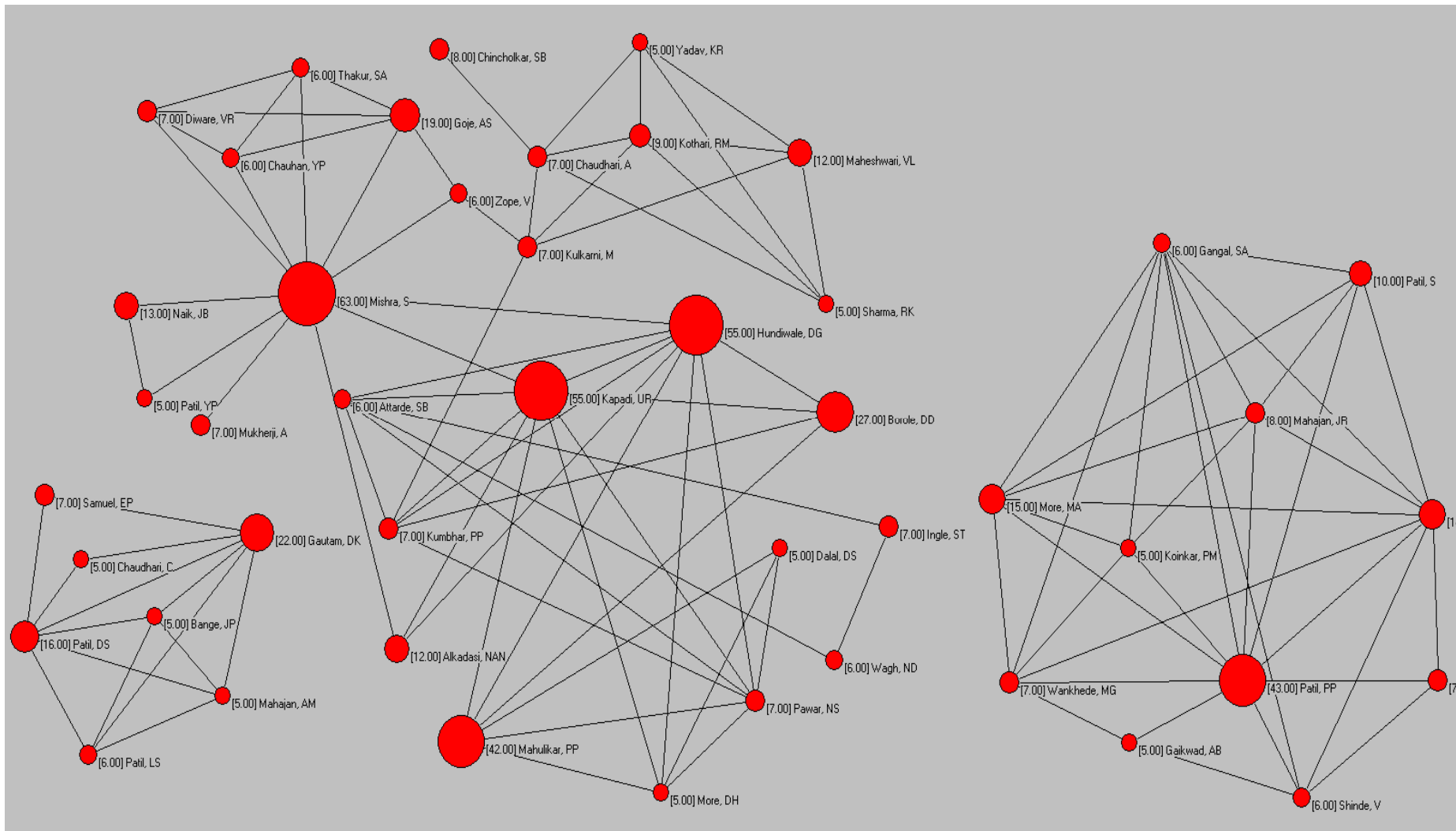


Fig-2- Co-word Analysis of Author (1990—2007)

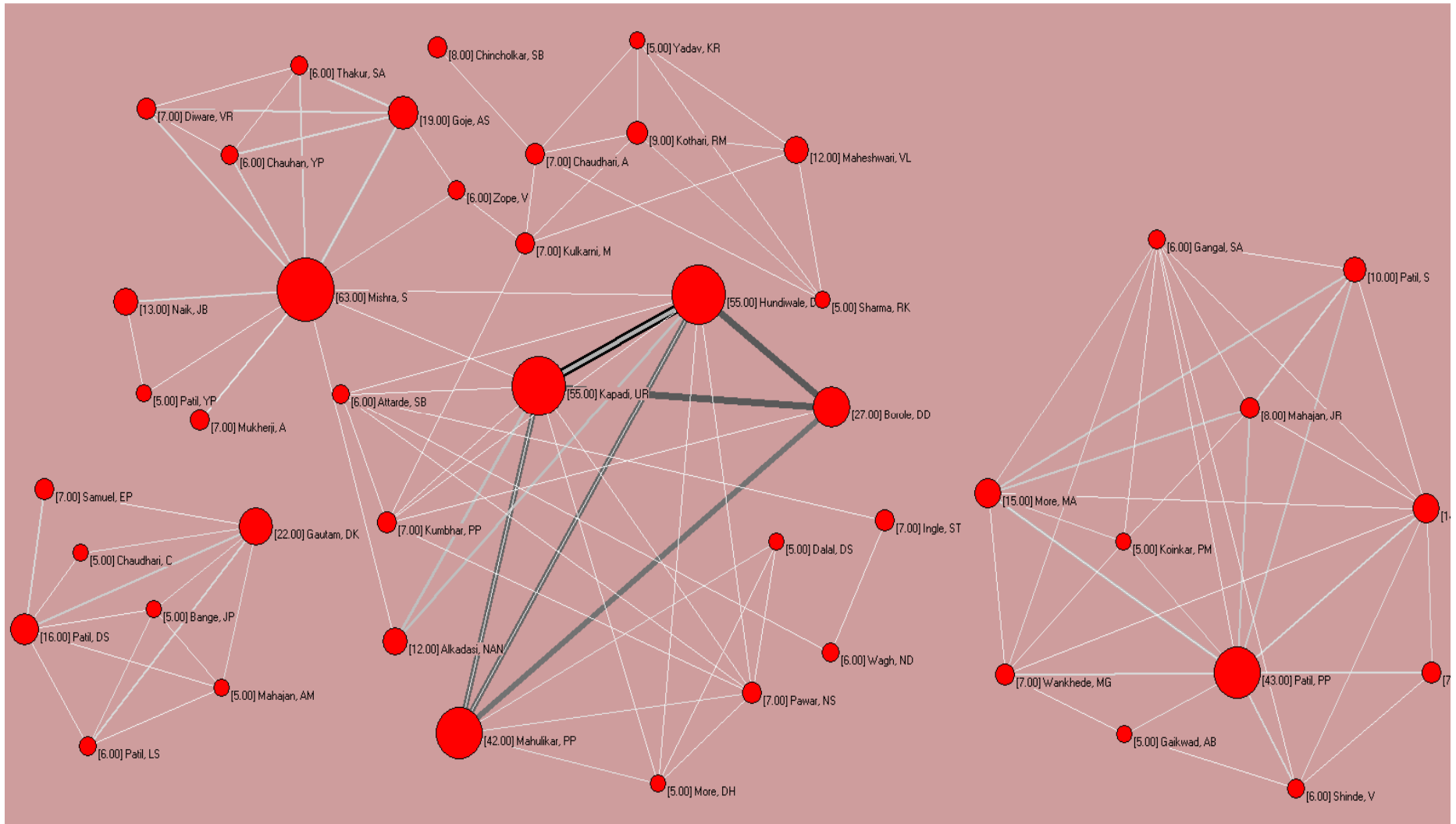


Fig:3- Co-word Analysis of Co- Author(1990—2007)

The study shows that “Knowledge Management”, “Bibliometric”, Citation Analysis”, “Information Retrieval” are most productive topics in library and information science research. A number of topics such as “Knowledge Management”, “Digital Libraries”, and Information Retrieval” are present in all years, whereas topics such as “Document Delivery”, “E-Commerce”, “Search Engine”, “Digital Divide” have disappeared over the year. New topics have emerged as a recombination of existing topics and in interaction with technological developments such as “E-Government”, “Web 2.0”, “Social Network”, “Information Literacy”, “Open Access”, “Scientometric”, “H Index”, etc.

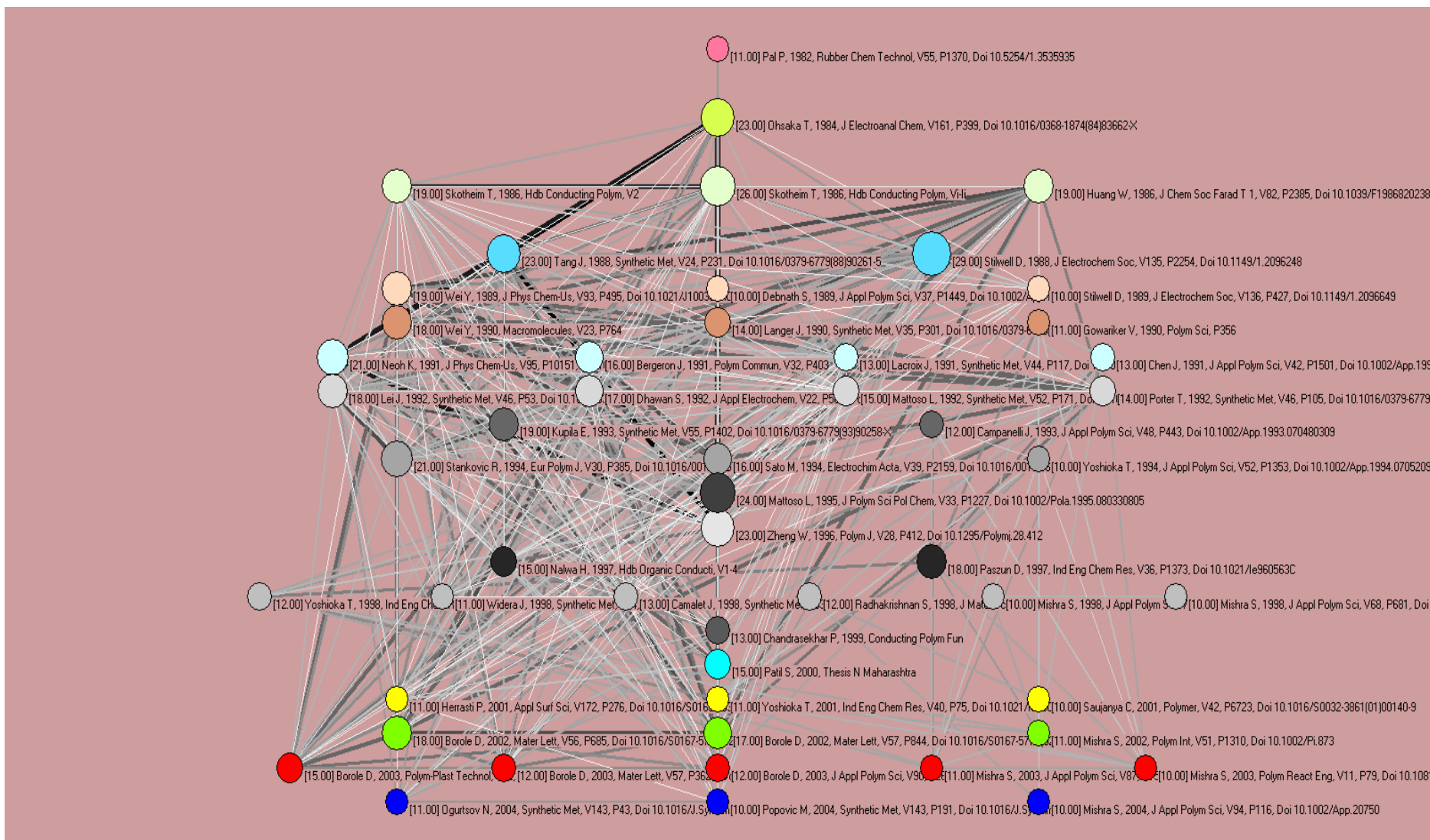


Fig:4 Co-citation Analysis of Author and Subject

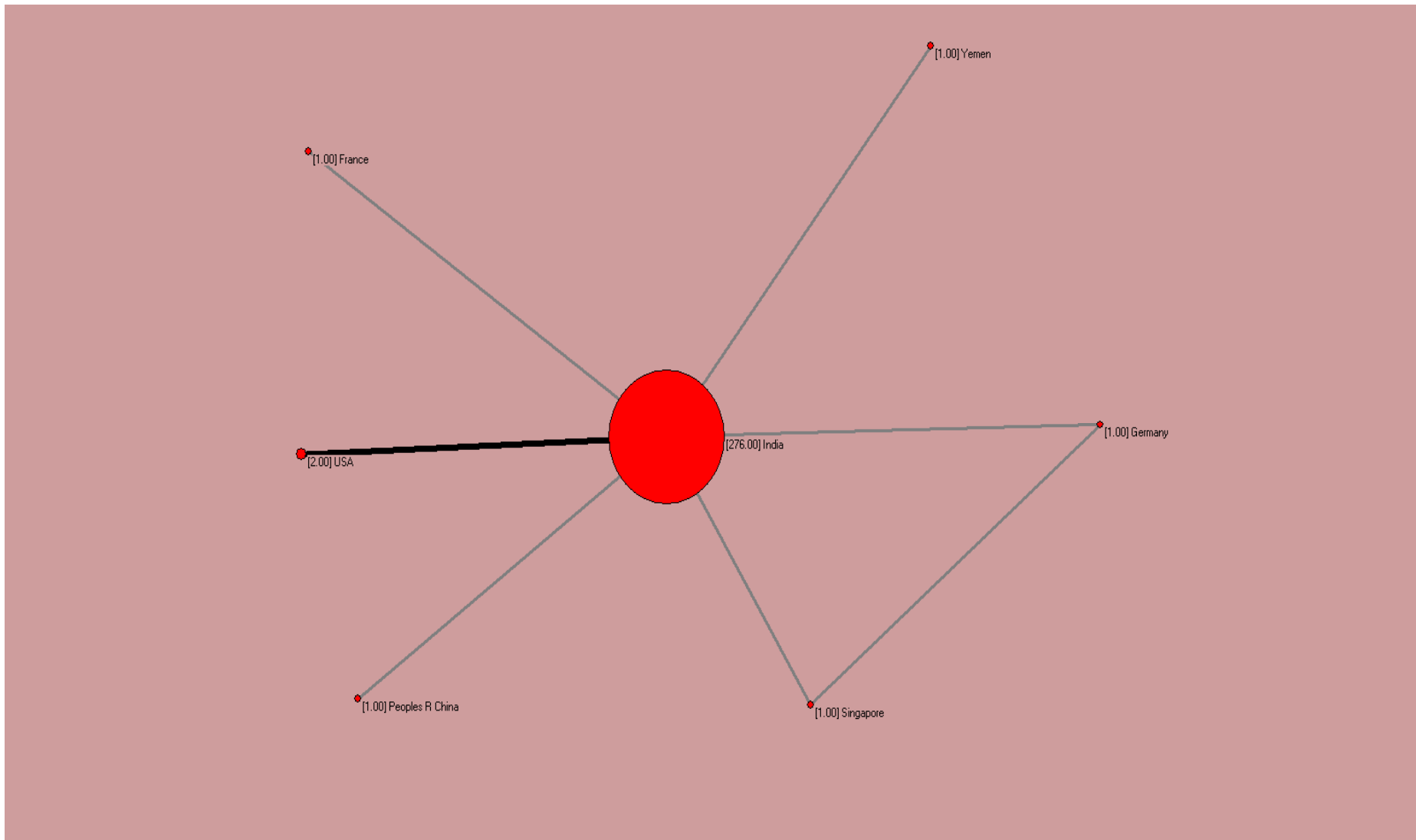


Fig:5- Collaboration patterns of India with other countries

North Maharashtra University has collaborated 276 papers with a total no. of 07 countries across the world. Researchers in India have written 02 collaborative papers with USA, 01 collaborative papers with Germany, ,01 collaborative papers with France, 01 collaborative papers with Singapore, 01 collaborative papers with China,01 collaborative papers with France. Figure 05 given below depicts collaboration patterns of India with other countries in field of Humanities and science.

Table 1: Distribution of Publications and Citations

Sha red Ref.	First Article	Total no. of Ref. in First Article	Second Article	Total no. of Ref. in Second Article	Salton's index
40	100	44	142	47	87.9599
39	73	44	76	49	83.99245
32	98	32	85	42	87.28716
31	127	32	100	44	82.61528
31	58	32	85	42	84.55943
31	14	38	142	47	73.35352
31	14	38	100	44	75.81298
30	127	32	142	47	77.35659
30	127	32	14	38	86.0309
28	17	38	26	47	66.25479
28	201	36	164	38	75.70333
28	128	30	153	32	90.36961
28	154	29	85	42	80.22956
27	154	29	98	32	88.63184
27	113	30	32	32	87.14213
26	83	31	32	32	82.55008
25	156	29	114	33	80.81352
25	167	30	164	38	74.04361
25	1	42	26	47	56.26864
25	113	30	83	31	81.97823
24	128	30	160	32	77.45967
24	85	42	73	44	55.82905
24	172	29	180	31	80.04448
24	154	29	58	32	78.78386
23	72	31	66	39	66.14769
23	85	42	76	49	50.69967
23	58	32	73	44	61.29521
22	129	38	117	43	54.42478
22	167	30	201	36	66.94387
22	71	30	54	31	72.14084
21	5	39	1	42	51.88745
21	5	39	26	47	49.04989
20	71	30	66	39	58.47053
20	155	29	76	49	53.05581
20	98	32	76	49	50.50763
20	98	32	73	44	53.30018
20	58	32	76	49	50.50763
20	138	28	167	30	69.00656

Sha red Ref.	First Article	Total no. of Ref. in First Article	Second Article	Total no. of Ref. in Second Article	Salton's index
20	171	29	73	44	55.98925
19	114	33	73	44	49.86207
19	174	21	118	22	88.396
19	17	38	1	42	47.55949
19	30	31	26	47	49.77644
19	30	31	1	42	52.65603
19	66	39	1	42	46.94579
19	171	29	76	49	50.40302
19	155	29	73	44	53.18979
19	216	29	211	32	62.37056
18	141	25	145	30	65.72671
18	71	30	17	38	53.3114
18	138	28	164	38	55.18254
18	47	26	17	38	57.26563
18	161	24	114	33	63.96021
18	114	33	85	42	48.34938
18	207	31	191	43	49.30119
18	161	24	156	29	68.22882
18	154	29	73	44	50.39033
18	114	33	76	49	44.76283
18	165	20	118	22	85.81163
17	180	31	191	43	46.56224
17	58	32	114	33	52.31388
17	175	28	76	49	45.89569
17	187	22	114	33	63.09292
17	106	28	107	29	59.6583
17	54	31	66	39	48.89177
17	57	25	96	34	58.30952
17	187	22	161	24	73.983
17	107	29	145	30	57.6354
17	155	29	85	42	48.7108
17	155	29	58	32	55.80523
17	187	22	156	29	67.30364
17	155	29	98	32	55.80523
17	30	31	17	38	49.53091
17	54	31	17	38	49.53091
17	141	25	107	29	63.13641
17	165	20	174	21	82.95151

17	172	29	152	32	55.80523
16	155	29	114	33	51.72065
16	109	24	106	28	61.72134
16	106	28	191	43	46.11123
16	17	38	66	39	41.56195
16	160	32	85	42	43.64358
16	156	29	73	44	44.7914
16	156	29	76	49	42.44465
16	175	28	98	32	53.45225
16	211	32	191	43	43.13311
16	175	28	85	42	46.65695
16	172	29	191	43	45.30924
16	175	28	73	44	45.58423
16	152	32	191	43	43.13311
16	128	30	76	49	41.73124
16	47	26	71	30	57.28919
16	47	26	66	39	50.24594
16	22	38	26	47	37.85988
16	30	31	66	39	46.01578
16	153	32	76	49	40.4061
15	83	31	73	44	40.61478
15	32	32	73	44	39.97513
15	67	17	118	22	77.56315
15	153	32	85	42	40.91585
15	62	23	46	24	63.84424
15	128	30	98	32	48.41229
15	138	28	201	36	47.24556
15	47	26	54	31	52.83525
15	128	30	85	42	42.25771
15	175	28	160	32	50.11148
15	156	29	85	42	42.98012
15	160	32	76	49	37.88072
15	6	176	68	22	24.10591
15	22	38	1	42	37.54696
15	72	31	1	42	41.57055
15	154	29	76	49	39.79186
15	47	26	26	47	42.90972
14	175	28	128	30	48.30459
14	118	22	190	38	48.42001
14	83	31	58	32	44.45004
14	156	29	58	32	45.95725
14	175	28	153	32	46.77072

14	174	21	190	38	49.55946
14	165	20	190	38	50.78334
14	32	32	76	49	35.35534
14	32	32	85	42	38.18813
14	83	31	85	42	38.79918
14	180	31	152	32	44.45004
14	71	30	72	31	45.90781
13	109	24	107	29	49.27637
13	141	25	106	28	49.13538
13	154	29	160	32	42.67459
13	156	29	98	32	42.67459
13	200	20	199	21	63.4335
13	172	29	207	31	43.35743
13	141	25	191	43	39.64963
13	72	31	26	47	34.05756
13	224	15	188	20	75.05553
13	66	39	26	47	30.36422
13	71	30	1	42	36.62335
13	83	31	76	49	33.35527
13	216	29	191	43	36.81376
13	113	30	58	32	41.95732
13	71	30	30	31	42.62868
13	98	32	114	33	40.00473
13	72	31	17	38	37.87658
13	4	30	17	38	38.50268
13	113	30	73	44	35.78132
13	113	30	85	42	36.62335
13	118	22	138	28	52.37849
13	160	32	73	44	34.64512
13	4	30	30	31	42.62868
13	30	31	5	39	37.38783
13	161	24	76	49	37.90877
12	172	29	145	30	40.68381
12	107	29	71	30	40.68381
12	187	22	76	49	36.54869
12	109	24	71	30	44.72136
12	32	32	114	33	36.92745
12	50	34	66	39	32.9541
12	113	30	114	33	38.1385
12	113	30	76	49	31.29843
12	154	29	114	33	38.79049
12	47	26	72	31	42.2682

12	138	28	81	30	41.40393
12	141	25	72	31	43.10527
12	128	30	58	32	38.72983
12	128	30	73	44	33.02891
12	224	15	192	20	69.28203
12	175	28	58	32	40.08919
12	47	26	1	42	36.31365
12	54	31	1	42	33.25644
12	106	28	71	30	41.40393
12	4	30	26	47	31.95742
12	107	29	191	43	33.98193
12	161	24	155	29	45.48588
12	203	12	155	29	64.32675
12	71	30	26	47	31.95742
12	50	34	17	38	33.38489
12	161	24	98	32	43.30127
12	67	17	165	20	65.07914
12	165	20	164	38	43.52858
12	175	28	171	29	42.11174
12	161	24	160	32	43.30127
12	161	24	85	42	37.79645
12	161	24	73	44	36.92745
12	67	17	174	21	63.51073
12	175	28	154	29	42.11174
12	47	26	30	31	42.2682
12	153	32	73	44	31.98011
12	155	29	160	32	39.39193
11	83	31	114	33	34.3918
11	118	22	164	38	38.0443
11	145	30	66	39	32.15879
11	116	17	31	21	58.21817
11	71	30	50	34	34.44234
11	81	30	164	38	32.57919
11	155	29	153	32	36.10927
11	154	29	153	32	36.10927
11	161	24	153	32	39.69283
11	160	32	114	33	33.85016
11	170	18	200	20	57.97509
11	258	18	254	24	52.92377
11	170	18	199	21	56.57789
11	165	20	138	28	46.48348
11	187	22	155	29	43.54942

11	156	29	160	32	36.10927
11	141	25	71	30	40.16632
11	141	25	66	39	35.22819
11	141	25	152	32	38.89087
11	141	25	172	29	40.85297
11	106	28	145	30	37.95361
11	155	29	128	30	37.29349
11	161	24	128	30	40.99458
11	83	31	98	32	34.92503
11	154	29	128	30	37.29349
11	245	18	254	24	52.92377
11	47	26	50	34	36.997
11	172	29	211	32	36.10927
11	180	31	50	34	33.88226
11	6	176	77	20	18.5405
11	106	28	54	31	37.33643
11	107	29	54	31	36.68705
11	107	29	66	39	32.70856
11	109	24	141	25	44.90731
10	54	31	26	47	26.19813
10	156	29	153	32	32.82661
10	128	30	114	33	31.78209
10	107	29	30	31	33.35187
10	113	30	98	32	32.27486
10	83	31	160	32	31.75003
10	63	18	84	31	42.33338
10	106	28	172	29	35.09312
10	38	14	37	22	56.98029
10	181	12	8	35	48.795
10	198	11	203	12	87.03883
10	156	29	128	30	33.90318
10	187	22	153	32	37.68892
10	187	22	128	30	38.92495
10	175	28	155	29	35.09312
10	109	24	30	31	36.66178
10	216	29	207	31	33.35187
10	118	22	167	30	38.92495
10	207	31	152	32	31.75003
10	174	21	164	38	35.39962
10	200	20	164	38	36.27381
10	54	31	50	34	30.80206
10	198	11	155	29	55.98925

10	145	30	152	32	32.27486
10	161	24	58	32	36.08439
10	153	32	114	33	30.77287
10	106	28	180	31	33.94221
10	216	29	180	31	33.35187
10	145	30	180	31	32.79129
10	172	29	50	34	31.84649
10	187	22	160	32	37.68892
10	113	30	160	32	32.27486
10	141	25	1	42	30.86067
10	65	12	55	26	56.61385
10	187	22	98	32	37.68892
10	54	31	191	43	27.38955
10	109	24	191	43	31.12864
10	177	23	112	25	41.70288
10	174	21	138	28	41.2393
10	82	13	134	16	69.33752
10	156	29	32	32	32.82661
10	250	23	191	43	31.79815
10	141	25	180	31	35.92106
10	4	30	1	42	28.17181
10	187	22	73	44	32.14122
10	205	10	175	28	59.76143
10	71	30	191	43	27.8423
10	161	24	154	29	37.9049
10	187	22	85	42	32.89758
9	145	30	1	42	25.35463
9	156	29	83	31	30.01668
9	199	21	138	28	37.11537
9	72	31	5	39	25.88388
9	172	29	66	39	26.76155
9	138	28	190	38	27.59127
9	180	31	211	32	28.57503
9	31	21	84	31	35.27378
9	170	18	164	38	34.41236
9	107	29	180	31	30.01668
9	67	17	190	38	35.41003
9	17	38	5	39	23.3786
9	200	20	138	28	38.03194
9	146	12	140	16	64.95191
9	201	36	190	38	24.33321
9	245	18	248	19	48.66643

9	50	34	26	47	22.51408
9	30	31	191	43	24.6506
9	258	18	191	43	32.34983
9	48	21	90	25	39.27922
9	4	30	54	31	29.51216
9	47	26	4	30	32.22517
9	72	31	191	43	24.6506
9	180	31	66	39	25.88388
9	102	12	140	16	64.95191
9	106	28	30	31	30.54799
9	200	20	201	36	33.54102
9	107	29	72	31	30.01668
9	145	30	72	31	29.51216
9	141	25	54	31	32.32895
9	248	19	191	43	31.48701
9	226	16	225	21	49.09903
9	145	30	191	43	25.05807
9	170	18	138	28	40.08919
9	165	20	167	30	36.74235
9	170	18	167	30	38.72983
9	222	20	176	23	41.96272
9	107	29	1	42	25.78807
9	248	19	254	24	42.14636
9	156	29	113	30	30.51286
9	77	20	68	22	42.90582
9	102	12	134	16	64.95191
9	154	29	113	30	30.51286
9	154	29	83	31	30.01668
9	154	29	32	32	29.54395
9	109	24	66	39	29.41742
8	174	21	167	30	31.87276
8	34	20	21	40	28.28427
8	109	24	72	31	29.32942
8	152	32	66	39	22.64554
8	125	13	80	40	35.08232
8	72	31	152	32	25.40003
8	71	30	152	32	25.81989
8	258	18	250	23	39.31785
8	155	29	113	30	27.12254
8	152	32	50	34	24.25356
8	187	22	154	29	31.6723
8	81	30	201	36	24.34322

8	102	12	91	16	57.73503
8	141	25	50	34	27.43977
8	113	30	153	32	25.81989
8	4	30	66	39	23.38821
8	107	29	4	30	27.12254
8	123	11	134	16	60.30227
8	248	19	73	44	27.66858
8	128	30	32	32	25.81989
8	187	22	58	32	30.15113
8	248	19	175	28	34.6844
8	71	30	180	31	26.23303
8	83	31	153	32	25.40003
8	225	21	254	24	35.63483
8	99	18	46	24	38.49002
8	47	26	5	39	25.12297
8	128	30	83	31	26.23303
8	155	29	83	31	26.68149
8	106	28	17	38	24.52557
8	22	38	5	39	20.78097
8	71	30	22	38	23.69396
8	250	23	254	24	34.05026
8	50	34	191	43	20.92263
8	161	24	175	28	30.86067
8	175	28	32	32	26.72612
8	107	29	211	32	26.26129
8	107	29	17	38	24.09901
8	258	18	225	21	41.14756
8	248	19	171	29	34.08115
8	17	38	191	43	19.79083
8	155	29	32	32	26.26129
8	54	31	22	38	23.30866
8	211	32	1	42	21.82179
8	109	24	180	31	29.32942
8	141	25	211	32	28.28427
8	205	10	73	44	38.1385
8	44	18	31	21	41.14756
8	200	20	167	30	32.65986
8	141	25	22	38	25.95543
8	151	12	140	16	57.73503
8	23	15	18	18	48.68645
8	194	15	190	38	33.50831
8	175	28	83	31	27.15377

8	172	29	71	30	27.12254
8	14	38	75	58	17.04057
8	207	31	211	32	25.40003
8	205	10	76	49	36.14032
8	4	30	72	31	26.23303
8	19	29	2	33	25.86033
8	118	22	81	30	31.13996
8	247	19	254	24	37.46343
8	130	17	104	26	38.05212
8	199	21	164	38	28.31969
8	79	14	80	40	33.80617
8	31	21	87	31	31.35447
8	226	16	191	43	30.49971
8	141	25	47	26	31.37858
8	146	12	91	16	57.73503
8	109	24	172	29	30.32392
8	225	21	191	43	26.62233
8	170	18	201	36	31.42697
8	1	42	191	43	18.82483
8	141	25	17	38	25.95543
8	109	24	54	31	29.32942
8	100	44	75	58	15.83615
8	63	18	87	31	33.8667
8	106	28	66	39	24.2091
8	82	13	91	16	55.47002
8	67	17	138	28	36.66794
8	172	29	72	31	26.68149
7	67	17	167	30	30.99652
7	109	24	17	38	23.17932
7	248	19	76	49	22.94157
7	106	28	207	31	23.75955
7	106	28	1	42	20.41241
7	191	43	76	49	15.24986
7	202	16	193	17	42.44373
7	254	24	191	43	21.79005
7	199	21	167	30	27.88867
7	225	21	50	34	26.19684
7	47	26	191	43	20.9352
7	4	30	191	43	19.48961
7	69	21	137	28	28.86751
7	107	29	152	32	22.97863
7	174	21	81	30	27.88867

7	109	24	145	30	26.08746
7	141	25	30	31	25.14474
7	151	12	134	16	50.51815
7	202	16	158	25	35
7	175	28	113	30	24.15229
7	66	39	191	43	17.09352
7	171	29	85	42	20.05739
7	146	12	134	16	50.51815
7	135	10	134	16	55.33986
7	106	28	72	31	23.75955
7	171	29	98	32	22.97863
7	123	11	140	16	52.76449
7	200	20	118	22	33.37119
7	54	31	152	32	22.22502
7	118	22	201	36	24.87342
7	106	28	4	30	24.15229
7	211	32	22	38	20.07388
7	254	24	155	29	26.53343
7	258	18	155	29	30.63817
7	199	21	201	36	25.45875
7	101	15	115	16	45.18481
7	199	21	118	22	32.56695
7	151	12	91	16	50.51815
7	102	12	82	13	56.04485
7	47	26	107	29	25.4925
7	115	16	133	20	39.13119
7	63	18	31	21	36.00411
7	47	26	22	38	22.26997
7	71	30	5	39	20.46469
7	170	18	174	21	36.00411
7	205	10	248	19	50.78334
7	225	21	73	44	23.02831
7	250	23	50	34	25.03195
7	250	23	180	31	26.21521
7	170	18	165	20	36.89324
7	172	29	54	31	23.34631
7	143	17	104	26	33.2956
7	165	20	201	36	26.08746
7	216	29	152	32	22.97863
7	123	11	102	12	60.92718
7	78	17	108	32	30.01225
7	248	19	207	31	28.843

7	254	24	76	49	20.41241
7	225	21	250	23	31.8511
7	109	24	22	38	23.17932
7	258	18	207	31	29.63336
7	179	14	53	18	44.09586
7	170	18	118	22	35.17632
7	106	28	22	38	21.45988
7	74	18	48	21	36.00411
7	127	32	75	58	16.24834
7	109	24	47	26	28.02243
7	165	20	81	30	28.57738
7	165	20	199	21	34.1565
7	30	31	22	38	20.39508
6	15	11	24	20	40.45199
6	248	19	154	29	25.56086
6	152	32	22	38	17.20618
6	99	18	62	23	29.48839
6	155	29	191	43	16.99096
6	152	32	1	42	16.36634
6	30	31	50	34	18.48123
6	107	29	50	34	19.10789
6	47	26	172	29	21.85071
6	47	26	180	31	21.1341
6	107	29	26	47	16.25187
6	142	47	75	58	11.49181
6	187	22	175	28	24.17469
6	145	30	211	32	19.36492
6	145	30	17	38	17.77047
6	248	19	155	29	25.56086
6	248	19	225	21	30.03757
6	4	30	50	34	18.78673
6	258	18	248	19	32.44428
6	4	30	5	39	17.54116
6	226	16	245	18	35.35534
6	254	24	175	28	23.1455
6	171	29	153	32	19.69596
6	107	29	22	38	18.07426
6	174	21	201	36	21.82179
6	149	30	29	33	19.06925
6	141	25	4	30	21.9089
6	225	21	180	31	23.51585
6	226	16	154	29	27.8543

6	175	28	156	29	21.05587
6	141	25	26	47	17.5038
6	200	20	174	21	29.277
6	226	16	248	19	34.41236
6	145	30	26	47	15.97871
6	145	30	30	31	19.67478
6	47	26	152	32	20.80126
6	248	19	250	23	28.70189
6	145	30	50	34	18.78673
6	145	30	54	31	19.67478
6	22	38	66	39	15.58573
6	245	18	250	23	29.48839
6	254	24	73	44	18.46372
6	54	31	211	32	19.05002
6	171	29	211	32	19.69596
6	171	29	128	30	20.34191
6	4	30	22	38	17.77047
6	67	17	81	30	26.56845
6	213	10	244	8	67.08204
6	106	28	211	32	20.04459
6	252	10	86	13	52.62348
6	72	31	22	38	17.4815
6	248	19	98	32	24.33321
6	71	30	211	32	19.36492
6	248	19	85	42	21.23977
6	72	31	211	32	19.05002
6	205	10	171	29	35.23321
6	109	24	4	30	22.36068
6	254	24	207	31	21.99707
6	207	31	76	49	15.39474
6	72	31	50	34	18.48123
6	203	12	258	18	40.82483
6	120	19	189	26	26.99528
6	162	11	164	38	29.34696
6	203	12	254	24	35.35534
6	171	29	191	43	16.99096
6	231	14	53	18	37.79645
6	175	28	114	33	19.73855
6	211	32	17	38	17.20618
6	123	11	82	13	50.17452
6	67	17	164	38	23.60668
6	47	26	106	28	22.23748

6	109	24	50	34	21.0042
6	167	30	190	38	17.77047
6	106	28	152	32	20.04459
6	226	16	85	42	23.1455
6	226	16	254	24	30.61862
6	195	22	138	28	24.17469
6	109	24	1	42	18.89822
6	82	13	140	16	41.60251
6	157	14	158	25	32.07135
6	193	17	158	25	29.10428
6	258	18	76	49	20.20305
6	226	16	73	44	22.61335
6	22	38	191	43	14.84312
6	171	29	160	32	19.69596
6	135	10	140	16	47.43416
6	245	18	191	43	21.56655
6	171	29	58	32	19.69596
5	162	11	118	22	32.14122
5	194	15	118	22	27.52409
5	152	32	17	38	14.33848
5	225	21	85	42	16.83588
5	109	24	26	47	14.88728
5	93	10	96	34	27.11631
5	248	19	216	29	21.30072
5	226	16	58	32	22.09709
5	254	24	154	29	18.95245
5	204	21	164	38	17.69981
5	245	18	207	31	21.16669
5	179	14	183	16	33.40766
5	194	15	174	21	28.17181
5	173	19	190	38	18.60807
5	18	18	34	20	26.35231
5	205	10	254	24	32.27486
5	31	21	46	24	22.27177
5	250	23	47	26	20.44652
5	203	12	76	49	20.61965
5	173	19	204	21	25.03131
5	205	10	155	29	29.36101
5	225	21	72	31	19.59655
5	225	21	76	49	15.58699
5	151	12	82	13	40.03204
5	205	10	98	32	27.95085

5	119	10	111	12	45.64355
5	150	11	53	18	35.53345
5	205	10	58	32	27.95085
5	205	10	85	42	24.3975
5	270	15	275	26	25.31848
5	30	31	211	32	15.87502
5	245	18	225	21	25.71722
5	4	30	211	32	16.13743
5	211	32	26	47	12.89277
5	194	15	165	20	28.86751
5	225	21	47	26	21.39802
5	250	23	211	32	18.43024
5	211	32	50	34	15.15848
5	245	18	175	28	22.27177
5	226	16	175	28	23.62278
5	225	21	175	28	20.61965
5	211	32	66	39	14.15346
5	226	16	98	32	22.09709
5	175	28	191	43	14.40976
5	161	24	113	30	18.6339
5	139	10	102	12	45.64355
5	245	18	216	29	21.88441
5	4	30	152	32	16.13743
5	105	17	166	47	17.68873
5	152	32	26	47	12.89277
5	250	23	152	32	18.43024
5	195	22	167	30	19.46247
5	225	21	154	29	20.26102
5	111	12	89	20	32.27486
5	107	29	207	31	16.67593
5	250	23	72	31	18.72515
5	252	10	3	12	45.64355
5	250	23	66	39	16.69451
5	250	23	71	30	19.03467
5	205	10	154	29	29.36101
5	171	29	114	33	16.1627
5	172	29	22	38	15.06188
5	254	24	85	42	15.74852
5	250	23	172	29	19.36008
5	245	18	76	49	16.83588
5	109	24	211	32	18.0422
5	191	43	73	44	11.49501

5	46	24	84	31	18.33089
5	254	24	98	32	18.0422
5	245	18	171	29	21.88441
5	172	29	30	31	16.67593
5	161	24	171	29	18.95245
5	50	34	22	38	13.91037
5	161	24	32	32	18.0422
5	125	13	79	14	37.06247
5	195	22	201	36	17.76673
5	180	31	73	44	13.53826
5	180	31	76	49	12.82895
5	254	24	71	30	18.6339
5	106	28	50	34	16.20509
5	258	18	50	34	20.2113
5	141	25	207	31	17.96053
5	172	29	1	42	14.32671
5	180	31	1	42	13.85685
5	203	12	191	43	22.01127
5	200	20	190	38	18.13691
5	157	14	193	17	32.41019
5	248	19	58	32	20.27768
5	199	21	190	38	17.69981
5	157	14	202	16	33.40766
5	205	10	191	43	24.11214
5	109	24	152	32	18.0422
5	162	11	138	28	28.49014
5	139	10	134	16	39.52847
5	191	43	26	47	11.1221
5	226	16	258	18	29.46278
5	250	23	141	25	20.85144
5	139	10	140	16	39.52847
5	50	34	1	42	13.2314
5	162	11	167	30	27.52409
5	162	11	165	20	33.70999
5	258	18	180	31	21.16669
5	162	11	170	18	35.53345
5	106	28	26	47	13.78295
5	161	24	83	31	18.33089
5	163	10	162	11	47.67313
5	47	26	145	30	17.90287
5	146	12	82	13	40.03204
5	180	31	22	38	14.56791

5	162	11	201	36	25.12595
5	225	21	71	30	19.92048
5	89	20	31	21	24.3975
5	54	31	5	39	14.37993
5	254	24	180	31	18.33089
5	155	29	207	31	16.67593
5	162	11	200	20	33.70999
5	123	11	132	9	50.25189
5	123	11	91	16	37.68892
5	123	11	146	12	43.51941
5	123	11	151	12	43.51941
5	145	30	22	38	14.80872
5	135	10	123	11	47.67313
4	173	19	174	21	20.02505
4	258	18	73	44	14.21338
4	254	24	50	34	14.0028
4	173	19	165	20	20.51957
4	258	18	71	30	17.21326
4	225	21	155	29	16.20882
4	173	19	167	30	16.75416
4	170	18	190	38	15.29438
4	163	10	167	30	23.09401
4	187	22	171	29	15.83615
4	106	28	216	29	14.03725
4	170	18	195	22	20.10076
4	173	19	201	36	15.29438
4	250	23	26	47	12.16598
4	250	23	30	31	14.98012
4	250	23	4	30	15.22774
4	204	21	167	30	15.93638
4	171	29	83	31	13.34075
4	89	20	84	31	16.06439
4	250	23	17	38	13.5302
4	225	21	171	29	16.20882
4	225	21	58	32	15.43033
4	3	12	255	6	47.14045
4	250	23	54	31	14.98012
4	172	29	4	30	13.56127
4	173	19	164	38	14.88646
4	172	29	26	47	10.83458
4	225	21	98	32	15.43033
4	89	20	87	31	16.06439

4	155	29	71	30	13.56127
4	172	29	17	38	12.0495
4	162	11	174	21	26.31807
4	254	24	58	32	14.43376
4	250	23	1	42	12.86979
4	162	11	190	38	19.56464
4	180	31	17	38	11.65433
4	165	20	204	21	19.518
4	195	22	164	38	13.83429
4	254	24	171	29	15.16196
4	99	18	89	20	21.08185
4	245	18	155	29	17.50752
4	198	11	254	24	24.6183
4	245	18	247	19	21.62952
4	49	12	53	18	27.21655
4	198	11	258	18	28.42676
4	250	23	109	24	17.02513
4	225	21	109	24	17.81742
4	74	18	80	40	14.90712
4	200	20	195	22	19.06925
4	199	21	195	22	18.60968
4	199	21	81	30	15.93638
4	203	12	245	18	27.21655
4	203	12	207	31	20.73903
4	203	12	71	30	21.08185
4	203	12	248	19	26.49065
4	204	21	201	36	14.54786
4	139	10	123	11	38.1385
4	39	14	24	20	23.90457
4	50	34	5	39	10.9847
4	200	20	204	21	19.518
4	163	10	138	28	23.90457
4	173	19	138	28	17.3422
4	135	10	82	13	35.08232
4	135	10	91	16	31.62278
4	204	21	138	28	16.49572
4	139	10	92	11	38.1385
4	81	30	190	38	11.84698
4	139	10	146	12	36.51484
4	139	10	91	16	31.62278
4	133	20	243	57	11.84698
4	226	16	30	31	17.96053

4	46	24	87	31	14.66471
4	194	15	67	17	25.04897
4	29	33	129	38	11.29565
4	134	16	132	9	33.33333
4	146	12	132	9	38.49002
4	82	13	132	9	36.98001
4	139	10	132	9	42.1637
4	140	16	132	9	33.33333
4	47	26	211	32	13.8675
4	11	24	137	28	15.43033
4	71	30	76	49	10.43281
4	135	10	102	12	36.51484
4	23	15	34	20	23.09401
4	69	21	209	39	13.97713
4	248	19	211	32	16.22214
4	101	15	133	20	23.09401
4	225	21	216	29	16.20882
4	216	29	76	49	10.61116
4	226	16	76	49	14.28571
4	250	23	22	38	13.5302
4	111	12	31	21	25.19763
4	102	12	132	9	38.49002
4	258	18	216	29	17.50752
4	254	24	216	29	15.16196
4	216	29	50	34	12.7386
4	227	11	231	14	32.23292
4	119	10	131	12	36.51484
4	119	10	31	21	27.60262
4	63	18	89	20	21.08185
4	204	21	118	22	18.60968
4	205	10	258	18	29.81424
4	205	10	225	21	27.60262
4	205	10	207	31	22.71847
4	205	10	245	18	29.81424
4	205	10	226	16	31.62278
4	173	19	118	22	19.56464
4	207	31	73	44	10.83061
4	116	17	44	18	22.86648
4	49	12	231	14	30.86067
4	109	24	5	39	13.07441
4	116	17	63	18	22.86648
4	29	33	117	43	10.61864

4	226	16	207	31	17.96053
4	116	17	84	31	17.42427
4	250	23	207	31	14.98012
4	204	21	190	38	14.15985
4	142	47	76	49	8.335142
4	73	44	142	47	8.79599
4	245	18	98	32	16.66667
4	180	31	26	47	10.47925
4	250	23	145	30	15.22774
4	4	30	180	31	13.11652
4	43	15	35	25	20.65591
4	141	25	76	49	11.42857
4	258	18	141	25	18.85618
4	254	24	141	25	16.32993
4	245	18	85	42	14.54786
4	245	18	73	44	14.21338
4	155	29	142	47	10.83458
4	175	28	207	31	13.57688
4	250	23	107	29	15.48806
4	67	17	173	19	22.2566
4	173	19	81	30	16.75416
4	245	18	154	29	17.50752
4	258	18	175	28	17.81742
4	247	19	250	23	19.13459
4	18	18	21	40	14.90712
4	226	16	180	31	17.96053
4	30	31	152	32	12.70001
4	62	23	84	31	14.98012
4	258	18	247	19	21.62952
4	189	26	59	28	14.82499
4	99	18	19	29	17.50752
4	14	38	76	49	9.269795
4	89	20	19	29	16.6091
4	86	13	189	26	21.75713
4	141	25	155	29	14.85563
4	203	12	141	25	23.09401
4	14	38	73	44	9.78232
4	32	32	14	38	11.47079
3	226	16	54	31	13.4704
3	247	19	191	43	10.49567
3	71	30	207	31	9.837388
3	207	31	58	32	9.52501

3	46	24	19	29	11.37147
3	207	31	85	42	8.31411
3	23	15	21	40	12.24745
3	176	23	95	41	9.769344
3	227	11	179	14	24.17469
3	207	31	98	32	9.52501
3	49	12	179	14	23.1455
3	225	21	207	31	11.75793
3	248	19	30	31	12.36128
3	225	21	5	39	10.48285
3	248	19	54	31	12.36128
3	248	19	180	31	12.36128
3	216	29	1	42	8.596024
3	205	10	180	31	17.03886
3	245	18	180	31	12.70001
3	171	29	32	32	9.847982
3	248	19	71	30	12.56562
3	203	12	175	28	16.36634
3	225	21	30	31	11.75793
3	171	29	17	38	9.037128
3	175	28	216	29	10.52794
3	198	11	191	43	13.79401
3	250	23	73	44	9.430419
3	226	16	47	26	14.70871
3	216	29	54	31	10.00556
3	216	29	71	30	10.17095
3	250	23	76	49	8.936332
3	175	28	180	31	10.18266
3	216	29	22	38	9.037128
3	226	16	71	30	13.69306
3	247	19	225	21	15.01879
3	62	23	19	29	11.61605
3	173	19	200	20	15.38968
3	245	18	211	32	12.5
3	172	29	73	44	8.398388
3	172	29	76	49	7.958372
3	227	11	53	18	21.32007
3	211	32	76	49	7.576144
3	226	16	250	23	15.63858
3	226	16	72	31	13.4704
3	58	32	191	43	8.087458
3	3	12	189	26	16.98416

3	225	21	54	31	11.75793
3	245	18	71	30	12.90994
3	198	11	71	30	16.51446
3	198	11	76	49	12.92191
3	61	16	24	20	16.77051
3	180	31	98	32	9.52501
3	200	20	81	30	12.24745
3	180	31	85	42	8.31411
3	225	21	172	29	12.15661
3	89	20	2	33	11.67748
3	99	18	2	33	12.30915
3	98	32	191	43	8.087458
3	237	12	188	20	19.36492
3	85	42	191	43	7.059312
3	245	18	54	31	12.70001
3	232	18	189	26	13.8675
3	237	12	192	20	19.36492
3	252	10	189	26	18.60521
3	171	29	207	31	10.00556
3	198	11	247	19	20.75143
3	245	18	58	32	12.5
3	204	21	195	22	13.95726
3	187	22	83	31	11.48759
3	187	22	32	32	11.30668
3	203	12	98	32	15.30931
3	67	17	204	21	15.87768
3	248	19	83	31	12.36128
3	225	21	66	39	10.48285
3	203	12	73	44	13.05582
3	203	12	85	42	13.36306
3	205	10	216	29	17.61661
3	17	38	76	49	6.952347
3	237	12	224	15	22.36068
3	232	18	59	28	13.36306
3	222	20	95	41	10.47645
3	180	31	5	39	8.62796
3	172	29	5	39	8.920516
3	203	12	225	21	18.89822
3	222	20	229	24	13.69306
3	203	12	247	19	19.86799
3	248	19	32	32	12.16661
3	67	17	201	36	12.12678

3	205	10	203	12	27.38613
3	180	31	58	32	9.52501
3	233	13	234	15	21.48345
3	203	12	58	32	15.30931
3	258	18	171	29	13.13064
3	170	18	81	30	12.90994
3	67	17	170	18	17.14986
3	54	31	76	49	7.69737
3	258	18	58	32	12.5
3	3	12	86	13	24.01922
3	79	14	74	18	18.89822
3	187	22	113	30	11.67748
3	171	29	152	32	9.847982
3	121	18	120	19	16.22214
3	258	18	85	42	10.91089
3	150	11	231	14	24.17469
3	119	10	89	20	21.2132
3	31	21	62	23	13.65047
3	213	10	124	11	28.60388
3	258	18	98	32	12.5
3	150	11	49	12	26.11165
3	149	30	129	38	8.885233
3	254	24	54	31	10.99853
3	154	29	142	47	8.125935
3	254	24	1	42	9.449112
3	248	19	1	42	10.61988
3	254	24	47	26	12.00961
3	131	12	63	18	20.41241
3	254	24	5	39	9.805807
3	111	12	63	18	20.41241
3	113	30	14	38	8.885233
3	131	12	31	21	18.89822
3	111	12	87	31	15.55428
3	254	24	66	39	9.805807
3	121	18	59	28	13.36306
3	111	12	84	31	15.55428
3	79	14	53	18	18.89822
3	155	29	180	31	10.00556
3	155	29	17	38	9.037128
3	116	17	87	31	13.06821
3	150	11	179	14	24.17469
3	247	19	155	29	12.78043

3	226	16	155	29	13.92715
3	48	21	28	23	13.65047
3	116	17	89	20	16.26978
3	258	18	154	29	13.13064
3	53	18	48	21	15.43033
3	163	10	118	22	20.226
3	124	11	244	8	31.98011
3	149	30	117	43	8.352691
3	250	23	155	29	11.61605
3	72	31	73	44	8.122955
3	36	16	35	25	15
3	58	32	142	47	7.735659
3	119	10	63	18	22.36068
3	114	33	14	38	8.471737
3	154	29	180	31	10.00556
3	154	29	191	43	8.495482
3	203	12	154	29	16.08169
3	119	10	116	17	23.00895
3	64	12	144	22	18.46372
3	145	30	207	31	9.837388
3	98	32	142	47	7.735659
3	1	42	76	49	6.613001
3	154	29	207	31	10.00556
3	85	42	142	47	6.752237
3	162	11	173	19	20.75143
3	198	11	109	24	18.46372
3	203	12	109	24	17.67767
3	44	18	87	31	12.70001
3	252	10	121	18	22.36068
3	92	11	140	16	22.61335
3	121	18	242	25	14.14214
3	109	24	155	29	11.37147
3	44	18	89	20	15.81139
3	168	14	164	38	13.00665
3	245	18	1	42	10.91089
3	163	10	81	30	17.32051
3	141	25	171	29	11.14172
3	139	10	82	13	26.31174
3	194	15	164	38	12.56562
3	137	28	209	39	9.078413
3	62	23	87	31	11.23509
3	44	18	84	31	12.70001

3	58	32	14	38	8.60309
3	121	18	189	26	13.8675
3	44	18	62	23	14.7442
3	44	18	46	24	14.43376
3	83	31	14	38	8.740748
3	135	10	146	12	27.38613
3	63	18	62	23	14.7442
3	135	10	151	12	27.38613
3	248	19	107	29	12.78043
3	208	16	166	47	10.93987
3	165	20	195	22	14.30194
3	163	10	67	17	23.00895
3	163	10	173	19	21.76429
3	111	12	116	17	21.0042
3	225	21	141	25	13.09307
3	194	15	138	28	14.6385
3	141	25	216	29	11.14172
3	151	12	132	9	28.86751
3	163	10	164	38	15.38968
3	135	10	132	9	31.62278
3	131	12	89	20	19.36492
3	141	25	5	39	9.607689
3	162	11	81	30	16.51446
3	162	11	67	17	21.93817
3	198	11	141	25	18.09068
3	226	16	109	24	15.30931
3	139	10	151	12	27.38613
3	63	18	46	24	14.43376
3	248	19	106	28	13.00665
3	109	24	207	31	10.99853
3	250	23	106	28	11.82166
3	109	24	216	29	11.37147
3	258	18	109	24	14.43376
3	91	16	132	9	25
3	3	12	121	18	20.41241
3	226	16	106	28	14.17367
2	203	12	250	23	12.03859
2	67	17	199	21	10.58512
2	58	32	100	44	5.330018
2	125	13	74	18	13.07441
2	122	12	169	7	21.82179
2	203	12	216	29	10.72113

2	49	12	90	25	11.54701
2	121	18	88	21	10.28689
2	45	10	121	18	14.90712
2	203	12	211	32	10.20621
2	86	13	121	18	13.07441
2	236	16	276	21	10.91089
2	62	23	2	33	7.25954
2	46	24	2	33	7.106691
2	121	18	257	6	19.24501
2	67	17	200	20	10.84652
2	203	12	226	16	14.43376
2	194	15	204	21	11.26872
2	106	28	171	29	7.018624
2	194	15	201	36	8.60663
2	89	20	46	24	9.128709
2	245	18	30	31	8.466675
2	67	17	195	22	10.34175
2	195	22	81	30	7.784989
2	250	23	100	44	6.286946
2	47	26	73	44	5.913124
2	245	18	32	32	8.333333
2	45	10	86	13	17.54116
2	92	11	134	16	15.07557
2	137	28	249	7	14.28571
2	135	10	92	11	19.06925
2	131	12	87	31	10.36952
2	131	12	84	31	10.36952
2	92	11	132	9	20.10076
2	106	28	155	29	7.018624
2	218	11	133	20	13.484
2	198	11	58	32	10.66004
2	198	11	66	39	9.656091
2	198	11	50	34	10.34175
2	198	11	47	26	11.82625
2	198	11	5	39	9.656091
2	198	11	85	42	9.304842
2	198	11	98	32	10.66004
2	49	12	48	21	12.59882
2	198	11	72	31	10.83061
2	198	11	73	44	9.090909
2	47	26	83	31	7.0447
2	198	11	207	31	10.83061

2	258	18	100	44	7.106691
2	205	10	198	11	19.06925
2	47	26	76	49	5.603318
2	254	24	100	44	6.154575
2	198	11	248	19	13.83429
2	198	11	250	23	12.57389
2	128	30	142	47	5.326236
2	198	11	225	21	13.15903
2	198	11	245	18	14.21338
2	111	12	2	33	10.05038
2	111	12	19	29	10.72113
2	226	16	50	34	8.574929
2	226	16	83	31	8.980265
2	216	29	72	31	6.670373
2	216	29	73	44	5.598925
2	225	21	22	38	7.079923
2	254	24	22	38	6.622662
2	69	21	11	24	8.908708
2	203	12	106	28	10.91089
2	226	16	22	38	8.111071
2	245	18	22	38	7.647191
2	248	19	22	38	7.443229
2	113	30	142	47	5.326236
2	49	12	212	13	16.01282
2	212	13	53	18	13.07441
2	228	11	238	18	14.21338
2	47	26	113	30	7.161149
2	212	13	231	14	14.82499
2	212	13	28	23	11.5663
2	248	19	113	30	8.377078
2	250	23	216	29	7.744031
2	216	29	30	31	6.670373
2	171	29	113	30	6.780635
2	217	23	214	7	15.76221
2	226	16	216	29	9.284767
2	205	10	113	30	11.54701
2	203	12	107	29	10.72113
2	89	20	62	23	9.325048
2	245	18	107	29	8.753762
2	226	16	107	29	9.284767
2	225	21	32	32	7.715167
2	245	18	106	28	8.908708

2	225	21	83	31	7.838618
2	225	21	106	28	8.247861
2	106	28	76	49	5.399492
2	258	18	106	28	8.908708
2	254	24	106	28	7.715167
2	254	24	107	29	7.58098
2	247	19	109	24	9.365858
2	226	16	32	32	8.838835
2	86	13	59	28	10.48285
2	226	16	4	30	9.128709
2	109	24	76	49	5.832118
2	248	19	109	24	9.365858
2	22	38	75	58	4.260143
2	60	11	94	14	16.11646
2	107	29	76	49	5.305581
2	258	18	107	29	8.753762
2	22	38	76	49	4.634898
2	88	21	59	28	8.247861
2	108	32	8	35	5.976143
2	53	18	90	25	9.42809
2	5	39	73	44	4.828045
2	205	10	22	38	10.25978
2	5	39	76	49	4.57509
2	204	21	81	30	7.968191
2	12	20	29	33	7.784989
2	205	10	211	32	11.18034
2	119	10	99	18	14.90712
2	205	10	30	31	11.35924
2	205	10	32	32	11.18034
2	86	13	232	18	13.07441
2	119	10	87	31	11.35924
2	205	10	250	23	13.18761
2	119	10	84	31	11.35924
2	232	18	120	19	10.81476
2	203	12	47	26	11.32277
2	203	12	5	39	9.245003
2	203	12	50	34	9.901475
2	121	18	169	7	17.81742
2	121	18	159	9	15.71348
2	203	12	54	31	10.36952
2	203	12	72	31	10.36952
2	45	10	120	19	14.50953

2	3	12	120	19	13.24532
2	86	13	120	19	12.7257
2	203	12	66	39	9.245003
2	120	19	59	28	8.6711
2	115	16	210	28	9.449112
2	231	14	74	18	12.59882
2	100	44	76	49	4.307305
2	50	34	73	44	5.170877
2	218	11	115	16	15.07557
2	85	42	100	44	4.652421
2	254	24	211	32	7.216878
2	258	18	211	32	8.333333
2	53	18	80	40	7.45356
2	50	34	76	49	4.89996
2	218	11	101	15	15.56998
2	114	33	142	47	5.078367
2	131	12	116	17	14.0028
2	3	12	232	18	13.60828
2	205	10	71	30	11.54701
2	205	10	83	31	11.35924
2	119	10	62	23	13.18761
2	205	10	54	31	11.35924
2	119	10	46	24	12.90994
2	119	10	19	29	11.7444
2	207	31	50	34	6.160411
2	116	17	46	24	9.901475
2	168	14	118	22	11.39606
2	72	31	76	49	5.13158
2	252	10	232	18	14.90712
2	250	23	175	28	7.881104
2	71	30	73	44	5.504819
2	194	15	170	18	12.17161
2	3	12	59	28	10.91089
2	162	11	204	21	13.15903
2	152	32	73	44	5.330018
2	163	10	174	21	13.80131
2	175	28	30	31	6.788442
2	163	10	165	20	14.14214
2	152	32	76	49	5.050763
2	175	28	22	38	6.131393
2	162	11	199	21	13.15903
2	198	11	175	28	11.39606

2	198	11	154	29	11.19785
2	250	23	154	29	7.744031
2	170	18	204	21	10.28689
2	175	28	211	32	6.681531
2	45	10	3	12	18.25742
2	155	29	100	44	5.598925
2	28	23	90	25	8.340577
2	66	39	73	44	4.828045
2	191	43	100	44	4.598005
2	247	19	50	34	7.868895
2	203	12	1	42	8.908708
2	155	29	1	42	5.730683
2	254	24	30	31	7.332356
2	247	19	47	26	8.998425
2	198	11	100	44	9.090909
2	30	31	76	49	5.13158
2	247	19	5	39	7.347184
2	92	11	102	12	17.40777
2	247	19	152	32	8.111071
2	175	28	54	31	6.788442
2	152	32	5	39	5.661385
2	247	19	71	30	8.377078
2	163	10	190	38	10.25978
2	247	19	72	31	8.240856
2	254	24	32	32	7.216878
2	92	11	91	16	15.07557
2	171	29	1	42	5.730683
2	247	19	66	39	7.347184
2	175	28	71	30	6.900656
2	162	11	195	22	12.85649
2	258	18	54	31	8.466675
2	258	18	5	39	7.548514
2	226	16	172	29	9.284767
2	171	29	50	34	6.369298
2	155	29	66	39	5.94701
2	155	29	54	31	6.670373
2	155	29	50	34	6.369298
2	258	18	172	29	8.753762
2	205	10	160	32	11.18034
2	254	24	172	29	7.58098
2	171	29	54	31	6.670373
2	242	25	159	9	13.33333

2	32	32	1	42	5.455447
2	260	13	259	18	13.07441
2	175	28	1	42	5.832118
2	258	18	1	42	7.27393
2	171	29	71	30	6.780635
2	155	29	72	31	6.670373
2	258	18	66	39	7.548514
2	258	18	72	31	8.466675
2	248	19	50	34	7.868895
2	173	19	199	21	10.01252
2	229	24	103	28	7.715167
2	254	24	72	31	7.332356
2	194	15	173	19	11.84698
2	69	21	249	7	16.49572
2	162	11	194	15	15.56998
2	174	21	195	22	9.304842
2	7	36	27	42	5.143445
2	203	12	171	29	10.72113
2	171	29	180	31	6.670373
2	254	24	83	31	7.332356
2	250	23	171	29	7.744031
2	258	18	47	26	9.245003
2	155	29	5	39	5.94701
2	47	26	155	29	7.28357
2	99	18	84	31	8.466675
2	248	19	160	32	8.111071
2	66	39	76	49	4.57509
2	155	29	211	32	6.565322
2	83	31	1	42	5.54274
2	179	14	74	18	12.59882
2	168	14	167	30	9.759001
2	53	18	185	8	16.66667
2	39	14	42	15	13.80131
2	195	22	190	38	6.917145
2	14	38	85	42	5.006262
2	203	12	142	47	8.421519
2	168	14	199	21	11.66424
2	39	14	61	16	13.36306
2	250	23	85	42	6.434895
2	250	23	98	32	7.372098
2	183	16	215	8	17.67767
2	59	28	169	7	14.28571

2	39	14	36	16	13.36306
2	252	10	59	28	11.95229
2	250	23	142	47	6.082991
2	183	16	53	18	11.78511
2	49	12	183	16	14.43376
2	113	30	1	42	5.634362
2	245	18	83	31	8.466675
2	45	10	189	26	12.40347
2	245	18	50	34	8.084521
2	245	18	141	25	9.42809
2	248	19	141	25	9.176629
2	247	19	141	25	9.176629
2	168	14	67	17	12.96407
2	168	14	81	30	9.759001
2	189	26	169	7	14.82499
2	31	21	19	29	8.104409
2	187	22	142	47	6.219704
2	160	32	142	47	5.157106
2	19	29	84	31	6.670373
2	198	11	142	47	8.79599
2	191	43	142	47	4.448841
2	63	18	19	29	8.753762
2	141	25	73	44	6.030227
2	168	14	204	21	11.66424
2	156	29	142	47	5.41729
2	153	32	142	47	5.157106
2	254	24	142	47	5.954913
2	47	26	32	32	6.933752
2	254	24	17	38	6.622662
2	99	18	31	21	10.28689
2	15	11	61	16	15.07557
2	15	11	39	14	16.11646
2	147	16	217	23	10.42572
2	147	16	214	7	18.89822
2	226	16	17	38	8.111071
2	248	19	17	38	7.443229
2	245	18	17	38	7.647191
2	163	10	204	21	13.80131
2	207	31	1	42	5.54274
2	163	10	201	36	10.54093
2	163	10	200	20	14.14214
2	205	10	1	42	9.759001

2	150	11	183	16	15.07557
2	194	15	167	30	9.42809
2	203	12	180	31	10.36952
2	150	11	185	8	21.32007
2	258	18	17	38	7.647191
2	225	21	1	42	6.73435
2	166	47	215	8	10.31421
2	203	12	17	38	9.365858
2	250	23	58	32	7.372098
2	83	31	142	47	5.239625
2	203	12	100	44	8.703883
2	258	18	142	47	6.876142
2	168	14	138	28	10.10153
2	32	32	142	47	5.157106
2	175	28	17	38	6.131393
2	229	24	166	47	5.954913
2	168	14	174	21	11.66424
2	216	29	17	38	6.024752
2	225	21	17	38	7.079923
2	226	16	1	42	7.715167
2	207	31	17	38	5.827165
2	168	14	165	20	11.95229
1	229	24	275	26	4.003204
1	229	24	243	57	2.70369
1	98	32	66	39	2.830693
1	54	31	85	42	2.77137
1	252	10	257	6	12.90994
1	248	19	66	39	3.673592
1	48	21	229	24	4.454354
1	54	31	73	44	2.707652
1	54	31	58	32	3.175003
1	88	21	62	23	4.550158
1	252	10	88	21	6.900656
1	226	16	5	39	4.003204
1	226	16	66	39	4.003204
1	250	23	5	39	3.338903
1	9	10	94	14	8.451543
1	226	16	26	47	3.646625
1	254	24	4	30	3.72678
1	226	16	247	19	5.735393
1	72	31	58	32	3.175003
1	258	18	4	30	4.303315

1	93	10	57	25	6.324555
1	54	31	98	32	3.175003
1	227	11	49	12	8.703883
1	251	6	266	7	15.43033
1	58	32	66	39	2.830693
1	71	30	58	32	3.227486
1	3	12	257	6	11.78511
1	258	18	30	31	4.233338
1	45	10	257	6	12.90994
1	32	32	5	39	2.830693
1	32	32	50	34	3.031695
1	82	13	48	21	6.052275
1	36	16	24	20	5.59017
1	91	16	48	21	5.455447
1	246	18	266	7	8.908708
1	71	30	32	32	3.227486
1	252	10	242	25	6.324555
1	32	32	66	39	2.830693
1	54	31	32	32	3.175003
1	47	26	98	32	3.466876
1	30	31	98	32	3.175003
1	30	31	58	32	3.175003
1	92	11	82	13	8.36242
1	247	19	58	32	4.055536
1	247	19	76	49	3.277368
1	247	19	73	44	3.458572
1	30	31	73	44	2.707652
1	49	12	74	18	6.804138
1	30	31	85	42	2.77137
1	9	10	49	12	9.128709
1	235	13	234	15	7.161149
1	32	32	75	58	2.321192
1	245	18	5	39	3.774257
1	45	10	88	21	6.900656
1	4	30	76	49	2.608203
1	47	26	58	32	3.466876
1	245	18	66	39	3.774257
1	245	18	4	30	4.303315
1	74	18	90	25	4.714045
1	83	31	75	58	2.358333
1	42	15	61	16	6.454972
1	45	10	59	28	5.976143

1	245	18	47	26	4.622502
1	39	14	43	15	6.900656
1	47	26	85	42	3.026138
1	39	14	35	25	5.345225
1	3	12	242	25	5.773503
1	246	18	251	6	9.622504
1	242	25	257	6	8.164966
1	42	15	35	25	5.163978
1	43	15	36	16	6.454972
1	86	13	242	25	5.547002
1	45	10	242	25	6.324555
1	242	25	59	28	3.779645
1	247	19	85	42	3.539962
1	83	31	50	34	3.080206
1	231	14	48	21	5.832118
1	50	34	85	42	2.646281
1	98	32	50	34	3.031695
1	71	30	98	32	3.227486
1	248	19	5	39	3.673592
1	231	14	90	25	5.345225
1	58	32	26	47	2.578553
1	248	19	47	26	4.499213
1	248	19	4	30	4.188539
1	91	16	229	24	5.103104
1	53	18	229	24	4.811252
1	82	13	53	18	6.537205
1	9	10	53	18	7.45356
1	71	30	83	31	3.279129
1	91	16	53	18	5.892557
1	66	39	85	42	2.470831
1	99	18	87	31	4.233338
1	82	13	229	24	5.661385
1	32	32	26	47	2.578553
1	71	30	85	42	2.817181
1	83	31	66	39	2.875987
1	58	32	50	34	3.031695
1	45	10	232	18	7.45356
1	70	16	96	34	4.287465
1	260	13	274	7	10.48285
1	98	32	26	47	2.578553
1	260	13	271	9	9.245003
1	232	18	88	21	5.143445

1	30	31	32	32	3.175003
1	58	32	5	39	2.830693
1	3	12	88	21	6.299408
1	49	12	28	23	6.019293
1	53	18	28	23	4.914732
1	83	31	5	39	2.875987
1	73	44	26	47	2.198997
1	26	47	76	49	2.083786
1	98	32	5	39	2.830693
1	232	18	242	25	4.714045
1	86	13	88	21	6.052275
1	83	31	26	47	2.619813
1	85	42	26	47	2.250746
1	5	39	85	42	2.470831
1	247	19	98	32	4.055536
1	232	18	255	6	9.622504
1	72	31	85	42	2.77137
1	133	20	229	24	4.564355
1	133	20	221	31	4.016097
1	133	20	210	28	4.225771
1	134	16	48	21	5.455447
1	134	16	229	24	5.103104
1	134	16	166	47	3.646625
1	131	12	44	18	6.804138
1	131	12	19	29	5.360563
1	128	30	75	58	2.397317
1	131	12	99	18	6.804138
1	131	12	62	23	6.019293
1	131	12	46	24	5.892557
1	134	16	53	18	5.892557
1	141	25	175	28	3.779645
1	141	25	142	47	2.9173
1	98	32	14	38	2.867697
1	152	32	142	47	2.578553
1	226	16	141	25	5
1	205	10	141	25	6.324555
1	156	29	14	38	3.012376
1	155	29	14	38	3.012376
1	154	29	14	38	3.012376
1	161	24	14	38	3.311331
1	160	32	14	38	2.867697
1	128	30	26	47	2.663118

1	45	10	122	12	9.128709
1	122	12	189	26	5.661385
1	156	29	127	32	3.282661
1	155	29	127	32	3.282661
1	122	12	86	13	8.006408
1	120	19	169	7	8.6711
1	122	12	120	19	6.622662
1	12	20	149	30	4.082483
1	120	19	88	21	5.006262
1	252	10	120	19	7.254763
1	120	19	242	25	4.588315
1	127	32	22	38	2.867697
1	198	11	128	30	5.504819
1	128	30	17	38	2.961744
1	248	19	128	30	4.188539
1	205	10	128	30	5.773503
1	203	12	128	30	5.270463
1	127	32	73	44	2.665009
1	127	32	85	42	2.727724
1	83	31	127	32	3.175003
1	127	32	76	49	2.525381
1	150	11	48	21	6.579517
1	150	11	28	23	6.286946
1	150	11	219	39	4.828045
1	151	12	208	16	7.216878
1	150	11	90	25	6.030227
1	9	10	150	11	9.534626
1	148	11	231	14	8.05823
1	148	11	183	16	7.537784
1	148	11	179	14	8.05823
1	150	11	212	13	8.36242
1	15	11	214	7	11.39606
1	148	11	49	12	8.703883
1	155	29	152	32	3.282661
1	258	18	152	32	4.166667
1	254	24	152	32	3.608439
1	248	19	152	32	4.055536
1	203	12	153	32	5.103104
1	198	11	153	32	5.330018
1	153	32	17	38	2.867697
1	203	12	152	32	5.103104
1	198	11	152	32	5.330018

1	175	28	152	32	3.340766
1	245	18	152	32	4.166667
1	225	21	152	32	3.857584
1	205	10	152	32	5.59017
1	226	16	142	47	3.646625
1	225	21	142	47	3.183035
1	22	38	142	47	2.366243
1	248	19	142	47	3.346372
1	247	19	142	47	3.346372
1	245	18	142	47	3.438071
1	175	28	142	47	2.756589
1	172	29	142	47	2.708645
1	161	24	142	47	2.977457
1	207	31	142	47	2.619813
1	205	10	142	47	4.612656
1	180	31	142	47	2.619813
1	47	26	142	47	2.860648
1	145	30	73	44	2.752409
1	145	30	5	39	2.923527
1	216	29	145	30	3.390318
1	15	11	147	16	7.537784
1	92	11	146	12	8.703883
1	145	30	76	49	2.608203
1	66	39	142	47	2.335709
1	50	34	142	47	2.501564
1	5	39	142	47	2.335709
1	171	29	145	30	3.390318
1	72	31	142	47	2.619813
1	71	30	142	47	2.663118
1	115	16	103	28	4.724556
1	101	15	243	57	3.419928
1	101	15	229	24	5.270463
1	218	11	103	28	5.698029
1	103	28	209	39	3.026138
1	133	20	103	28	4.225771
1	72	31	100	44	2.707652
1	71	30	100	44	2.752409
1	66	39	100	44	2.414023
1	101	15	221	31	4.637389
1	101	15	103	28	4.8795
1	98	32	100	44	2.665009
1	103	28	221	31	3.394221

1	198	11	106	28	5.698029
1	105	17	229	24	4.950738
1	175	28	107	29	3.509312
1	106	28	5	39	3.026138
1	205	10	106	28	5.976143
1	12	20	104	26	4.38529
1	275	26	103	28	3.706247
1	103	28	243	57	2.503131
1	208	16	105	17	6.063391
1	151	12	105	17	7.0014
1	111	12	105	17	7.0014
1	50	34	100	44	2.585438
1	114	33	100	44	2.624319
1	109	24	100	44	3.077287
1	98	32	1	42	2.727724
1	154	29	100	44	2.799463
1	152	32	100	44	2.665009
1	141	25	100	44	3.015113
1	198	11	1	42	4.652421
1	160	32	1	42	2.727724
1	154	29	1	42	2.865341
1	1	42	73	44	2.326211
1	58	32	1	42	2.727724
1	172	29	100	44	2.799463
1	247	19	100	44	3.458572
1	245	18	100	44	3.553345
1	226	16	100	44	3.768892
1	5	39	100	44	2.414023
1	47	26	100	44	2.956562
1	248	19	100	44	3.458572
1	205	10	100	44	4.767313
1	180	31	100	44	2.707652
1	175	28	100	44	2.849014
1	225	21	100	44	3.289758
1	22	38	100	44	2.44558
1	207	31	100	44	2.707652
1	113	30	66	39	2.923527
1	113	30	54	31	3.279129
1	114	33	17	38	2.823912
1	127	32	114	33	3.077287
1	113	30	75	58	2.397317
1	113	30	26	47	2.663118

1	254	24	113	30	3.72678
1	245	18	113	30	4.303315
1	113	30	50	34	3.131121
1	113	30	5	39	2.923527
1	113	30	30	31	3.279129
1	205	10	114	33	5.504819
1	12	20	117	43	3.409972
1	116	17	99	18	5.71662
1	116	17	62	23	5.057217
1	12	20	129	38	3.627381
1	119	10	44	18	7.45356
1	119	10	2	33	5.504819
1	115	16	221	31	4.490133
1	114	33	26	47	2.539184
1	248	19	114	33	3.993615
1	116	17	19	29	4.503773
1	115	16	243	57	3.311331
1	115	16	229	24	5.103104
1	226	16	113	30	4.564355
1	109	24	175	28	3.857584
1	109	24	171	29	3.79049
1	109	24	142	47	2.977457
1	109	24	73	44	3.077287
1	245	18	109	24	4.811252
1	205	10	109	24	6.454972
1	225	21	107	29	4.052204
1	205	10	107	29	5.872202
1	198	11	107	29	5.598925
1	53	18	108	32	4.166667
1	108	32	185	8	6.25
1	107	29	5	39	2.973505
1	11	24	209	39	3.268602
1	113	30	180	31	3.279129
1	172	29	113	30	3.390318
1	113	30	17	38	2.961744
1	225	21	113	30	3.984095
1	113	30	22	38	2.961744
1	216	29	113	30	3.390318
1	111	12	46	24	5.892557
1	111	12	44	18	6.804138
1	11	24	249	7	7.715167
1	113	30	127	32	3.227486

1	111	12	99	18	6.804138
1	111	12	62	23	6.019293
1	205	10	153	32	5.59017
1	194	15	195	22	5.504819
1	248	19	192	20	5.129892
1	5	39	191	43	2.441931
1	194	15	81	30	4.714045
1	194	15	200	20	5.773503
1	194	15	199	21	5.634362
1	242	25	189	26	3.922323
1	187	22	26	47	3.109852
1	74	18	185	8	8.333333
1	19	29	87	31	3.335187
1	44	18	19	29	4.376881
1	88	21	189	26	4.279605
1	247	19	196	25	4.588315
1	44	18	2	33	4.10305
1	31	21	2	33	3.798686
1	198	11	54	31	5.415304
1	203	12	22	38	4.682929
1	84	31	2	33	3.126527
1	63	18	2	33	4.10305
1	198	11	22	38	4.89116
1	198	11	216	29	5.598925
1	198	11	211	32	5.330018
1	198	11	4	30	5.504819
1	198	11	30	31	5.415304
1	198	11	226	16	7.537784
1	48	21	185	8	7.715167
1	175	28	50	34	3.241019
1	175	28	5	39	3.026138
1	47	26	175	28	3.706247
1	212	13	179	14	7.412493
1	175	28	75	58	2.481458
1	175	28	66	39	3.026138
1	172	29	98	32	3.282661
1	172	29	85	42	2.865341
1	172	29	83	31	3.335187
1	175	28	4	30	3.450328
1	175	28	26	47	2.756589
1	173	19	195	22	4.89116
1	179	14	215	8	9.449112

1	227	11	183	16	7.537784
1	180	31	32	32	3.175003
1	219	39	185	8	5.661385
1	9	10	183	16	7.905694
1	231	14	183	16	6.681531
1	9	10	179	14	8.451543
1	179	14	48	21	5.832118
1	247	19	180	31	4.120428
1	198	11	180	31	5.415304
1	179	14	90	25	5.345225
1	216	29	98	32	3.282661
1	216	29	85	42	2.865341
1	216	29	83	31	3.335187
1	218	11	243	57	3.993615
1	218	11	229	24	6.154575
1	218	11	221	31	5.415304
1	47	26	216	29	3.641785
1	216	29	4	30	3.390318
1	216	29	32	32	3.282661
1	216	29	66	39	2.973505
1	216	29	58	32	3.282661
1	216	29	5	39	2.973505
1	53	18	219	39	3.774257
1	229	24	221	31	3.666178
1	98	32	22	38	2.867697
1	22	38	85	42	2.503131
1	225	21	4	30	3.984095
1	225	21	26	47	3.183035
1	221	31	243	57	2.37893
1	58	32	22	38	2.867697
1	32	32	22	38	2.867697
1	258	18	22	38	3.823596
1	83	31	22	38	2.913583
1	22	38	73	44	2.44558
1	7	36	22	38	2.70369
1	247	19	216	29	4.260143
1	247	19	207	31	4.120428
1	207	31	22	38	2.913583
1	205	10	66	39	5.063697
1	229	24	209	39	3.268602
1	207	31	66	39	2.875987
1	4	30	207	31	3.279129

1	205	10	4	30	5.773503
1	203	12	4	30	5.270463
1	203	12	30	31	5.184758
1	205	10	50	34	5.423261
1	205	10	5	39	5.063697
1	205	10	47	26	6.201737
1	236	16	209	39	4.003204
1	212	13	48	21	6.052275
1	211	32	73	44	2.665009
1	211	32	5	39	2.830693
1	212	13	90	25	5.547002
1	212	13	79	14	7.412493
1	212	13	74	18	6.537205
1	21	40	27	42	2.43975
1	276	21	209	39	3.494283
1	275	26	209	39	3.140371
1	247	19	211	32	4.055536
1	225	21	211	32	3.857584
1	218	11	210	28	5.698029
1	160	32	17	38	2.867697
1	88	21	159	9	7.27393
1	86	13	159	9	9.245003
1	198	11	160	32	5.330018
1	180	31	160	32	3.175003
1	172	29	160	32	3.282661
1	232	18	159	9	7.856742
1	189	26	159	9	6.537205
1	169	7	159	9	12.59882
1	59	28	159	9	6.299408
1	3	12	159	9	9.622504
1	252	10	159	9	10.54093
1	203	12	160	32	5.103104
1	47	26	160	32	3.466876
1	30	31	160	32	3.175003
1	160	32	26	47	2.578553
1	54	31	160	32	3.175003
1	160	32	50	34	3.031695
1	160	32	5	39	2.830693
1	225	21	160	32	3.857584
1	160	32	22	38	2.867697
1	216	29	160	32	3.282661
1	254	24	160	32	3.608439

1	245	18	160	32	4.166667
1	226	16	160	32	4.419417
1	156	29	26	47	2.708645
1	154	29	26	47	2.708645
1	247	19	154	29	4.260143
1	154	29	22	38	3.012376
1	154	29	5	39	2.973505
1	47	26	154	29	3.641785
1	154	29	30	31	3.335187
1	153	32	75	58	2.321192
1	153	32	26	47	2.578553
1	248	19	153	32	4.055536
1	154	29	17	38	3.012376
1	154	29	50	34	3.184649
1	155	29	4	30	3.390318
1	155	29	30	31	3.335187
1	155	29	26	47	2.708645
1	248	19	156	29	4.260143
1	205	10	156	29	5.872202
1	156	29	17	38	3.012376
1	154	29	71	30	3.390318
1	154	29	66	39	2.973505
1	154	29	54	31	3.335187
1	155	29	22	38	3.012376
1	154	29	72	31	3.335187
1	198	11	171	29	5.598925
1	170	18	173	19	5.407381
1	247	19	171	29	4.260143
1	226	16	171	29	4.642383
1	171	29	22	38	3.012376
1	17	38	73	44	2.44558
1	58	32	17	38	2.867697
1	32	32	17	38	2.867697
1	98	32	17	38	2.867697
1	17	38	85	42	2.503131
1	83	31	17	38	2.913583
1	171	29	26	47	2.708645
1	247	19	172	29	4.260143
1	245	18	172	29	4.376881
1	205	10	172	29	5.872202
1	172	29	58	32	3.282661
1	172	29	32	32	3.282661

1	248	19	172	29	4.260143
1	171	29	72	31	3.335187
1	171	29	4	30	3.390318
1	171	29	30	31	3.335187
1	203	12	172	29	5.360563
1	198	11	172	29	5.598925
1	175	28	172	29	3.509312
1	205	10	17	38	5.129892
1	163	10	194	15	8.164966
1	163	10	170	18	7.45356
1	161	24	26	47	2.977457
1	48	21	166	47	3.183035
1	163	10	199	21	6.900656
1	163	10	195	22	6.741999
1	160	32	75	58	2.321192
1	71	30	160	32	3.227486
1	160	32	66	39	2.830693
1	248	19	161	24	4.682929
1	205	10	161	24	6.454972
1	161	24	17	38	3.311331
1	53	18	166	47	3.438071
1	3	12	169	7	10.91089
1	252	10	169	7	11.95229
1	242	25	169	7	7.559289
1	198	11	17	38	4.89116
1	187	22	17	38	3.458572
1	86	13	169	7	10.48285
1	168	14	170	18	6.299408
1	91	16	166	47	3.646625
1	82	13	166	47	4.045567
1	232	18	169	7	8.908708
1	168	14	257	6	10.91089

Table 2: Paper Published in Area of Library and Information Science from the Journals Indexed in WoS during 1990-2007

h-index	Author	Citation sum within h-core (Without Self Citation)	All citations	All articles
17	Mishra, S	615	913	63
15	Patil, PP	558	787	43
14	Kapadi, UR	385	634	55
14	Hundiwale, DG	385	634	55
12	Mahulikar, PP	280	442	42
12	Borole, DD	291	384	27
10	Goje, AS	238	264	19
9	Sainkar, SR	266	294	14
8	Naik, JB	209	237	13
8	More, MA	144	171	15
7	Patil, DS	111	138	16
7	Gautam, DK	129	160	22
7	Patil, S	162	170	10
6	Kumbhar, PP	136	136	7
6	Wankhede, MG	84	90	7
6	Zope, V	102	102	6
6	Gangal, SA	70	70	6
6	Chaudhari, S	99	105	7
5	Thakur, SA	40	41	6
5	Mahajan, JR	73	81	8
5	Shinde, V	112	114	6
5	Maheshwari, VL	96	105	12
5	Alkadasi, NAN	59	73	12
5	Pawar, NS	104	107	7
5	Mukherji, A	39	45	7
4	Patil, PS	33	33	4
4	Patil, SR	33	33	4
4	Husain, M	33	33	4
4	Ingle, ST	32	34	7
4	Gaikwad, AB	90	92	5
4	Diware, VR	26	29	7
4	Pawar, P	111	111	4
4	Sonawane, SH	145	145	4
4	Kulkarni, M	206	208	7
4	Kothari, RM	34	42	9
4	Samuel, EP	38	43	7
4	Mendki, PS	88	88	4

h-index	Author	Citation sum within h-core (Without Self Citation)	All citations	All articles
4	Mahajan, AM	61	63	5
4	Patil, LS	86	92	6
4	Shimpi, NG	101	101	4
4	Patil, KR	34	34	4
4	Koinkar, PM	28	29	5
4	Samdarshi, SK	33	33	4
4	Bange, JP	86	90	5
4	Attarde, SB	37	38	6
4	Chauhan, YP	26	29	6
4	Wagh, ND	32	33	6
3	Kuwar, AS	21	21	3
3	Lande, MK	86	86	3
3	Mali, RS	27	30	5
3	Sharma, RK	22	26	5
3	Chandra, R	34	34	3
3	Chaudhari, C	29	31	5
3	Khadayate, RS	60	60	3
3	Chaudhari, A	174	180	7
3	Kotkar, HM	84	84	3
3	Bendre, RS	21	21	3
3	Patil, LA	76	76	3
3	Pachpande, BG	26	26	4
3	Patil, AG	20	20	3
3	Pandey, RK	66	66	3
3	Upasani, SM	84	84	3
3	Mane, RB	19	19	3
3	Mandale, AB	22	22	3
3	Bidkar, SH	35	35	3
3	More, DH	24	26	5
3	Patil, NB	86	89	4
3	Dalal, DS	85	89	5
3	Patil, YP	133	136	5
3	Yadav, KR	22	26	5
3	Chincholkar, SB	39	47	8
3	Dewang, PM	31	33	4
2	More, UB	20	20	2
2	Deore, D	4	4	2
2	SINGH, S	11	13	4

2	Talele, K	11	13	3
2	Manwar, AV	21	21	2
2	Gite, VV	23	23	3
2	Gaikwad, SA	25	27	3
2	Singh, RP	109	109	2
2	Bhole, MP	32	32	2
2	Sarwade, BD	15	15	4
2	Sali, JV	19	19	2
2	Patil, ID	10	12	3
2	Patel, VS	16	16	3
2	Patil, DR	82	82	2
2	Patil, D	33	33	2
2	Salunke, BK	30	30	2
2	Narkhede, HP	20	20	2
2	Verma, J	13	13	2
2	Nikumbh, VP	12	12	2
2	Sonawane, S	21	21	2
2	Desai, MC	31	31	2
2	Gore, RB	18	18	2
2	Kotwal, KS	6	6	2
2	Chaudhari, BL	26	28	3
2	Tare, VS	12	12	2
2	Sharma, DK	12	12	3
2	Kulkarni, RD	18	18	2
2	Patil, TM	19	19	2
2	Patil, SL	8	12	4
2	Shimpi, SR	68	68	2
2	Sharma, RP	33	33	2
2	Patil, SA	10	10	2
2	Khandelwal, SR	21	21	2
2	Shinde, RL	6	7	3
2	Mahajan, RP	8	10	3
2	Butcher, RJ	15	15	2
2	Wakharkar, RD	5	5	2
2	Patil, PR	66	66	3
1	Pondhe, GM	20	20	1
1	Pawar, NJ	20	20	1
1	Perumal, GB	12	12	1
1	Zope, U	7	7	1
1	Puniya, AK	7	7	2
1	Puranik, PR	43	43	1
1	Waghulade, RB	44	44	1

1	RAMANATHAN, TV	6	6	1
1	Puri, M	11	11	1
1	Wani, MR	5	5	1
1	Rane, MR	7	7	1
1	RAJARSHI, MB	6	6	1
1	Walvekar, AA	14	14	1
1	Waghulde, RB	16	16	1
1	Rane, SB	3	3	1
1	THAKARE, NK	1	1	2
1	Shinde, DN	1	1	1
1	Tambe, SB	6	6	1
1	Shet, JB	1	1	1
1	Tilve, SG	1	1	1
1	Shanubhogue, A	1	1	1
1	SHARMA, KC	1	1	1
1	Talele, NR	4	4	1
1	Sivaram, S	771	771	1
1	Talegaonkar, SK	1	1	1
1	Singh, K	7	7	1
1	Talwar, MB	12	12	1
1	Shukla, PV	6	6	1
1	SINGH, BB	4	4	2
1	Sarmade, BD	7	7	1
1	Sarode, PD	7	7	1
1	VAISHAMPAYAN, SV	1	1	1
1	VIBHUTE, CP	2	2	2
1	Rao, SV	8	8	1
1	Sadan, SVGS	26	26	1
1	Sali, V	41	41	1
1	Tondare, VN	1	1	1
1	Tomar, VK	3	3	2
1	Shankarwar, AG	14	14	1
1	Shaikh, AAG	771	771	1
1	Saxena, P	2	2	1
1	Sayyed, RZ	13	13	1
1	Seth, M	11	11	1
1	Gurav, K	31	31	1
1	Hazarika, M	6	6	1
1	BALIGA, AR	1	1	1
1	Gosavi, SW	27	27	1

1	Gajre, B	35	35	1
1	Gore, V	10	10	1
1	Bari, RH	10	10	1
1	Balakrishnan, S	6	6	1
1	Badgujar, N	31	31	1
1	Joshi, BN	9	9	1
1	Kulkarni, VL	2	2	1
1	Joag, DS	1	1	1
1	Jahagirdar, DV	14	14	1
1	Jain, GH	12	12	1
1	Jha, SR	26	26	1
1	Dusane, D	35	35	1
1	Bhalerao, TS	43	43	1
1	Bendale, A	45	45	1
1	Chavan, M	7	7	1
1	Borse, TH	3	3	1
1	Bhalsing, SR	1	1	2
1	BISEN, PS	4	4	2
1	Borhade, AV	1	2	2
1	Chavan, S	35	35	1
1	Dhande, AD	1	1	1
1	Baviskar, MP	3	3	1
1	Dubey, RS	3	4	2
1	Desai, VG	1	1	1
1	Baweja, B	22	22	1
1	Chitodkar, V	9	9	1
1	Dalwale, PS	5	5	1
1	LAXMAN, RS	2	2	1
1	Patil, P	2	2	1
1	Babu, KN	17	17	1
1	Patil, RP	2	2	2
1	Patil, KP	5	5	1
1	Badgujar, DM	12	12	1
1	Patil, DP	28	29	2
1	Patil, K	45	45	1
1	Patil, SB	48	48	1
1	Patil, V	12	12	1
1	Arbad, BR	14	14	1
1	Pawar, N	4	4	1
1	Patil, UK	3	3	1
1	Patil, SF	20	22	4
1	Asthana, SN	12	12	1

1	Patil, UD	31	31	1
1	Patil, BB	3	3	1
1	Mruthyunjaya, HC	12	12	1
1	Mulik, UP	12	12	1
1	Namdas, SB	1	1	1
1	Mali, PL	28	28	1
1	Marwaha, SS	11	11	1
1	Meyer, JM	19	19	1
1	Nikumbh, M	10	10	1
1	Papalkar, AS	5	5	1
1	Pasricha, R	44	44	1
1	Patel, SA	2	2	1
1	PANDYA, MV	5	5	1
1	Mahajan, MM	28	28	1
1	PANDEY, PK	4	4	2
0	Wani, YR	0	0	1
0	Waphare, BN	0	0	1
0	Wankar, R	0	0	1
0	BHARDWAJ, R	0	0	1
0	Narsay, D	0	0	1
0	Rau, SS	0	0	1
0	Jobanputra, AH	0	0	1
0	KHOPKAR, SM	0	0	1
0	Prasad, T	0	0	1
0	Patil, YM	0	0	1
0	Patil, RN	0	0	1
0	Rainald, E	0	0	1
0	Chavan, CD	0	0	1
0	Chhabra, A	0	0	1
0	Uma, B	0	0	1
0	Chaudhari, NS	0	0	1
0	ISHIDA, K	0	0	2
0	Shinde, PH	0	0	1
0	Disawal, SK	0	0	1
0	Singh, H	0	0	1

We acknowledge that this study has a number of limitations. For instance, due to huge number of extracted records and complexity of network diagram, we have considered top 20 highly frequent keywords for co-word analysis and 36 highly productive countries for international collaboration. Keywords, assigned by author, were analysed for this study. However, we believe that this study could be useful for a wide range of users, notably scientists, researchers and librarians to see which topics in their discipline is being researched by their peers, and which areas was less attended to during a specific time period. The result would assist the policy makers in allocation of research funding. It can also help early career researchers gain, useful and interesting insights into the field of library and information science.

CHAPTER-6

FINDINGS, CONCLUSION AND SUGGESTIONS

6.1 INTRODUCTION

The word 'library' is rich in tradition, meaning, and usage. The definitions of 'school library' given by various library scientists and associations reflect this heritage. Throughout the world the Library of a school is considered as part and parcel of the academic set-up. It is created and maintained to serve and support the educational activities of the school. The recommendations of numerous commissions and committees established by the Government of India and various other states for the improvement of school education can bring in desired results provided the school has the full complement of library resources, personnel, and necessary infrastructure. So far the school library has not been given its rightful place in the scheme of things. Nevertheless, it can play a very important role and help the school in achieving the educational objectives. If we recognize the value and importance of informal system of education, then library method of self-education is sure to get its due place.

Now-a-days study on users and uses of various library resources are very popular among researchers. Both of these provide the base for managing the services provided by library at all levels. This in turn facilitates the proper management of knowledge that is the proper management of data into work. The various tools and techniques have been given to improve the library services for fulfilling the user's requirements timely. Computer is a solution to solve several problems related to the management of this vast amount of data. However, various tools and techniques are there, still librarians' knowledge is not adequate because of the frequently changing needs of users, and is being quite unable to predict what actually user is asking for. It may be summarised that user's study, what actually he/she needs at a particular point of time is the major focus in library education programme. In the age of information explosion, it is very essential to organise the information for their effective and efficient use. Citation Analysis is one of the popular method employed in recent days for the identification of core journals in various subjects field or for a particular specific community in a geographical proximity. Citation method is used in the present study to understand the Information needs, use pattern and use behaviour of research scholar in the field of Management.

In current project the detail analysis of contributions of faculty members (humanity and basic science) of university and affiliated colleges , during 1990—2007 will be done and its impact on social , regional and national level progress will also studies.

6.2 MAJOR FINDINGS OF THE STUDY:

The major findings drawn from this study are following:

- 6.2.1 PERSONAL INFORMATION.
- 6.2.2 TOTAL DATABASE OF THE STUDY.
- 6.2.3 SUBJECT-WISE DISTRIBUTION OF TOTAL JOURNALS AND PERIODICAL.
- 6.2.4 FORM-WISE DISTRIBUTION OF TOTAL CITED JOURNALS.
- 6.2.5 STATE-WISE BREAKUP OF CITATIONS OF JOURNALS AND OTHER DOCUMENTS.
- 5.2.6 AUTHORSHIP PATTERN OF CITED JOURNALS.
- 6.2.7 AUTHORSHIP PATTERN OF TOTAL NUMBER OF CITATIONS CITED IN JOURNALS.
- 6.2.8 COMPARATIVE STUDY OF AUTHORSHIP COLLABORATION OF TOTAL CITATIONS CITED IN JOURNALS.
- 6.2.9 RANKING OF JOURNALS.
- 6.2.10 COUNTRY WISE DISTRIBUTION OF JOURNAL PUBLICATIONS.
- 6.2.11 APPLICATION OF BRADFORD’S LAW OF DISTRIBUTION.
- 6.2.12 COMPARATIVE STUDY OF CHRONOLOGICAL DISTRIBUTION OF TOTAL CITATIONS OF JOURNALS.
- 6.2.13 COMPARATIVE STUDY OF CHRONOLOGICAL DISTRIBUTION OF TOTAL CITATIONS OF JOURNALS.
- 6.2.14 OBSOLESCENCE/ HALF-LIFE OF JOURNALS.
- 6.2.15 AGE WISE DISTRIBUTION OF TOTAL NUMBER OF CITATIONS CITED IN BOOKS AND JOURNALS.
- 6.2.16 OBSOLESCENCE FACTORS OF SHOWING ANNUAL AGING, HALF-LIFE, MEAN-LIFE AND UTILITY FACTOR FOR CITED JOURNALS.
- 6.2.17 TEST OF EXPONENTIALLY OF CITATION DISTRIBUTION JOURNALS.

6.3 RESULT OF HYPOTHESIS TESTING :

Ho: Data does not fit with Bradford's Law of Distribution. Result: Application of chi-square test of goodness of fit indicated that data did not fit with Bradford's Law of Distribution. Hence the null hypothesis was 277 accepted because the calculated value of chi-square was much less compared to the tabular value of chi-square at 0.05% level of significance in all cases

6.4 SUGGESTIONS

The study has initiated the researcher to put forward the following suggestions:

1. Periodical orientation programmes should be arranged for the research scholars in order to exploit the available resources in the library.
2. The quality of such studies depends on the accuracy and correctness of the citations given by the authors. Inaccurate and incomplete citations should be avoided.
3. The acquisition policy of university library should be evaluated on the behalf of researchers' requirements.
4. There is a need to conduct more citation studies on theses/dissertations at local, national, regional and international levels from time to time.
5. More funds for journals and books should be allocated in comparison of other bibliographical forms of documents.

6.5 CONCLUSION

Analysis of references lists appended to doctoral dissertations is one approach of the present study, to measure citation pattern by analysing characteristics features of literature like bibliographic forms, highly cited books and journals, country-wise distribution, year-wise distribution etc. The collected data was analysed to arrive at some generalizations. This type of study helps to know the better understanding of information requirements of researchers. The quality of such studies as this depends on the accuracy and correctness of the citations given by the authors, inaccurate and incomplete citations should be avoided. The results of such study are very useful in decision making in research administration and planning. As regards further, research in this field, a study of authorship pattern with year-wise analysis of authorship trend need to be conducted, to

determine the trends of research more accurately. The result may be far accurate and with wide application from such a study So far as for the information professional and librarians are concerned, the growth study, international collaboration, institution and journal ranking study will help them in collection management. The study of institutional productivity will help the information professional and librarians to design and develop the resources on those people and institutions and their area of specialization. Journal ranking and the list of core journals in the field of science and technology will help them to subscribe to the most productive core periodicals for their users.

Bibliography

- Aggarwal B.S. (2004), An Introduction to Library and Information Science,.1st Ed. Jaipur : ABD Publishers. PP. 167-169.
- Ali Amjad (2004), Glossary of Library and Information Science, V.2 Ist Ed. New. Delhi , Ess Ess Publications, PP. 177.
- Apeji, E. Adeche (1989) meaningful Children's education a programme of cooperation between the library and the teaching staff, International Library Movement.
- Bavakutty , M. (2000), School libraries in 50 years Library and information Services in India : 1947-98, Edited by M.K.Jain 2nd Delhi, Shipra publication.
- Bavakutty, M. (2001) Development of Libraries in Southern Region : Kerala In Op. Cit- 10 P. 186.
- Chacho, Mary George (1995), The School Libraries as a Major Educational factor in the Twenty First Century In preparing Libraries for the 21st Century, seminar papers : fortieth All Indian Library Conference. Edited by C.V. Subbarao & Others, Delhi : ILA.
- Chaudhary S.K. (2002), Modern Library Strategies, New Delhi : APH Publishing Corporation, P. 179. • Chopra H.R. (1987), The nature and scope of school library services, A Case study CLIS observer.
- Dhiman Anil K. & Rani Yashoda (2005), UGC (NET) Manual for Library and Information Science, 1st Ed. New Delhi : Ess Ess Publications, pp. 81-82.
- Dhiman Anil K. & Rani Yashoda (2005), Learn Library and Society, 1st Ed. New Delhi : Ess Ess Publications, pp. 22.
- Gupta Sushma (1986), "Library resources and services for the deaf children in secondary Schools: A proposal." International Library Movement 8(4), pp. 163-171.
- Hasan Nabi (1997) School Libraries in India : A Descriptive Analysis, In ILABulletin 32 (3-4) pp 25-29. • Henri S. James (1986), School Curricula : The

- kinship model of curriculum development, *International Library Movement* 8(1) pp. 47-48.
- Kalia D.R. (1981), *Library Services in India in the Bowker Annual of Library and Book trade information*, 26th ed. New York : R.R. Bowker, pp. 377-381.
 - Kaula P.N.(1989), *Education and School Libraries : Observation on National Education Policy and School education*, *Herald Library Science* 28(4).
 - Khanna J.K. (1994), *Library and Society*, 2nd ed. New Delhi : Ess Ess Publications, pp. 66-78
 - Krishan Kumar (1987), *Library Organization*, New Delhi : Vikas Publishing House, PP. 19-35.
 - Kumar P.S.G. (2006), *A students Manual of Library and Information Science*, 3rd ed. Delhi, B.R. Publishing Corporation, p. 944.
 - Kumar Sunil (1993), *Changing role of School Library in present scenario*, *ILA Bulletin* 28(3-4).
 - Luthara K.L. (1988), "New Education Policy and School Libraries" *International Library Movement*9 (1), pp. 31-52.
 - Rao VKRV (1965), "Presidential Address delivered in the All India Library Conference at Mysore, Quoted in *Magnand School Libraries. Cultural Forum (Libraries Special Number)* v.9. No. 2-3 (January-April, 1967) pp. 51-55."
 - *School Library Standards* (1986) "CLIS Observer 3 (3-4)," pp.82-88. Sen, Smita (1987), "Emerging information society and school library media management" DRTC 1987, BC.
 - Seth Ved (2001), *Development of Libraries in Eastern Region : Sikkim*, In Op. Cit-10, p-186
 - Sridevi J. & Vyas, Shalini (2005), *Library and Society*, New Delhi, Ess Ess Publications, pp. 66-78.
 - Taher Mohamed, Burhanuddin, Mohanned and Khan, Amin Ahmed (1989), "Madras libraries in India" *International Library Review* 21 (1) pp. 83-97.

- Trikha ,Sudha (2001), Development of Libraries innorthern Region : Rajasthan In Library and Information services in India states and union Territories : On the eve of new Millennium, Edited by M.K. Jain 1st . Ed. Delhi : Shipra Publications, p-40.
- Vashishth, C.P. ed (1986), School Library development : Seven papers presented at the All-India Seminar on school library development, New Delhi : Indian Library Assocation, p. 64.
- Vyas S.D. (1993), Library and Society, 1st ed. Jaipur : Panchsheel publication, p. 103.
- Watkin's quoted by Dhiman Anil K. & Rani Yashoda (2005), UGC (NET) Manual for Library and Information Science, 1st Ed. New Delhi : Ess Ess Publications, pp. 77.