

# **Knowledge Mapping of DRTC Seminar Publications: A Scientometric Study**

**Dr. Sachin Abaji Borde**

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## Preface

The statistical evaluation of books, research papers, or other publications is known as bibliometrics. Analyses are used to monitor the output and influence of writers and researchers. Used to determine journal impact factors as well. It is also possible to view bibliometrics data to comprehend publishing linkages.

Bibliometric information can be used to compute additional impact measurements. Article/Book Citation Impact: The quantity of times a specific work—such as a book, journal article, or conference proceedings—is cited by other works is a good indicator of its academic impact. Impact of Journal Citations: The quantity and location of an academic journal's citations in publications serve as a proxy for the journal's influence. Impact of Researcher Citations: An individual researcher's academic impact can be determined by counting the publications they have made and the number of times these publications have been cited.

The critical review seeks to identify the research themes and the associated issues based on scientometric results, while the scientometric analysis is used to map the scientific knowledge field objectively. The citations provided at the conclusion of the Annual Seminar Proceedings, which the researcher used to prepare the articles, are the basis for this book. The current investigation is predicated on 1830 citations that are included in the 13 Annual Proceedings on DRTC Seminars (written exclusively in English). A ten-year period, from 1993 to 2002, was taken into consideration.

Citation analysis of seminar proceedings will assist librarians in finding essential journals, subscribing to helpful journals, and managing the entire library while upholding standards. Selecting a publication that provides up-to-date information on a connected issue assists research researchers as well.

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# 1 INTRODUCTION

## 1.1 Preamble

This chapter's goal is to draw attention to the necessity and significance of the study as well as its goals, hypotheses, sample, and methods.

Bibliometrics is "Library and Information Science's most active subfield. The examination of citations makes up most of the work. According to "E.J. Cole" and "N.B. Ellis," the information science area known as "bibliometric" was first applied in 1917 when researchers collected publications by nation in order to analyze works on comparative anatomy. In 1923, "Hulme" conducted a follow-up study. In all of these disciplines, it is called the statistical bibliography and defined as the use of quantitative techniques to bibliographical and library work. In 1969, "Alan Pritchard" coined the term bibliometrics. This word was replaced in 1948 by "Dr. S.R. Ranganathan" with "Librametry" (Kabir, 1999).

According to Alan Pritchard (1969), bibliometrics is "The application of mathematics and statistical method to books and other media of communication." According to Fairthorne (1969), bibliometrics is the quantitative study of the traits of recorded speech and behavior associated with it. Bibliometrics is the quantitative study of the bibliographic characteristics of a corpus of books. Nicholas and Riche (1978) defined bibliometrics as "the statistical or quantitative description of a literature." Page 180 Sengupta (1990) defined bibliometrics as the "organization, classification, and quantitative evaluation of publication of pattern of all macro and micro communications along with their authorship by mathematical and statistical calculation." Page 156 Contrary to popular belief, bibliometrics is more than just theory, which illustrates its significance. It is realistically applicable to library administration and journal quality evaluation. However, a significant lot of research and studies are needed in this field since bibliometrics is so vital for scientific policy research, library documentation, and information centers (Kabir, 1997). Bibliometrics, as defined above, examines the statistical distribution of processes related to

- Using Documents
- Library staff members as well as users.

The information that has been statistically evaluated is useful for managing and assessing the information that may be found in libraries and information centers.

### **1.1.1 Scientometrics**

Although it is a relatively young field, "scientometrics" investigates the quantitative components of research and is growing quickly. Scientific communication studies, science policy studies, and other related fields fall within this quantitative subfield of science. These days, it's often used as a catch-all word to describe a variety of scientific research methodologies. It is frequently used synonymously with bibliometrics, the use of quantitative techniques to the study of scientific history. Science's attributes can be accessed through its quantifiable component (Conference Reports Library Hi Tech News, 2001). Vovierence and Trumpiene (1994) describe it as an organized part of scientific methodology that consists of an extensive mathematical and statistical procedure for examining the quantitative aspects of research as a business. According to Nalimov and Mulchenk (1969), "scientometrics is the investigation of science as development of information process."

### **1.1.2 Informetrics**

The words informetrics and bibliometrics are synonymous and equivalent. The idea that knowledge is an important resource that is necessary for the development and growth of a country's socioeconomic structure was first proposed and put into practice by the "International Federation of Documentation" (IFD). The word "informatics" was coined in 1982 by German scientists Blackert and Zygel to refer to a newly formed field of study that examined scientific and technical data at the theoretical level as well as practical information-related activities using statistical and mathematical techniques (Blackert and Stegel, 1979). Informatics encompasses more than simply media and scientific communication; scientometrics and bibliometrics study all quantitative facets and formats of printed materials. Research on the word was originally suggested in 1980. It also extends beyond research projects undertaken by scientists. Consequently, information science's fast-growing field of informetrics blends developments in information retrieval with quantitative study of information flow. Information metrics include the following areas:

- Define and quantify information;
- Retrieval time and attribute performance measures;

### **1.1.2 Webometrics**

"Webometrics" is a relatively new field in library and information science that uses quantitative bibliometric methods to analyze the 3Ds, or distributed, diverse, and dynamic information space, of the web, which includes user searching and browsing behavior, link structures, webpage content, and search engine optimization. Among these methods are cluster analysis, citation analysis, and publication analysis. The quantitative study of web-

related events known as "webometrics" emerged from the realization that a technique originally meant for bibliometric analysis of scientific journal articles may be used to other contexts. Citation patterns may be utilized to acquire unprocessed data from online commercial search engines. The web impact factor (WIF) was developed by Ingwerson to measure the power of a website based on the number of links it receives. WIF calculations were found to be an inaccurate method for webometric

Webometric research has made use of academic web crawlers and search engines. Both have advantages and disadvantages. In certain circumstances, utilizing a search engine is more appropriate, while in other circumstances, using a personal web crawler is more suitable (Li, 2003). Cybermetrics is a broad term for the quantitative study of the development and use of information resources, structures, and technologies over the internet, drawing on techniques from bibliometrics and informatics. Consequently, statistical evaluations of email lists, discussion groups, and other online computer communication, including www. As of right now, webometrics and cybermetrics are the two terms that are most frequently used interchangeably (Kretschmer, 1994).

#### **1.1.4 The Bibliometrics Three Laws**

The three basic principles that give rise to bibliometrics.

##### **1.1.4.1 The Lotka Law**

The fundamental theoretical foundation for authorship-related bibliometrics research is provided by this legislation. Scientific productivity is frequently measured in terms of published output since published output statistics are readily available and quite trustworthy on the quantity of publications authors have created. In other words, there is a correlation between the legislation and the amount of donations. The scientific production frequency distribution is the first claim made in Lotka's 1926 journal paper (Potter, 1981).

##### **1.1.4.2 Bradford's Law**

Bradford's laws provide the fundamental framework for bibliometrics. The 1934 law described the journal's scattering pattern in the field of applied geophysical lubrication; the law of dispersion describes the distribution of papers in a discipline or issue area, usually in journals; Bradford's law was developed based on a regularity observed in the retrieval or application of published knowledge (Drott, 1981; Singh, 2007; Bandyopadhyay, 1999; Afolabi, 1983).

##### **1.1.4.3 Zipf's Law**

"Describing word frequency ranking" creates an empirical or external law governing the relationship between a word's rank and how often it occurs in

a long text. Putting words in decreasing order of frequency results in the rank of each word in the text being inversely related to how frequently the words occur. As statistician Gustav Hwerdan noted, "Linguists believe in Zipf's law because they think mathematicians have established it to be linguistic law, and mathematicians believe in Zipf's law because they think linguists have established it to be mathematical law" (Gustav, 1966; Wyllys, 1981).

### **1.1.5 Extra Laws of Empiricism**

As per K.P. Vijayakumar's article "Applications of Bibliometrics in Library and Information Centers," a substantial amount of bibliometric research that followed was carried out with the aim of verifying, modifying, extending, linking, or disputing these three empirical laws:

#### **1.1.5.1 Price's law of scientific production, or square root**

In accordance with this law, "the square root of the total number of scientific authors contributes half of the scientific papers."

#### **1.1.5.2 Garfield's concentration law**

Garfield talked about the number of journals that actively distribute the literature on a given subject.

#### **1.1.5.3 Sengupta's bibliometrics law**

As stated by Mahapatra (2000), "articles of interest to that discipline appear in an increasing number of periodicals distant from the field during phases of rapid growth of knowledge in a scientific discipline" is essentially an extension of Bradford's rule.

### **1.1.6 Analysis of Citations**

Studies on citation analysis are useful because "citation analysis" defines how a text cites another text and indicates where the referenced text is located. One can use citation analysis to access and analyze citations obtained by authors, articles, institutions, and other signs of scientific activity. It can also be used to understand publishing trends, the effectiveness of subject relationships, and other topics. The first known citation analysis was carried out in 1927 by Gross and Gross, who used citation, trends to identify which journals to subscribe to and which back volumes to buy for Pomona College's library. They looked at how frequently citations appeared in the references included in the American Chemical Society publication.

Widely employed and highly regarded in their fields locally. Bibliographic references are utilized, which are a crucial component of scientific writing. One important area of bibliometric research is citation analysis, which employs a variety of citation analysis techniques to determine connections between authors or their works (Ane's Encyclopedic Dictionary of Library and Information Science, 2006). The purpose of citation analytics is to assess

and analyze the citations that authors and papers have received. Organizations and further collections of scientific endeavors. In science and sociology, it's also employed as a metric for communication link measurement. The chronological arrangement of all cited works, citing authors, and their papers facilitates easy tracking of developments since the publication of a specific article by identifying the authors and their papers pertaining to the primary works (Kumar, 2002). One bibliometrics technique is citation analysis. It is a crucial research tool for comprehending the topic, as we examine its direction and organization. It evaluates the value of documents, the connections between related documents on the topic, and the connections between authors and the materials they write. Citation analysis is described as "A reference to a text identifying the document in which it may be found" by Bose (1986). The citations are more significant than is typically thought. In bibliographical works, citation is a crucial tool. Compiling a bibliography on a recent topic is as simple as writing down the citation (or references, as they are commonly called) provided at the conclusion of the pertinent article and organizing them in a certain way.(90 pages) Citation analysis is a crucial technique employed by educators, information scientists, and librarians to illustrate the relationship between the cited and the citing document. It entails gathering, tallying, and analyzing information from a variety of literary sources. This is the straight-forward way to examine the library record to find out how the papers are really being used. These kinds of data might offer helpful suggestions for obtaining significant materials, choosing documents, etc. Both information system designers and librarians can benefit from this in terms of product and service planning. One can identify the following using the citation analysis: i) Honoring pioneers. ii) Crediting similar work (paying respect to colleagues). iii) Determining the equipment, technique, etc. iv) Giving background information. v) Making edits to one's own work. vi) Editing other people's work. vii) Evaluating earlier research. viii) Supporting a claim; ix) Notifying future work; x) Offering leads for inadequate dissemination. Inadequately cited or indexed literature (Kumar, 2002).

## **1.2 Definitional analysis**

The definitions of the terms used in this study are provided below.

### **1.2.1 Scientific Measurement**

Scientometrics, "a complex of quantitative (mathematical and statistical) methods, which are used to investigate the process of science," is a field of scientific sociology that is utilized in the creation of science policy (Tiwari, 2006).

Scientometric research looks at the statistical and mathematical aspects of data on scientific innovation, technology diffusion, and labor force, among other topics, to identify the field of science and technology. These groups

gain from the knowledge of the sociology of science and the relationships between technology and social change, which also aids in statistical analysis and modeling. As a result, Scientometric is a useful tool for visualizing the cognitive landscape of an R&D field (Kalyane et al., 2001).

### 1.2.2 Seminar

Generally speaking, a seminar is a type of academic teaching that is provided by a business or professional group or at an academic institution. Its purpose is to organize regular gatherings of small groups, with a specific theme each time and an active participation requirement for all attendees. This is typically achieved through a more formal research presentation or through an ongoing Socratic discussion with a seminar leader or instructor. Seminar classes are often designated for upper-class students at US and Canadian colleges; however, seminars are frequently used for all years at UK and Australian universities. Often, participants must not be novices in the topic under discussion. The purpose of the seminar system is to provide students a deeper understanding of the approach of the subject they have selected and to give them the opportunity to engage with real-world examples of the practical issues that arise throughout research projects. Basically, it's a forum for discussing the required readings, asking questions, and having disputes. At least when contrasted with the academic lecture system, it is comparatively casual. 2014's [www.Wikipedia.org/wiki/Seminar](http://www.Wikipedia.org/wiki/Seminar)

**1.2.3 Documentation Research and Training Centre (DRTC):** The Indian Statistical Institute (ISI) formed the Documentation Research and Training Centre (DRTC) in Bangalore in January 1962. In April 1962, it officially started operating as a training and research center. In light of the International Congress of Libraries and Documentation Centers' recommendation, which was made in Brussels in 1955, ISI decided to create such a center. Forming specific groups to train document lists would be beneficial, according to the recommendation. The recommendation represented the recognition among academics that a necessary corollary to the rapid advancements in science, technology, and industry was the extension of the scientific library service to incorporate information and involvement in scientific research. The following is a summary of the main factors that encouraged the creation of this recommendation: An institution of higher education and advanced research must have all the facilities required for a library, records, and information services. In the setting of a major institution, these facilities should unavoidably have the tools, techniques, and processes necessary for more effective and efficient information services, necessitated by ongoing adjustments to the elements that influence the service. These are all basically the largest facilities needed to train people to perform sophisticated information job and services. Consequently, a straightforward reorientation of these facilities can enhance the system and function as the most cost-

effective and efficient way to build information personnel at the same time. Such a system would provide labor that would, on the one hand, guarantee a ready supply for the relevant institution and, on the other, serve as a source of labor for the entire nation. (DRTC, 2014; <http://www.drtc.isibang.ac.in>)

### **1.3 Objectives of the study**

The main objective of the present study is –

1.3 The study's objectives analyzing the citation of DRTC Publications is the primary goal of the current investigation.

2. To highlight the publications from the annual seminar.
3. To ascertain the kinds of cited papers (in terms of form).
4. To ascertain how the referenced papers are distributed chronologically.
5. To ascertain the cited document's authorship pattern
6. To order the referenced journal Bradford's law of dispersal
7. To order the referenced books
8. To ascertain the distribution of cited documents by language.
9. To ascertain where the referenced materials are distributed geographically.
10. To ascertain how citations are distributed in India and beyond.
11. To order the websites those are cited.
12. To order the writers who are cited.
13. The publisher's ranking.

### **1.4 Hypotheses**

The study formulates the following hypothesis.

1. Researchers in seminar proceedings mostly prefer Indian publication.
2. The journals are the primary documents mentioned most frequently.
3. Multiple authors are predominant than Single author.
4. English language is a predominant language.

### **1.5 Scope and Limitation**

Citations from the Annual Seminar Proceedings, which the researcher utilized to prepare articles, form the basis of the study. The current investigation is predicated on 1830 citations that are included in the 13 Annual Proceedings on DRTC Seminars (written exclusively in English). A ten-year period, from 1993 to 2002, was taken into consideration.

## **1.6 Research Methodology**

"Research" is a colloquial term for an endeavor to get new knowledge. Redman and Moray defined research as "Systematized effort to gain new knowledge" in 1923 (Kothari, 1990). Using research technique is one way to approach the research challenge carefully. It might be thought of as a science that investigates scientific research design. According to P.V. Young (Kothari, 1990), research technique is the systematic process of obtaining new facts and validating existing ones, along with their sequence, linkages, random interpretations, and underlying natural laws.

The following are some different kinds of research methods:

- Analytical and descriptive research.
- Both fundamental and applied research.

Research that is both quantitative and qualitative.

- Research that is conceptual and empirical.
- Table and field research.
- One-time and ongoing studies
- The survey study methodology.
- Research technique sampling.
- The use of historical research techniques
- The scientific research methodology, etc.

The sample method was used in this investigation. The technique is very ancient and widely used in all human communities. It is currently in widespread use. A sample is a condensed version of a larger whole (Panneerselvam, 2004; Kothari, 1990). DRTC Seminar Proceeding from 1993 to 2002 were selected as a sample for this study; 13 of these Proceedings have 1830 citations appended. The researcher used the information gathered from the bibliographical entries mentioned at the end of the theses to finish the theses. Data was gathered and the citations were photocopied. Many parameters were used in the analysis.

### **1.6.1 Information gathering**

For additional analysis, photocopies of the bibliographical entries were made of the 13 Proceedings of the DRTC Annual Seminars.

### **1.6.2 Data Analysis:**

A variety of criteria were used to analyze the 1830 citations that were appended at the end of the 13 Proceedings. These parameters included identifying the core journals, ranking the cited author and journal,

determining the chronological distribution of citations, determining the geographical distribution of citations, and determining the types of cited documents.

### **1.8 Conspectus**

There are five chapters in the dissertation.

#### Chapter I

This chapter's goal is to draw attention to the necessity and significance of the study as well as its goals, hypotheses, sample, and methods.

#### Chapter II

The current chapter's goal is to concentrate on citation analysis literature scans.

#### Section III

The history of DRTC Bangalore is covered in this chapter.

#### Chapter IV

This chapter's main goal is to analyze data that has been gathered and is shown as tables and figures.

#### Chapter V

The results, recommendations, and conclusion are covered in this chapter. Bibliographic references are included at the end of the dissertation.

\*\*\*\*\*

## 2 Scientometrics Analysis

### 2.1 Introduction

The aim of this chapter is to focus on literature scans for citation analysis.

A review of relevant literature is a crucial part of every research activity. It is useful to know what is currently known and what is uncertain and unverified. It helps to avoid doing unnecessary research.

Numerous books, journals, and bibliographies were explored in order to locate previous, similar studies while selecting a study topic. To find possible study subjects and find out if prior research has been done on the stated challenges, searches were conducted using the Internet Bibliography of AIU (2010), the databases of theses and dissertations on InFLIBnet, and Vidyanidhi (2010).

A great deal of the previous research on "Citation analysis" was done at the MLISc and Ph.D. levels. (Kannappanava, 1991; Berhanuddin, 1992; Sangam, 1986; Thoidingjam, 1997; Mishra, 1997; Chikate, 2008) were the subjects of PhD-level study. On the other side, Mutkule (2002), Dharmapurikar (1987), Onguso (1995), Jadhav (1990), Hambarde (1989), Horshil (1992), Deo (1990), Surve (1992), Bhand (1993), and Tupkar (1991) conducted study at the MLISc Level.

### 2.2 Measurements of Scientometrics

#### 2.2.1 Definition and Importance of Scientometrics

"Scientometrics" is a term that was first used in the Soviet Union to describe the quantitative analysis of science as a method of data collection. The terms "scientometrics" can also refer to social relevance, bibliometric measurement, and the outcomes of applying science and technology.

Scientometrics is a relatively new field that uses bibliometric measurements to assess scientific advancement, the degree of scientific development, the impact of science and technology applications on society, and other factors (Parthsarthy, 1985; Rajan & Sen, 1986; Patra, Bhattacharya & Verma, 2006; Kawatra, 2000; Kasirao, 2007; Sen & Chatterjee, 1990, Wolfram, 2005; Rajan & Sen, 1986).

The word "scientometrics" is somewhat recent. It is still commonly used with the same meaning as bibliometrics, which is the application of quantitative methods to the history of science, even though it now generally refers to a range of research approaches in the study of science that use quantifiable aspects of science to access the characteristics of science.

With the publication of the journal "Scientometrics" in 1978, braining spread throughout the West. However, Bankapur and Kumbar (1993) claim that the term "scientometrics" has long been used throughout Eastern Europe and the USSR under the name "Naukometria." Originally published in Hungary, it is currently published from Amsterdam. The journal will publish all of these works on quantitative aspects of science as a field or economic activity.

Bibliometrics is a narrower area than scientometrics, as stated by Bankapur and Kumbar in 1993. It's fascinating to know that there is a lot of overlap between the two fields. I was surprised to read a remark claiming that scientometrics is bibliometrics' subset and that it makes use of bibliometric techniques.

Tijssen (1988), Metron and Gorefiled (1970), Nalimove and Mulchenko (1969), and Bonitz (1992) describe scientometrics as a set of quantitative mathematical and statistical methods for characterizing the evolutionary viewpoint of science and examining elements like research staff.

Drawing from the research conducted by Anand (1997), Dhiman and Yeshiva (2005), Kalyane and Kalyane (1994), Voveriene and Trumpiene (1994), and Kalyane et al. (2001), it can be concluded that scientific metric analysis is a structural element of science of science methodology. This includes the complex network of statistical and mathematical methods used to analyze the quantitative aspects of science as an industry.

"Scientometrics is a subfield which applies quantitative methods to the study of science as an information process in the historical perspective of sociology of knowledge," as stated by Kashia (2003), Krestchmer (1999), Kumar (2002), Kumar (2004), Kumar and Kumar (2005), Munnoli and Kalyane (2003), Neigh (2005), Rajan and Sen (1986).

Scientometric research looks at the statistical and mathematical aspects of data on scientific innovation, technological diffusion, workforce, etc. to identify the field of science and technology. Kalyane et al. (2001) showed that scientometrics is a useful tool for illustrating the cognitive landscape of a research and development field, which is interesting to know because the sociology of science and the relationships between technology and social change share knowledge with these groups and help them in statistical analysis and modeling.

- How does an R&D field's intellectual and cognitive structure look like?
- Who are the most renowned researchers, and where are they located?
- What is the relationship between the field and the "scientific environments" it directly inhabits?

Can "graphics" be used to illustrate these structural links?

## **2.2.2 The Historical Evolution of Scientometrics**

The phrases scientometrics, online metrics, cyber metrics, informatics, librarian metrics, and bibliometrics are almost synonymous; however this research used them interchangeably.

A number of information scientists have made reference to scientometric studies under different names. For example, research by Lal (1993), Parvathamma (1993), Kumar (2004), Rajan and Sen (1986), Panda (1997), and Sharma (1997) cites the 1917 seminal work "Statistical analysis of the literature," by Cole and Eales.

In 1923, Hulme made a second attempt, referring to the use of quantitative methods in libraries as "statistical bibliography." (Kumar & Kumar, 2005; Raising, 1962; Lal, 1993; Sengupta, 1986; Rajan & Sen, 1986; Kumar, 2004; Panda, 1997; Parvathamma, 1993; Dheerendra & Venugopal, 1994; Price, 1963; Goffman, 1971; Vickery, 1968; Clark, 1976; Sharma, 1997) The purpose of statistical bibliography is "to shed light on the process of written communication and the nature and course of development of a discipline by means of counting the various facets of written communication."

Dr. S R Ranganathan coined the term "bibliometry" in 1948 at the ASLIB conference in Leamington Spa. It bears similarities to other terms such as "biometry," "econometry," "psychometry," etc. (Guha, 1983). (Ravichandrarao & Neelameghan, 1992; Sengupta, 1986). He defined Libra metrics as the application of mathematical & statistical tools for analyzing library operations and resources. Dr. S R Ranganathan has used Librametry to analyze reader queries, streamline the acquisition system by analyzing library documents (books, monographs, journals, etc.); identify the most useful sequence for classifying micro and macro documents; develop and organize the national and state library system; determine the ideal size of a service library; design library buildings; and distinguish service & dormitory libraries.

The reference and circulation departments usually experience fluctuations in workload strain during the day; the precise pattern of this fluctuating demand can be identified so that staffing levels in certain areas can be scheduled appropriately. Anand (1997), Bara (1992), Dheerendra and Venugopal (1994), Dhiman and Yashodarani (2005), Guha (1983), Kumar (2002), Kumar (2004), Kumar and Kumar (2005), Nagy (2005), Rajah and Sen. (1986), Ravichandrarao and Neelameghan (1992), Seen and Chattered (1990 a & b).

## **2.2.3 Aspects of scientometric research those are theoretical**

These days, scientometric research is highly valued by information scientists, research academics, librarians, and library staff. It is one of the primary techniques for determining how users' needs are satisfied, creating and

maintaining collections, and assessing research output. Its benefits include improving comprehension and assessing scientific output, library services, and their progress (Mahapatra, 2000).

#### **2.2.4 The Goal of Scientometrics**

Determining the current state, future potential, and potential for further growth of a subject is the main goal of scientometrics. For this, a number of scientometric markers are employed. The most important metric is the quantity of publications; their evolution over time is typically seen as an indicator of the topicality of research in a certain field. These indicators are headed toward becoming a common assessment and analysis tool in scientific policy making and research administration. Measurement of scientific information has received a lot of attention lately. It can be applied strategically or practically to regulate the advancement of science. Information searches for users are part of the practical approach. In terms of information strategy, this means keeping an eye on scientific advancements and analyzing how research is evolving structurally. This type of research activity has been there since the early 1970s and is becoming more and more popular. Its goal is to provide a structural (or qualitative) image of the status of science.

Mathematical and statistical tools enabled the method of counting publications and participants in the R&D process. If one has to properly quantify the intellectual output of scientists and researchers, can the information contained in graphic media be measured in the same way as the other one? Although there might be mathematical challenges, it was still relatively simple because it was (or could be reduced to) a process of counting the question. This requires that the focus be on the qualitative research, which needs to have a descriptive orientation. Scholars in this subject have over the years created unique protocols and quantitative tools to examine the traits of a particular discipline and monitor changes in the discipline.

- The ability to interpret disciplinary literature at different levels through mapping.
- The ability to provide perceptive indicators of scientific and, increasingly, technological advancements.
- The ability to accurately and superbly match dynamic literary components mathematically.
- Gaining more expertise in digital databases and useful tools for bibliometric analysis.

Numerous studies in this vein were published in the literature from the USSR (AP too finked), the Netherlands (A F J Van Ran), France (Michael Cable et al.), and other countries (Krishnamurthy, 2003).

### **2.2.5 The Range of Scientometrics**

Panda (1997), Patel (2006), Seen and Chattered (1990 b), Parmeswaran and Rajesh Babu (2003), Sharma and Mall (2004), Sengupta (1986), Soman (2002), Shukla (1992), and Tiwari (2006) all classify scientometric investigations into essentially two categories.

- 1) Research on behavior
- 2) Descriptive studies.

#### **2.2.5.1 Behavior research**

Behavioral studies in scientometrics examine the relationships between various elements, including author, title, bibliographic history, etc. Panda (1997), Sen (1986), Sen and Chatterjee (1990), Parmeswaran & Ramesh Babu (2003), Sharma (2005), Sengupta (1986), and other authors state that behavioral studies concentrate on the bibliographic relationships between publications, including authorship, title statements, bibliographic histories (titles, dates, etc.), frequency of publication (for serials), form, place, language, subject, related documents, level of market orientation, content analysis, physical composition, size, quality of production or production values, price, circulation, translations, formats, Citations, etc.

#### **2.2.5.2 Identifying research**

Research examines the bodies (individuals and entities) that produce information-carrying documents. Presentation style, information type, information quantity, study of time and frequency, origin and geographic dispersion or distribution, etc. Descriptive studies are limited to describing the qualities or attributes of a text, piece of literature, or magazine (Kumar, 2002).

### **2.2.6 Functions of Scientometrics**

- Sivakami (2006) states that the following are the functions of scientometrics: -
- To provide information on the distribution and composition of knowledge;
  - To determine how widely distributed all written messages are on average;
  - To provide a quantitative analysis of publishing trends at the macro and micro levels across a wide range of topic areas;
  - To provide assessment indicators that illustrates each country's output;
  - To investigate the application of various document sources;
  - To display the citation structure of the literature;

- To investigate the application of individual contributions;

### **2.2.7 Scientometrics-Based Research Methodology**

A popular research methodology is tracing citations using the Social Science Citation Index, Science Citation Index, or Arts and Humanities Citation Index. Scientometrics is an approach to research that is used by information science and libraries. It uses quantitative analysis and statistics to describe publication patterns within a certain topic or body of literature. Researchers can use scientometric methodologies to appraise the impact of a single writer or the relationship between two or more writers or works.

The use of statistical and mathematical techniques to quantify and qualitatively assess changes in book and media collections is known as scientometrics. Quantitative analysis can be used, for example, to quantify the distribution of articles among journals or the growth and obsolescence of literature in various subject areas. This analysis demonstrates two key findings: first, only a tiny percentage of writers in a field are extremely productive (Lotka's rule), and second, a small percentage of journals in a field represent a large portion of the important publications in the area (Bradford's law). Research profiles at the national and regional levels, as well as the degree of collaboration across research organizations, can all be examined using scientometric analyses. The techniques are repeatable and objective, but in order for the results to be useful, they need to be applied to a complicated world. Apart from the previously described techniques, the most commonly employed ones are co-citation analysis, bibliographic coupling, and co-word analysis (Unger & Sara 1995).

### **2.2.8 Scientometric Research's Significance and Worth**

Scientometrics and bibliometrics are related because scientometrics analyzes scientific endeavors quantitatively, which includes publications among other things. Price (1963) enumerates the basic ideas of scientometrics in the introduction to "Little science, big science," saying that since science is a measurable field, its resources (talent, funding, and manpower) can be measured by applying statistical techniques appropriately. Sarala (2005) states that scientometrics includes all quantitative aspects of research, science communication, and science policy.

### **2.2.9 Problems and Limitations of Scientometric Methods**

As with every methodology, scientometrics has its critics. Some of the primary problems and limitations of scientometrics are as follows:

- 1) It is impossible to predict with any degree of accuracy how science will develop since informal publications and communications are excluded from scientometric investigations.

2) Inconsistency in the bibliographical references utilized for citation analysis research makes it difficult to rank the authors based on the frequency of citations they receive. For example, the author S.R. Ranganathan is also known by several names, including Siyali Ramamrita Ranganathan, S. Ranganathan, and S.R. The Ranganathan. This could lead to citations to the same author's works being scattered, making it difficult to distinguish between them at the same time.

3) When authors cooperate, the referenced articles are only shown next to the first author listed for each piece. This means that obtaining the correct author rank requires locating the names of each individual contributor who worked on the project, which is a time-consuming and difficult task.

4) There are further limitations with the Citation Index;

5) Self-citation is another limitation of the citation analysis research. Although self-citations in publications by single authors are easily recognized and eliminated, it is more difficult to find self-citations in works by collaborations, especially when authors are in second or subsequent roles.

Sixth, "hello citations" (Mahapatra, 1992) are a major problem in citation studies: these are citations that writers intentionally make to other writers out of goodwill; estimating these citations is a challenging undertaking when assessing writers based just on their citation counts.

7) A further problem with citation analysis is that missing citations occur in several situations and in some circumstances the reference is incorrect for the context of the articles it cites.

8) "Implicit citations" represent another problem with scientometric research: despite the fact that thousands of publications have referenced the work of a few prominent scientists, their contributions are not properly acknowledged.

Since many of the conclusions of the current study are based on Einstein's work, it is no longer considered necessary to acknowledge his contributions in the articles relating to the work. This means that the citation count, which is used to determine an author's rank, undervalues the contributions of numerous well-known authors in various fields. The bibliographical information of the source where the refereed papers initially appeared is not provided in the articles relating to the work.

Furthermore, Kademani et al. (2006) noted a few restrictions on scientometric investigations, including the following: (a) Text is characterized by scientometrics; meaning and context are not always incorporated;

(a) Limited attention to monographs

(c) The citation indexes encompass a number of periodicals, mostly published in English;

- (d) Only the first author of an article is listed in the citation indices;
- (e) Homographs, a group of writers grouped together under a same name, using different initials and complete names;
- (f) Names after they have been revised and translated;
- (g) Authors whose names (de, des, von, van, etc.) start with an article;
- (h) The author's married and maiden names, if she is a woman;
- (i) Typing mistakes made by humans;
- (j) Some important papers begin to drift into obscurity because they are disregarded in the field;
- (k) Citations may be manipulated for non-academic objectives;
- (l) Some articles that were published before to their time may not be mentioned;

There may be differences in references to the same object (year, volume, page, etc.) according to Kidman et al. (2006).

Scientometric research, for all its drawbacks, remains one of the best ways to find out about the productivity of scientists, individual writers, scientific institutions, and scientific journals. It is also a valuable tool for studying the characteristics and trends of research publications, the age of the literature, the information requirements of scientists, and other aspects of the scientific community (Mahapatra, 2000).

### **2.3 Seminar**

Generally speaking, a seminar is a type of academic teaching that is provided by a business or professional group or at an academic institution. Its purpose is to organize regular gatherings of small groups, with a specific theme each time and an active participation requirement for all attendees. This is typically achieved through a more formal research presentation or through an ongoing Socratic discussion with a seminar leader or instructor. Seminar classes are often designated for upper-class students at US and Canadian colleges; however, seminars are frequently used for all years at UK and Australian universities. Often, participants must not be novices in the topic under discussion. The purpose of the seminar system is to provide students a deeper understanding of the approach of the subject they have selected and to give them the opportunity to engage with real-world examples of the practical issues that arise throughout research projects. Basically, it's a forum for discussing the required readings, asking questions, and having disputes. At least when contrasted with the academic lecture system, it is comparatively informal.

## 2.4 Bibliometrics:

Bibliometric size, citation rate, citedness of the work, immediacy index, international cooperation, and distribution of papers and citations by universities and research institutes. The study of documents and their bibliographic reference and citation structure is known as bibliometrics. It is an investigation into the quantitative aspects of the creation, sharing, and retrieval of knowledge in science. The most active area of library and information science is called bibliometrics. Most of the study is a citation analysis.

Several disciplines' intellectual structures have been successfully examined using bibliometric methodologies (Schneider, 2004). The quantitative analysis of articles authored by authors who collaborated with City University's Bibliometric Research Group (BRG) between 2001 and 2003. Nowadays, the field of bibliometrics is highly international, with academics from 40 countries coming together for the International Society for Scientometrics and Informetrics' (ISST) biennial conferences (Aslib Proceedings, 2005). Bibliometrics is the quantitative study of a subject domain's literature as it is represented by bibliographic entries, which include authors, citations, classification codes, and keywords. The goal of bibliometrics research is to determine the composition and trends of digital library literature. Authorship patterns, author productivity, prolific authors, core journals in the field, indexing terms frequency, Bradford distribution of articles, year-wise distribution of articles, language-wise distribution of articles, and country-wise distribution of journals are among the main goals of the bibliometrics study (Singh, 2007). Traditionally, bibliometrics has been connected to the quantitative evaluation of written texts. It alludes to a range of regularities with diverse shapes that are drawn from various fields. Despite the fact that bibliometric distributions look very different from one another, they can all be thought of as variations on a common regularity, which allows us to talk about bibliometrics laws and how they manifest. The most well-known laws addressing significant occurrences or "regularities" in science communication are Bradford's law of scattering, Zipf's law, and Lotka's law. It is, for example, focused on retrieval in information science, libraries, and scientific policy applications. Unfortunately, there is ambiguity surrounding the terms "bibliometrics," "Informetrics," "Scientometrics," and "Technimetrics," and there is variation in their usage (Wormell, 1998).

The ease of data availability and the numerous opportunities for mapping relationships between authors, institutions, geographic locations, and funding sources account for the popularity of bibliometric techniques (Rangnekar, 2005). Research quality may undoubtedly be evaluated using bibliometrics, in particular the degree to which published research is cited by other published research. A new metric system that is plagued by the

enduring nature of the old will always be evaluated more critically than a metrics-based system that lacks any prior results to compare it to. Bibliometrics is a unique field that has long piqued the curiosity of academic information management departments. It frequently defies easy comprehension and has little bearing on actual information practice. However, if speaking for the fictitious "typical librarian" is acceptable, then the average LIS practitioner probably possesses some basic and helpful insights into practical applications of bibliometrics and citation analysis; using bibliometrics as a deciding factor at a more specialized level is not warranted (Joint, 2008). Bibliometrics is a popular assessment technique that has been used on many different topics over the years. It provides academics with quantitative data on journal frequency, use, and impact on the field, which helps librarians in collection construction and evaluation. In addition, it helps researchers discover the characteristics of subject literature. Librarians can more easily make decisions about acquisitions and filtering out remote storage with the use of this data. One weakness is that it takes a lot of time to complete. In general, bibliometrics' second drawback is that it merely provides the user with a string of numbers, which might not accurately reflect a journal's significance and influence on an area of study (Lawe, 2003). It is necessary to conduct a thorough survey of the cancer literature by using the technique of bibliometry, which combines various sub-fields of concern, in order to provide working scientists with all relevant and authentic data on the subject. Bibliometric analysis of cancer articles may provide some useful data that will not only help the librarians and information scientists of the concerned field but also the working specialists of this field (Ghosh and Sengupta, 1989). Bibliometrics is a rapidly developing field of study that brings together scholars from several fields of human knowledge. The word "bibliometrics" is rather new, having only been created in 1969. It is located on the boundary between the physical and social sciences (Sengupta, 1990). The collection and analysis of data on books and journals to show historical movements, ascertain the general usage of books and journals in numerous local contexts, and ascertain the use of books and journals for national and international research (Raising, 1962). As stated by Pritchard (1972), "measurement is the common theme through definition and purpose of bibliometrics" and "the things that we are measuring when we carry out bibliometric study are the process variable in the information transfer process," bibliometrics aims to shed light on the nature and course of development of descriptive (insofar as this is displayed through written communication) means of counting and analyzing the various facets of written communication.

Bibliometrics offer insights into the organization and dissemination of knowledge. They also highlight the fact that bibliometric studies fall mostly into two categories: (i) studies that are descriptive and (ii) studies that are

behavioral. According to Nicholas and Ritchie (1978), descriptive studies are those that describe the qualities or attributes of a work of literature, whereas behavioral studies look at the connections that arise between different literary elements. The field of bibliometrics encompasses the analysis and description of literature as well as the study of relationships within it (such as citation studies). These descriptions usually center on recurring themes, such as authors, books, journals, subjects, or languages (O'Connor, 1981). It is a quantitative discipline that splits its focus into two main areas: (i) evaluative bibliometrics (like literature usage count) and (ii) descriptive bibliometrics (like productivity count). There are three more categories into which the descriptive bibliometrics, or the production count, can be separated: (i) geographic; (ii) time period; and (iii) disciplines. The literature usage count, or evaluative bibliometrics, can be further separated into two categories: (i) reference count and (ii) citation count (Stevens, 1990). It would be feasible to approach a subject's literature for bibliometrics research as more than a "black box" that yields only basic statistical facts. One day, bibliometrics may well belong to the field of epistemology (Small, 1980). A well-established field for the quantitative analysis of the numerous facets of a specific subject's literature is bibliometrics. It is a subfield of information theory that uses quantitative analysis to determine the characteristics and behavior of recorded knowledge. The knowledge that has been documented can be found in books, journals, etc. A corpus of theoretical knowledge and a set of procedures based on bibliographic data elements have been generated by bibliometrics research in practically all subject disciplines (Sahoo, 2001). The use of statistical and mathematical techniques to bibliographical studies is known as bibliometrics. Etymologically speaking, bibliometrics is formed from the Latin and Greek words *biblio* and *metric*. In 1948, Dr. Ranganathan gave an explanation of the term "librametric." In 1969, Alan Pritchard coined the word "bibliometric," which quickly gained traction (Kogamuramath and Pothare, 2001).

According to Satish and Kabir (2001), bibliometrics is the study and assessment of patterns in all types of recorded information and the producer. It is a well-established fact that bibliometric techniques are used these days to choose the most important journals in every subject of expertise. An accurate and significant method for choosing the most significant journals in a given subject has been made possible by statistical analysis of the hundreds of bibliographies found at the conclusion of the scientific communications in the source journals chosen for that topic. Sengupta proposed an objective method for citation analysis and created a new process for choosing source journals for bibliometric research, which was first introduced by Gross and Gross in the second decade of this century (Sengupta, 1980). Garfield concludes through bibliometric analysis that Indian research has not yet attained the level of impact and quality required by international norms. Science Citation

Index (SCI) data served as the foundation for Garfield's research (Kumari, 1990). Recent advancements in the fields of science of science, library and information science, and science may be investigated. The fields of informatics, bibliometrics, and scientometrics are supposedly responsible for these advancements.

There are currently thousands of papers in the continuously expanding literature in various scientific fields. The abstracting journals of different themes show the state of affairs. One could argue that these "metrics" are quickly developing a methodology or set of methods, making them contenders for consideration as the foundation of a new discipline of science (Price, 1976; Garfield, 1970; Small, 1980; Lawant, 1981). According to Pritchard (1969), "bibliometrics" refers to a collection of statistical and mathematical techniques used to analyze the bibliographical features of documents. A developed scientific subdiscipline called "bibliometrics" analyzes document bibliographical properties using a variety of statistical and mathematical techniques. if bibliometrics is integrated into library and information science methods as a structural component (Voverine, 1994). Bibliometrics is the study of documents and trends in scholarly publications via the application of statistical and mathematical methodologies. Information science's fundamental methodology is this (James, 2008). To put it simply, bibliometrics is the measurement and analysis of the publication patterns of authors and all written forms of communication (Potter, 1981). In the field of library and information science, bibliometrics has drawn the interest of many. Bibliographic information measurement holds the potential to yield a theory that will address a wide range of real-world issues. It is argued that one may evaluate authors, evaluate fields, and manage collections using patterns of author productivity, literature growth rates, and related statistical distributions. However, it's not obvious if bibliometrics is just a technique or if its capacity to explain and forecast phenomena passes muster as a theory (O'Connor, 1981).

Until a more comprehensive, unified theory is created, the practical bibliometric methods helpful to library administrators will not be widely applied. The use of one-dimensional descriptions of consistency in journal citation patterns or author productivity is another drawback of bibliometric distributions. There is now a substantial body of literature on bibliometric models. The early models were put forth because to their apparent ability to fit a particular empirical frequency distribution graphically. Only years later did other writers observe the similarities between their functional structures, which in many cases were identical. There was an abundance of publications that altered, expanded, clarified, applied, and generalized the original model in each instance, depending on the topic field they were applied to. Nearly all bibliometric models link two variables in a straightforward functional way (Hubert, 1981). According to Price, his model is rather generic since it offers a

solid conceptual foundation for empirical laws including the Zipf's law for literary word frequencies, Bradford's rule for journal use, the Lotka's distribution for scientific productivity, and the Pareto law for income distribution. Consequently, Price (1976) argues that it is an underlying probability process that has broad applicability and versatility in the social sciences.

Bookstein tried to develop an expression for the anticipated number of authors in a discipline authoring papers within a certain time frame, taking into account social factors influencing productivity and other constraints (Price, 1970).

## **2.4.1 Bibliometric Laws**

### **2.4.1.1 Bradford's Law (1934)**

Bradford's 1934 law, which describes the journal's scattering pattern in the field of applied geophysical lubrication, provides the foundational theory of bibliometrics. The law of scattering describes the dispersion of papers in a discipline or issue area, usually journals. Bradford's law is based on the observation that journal papers on a given subject exhibit a specific pattern that is shared by a significant number of articles (Bandyopadhyay, 1999).

Bradford's mathematical model was used to measure the scattering of bibliographic data (Bhattacharjee, 1975; Afolabi, 1983). Bradford's law has been the subject of both theoretical and empirical research in the literature. Each of these elements is a growing and cohesive field of scientific study. Bradford law states that three zones may be identified so that each provides one-third of the total number of relevant papers if a large collection of articles is sorted in order of decreasing productivity of journal (source) related to a particular topic (Singh, 2007). The law embodies a mysterious phenomenon. On the one hand, it may be expressed by a relatively simple mathematical formula and is easy to see in real-world settings (Garfield, 1970).

### **2.4.1.2 Lotka's Law (1926)**

Author publication counts are easily obtained and highly reliable; that is, the quantity of contributions is correlated with the law. Lotka's 1926 journal paper, "The frequency distribution of scientific productivity," contained the first formulation of what is now known as Lotka's law (Potter, 1981). Since then, it has been shown that data from a variety of drastically different historical periods and disciplines suit Lotka's "inverse square law" of scientific productivity (Singh, 2007). Thus, the legislation provides a basic theoretical foundation for authorship-related bibliometrics research.

### **2.4.1.3 The Zipf's Law 1933**

"Describing word frequency ranking" is the process of using an extended empirical law to establish a relationship between a word's rank and its

frequency of occurrence in a long text. As a result of the words being grouped in decreasing order of frequency, every word in the text has a rank that is inversely related to how frequently it occurs. Zipf's law is a phenomenon that is somewhat puzzling in bibliometrics and, to a lesser extent, in quantitative linguistics; mathematicians believe in it because they believe linguists have established it to be a mathematical law, and linguists believe it because mathematicians have established it to be a linguistic law (Gustav, 1966; Wyllys, 1981), according to statistician Gustav Herdan.

## **2.5 Citation:**

A reference to a text that indicates the document it may be located in is known as a citation. The citations are more significant than is typically thought. In bibliographical works, citation is a crucial tool. Compiling a bibliography on a current topic is as simple as writing down the citation (or reference, as it is commonly called) provided at the conclusion of each pertinent article and sorting them according to a predetermined order (Bose, 1986, p.90). According to Leydes Dorff, there are many settings for citation analysis, but no comprehensive theory of citation itself has been developed. Garfield uses the term "citationology" to refer to the study of theory and practice of citation and citation analysis. According to Schneider (2004), citations are complicated units, and the citation process is also quite complex. Citations serve as a repository for archival knowledge, from which writers extract preexisting concepts and subsequently produce original research ideas. This information may be shared both inside and between disciplines (Sharif, 2004). It is simple to modify impact factors and the number of citations (Gorman, 2005). The acknowledgement of previously published research is a crucial step in the research process. A bibliographic citation serves the purpose of establishing a connection between the citing and referenced item.

Some academics have defined the linking of concepts or ideas through bibliographic citations as intellectual transactions or the official recognition of one's "intellectual debt" to prior information sources. The thoughts or ideas that the writers discuss are represented by bibliographic citations (Waytowich and Onwuegbuzie, 2006). The usefulness of using impact factors in selection processes is called into question because, although there may be a strong correlation between high local use and impact fractions, this correlation breaks down as local use of specific serials drops. According to some, local use study results are a more reliable source of information than citation data for making selection decisions (Altman, 1999). Numerous studies have examined how a scientific paper's citation count decreases with age. One challenge is that the rate of citation decay varies on multiple factors: the journal or journals picked (i.e., the coverage of the subject), the particular field chosen for investigation (a physical science may have a different citation

decay rate from a biological science). The specific nation or language may also have an impact on the rate of deterioration (Meadows, 2004). Citation context studies, which use "citations as proxies," have attempted to classify or taxonomy cited works based on text analysis in order to determine the inter-document relationship when reference citations are present, whereas content analysis has attempted to characterize the cited work by examining the semantic content of the citing papers. Citations of the affirmation type, assumptive type, conceptual type, contrastive type, methodological type, notational type, perfunctory type, and persuasive type are the categories that Garzone and Mercer's classification of the citations based on functions uses (Bormann, 2008).

A total number of citations, their age, language, format, and the number of authors per citation are the five categories in which citations and references will be measured. Citation studies have a very basic concept. Scholarly references to one another's work are an integral element of the process. Thus, one could anticipate that a review of references would provide insight into the research practices of academics (Lowe, 2003). The data material shows two different correlations between the JIFs (Journal Impact Factor) of the citing and cited publications. The first concerns the JIF of the journal that is mentioned, while the second concerns the distinction between the JIFs of the journal that is cited and the one that is cited (Frandsen, 2005). When assessing the intellectual output of scholars, departments, entire universities, or even the entire country, citation should be utilized with caution (Li, 2003). In bibliometrics, citation is frequently employed. Scholars typically "cite" the theories and works of early adopters. We refer to this conduct as "citation." A citation consists of two items: the source work and the referenced work. Citation analysis can benefit greatly from the information gathered about cited works (Chen, 2004). Citation analysis that offers valuable direction for the library's collection development process. Citation research determines a work's half-life, which is helpful in determining how long it should be kept in a library and for what purposes (Barroah and Sharma, 1999). Citations are useful in identifying the key figures in a field of study. According to Kretschmer (1994), citations are a sufficient indicator of the caliber of scientific research or the intellectual impact on it.

### **2.5.1 Textual characteristic of citations**

The referenced reference's textual features in order to pinpoint important markers of document relatedness. The placement of the citations, how frequently the references were mentioned, and how the citations were handled were all potential red flags. The "introduction" portion of the citing articles had the largest number of citations, according to an analysis of their location. When citation categories were coded according to Moravesik and Murugesan's scheme, it was discovered that while organic citations were

mostly found in the article's middle section, the largest group of citations was precisely positioned in the opening section of the text. It has been demonstrated that the value of citations is related to the frequency of a work being cited in text in addition to location and functional type. Voos & Dagaev, Herlach, and Bonzi discovered that the type of citing article, frequency of work cited text, sources of cited work, and source of citing work were all reliable predictors of how a citation was employed in the citing document (Tang, 2008).

### **2.5.2 Citation Database**

Citation databases contain critical information about technical publications, such as article type, language, references, journal name, author(s), title, and keywords. Citation databases can provide insightful information about new research trends by analyzing the correlation between cited publications and sources. The challenge lies in applying effective knowledge discovery techniques to extract relevant information from the citation database.

We propose two approaches to integrate semantic understanding into the citation database retrieval process for relevant publications: the first approach combines knowledge-based methodologies and an automatic Saurus conceptual clustering with artificial neural network (ANN) learning capabilities; the second approach explores the use of coward analysis to create relationships between papers in order to categorize them (Hui, 2004).

### **2.5.3 Assessment of databases with increased citations**

When evaluating citation enhanced services for bibliometric objectives, it is important to consider the two ways that bibliographic databases can support bibliometric analysis: first, as a source of data; and second, as a platform that provides analytical tools for bibliometric analysis. Both contributions are hampered by a number of methodological and technological problems, including insufficient coverage of the academic literature, inconsistent and erroneous data, and insufficient resources for browsing, searching, and analyzing data (Neubaus and Daniel, 2008).

### **2.5.4 Citation Impact**

Publications published in open access journals are not always recent. Only a small portion of recent content from several well-known magazines is available online; most content may only be accessed via conventional means. Since switching to open access publishing, several reputable journals have also made much older content available. The significance of their work is a crucial consideration for all writers. Authors will be more inclined to employ open access channels if they can observe an increase in the effect of their work as a result of it. Electronic citations, which are similar to bibliographic citations in evaluating the influence of published works, offer a new way to measure the impact of papers that are accessible through online journals. The

"citation impact"—a gauge of the value of particular articles—is determined by the correlation between citation counts. One way to gauge an article's influence in a certain field is through its citation impact. A frequently read and quoted paper suggests that it has influenced other academics working in the same field (Turk, 2008).

### **2.5.5 Citation error**

The investigation also identified a few characteristics of students who make citation errors. Specifically, the canonical correlation analysis revealed that graduate students with relatively high levels of both self- and other-oriented perfectionism tended to make the fewest citation errors and produce reference lists that resembled the publication manual of the American Psychological Association. The data also revealed that students with the highest course load in their graduate programs usually receive the lowest marks for the quality of their reference lists, while students with the lowest expectation levels tend to make the most citation errors. Moreover, since expectancy is a sign of self-efficacy, it's possible that social cognition theory in general and self-

### **2.5.6 Citation Analysis**

Citation analysis is one of the bibliometrics techniques that are used to count the citations provided at the end of each article from a set of primary journals in order to determine which core journals are relevant to a certain subject. After that, a number of research projects that focused on citations in books, main journals, dissertations/theses, and reviewing journals were completed. Citation analysis is an important research tool for understanding the topic, as we examine its direction and organization. It evaluates the value of documents, the connections between related documents on the topic, and the connections between authors and the materials they write.

A citation is a work referenced from a more recent publication; the document that is referenced is known as the referring document.

The cited document is the one that gets the citation. Citation analysis, also known as direct citation analysis, is the process of calculating how many times a specific document has been cited during a given period of time following its publication. According to the conventional interpretation of the citation function, a document's impact or influence on the citing literature can be gauged by how frequently it is cited. More advanced techniques including cogitation analysis, literature mapping, bibliographic coupling, and co-word analysis are derived from citation analysis. By combining statistical analysis with an examination of word use frequencies, reference and citation patterns, and other relevant data, these techniques, both alone and in combination, enable the discovery of information patterns. To find highly cited documents, citation analysis is used (Schneider, 2004). The bibliometrics indicator journal

impact factor (JIF) in particular, as well as citation analysis in general, are important for the impression of quality and reputation in the sciences. It has been found that citation

Citation analysis is widely used by academics, policymakers, and publishers to support claims about the caliber or significance of research, and because analyses are seen as so important, several journals attempt to manipulate their JIF rankings. Despite the dubious objectivity of such studies, they are often used for evaluations, so it is important to make an effort to qualify them (Farnese, 2005).

The exploration of the connection between the cited and citing materials, or "the links expressed in the references," is the main subject of analysis (Tang, 2008; Sharif, 2004). To fulfill "useful purposes" and advance the goals of the research environment, citation effect analyses and studies are conducted (Wormell, 1998). Studies on web connectivity can be based on the citation analysis that has been provided. Citation analysis of documents is not a popular practice in Pakistan; just a few studies utilizing this technique can be found (Sharif, 2004). Citation analysis is a crucial tool for tracking academic research, assessing its influence, and defending funding and tenure decisions. By tracing an article's evolution and influence throughout time, a researcher can look back at the references an author cites and forward to the author who cites the piece (Bauer and Backlash, 2005). This legacy serves as the basis for the use of citation analysis to research appraisal. Its goal is to calculate the various ways that scholarly activity contributes to the growth of knowledge. Citation analysis has shown to be a valuable tool for evaluating research. While utilizing Thomson Scientific's citation indexes for citation analysis offers a clear foundation for evaluating research performance, it is bibliometrically limited to a small portion of the journal literature. The potential to expand the data source for conducting citation analysis, especially to include other publication types of written scholarly communication like books, chapters in edited books, and conference proceedings, is made possible by the availability of citation data in other bibliographic databases (Neuhaus and Daniel, 2008). One approach used by libraries to assess their holdings and create a useful journal collection is citation analysis (Aina and Mabandoun, 1997; Asundi and Kabin, 1996). The foundation of citation analysis is the total number of citations an article or monograph has received during a specific time period. Prior to the introduction of the science, social science, and arts and humanities citation indices, citation analysis was a difficult task. Despite being 25 years old, Garfield's groundbreaking work on citation analysis offers a reliable conceptual and historical grasp of the subject and all of its applications (Garfield, 1979). Numerous people have criticized citation analysis, with some concentrating on the notion that it may be incorporated into the Research Assessment Exercise (RAE) procedure (Norris and Oppenheim,

2003). Topic retrieval, which is based on straightforward yet elegant principles – that is, if an item references an earlier piece, there's a good chance the latter article and the earlier article have a topic relationship – has always been the primary use of citation analysis data for the LIS profession. Citation analysis indicates that it is a somewhat functional machine-driven system. However, it should always be utilized as a supplementary tool to human-driven information retrieval methods. In the government's vision of the new "metrics," research income measures and citation analysis were to be the primary measures and citation analysis was to be the primary measure of research quality. This is also how we should naturally expect bibliometrics to be used in other applications, like research assessment (Joint, 2008).

Citation analysis is the process of carefully examining the literature in a field or subject to identify its features. The underlying tenet of it is that "the material's actual use is indicative of its relevance to current research." A citation analysis can proceed in one of two ways: (i) toward the theoretical, which is helpful for comprehending how the literature has developed as it relates to bibliographic and budgetary matters, or (ii) toward the specific, which enables experts in a given field to learn about the specifics of their field (Lowe, 2003). Citation analysis, citation analysis in general, and the bibliometric indicator are rarely used as beginning points for in-depth research of the rated science. In science, the Journal Impact Factor (JIF) holds significant influence over the perception of quality and prestige. In fact, citation analysis is seen so crucial that some journals attempt to maneuver their way up the JIF scale (Farnese, 2005). Citation analysis is a useful but sometimes underutilized method for developing and assessing collections. Citation analysis is a process that counts and ranks the number of times a document appears in an indexing tool, bibliographies, or footnotes (Baker and Lancaster, 1991). Nationally collected citation statistics have been used for citation analysis, and suggestions have been made to apply the results for the establishment and assessment of library collections (Bensman, 1985; Broadus, 1985). The library's journal holdings should not be ascertained just from citation analysis data. The approach has drawbacks; hence convergence of data from all accessible sources should be used to get the greatest outcomes for collection development (Sylvia, 1998).

It may be possible to ascertain the ideal composition of special and general collections by using citation analysis as an evaluation tool to calculate citation frequency and impact factor. This can be used as a reference to find out about science journal back files, binding, and retention policies (Garfield, 1978). Citation analysis of theses and projects completed by students is helpful in assessing how references are used. University libraries' collections (Okiy, 2003). Citation analysis helps researchers understand research patterns, bibliographical qualities, and current advancements in their subject areas (Chen, 2004). Due to the exponential expansion of available literature, rising

subscription fees, space constraints, and declining budgets, library managers are under pressure to establish collection development and maintenance policies that maximize available funds and resources while simultaneously satisfying the needs of both present and future library patrons (King, 1976). It was discovered that the annual growth rate of scholarly journals was 2.6%, and that the average annual increase in subscription prices was between 10% and 13% (Subramanyam, 1975). One branch of bibliometrics that studies the connections between cited and citing contributions is citation analysis. Garfield provided fifteen reasons for citing any document; however, there are some limitations with citation analysis: (i) a substantial amount of data is needed to draw a firm conclusion; (ii) the raw data is collected, processed, and analyzed manually, which could compromise the accuracy of the result; (iii) whimsical titles in citations caused significant difficulties in determining the subject matter; (iv) each timely reference is counted as one citation; if the same reference is made again using "ibid" or "op.cit," it is counted once more; and (v) all sporadic papers are treated as unpublished papers due to their nature (Satish and Kabir, 2001). The type and traits of the literature mentioned in many disciplines can be studied using citation analysis (Balasubramanian and Bhaskar, 1984). The creation of novel methods and metrics, the application of novel instruments, and the investigation of various analytical units have all contributed to the advancement of citation analysis. Citation analysis studies have increased rapidly in number and variety as a result of these trends (Smith, 1981). The simplest method is a citation count, which counts the number of citations a document or group of papers have gotten over time from a certain set of citing documents (Pinski and Francis, 1976). Bibliographic coupling and co-citation analysis are two methods that have been developed to find texts that are likely to be closely related (Kessler, 1963).

### **2.5.7 The Goals of Citation Analysis:**

The objectives of the citation analysis are as follows:

- (i) To determine the distribution of citations among different bibliographic forms,
- (ii) Examining the authorship pattern,
- (iii) To identify the journal's central idea,
- (iv) To determine the regional distribution of the citations,
- (v) Examining the breakdown of citations by subject,
- (vi) To ascertain the age of the mentioned works,
- (vii) Where monographic citations are included in national and international publications,

- (viii) An analysis comparing each statistic listed in the journal above,
- (ix) Use citation analysis to assess researchers' access to information
- (x) Assess the extent to which the available information resources meet the study's defined research criteria.
- (xi) Analyze dispersion in relation to the publication site,
- (xii) Ascertain how languages are distributed,
- (xiii) Make a ranking list for the author in question.
- (xiv) Determine the citation half-life of the literature using the references in 120 and
- (xv) Produce a model journal citation index (Farnese, 2005; Doorway, 2001;

## **2.6 Measurements of Scientometry:**

The term "scientometrics" refers to the production and communication of science; it was introduced in 1960 by the groundbreaking work of "Derck de Solla Price," "Mauric Goldsmith," and "Eugengent." The two main sources of data used in analysis are the Institute of Scientific Communication (SCI - Science Citation Index) and the Social Science Citation Index (SSCI - Social Science Citation Index). It is commonly known that using Scientometrics to evaluate an individual requires greater caution than using bibliometric analysis to analyze nations, organizations, or groups. This correlation between citation impact and peer review helps to increase the reliability of evaluation studies. (Wormell, 1998). The quantitative side of research, scientific communication, investigations, and science policy studies is known as scientometrics, a recently developed area that looks into quantitative components of science (Conference Report from Library Hi Tech News, 2001). A transaction matrix can be used to illustrate a variety of scientometrics data types. Each cell in the matrix represents the degree of transaction between the row and column items, and the matrix is composed of a set of items that are assigned to each row and column in every scenario (Kretschmer, 1994).

Scientometrics is defined as an amalgam of quantitative (statistical and mathematical) methods used to study scientific processes (Nalimov and Mulchenk, 1969). A developed structural component of the science of science approach is scientometrics. One example is the range of statistical and mathematical techniques used to analyze the quantitative features of research as an industry (Veverience, 1994). Nalimov and Mulchenko (1969) proposed scientometrics in their 1969 book "Scientometrics: the investigation of science as development of information process."

## **2.7 Informetrics:**

Informetrics is a catch-all word that encompasses all quantitative information studies, including bibliometrics, international concepts, science search databases, and science citation indexes. The use of informatics techniques to address chemical problems (Gasteiger, 2006). Improved bibliometric methods are applied not only to scientometric studies and research evaluations of science and technology (SST), but also to the analysis of their mutual, societal, industrial, and other specific relations. The term "informetrics studies" refers to the new approach taken by CIS - Centre for Informetric Studies - to the scientific study of information flow. Additionally, CIS has expanded the scope of traditional bibliometric study to include non-scholarly communities that generate, disseminate, and utilize information (Wormell, 1998). The intriguing concept of applying informatics techniques to the World Wide Web (www) has been researched by CIS researchers, who have also begun to establish the foundation for a new field called "web metrics." Almond and Ingwersen (1997) presented a feasible approach for conducting general informatics analysis on the World Wide Web. The method included case studies analyzing websites from Denmark, Norway, Sweden, and other countries, as well as analyzing their online visibility in relation to pertinent positions in scientific databases. Informatics studies the quantitative characteristics of information and is interested in the regularities that underlie the use and creation of information (Ruthven, 2003).

The laws or generalizations in the information process and creation, such as Lotka's law, Bradford's law, and Zipf's law, are outlined by Wolfram as the fundamental building blocks of informatics. These mathematical formalizations are not specific to informatics, as Wolfram pointed out. The more recent fields of cybermetrics and webometrics, as well as the more established discipline of bibliometrics, are combined into informetrics (Conference Report from: Library Hi Tech News, 2001). German scientists Blackert and Zygel proposed the term "informetrics" in 1982 as a recently established field of study that combined theoretically grounded mathematical and technological knowledge with applied information operations. Informetrics is an emerging field within science. The issue of how to formulate a study object based on the notion of "information" remains unresolved (Voverine, 1994). Informetrics encompasses a larger segment of society in addition to a wide range of information and knowledge resources. According to James (2008), informatics studies represent a novel method for studying the creation, sharing, and application of information in science.

## **2.8 Distribution based on structure**

The literature that is referenced in the journal is published in a variety of formats, including books, journals, theses, and conference proceedings. To determine the most common literary form, form-related data was gathered

from the source data and tallied. The most common format in which the information is cited has been determined by analyzing the form-wise distribution of citations. Researchers and information scientists will find the study useful in determining the most common format in which the material was quoted in the concept. According to form-wise distributions of citation analysis, the majority of citations in many studies come from books; less citation come from journals; citations to other types of documents are then provided; citations to online literature are also provided. The number of citations for it is rising daily (Haridasan, 2007; Doorway, 2001). Books, patents, proceedings, reports, theses, and reports are not the only materials that are cited in scientific studies (Barroah and Sharma, 1999; Lokhanda, 2007; Satish and Kabir, 2001; Deshpande, 1997).

## **2.9 Authorship Pattern**

The distribution of citations according to the number of authors in a given discipline is known as the authorship pattern (Doorway, 2001). The greatest number of publications contributed by a single author suggests that the subject is still relatively new and developing (Chen and Chen, 2005). The highest numbers of citations are found in publications with one or two authors, while the lowest numbers are found in publications with three or more authors (Sharif, 2007; Barroah and Sharma, 1999). The number of single-authored studies is greater than that of multi-authored studies (Sahoo, 2001; Kagamuramath, 2001; Kannappanavar, 1991; Afolabi, 1983; Deshpande, 1997).

## **2.10 Geographical distribution**

Bibliometrics states that the value of the publication location is the best indicator of a document's nationality (Singh, 2007). The geographic distribution of citations by country indicates that the distribution of foreign citations is greater than the distribution of Indian citations (Balasubramanian and Bhaskar, 1984), and the data show a geographic link where journals tend to cite journals from their own region more frequently (Frandsen, 2005) after adjusting for self-citations and the geographic origin of the cited journal. The geographic location of each magazine, or the location of publishing, is used to create the geographic variables.

## **2.11 Distribution according to Chronological**

Citations are references added by authors to their articles. Over the course of the study period, this creates a sequential order. Some citations are arranged according to the time period in which the cited articles were published. If a study is long-term, the journals are divided into years. Periods of five, ten, and sometimes twenty years are used for periodicity. Based on a chronological distribution analysis (Singh, 2007; Kumar, 1984; Lokhanda, 2007; Pillai, 2007; Sahoo, 2001; Kogamuramath, 2001; Mahapatra and Kaul,

1992; Deshpande, 1997; Balasubramanian and Bhaskar, 1984; James, 2008), the mentioned sources were scattered over different time periods.

### **2.12 Distribution by language**

Language is a communication medium; authors employ a range of documents for their work; the choice of document depends on a number of factors, such as the subject matter, the publishing year, the location of origin, the working methodology, the language, and the accessibility of source material.

Mainly research, English is the language of teaching and study, especially at the higher education level, and the majority of scientific material is produced in this language.

A language distribution investigation reveals the most common language used in journal citations of related literature. Knowledge scientists and researchers can both benefit from this knowledge. Haidasan (2007) states that English is the language that predominates in all literature. English was the preferred language of scientific scholars (Beena, 1997; Deshpande and Rajyalakshmi, 1997; Hasso, 1984).

### **2.13 Author Ranking**

Professionals can benefit from rank lists of authors in a variety of ways, including determining an author's popularity or the level of his work, choosing reading materials, and determining acquisition strategy. It is also helpful to researchers to know which documents are well-liked because it shows how important the author is and how much effort they have done in a given topic. Author ranking is crucial for providing guidance to scholars, professionals, and users. The number of citations an author will receive in comparison to other writers is one risk associated with author ranking; it neither explains nor supports the reasons why an author receives more or fewer citations than another. This effort does not aim to advance the ranking (and subsequent recruiting and promotion decisions) system based on citations. Citation data should, in no way, be the deciding factor in significant decisions; at most, it should be one of several inputs (Feitelson, 2004). Authors rank each other in order to become aware of the notable figures in the field whose writings they utilize to hone their ideas about a certain subject (Haridasan, 2007).

### **2.14 Journal Ranking**

Journal rankings reflect the journals' value and significance within a given field. This has an effect on every academic area. It is utilized in a broad scientific setting as a method for evaluating (researchers and research effort) in order to gain an overall synthetic perspective of impact factor values through the analysis of journal rankings. Solari and Magri identified the core

journal regarding journal rankings. According to Frandsen (2005), the list is only helpful if it is assumed that all of the journals included in the ranking are similar. Making a list of the journals that the author cites the most is helpful (Sharif, 2004). There are two methods for applying citation scores to rank the journals (i). Journals were ranked (ii) based on user opinion; those having a high citation count were deemed to be of high use and were ranked as such. User ratings were used to rank the journals, with the highest scoring journals appearing at the top (Dulle, 2004). A journal's ranking is required to determine which are the most productive journals that are used as references for additional research on the topic. Research researchers and librarians can both benefit from this information (Haridasan, 2007; Barroah, 1999). When it comes to reviewing and revising their acquisition list, librarians, information scientists, and document lists can all benefit greatly from having access to a ranked list of journals on a certain subject that indicates their productivity. However, measuring the bibliographical scattering of periodicals on a certain topic would show how much more periodical coverage needs to be expanded in order to attain the best possible bibliographical control (Bhattacharjee, 1975; Deshpande, 1997).

### **2.15 Self-citation by the author**

Self-citation is one common occurrence in citation behavior. It shows the connections and relationships between various publications. Author ranking studies often show the rate of self-citation (Tagliacozzo, 1977). Only writers who are concerned engage in self-citation. It is also suggested that the citation analysis study should properly take into account the quantity of self-citations provided in an article, since older writers are more likely than younger ones to obtain more citations from their earlier works.

Kaul (1992). The frequency of previous publications in the same journal is the definition of self-citation; it is less prevalent than citations to other authors (Balasubramanian and Bhaskar, 1984).

### **2.16 Journal self-citation**

Journal self-citation is a fascinating bibliometric metric that provides insights into the popularity of the journal among its contributors and readership. Journal self-citation is the term used to characterize the practice of a journal quoting itself. Depending on the perspective from a journal (referencing) or to a journal to which citations can be supplied, the pattern of journal self-citations is a component of both the citation identify and the citation image. Practical considerations dictate that self-citations peak earlier than external citations in a journal, which is why both elements will be covered here simultaneously. Journal citation rates decrease with aging (Mahapatra and Kaul, 1992).

## 2.17 Informetrics

A significant portion of the LIS community has not yet realized the primary benefit of citation indexing, which is the ability to eschew the use of common linguistic forms like title, keywords, or subject heading. This is evident from a review of the 40-year history of the ISI citation databases. The symbolic significance that citations play in describing the content of articles in a crucial area of information retrieval: citation indexes, when combined with a variety of natural language phrases, can significantly enhance thorough literature searches. Citation indexes make it possible for a researcher to find later, and particularly more recent, descendants of specific publications or books. Citation indexes are a useful tool for searching the literature since they can retrieve publications that are connected to the citing references as well as those that cite important works (Wormell, 1998). The citation indexes generated by Thomson Scientific (formerly the Institute for Scientific Information) are the primary sources for citation analysis. The main justification was citation indexing, in addition to their multidisciplinary nature. Why this service had a special place for many years among bibliographic databases. However, depending on the industry, Thomson Scientific is no longer the only provider of citation-enhanced data. A number of database providers have realized the benefits of citation indexing in recent years, and as a result, they have added cited references by hand to a portion of their records. There are certain limits to Thomson Scientific Citation Indexes that are important to consider when using citation analysis as a method to evaluate research performance. The restricted coverage of the citation indexes is one of these constraints. Thomson Scientific processes a limited number of periodicals for its citation indexes, as previously mentioned. Even while these peer-reviewed journals with the highest impact are often the most accessed, they still only account for a small portion of the documented body of scientific work. According to Neuhaus and Daniel (2008), coverage thus refers to how much of the written scholarly literature in the topic is covered by the citation indexes. Citation analysis originated as a widely used tool for evaluating research success in the mid-1950s, when Garfield introduced the revolutionary idea of citation indexing. Systematic analysis of the impact and influence of scholarly work as well as of trends in science became available with the introduction of the science citation index (SCI), the social sciences citation index (SSCI), and the Arts and Humanities Citation Index (A&HCI) by the Institute for Scientific Information (Garfield, 1979). Since 1989, the Chinese science citation database (CSCD) has been created by the library of the Chinese Academy of Science (Meng, 1995). The Chinese Social Science Citation Index (CSSCI) is produced by the Hong Kong University of Science and Technology and Nanjing University in Mainland China (Su and Han, 2001). The impact of these citation index databases on research is significant. Citation data is used by certain academics to assess the

value of research fellows, journals, or institutes. Some use citation data to examine the organization of a particular field of study. Certain individuals utilize citation data to assess research patterns in the past and forecast future trends (Garfield, 1979).

### **2.18 Distribution according to form:**

The co-authorship index (CAI) (Bonilld, 2008) characterizes the average number of authors per document, the intercenter collaboration index (IC), the number of centers per document, and the international collaboration rate (the percentage of papers authored by two or more nations). It has been found that the predominant tendency in several topic areas is collaboration research. Lack of collaboration in a discipline is a sign of scientific underdevelopment or it is an indication that the subject matter and problem of field are more complex (Lowe, 2003; Li, 2003). Collaboration is a sign of scientific achievement and an indication of teamwork, which can occur because there is a recognized theoretical structure about which scientist can easily communicate.

### **2.19 Obsolescence**

Line and Sandison (1974) defined obsolescence as the "decline over time in validity or utility of information." Information theorists that are interested in the evolution, eventual demise, or assimilation of a specific type of information will undoubtedly find this concept interesting. However, practical librarians who manage expanding collections in limited places will also find it interesting. This type of librarian looks to obsolescence studies to assist them in determining which materials to hold onto and which to store or destroy in order to create space for new purchases. Research on obsolescence should ideally lead to a straightforward mathematical formula that could be successfully applied to any and all libraries for remote storage or destruction. Numerous mathematical formulas have been developed as a result of obsolescence study, but regrettably they have not been straightforward or broadly applicable. The most knowledgeable academics are those who acknowledge that obsolescence is a lot more theoretical and complex issue (Gapen and Milner, 1981). The half-life serves as a gauge for discipline development. A journal that mostly refers recently published work is often thought to be superior to one that cites older sources within the same topic field. According to Haidasan (2007), the citing half life, also known as the median citation age, indicates the amount of time that must pass before accounting for the age of half of the bibliographic references that were published in a journal in a given year. In information science and librarianship literature, the word "obsolescence" appears frequently. Many articles inform us that the majority of published works become outdated in a quantifiable amount of time and that an object reaches its half life (i.e., half of its potential usage) in a matter of years. However, the term "obsolescence" is

hardly ever defined, and its applicability, legitimacy, and usefulness are frequently assumed rather than discussed (Meadows, 2005; Ijari & Kannappanavar, 1989). One of the primary focuses of informatics is the study of obsolescence, which has grown in importance as a feature of scientific and technological writing. Most studies on obsolescence concentrate on individual documents, though they can also focus on journals, subdisciplines, or entire disciplines. Since the development of literature and its obsolescence mark the beginning and end of the information cycle, they are typically discussed jointly. Compared to most other areas of informatics, where time is viewed more as a barrier defining which data are collected than as a variable, both are more dependent on time. Growth studies look for patterns in the production of literature or documents throughout time, which is analogous to the expansion of knowledge. Buckland defined obsolescence as a material's proportional reduction in use with age. It is the process by which some materials lose their dependability or usefulness. The term obsolescence, which has a negative connotation, refers to the gradual decrease in usefulness over time. Another way to characterize it is as selective in terms of timing when using articles (Pillai, 2007).

## 2.20 Conclusion

The review of the literature shows how much material was accessible for collection appraisal. The standards or rules for gathering development did not follow any regular pattern.

Citation analysis, the primary bibliometrics approach, is useful for evaluating data collected from library collections, and research scientists and librarians may make use of it for their research as well as collection development.

In the current study, economics collection has been quantitatively assessed while taking published literature into account.

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# 3 DOCUMENTATION RESEARCH AND TRAINING CENTRE : A BRIEF HISTORY

## 3.1 Indian Statistical Institute

The Indian Statistical Institute (ISI) was developed in the statistical laboratory, which was established in Calcutta in the early 1920s by Professor P.C. Mahalanobis. Since April 1932, ISI has been in operation as a learned organization under the Societies Registration Act XXI of 1860. The main objective of the Institute is to advance knowledge in the domains of connected subjects and theoretical and practical statistics. One aspect of ISI's operations is the collection and analysis of information and data, both large- and small-scale, including data pertaining to scientific research. Its contributions are meant to boost management and production efficiency while also supporting planning for social welfare and national growth. The Indian Parliament designated the Indian Statistical Institute (ISI) as an Institution of National Importance and gave it the ability to confer degrees and certificates through the Indian Statistical Institute Act, Act No. 57 of 1959.

ISI has recorded an exceptionally wide range of theoretical and practical research. Among the important topics covered by these are advanced probability, statistical inference, experiment design, sample surveys, multivariate analysis, sociometry, agricultural and psychological statistics, industrial statistics and quality control, meteorological statistics, geological studies, econometrics, economic planning, computer science, documentation, and information sciences.

ISI has established several features of both national and international importance. It is similar to the following in several ways:

- A community of scholars dedicated to expanding the nation's knowledge of statistics.
- An organization for professionals that recognizes statisticians in many capacities.
- A business that may help governmental and non-governmental organizations with fact-finding and analytical projects.
- A postgraduate center for teaching information science and documentation, as well as pure and applied statistics for undergraduates and graduates.
- A publishing house with operations akin to those of university presses at several western institutions.

## **3.2 The creation of the DRTC**

### **3.2.1 An Important professional suggestion.**

In January 1962, the Documentation Research and Training Centre (DRTC) were established in Bangalore by the Indian Statistical Institute (ISI). It formally opened for business as a training and research facility in April 1962. ISI took the decision to establish such a center based on the advice of the 1955 Brussels International Congress of Libraries and Documentation Centers. The proposal was that specific groups should be formed at train document listings. The suggestion reflected the understanding among academics that expanding the scope of the scientific library service to include information and participation in scientific research was a required corollary to the swift improvements in science, technology, and industry. The key driving forces for the development of this suggestion are summed up as follows: An advanced research and higher education institution has to have all the facilities needed for a library, records, and information services. As a result of constant modifications to the factors influencing the service, significant institutions should invariably have the instruments, methods, and procedures required for more effective and efficient information services. These are all essentially the biggest facilities required for advanced information career and service training. Thus, a simple realignment of these facilities can improve the system and serve as the most economical and effective means of concurrently developing information staff. An example of a system like this would offer labor that would both ensure a ready supply for the appropriate institution and function as a national labor pool.

### **3.2.2 Social Forces:**

One may link a center like DRTC to the results of several pertinent social dynamics. Soon after India attained independence in 1947, the Indian government established the Indian Standards Institution. In the same year, it created its Documentation Sectional Committee, whose head was chosen to be Dr. S. R. Ranganathan. The Union Ministry of Education received a recommendation from this committee about the establishment of a National Documentation Center for India. The proposal was addressed to a group of professors and researchers that included Dr. Ranganathan. Dr. Shanti Swarup Bhatnagar, the Director General of the Council of Scientific and Industrial Research (India) in 1949, was intrigued by the proposal. He understood very well how important it was to have documentation services to support the research done in the national laboratories. As a result, in 1950, he granted Dr. K.S. Krishnan, the Director of the National Physical Laboratory (India), and Dr. S.R. Ranganathan authorization to apply to UNESCO for support in setting up a national documentation center. In September 1951, the Indian National Scientific Documentation Centre (INSDOC) was established as a consequence of the talks with UNESCO.

By the middle of the 1950s, a sizable number of industries had developed. The national laboratories are doing more extensive and detailed research. Professional training in documentation was deemed necessary, and industry and research were served by the establishment of specialized libraries. There wasn't a regular institution like that in the country at the time. The efforts of a few prominent specialist libraries led to the establishment of the Indian Association of Special Libraries and Information Center (IASLIC) in 1955. One of its primary objectives was to establish mechanisms for documentation training.

For a long time, Professor P.C. Mahalanobis had been engaging in perspective planning. As the head of the Indian Statistical Institute and a member of the Planning Commission, he understood the need of timely, accurate, and comprehensive documentation for the efficiency of business and research. Upon initially meeting Dr. Ranganathan in Zurich in 1956, Professor Mahalanobis requested that he go back to India in order to establish a research and teaching center focused on documentation. This sort of workforce development center was thought to be required in India to meet the information demands of both industry and research. In 1958, Dr. Ranganathan made a trip to India. He met with Professor Mahalanobis to discuss the creation of the planned facility. In 1959, the Planning Commission also started to show interest in documentation initiatives. The scientists in its working party appointed Dr. Ranganathan as a one-man committee to provide suggestions for INSDOC's progress throughout the third plan term. Dr. Ranganathan proposed six times as much operation and service expansion for INSDOC. There was a strong feeling at this hour that a documentation research and training center was required. Ultimately, in 1961, Dr. Ranganathan was invited to create a documentation research and training center by Professor Mahalanobis once more. He proposed that ISI provide funding for the establishment of this center, and by midyear, the relevant ISI authority had produced and approved a letter detailing the institution's organizational structure.

The creation of DRTC as a Unit of ISI was considered highly significant as it was the first instance of the International Congress of Libraries' suggestion and the Documentation and Information Science Division of ISI's recommendations being successfully implemented. The volume of information service activities conducted in ISI libraries worldwide presents a fantastic opportunity for developing and testing information science methods and processes, including documentation and library science, without incurring any additional costs. It would benefit from all necessary substantial infrastructural faculties. It was also observed that the development of a really scientific basis for information services depended on the application of quantification approaches to the field of information science. It was Dr. Ranganathan who originally used the term "Librametry" to describe these

types of studies after conducting a thorough inquiry in this area. Eventually, statistical procedures include most of the quantification techniques used in the field of information science, and this type of research became known as "bibliometrics." From this vantage point, it was thought that this development would present the most opportunities for multidisciplinary research, including the documentation and information science domains. It also became clear that in the near future, the sector of information storage and retrieval will depend heavily on computers and other data processing technologies. At the time, these amenities were conveniently located within ISI.

An analysis of the evolution of education in this area, which is currently understood to fall under the umbrella of "Information Science," shows that DRTC is the first institution in the world to have full-time research and educational programmers in the subject of documentation. Regular full-time courses were only offered by City University (UK) in 1963 and by Georgia Institute of Technology (USA) in 1964, respectively; this was after the DRTC Course was established in 1962. The emphasis on "Documentation" sets the DRTC Course on "Documentation and Information Science" apart from other similar courses. Later, a number of institutions in North America and Europe added documentation components to their library science course materials and renamed their classes from "Library Science" to "Library and Information Science." In this course, a "Library" is utilized, which includes documentation centers, data centers, information analysis centers, etc.

### **3.3 DRTC'S Objectives and Plans**

The objectives of DRTC are as follows:

1. To carry out, oversee, and facilitate research and development in pertinent fields to promote the growth of information sciences across a wide range of specializations, including documentation and library science. The objective is to become a multi-field specialist in information science.
2. To the establishment of information centers, which include libraries, data centers, documentation centers, and centers for the aggregation and analysis of information? In order to achieve this goal, consulting services are offered for the creation of specific development plans, instruments, and protocols.
3. To disseminate research findings, information aggregation, analysis, and consulting services across a range of information sciences disciplines, including documentation and library science.
4. To develop human resources with the professional knowledge and skills required to effectively and efficiently contribute to the advanced teaching and research of information scientists programmers, as well as to the management of information service systems, centers, and programmers – that is, to the design, development, organization, implementation, operation,

control, and evaluation of these resources. Furthermore, to help this labor force find appropriate job opportunities.

5. To ensure the expansion of the workforce engaged in professional activities.

6. To ensure the DRTC faculty members are growing.

To achieve these objectives, the DRTC's activities have been split among the following programmers:

- 1) Research project
- 2) The advisory services program
- 3) Extension of the Program
- 4) The Program for Publications
- 5) Course in Education
- 6) Employment Information Program
- 7) The postsecondary education program
- 8) The Faculty Development Program

### **3.4 The Objectives of Different Programmers**

The objectives of many DRTC programmers are listed below:

Programming researchers: The goals of the DRTC Research Programmer are as follows: (a) guide research toward the requirements or partial fulfillment of courses leading to different professional degrees; (b) guide research toward doctoral and related degrees and their equivalents; (c) support, encourage, carry out, and carry out ongoing research in the various fields of information science, including library science and documentation; and (d) organize meetings to foster ideas among researchers.

At DRTC, the Advisory Service Programmer is in charge of offering advice on the design and development of libraries, systems, information centers, and programming tools, services, and methods.

3) Extension Programmers: Through the work of its research programmers, the DRTC Extension Program seeks to: (a) support information centers in adopting and putting innovative ideas into practice; and (b) disseminate newly developed knowledge.

4) Publication Program: The publication program of the DRTC aims to publish and get publications in the fields of information sciences, including library science and documentation. These publications include technical reports, monographs, conference proceedings, magazines, articles and papers, and course materials.

5) Training Program: To meet the needs of different professional education levels, the DRTC Training Program aims to: (a) offer training in information science and documentation; (b) develop and implement appropriate teaching and learning approaches for a variety of subjects; and (c) create curricula that maintain current and noise-free course materials.

The DRTC Employment Information Program seeks to achieve the following objectives: (a) maintain a register of qualified job seekers; (b) maintain a register of job openings; (c) keep a register of hiring companies and promoting agencies and note their requirements; and (d) provide information about job openings.

7) Continuing Education Program: The objectives of the DRTC Continuing Education Program are to: (a) provide working professionals with the opportunity to maintain up-to-date professional knowledge and skills through the organization of institutes, seminars, workshops, refresher courses, and other events; and (b) promote active engagement in other professional organizations' continuing education programs.

8) Faculty Development Program: The objectives of the DRTC Faculty Development Program are to: (a) ensure the intellectual and professional growth of each faculty member by providing opportunities; and (b) enable faculty members to take advantage of opportunities offered by other professional institutions.

### **3.5 Work Done Report**

#### **3.5.1 Research Program Work Report Prepared:**

Some of the Concrete Targets of the DRTC Research Programmed include developing theories and models, designing tools, developing and refining techniques, formulating standards, specifications, guidelines, etc., designing and evaluating information service systems, developing computer-based information retrieval systems, studying information phenomena through quantification techniques, and more.

Throughout the 1930s and 1950s, Dr. S.R. Ranganathan was a well-known figure in the information sciences, which included library science and documentation.

is among the principal players. Many of his seminal concepts that paved the way for librarianship's scientific recognition.

Normative standards that elevated librarianship to the status of science are referred to as the "five Laws of Library Science."

(2) A general theory of library classification was developed through a thorough examination of the unique features of the universe of subjects'

evolution and structure. This theory formed the basis for the development of a completely unique and innovative scheme for faceted classification.

(3) The colon categorization: This completely new and unique system for faceted categorization was developed on the basis of his general theory.

(4) A novel and unique approach to subject indexing is the chain indexing.

(5) A library cataloging philosophy that formed the basis for the development of structured guidelines for cataloging practices.

(6) The Classified Catalogue Code: Developed based on his idea, this was the first comprehensive and systematic code for producing a Classified Catalogue. It also greatly improved the process of creating the dictionary catalogue.

(7) Theories of documentation and reference services.

The efforts of Dr. Ranganathan prepared the way for more innovative research in the field. Many studies on developmental psychology have been carried out, mostly drawing from the study of Dr. Ranganathan. This study has improved upon many of his contributions. Many developments have also been made in addition to that. These are all related to the research conducted by the DRTC.

A few notable examples of the contributions made by DRTC are as follows:

Methods for developing depth classification techniques.

(2) Extensive classification systems covering around 130 different topic categories.

(3) A thorough investigation into the methods used to create different kinds of subjects.

(4) Chain indexing based on the formation of several subject types.

(5) A comparison study of broad categories for topic categorization, as well as a typology of connections between the component elements of subject propositions.

(6) A comprehensive viewpoint of the universe of subjects.

Ranganathan's comprehensive theory of classification served as the foundation for the development of guiding principles for concept presentations in texts of different document kinds.

(8) The role of information service systems in technology transfer.

(9) The process for planning information services systems.

(10) How courses are organized and how curricula are created.

(11) Appropriate teaching methods for various information science courses, including documentation and library science.

(12) The economics of information;

(13) A comprehensive linguistic theory applied to subject indexing;

(14) Postulate-based permuted subject indexing (=POPSI) is an innovative method of topic indexing;

(15) Method for developing Classers, a revolutionary type of topic indexing vocabulary management tool that combines the unique features of a thesaurus with a category-based faceted categorization scheme; and classier for more than 10 different micro subjects;

(16) A review of the subject indexing languages of Cutter, Dewey, Kaiser, and Ranganathan, as well as the Universal Decimal Classification (UDC) in light of the general idea of topic indexing language;

(17) A process for developing bibliographic description codes that incorporates the developments made possible by the Universal Bibliographic Control (UBC) Program of the International Federation of Library Associations and Institutions (IFLA);

(18) Coded bibliographic descriptions for standards and patents;

(19) Examination of a number of outstanding cataloging codes from the US, UK, and India;

(20) Methods for doing research on topics related to information services and work;

(21) Examination of the development of the first to seventh editions of Dr. S.R. Ranganathan's colon categorization;

(22) Guidelines for determining the number of specialists required in documentation centers and libraries;

(23) Development plans for around twenty information centers and systems at the local, national, and worldwide levels;

(24) An information systems and industrial services model;

Techniques used in the abstracting process;

(26) Methods for information aggregation and analysis;

(27) Research that use bibliometrics to look at:

a) Spread and seepage,

b) How frequently bibliographical elements appear,

d) The regularity of the elements

- d) Several findings
  - e) Distribution of papers,
  - f) Checking the stocks,
  - g) The usefulness and obsolescence of the periodical Books,
  - h) The growth in journals,
  - I The transaction probability distribution's entropy,
  - j) The output of scientific research,
  - k) Special library operations in addition to
  - l) The degree of expressiveness of the topic propositions.
- 28) Developing and creating applications for
- a) To get bibliographic information for batch processing, use class numbers.
  - b) Selectively disseminating information (SDI),
  - b) Interactive web exploration,
  - d) Producing many versions of the postulate-based permuted subject indexing system, or POPSI
  - f) Creating a chain index,
  - f) Making an alphabetical thesaurus with classification schemes
  - g) Using organized subject propositions to create an alphabetical thesaurus, and
  - h) Alphabetic-systematic classers using POPSI Subject propositions are formed.
- 29) Producing an interchangeable format bibliographic record that computers can read;
- 30) An exemplary curriculum designed to prepare professionals for careers in information services; and
- 31) Overarching principles for planning education programs for service point users.

The results of research carried out at the DRTC are now found in more than 600 publications, 50 reports, 30 books, 18 dissertations, and 32 edited volumes.

### **3.6 Report on Work Completed for the Advisory Service Program**

To far, DRTC has designed twenty information centers and systems. Numerous thesauri, directories, trend reports, and categorization methods have also been produced as a result of this endeavor. In one form or another, the DRTC has offered consultancy services to over 100 businesses.

Among the notable organizations and associations for whom DRTC has developed plans for each of its information centers are the following:

Steel Authority of India Ltd. (Sail).

2) Bharat Heavy Electricals Ltd., or BHEL.

3) Larsen and Toubro Ltd.;

4) Central Drug Research Institute, or CDRI;

5) Development Studies, University of Madras;

6) The Food Technology Research Institute, Central (CFTRI);

7) Gundry, Madras, Technical Information Center, Industrial Estate;

8) Tamil Nadu Planning Commission;

9) Hindustan Aeronautics Ltd., or HAL.

10) HAL Aero Engine Division, Bangalore;

11) The Small Industries Extension Training Center, or SIET Institute;

12) Research Designs and Standards Organization (RDSO);

13) Natural Gas and Oil Commission;

The National Institute of Mental Health and Neurosciences (NIMHANS) is number fourteen.

The Ganesh Scientific Research Foundation (GSRF) is number fifteen.

16) The Central Tool Institute (CMTI); moreover,

17) Central Leather Research Institute (CLRI).

Moreover, DRTC actively participated in the development of the National Information System for Science and Technology (NISSAT) Plan, which is now being implemented by the Department of Science and Technology, Government of India.

### **3.7 Work Completed During the Appointed Extension Report**

The knowledge and accomplishments of DRTC in the areas of library science and documentation, as well as information science research and teaching, are today highly appreciated on a national and worldwide scale. At the moment,

it is difficult to write an information science course syllabus without considering the DRTC course syllabus. International universities invite members of the DRTC Faculty to provide seminars in their fields of specialization. UNESCO and UNDP have extended joint invitations to Prof. A. Neelameghan is going to be the director of the post-graduate program for scientific information specialists in South East Asia. A. Neelameghan and G. An offer to join the faculty at Western Ontario University in Canada was extended to Bhattacharyya. Syracuse University and City University of New York invited Professor Bhattacharyya to give lectures. Members of the DRTC Faculty are regularly asked to give lectures at different Indian institutions.

UNESCO supported Professor A. Neelameghan in writing the "Guidelines for formulation policy on education, training and development of library and information personnel" (PGI) as part of its General Information program. The "Guidelines" have been fined by UNESCO. The DRTC Faculty assisted in updating the library and information science course curriculum at several Indian colleges. DRTC is represented in most study boards of Indian library and information science schools.

Professor A. Neelameghan served as the chair of the UNISIST Advisory Committee to the UNESCO Director Central. He was also the Vice-Chairman of the Committee. He is now a member of UNESCO's standing committee on library and information science education's General Information Programs. Professional Neelameghan and Prof. Bhattacharyya are accredited Ph.D. advisers for several Indian colleges.

In recognition of DRTC's significant contribution to the improvement of classification, the Indian National Scientific Documentation Centre (INSDOC) appointed DRTC to the Committee on Classification Research of the International Federation for Documentation (FID/CR) in 1973. Before 1980, Professors. Bhattacharyya was the Secretary and Neelamghan was the Chairman of the FID/CR. The UNESCO has recognized DRTC as the National Information Transfer Center for its International Information System for Ongoing Research in Documentation (ISORID). Sri. S is the project leader for ISORID. Seetharama.

DRTC was assigned by the Government of India's Department of Science and Technology (DST) to develop the National Information System for Science and Technology (NISSAT). NISSAT of DST has designated four National Information Centers for Food, Drug, Machine Tools, and Leather. Professors Neelamghan and Bhattacharyya serve on the Expert Advisory Committees of each of the four National Information Centers. Professor Neelameghan was a member of the advisory council for NISSAT. A member of the NISSAT's National Manpower Development Committee is Professor Bhattacharyya. He also sits on the advisory panels for the Committee for the Development of Medical Library Services in India, the Textile Information System at ATIRA,

and the Chemical Information System at the National Chemical Laboratory in Pune. The faculty member of DRTC has been serving on many committees related to information science, including those that deal with documentation and library science. DRTC is represented on the Information System Development Committee of ESCAP's regional center for technology transfer. The DST-established committee on personnel use in research and development, led by Dr. B.D. Nag Chaudhary, included Professor Bhattacharyya. DRTC has a representative on the Documentation sectional committee of the Indian Standards Institution. Dr. Ranganathan was in charge of this committee from the start. In 1977, Prof. Neelameghan becomes its chairman, a role he holds until 1981. A member of the Documentation Standards issued by the Indian Standards Institution was written by the DRTC faculty.

In 1975, DRTC started providing many intense courses on science and technology information services in response to requests from the Department of Science and Technology, Steel Authority of India, Bharat Heavy Electricals Ltd., and Electrical Research and Development Association.

DRTC organizes expert seminars and conferences on behalf of national and international organizations. The Third International Study Conference on Classification Research was arranged by DRTC in 1975 on behalf of the International Federation for Documentation's Committee on Classification Research, The Hague. Subsequently, in 1976, the Asian Region's Conference of Supervisors of Library and Documentation Schools was arranged by DRTC on behalf of UNESCO. In 1977, the Indo-US Joint Working Group on Scientific and Science and Technical Information Conference was sponsored by DRTC on behalf of the Department of Science and Technology. The 1978 Patent Information Seminar was organized by the DRTC on behalf of the Department of Science and Technology.

The faculty members of the DRTC have frequently received invitations to participate in international conferences and seminars. In 1964, for example, Dr. Ranganathan was invited to head the Second International Study Conference on Classification Research, held in Denmark. That same year, he was invited to Rutgers State University to give a comprehensive discussion on his colon categorization as part of the Rutgers Lectures on System for the Intellectual Organization of Information. The American Medical Library Association's annual conference, once more in 1964. Prof. Neelmeghan was invited to chair a 1967 International Documentation Congress session in Japan, organized by the International Federation for Documentation, The Hague.

Prof. Bhattacharyya was invited to the 1971 International Conference on the Conceptual Basis of the Classification of Knowledge, held in Ottawa, Canada. An invitation to attend the 1972 NATO Advanced Study Institute in

Information on Science was extended to Professor Neelameghan. In 1975, he was invited to the Information System and Services for Ongoing Research in Science conference, which was held in Paris. An invitation to the 1978 International Conference on Bibliographic Exchange Format in Sicily was sent to Mr. F.J. Devadason. The American Society for Information Science's Special Interest Group on Classification Research invited Prof. Bhattacharyya to the International Classification Research Forum in Mineapolis, USA, in 1979. In 1980, F.J. Devadason got an invitation to participate at CILLING 80, an international conference on computational linguistics that will be held in Japan. In 1981, the University of the Philippines' Institute of Library Science extended an invitation to Dr. I.K. Ravichndra Rao by UNESCO to instruct a course on bibliography and scientometrics for the Fourth Postgraduate Course in Information Science. The talks were held in 1981 between November 23 and December 4. In 1982, Prof. Bhattacharyya was invited to chair two sessions of the Fourth International Study Conference on Classification Research in Augsburg, West Germany.

An invitation to participate in the Computerized Documentation System of UNESCO's Seminar on Computerization Techniques in Paris, France, from September 30 to October 4, 1974 was sent to Sri S. Seetharama. In December 1980, he received an invitation to participate in a program on "Management Principles and Techniques for Information Center Managers," sponsored by UNESCO, which was held in New Delhi from December 28 to January 10, 1981. He was invited to take part in the "International Classification and Indexing Bibliography: 1950-1980" project funded by the Gesellschaft for Indexing and Classification System, MBH, Frankfurt. He worked on the project from March 21, 1981, to September 23, 1981. In May 1982, Bielefeld, West Germany, hosted the Conference on Conceptual and Terminological Analysis in the Social Sciences (CONTA), to which Sri Seetharama was invited.

An invitation was sent to Shri M.A. Gopinath to participate in the Second International Seminar on Standards on Information Handling in 1980, which was held September 1-9 in Budapest, Hungary. Furthermore, he was invited to speak on "Analytic-synthetic classification for Chemical Science" at the 183rd meeting on Chemical Information of the American Chemical Society, which was held in Las Vegas, Nevada, on March 30, 1982.

At the invitation of the International Development Research Centre, Canada, Distinguished Professor G. Bhattacharyya attended the Vth Congress of the Southeast Asian Librarians (CONSAL-V), which was held in Kaulalumpur from May 25-30, 1981. Professor G. Bhattacharyya USSR from August 22-30, 1981, under invitation from the Indian government's Department of Science and Technology.

On each of the aforementioned occasions, DRTC had the opportunity to disseminate knowledge and expertise acquired at the global level. At the federal level, there were more chances to do the same operation. A DRTC faculty member's enthusiasm to learn about the newest ideas developed at DRTC is always there whenever they get the chance to visit a formal institution or organization. The DRTC faculty member constantly seizes this opportunity for their extended work. The sophisticated library and information science course curricula offered by numerous Indian colleges are the source of most of the unique concepts developed at DRTC today.

### **3.8 Report on Work Completed for Publishing Program**

From the beginning, DRTC has published documents and obtained publications that were the result of other programmers' labor. Course materials, handbooks, research reports, standards, specifications, advanced treaties, research periodicals, papers on teaching techniques, thesauri and classier for subject indexing, codes for bibliographic description, manuals for various indexing systems, proceedings of seminars and conferences, and more are among these documents.

The results of research conducted by the DRTC were primarily disseminated through the quarterly periodical publication "Library Science with a Slant to Documentation". Produced between 1964 and 1980 by DRTC under license from the Sarada Ranganathan Endowment for Library Science, a foundation established by Dr. S.R. Ranganathan. DRTC is on the Editorial Board of this periodical, however the Endowments retain complete editorial control over it. Naturally, it still serves as the primary means of disseminating the results of DRTC research.

Furthermore, DRTC offers two regular annuals that match two regular annual seminars as part of its continuing education program. They are (a) the DRTC Annual Seminar, which has been published annually since 1963, and (b) the DRTC Refresher Seminar, which has been published annually since 1969.

Another irregular publication from the organization is the DRTC report. Periodically, it is issued together with an embedded interim report on research undertaken by the DRTC or a synopsis of current developments.

In addition, the DRTC scientific team member has over eighteen dissertations to their credit.

### **3.9 Reports on trainee programmers' completed work**

As part of its training program, DRTC offers a regular course. The main organization of the course, the Indian Statistical Institute, grants an associate degree in information science and documentation. The duration of the course is one year. The formal residential course begins on August 1st and goes

through July 31st of the following year, approximately, every year. After completing the official residential phase of the 12-month program and having their performance assessed through the final exam, each student is required to complete an authorized research subject, write a dissertation on it, and submit it for approval. For this reason, each student is allowed a minimum of one year. The course performance scores of each student are only made public when the dissertation review procedure is complete.

The Indian government's Ministry of Education, in cooperation with the Union Public Service Commission, has recognized the "Association ship in Documentation and Information Science" award that the institute provides.

The Government of India hereby recognizes the affiliation of the Documentation Research and Training Centre, Bangalore, Of the Indian Statistical Institute as equivalent to a master's degree in library science of an Indian University, specifically for specialist libraries dealing with documentation, for the purpose of requirements and employment in posts where a master's degree in library science is the minimum qualification for requirements.

(Source: Office Memorandum No. F.3-8/67-CAI (3), September 23, 1967).

The success of the Training Program was reviewed by the Government of India's Board of Assessment for Education and Qualifications in 1979-1980. Furthermore, based on its suggestion, the Ministry of Education and Culture of the Government of India has reiterated its recognition for the subsequent term:

For the purpose of hiring superior positions or posts under the Central Government that require specialization in information science and documentation, the Government of India has decided to recognize the Association ship in Documentation and Information Science awards by the Indian Statistical Institute as equivalent to a master's degree. The Board of Assessment for Education Qualifications' suggestion served as the basis for this judgment.

(Source: Office Memorandum No. F. 18-21/79/T-7, September 23, 1980.)

The following universities have said clearly that the candidate meets the requirements for direct admission to their doctorate program:

- a) University of Western Ontario, Canada;
- c) Dharma, the University of Karnataka;
- c) Kerala University in Trivandrum;
- d) Ibadan University of Nigeria.

The requirements to register for the DRTC Course are as follows:

The majority of instruction in this course is one-on-one. The course design places a strong emphasis on the use of documentation and information services in academic institutions, research centers, corporate organizations, industries, national documentation centers, data centers, and centers for information analysis and consolidation. The goal of the projects, work, colloquia, and seminars is to help the students become more adept at methodical thought and clear communication.

The faculty of DRTC has been made up of professionals with a wealth of knowledge and experience since the institution opened its doors in 1962. The names of the faculty members at different times are shown in the list below:

1. F. Dr. S.R. Ranganathan (1962-72)
2. Shri S. Banerjee (1962)
3. Prof. A. Neelameghan (1962 onwards)
4. Shri A. R. Desai (1963-65)
5. Prof. G. Bhattacharyya (1965 onwards)
6. Shri M.A. Gopinath (1963 onwards)
7. Shri B.S.S.Gupts (1969-71)
8. Shri S. Seetharama (1971 onwards)
9. Dr. I.K. Ravichandra Rao (1970 onwards)
10. Prof. S. Parthasarathy (1977-78)
11. Shri J. Devadason (1978 onwards)
12. Dr. J. Misra (1978-81)

To enrich the course content, DRTC has been inviting visiting professors since its inception. The names of the persons who had been visiting professors in DRTC are furnished below:

1. Mr. A. J. Wells (U.K.) (1962)
2. Shri B. Guha (INSDOC) (1962)
3. Prof. P. N .Kaula (BHU) (1962)
4. Shri J. Saha (ISI) (1962,1963)
5. Prof. K. A. Isaac (Kerala University) (1963)
6. Shri T. S. Rajagopalan (INSDOC) (1963)
7. Shri D. Raj (ISI) (1963,1964)
8. Prof. S. Parthasarathy (INSDOC) (1963,1973)

9. Shri Girja Kumar (ICWA) (1964)
10. Mr. B. I. Palmer (UK) (1965)
11. Shri R. S. Parkhi (Poona) (1965,1967,1968)
12. Mr. P. K. Garde (UK, USA) (1966)
13. Mr. S. Venkataraman (ICL) (1967,1968)
14. Mr. D. W. Langridge (U.K) (19670)
15. Prof. Pauline Atheridge (USA) (1970)
16. Dr. Mrs. Suseela Kumar (British Council) (1971)
17. Prof. Ganesh Sundaram (IISc) (1973,1976)
18. Shri K. S. Nagarajan (INSDOC) (1975,1978,1979)
19. Shri M. M. Job (Kerala University) (1975)
20. Dr. J. M. Perrault (USA) (1975)
21. Dr. (Ms) Elaine Svenenius (Canada) (1975)
22. Dr. Patrick Penland (USA) (1976)
23. Mrs. Rathnamma Isaac (1976)
24. Dr. D. J. Urquahart (UK) (1976)
25. Dr. W. Cameron (Canada) (1976)
26. Dr. E. V. Krishnamurthy (IISc) (1977, 1978)
27. Dr. V. Tikekar (IISc) (1997)
28. Dr. (Mrs.) I. Dahlberg (W. Germany) (1977)
29. Shri B. S. Ramananda (HMT) (1978-81)
30. Shri M. V. Ranganathan (HMT) (1978-81)
31. Prof. Charles P. Bourne (U. S. A.) (1978)
32. Prof. D. J. Foskett (U. K.) (1979)
33. Mr. G. Thompson (U. K.) (1978)
34. Dr. R. Fugmann (West Germany) (1981)
35. Mr. Peter Lewis (U. K.) (1981)
36. Dr. Peter Lazar (Hungary) (1982)
37. Prof. K. J. McGarry (U. K.) (1982)
38. Mr. James E. Agenbroad (USA) (1982)

DRTC offered exclusive training to people who fit the requirements for professional certification. It often takes the form of a very difficult course that covers a select few topics. Sometimes it takes the form of a research-focused course. The purpose and subject content of these courses dictate their specificity. Since 1962, over forty people with professional qualifications have enrolled in these courses.

From 1975 to 1977, DRTC created intensive, one-of-a-kind information science courses to supply workers for the several Indian National Information Centers. This work was funded by the Department of Science and Technology, Indian government. More than sixty deputed officers obtained instruction from this session.

### **3.10 Courses:**

DRTC offers the following courses in library and information science. As of 2008–2010, the Master of Science in Library and Information Science (MS-LIS) has taken the position of ADIS.

Information Science and Library at MS

Previously known as ADIS:

Governments, R&D organizations, and large enterprises now value information and knowledge management as a critical topic of study due to the emergence of the knowledge-centered economy and knowledge society. The area encompasses several academic disciplines, including information technology, library science, and management sciences, to mention a few. The Documentation Research & Training Centre (DRTC), founded by Professor S. R. Ranganathan, is a worldwide recognized center for advanced training and research in the field of library and information science. The Indian Statistical Institute (ISI) is home to this section. The primary objective of the M.S. program is to prepare the next generation of information managers. The DRTC offers a program in library and information science. The courses in knowledge management, information technology, library science, and quantitative studies are perfectly balanced in this unique curriculum. Alumni of the program will have excellent career options in industry, especially in the IT industry, R&D firms, and research and higher education establishments. An excellent foundation for Ph.D. programs is offered by the M.S. program designed for people who have a tendency to learn more and conduct research.

### **Objectives & Scope:**

This program emphasizes information technology applications while providing an advanced library and information science education. After completing the program successfully, students will be equipped to work in

academia or take on leadership positions in a range of corporate and public sector organizations that deal with information and libraries. The goal of the course is to produce a workforce that can:

- Work at higher levels in libraries and information centers as information professionals;
- Design and build information systems; and
- Contribute to research and teaching in the field of library and information science.

**Time:**

The 24-month (2-year) curriculum is exclusively offered at the ISI Bangalore Center.

**Course Structure:**

The two-year program consists of twenty credit courses altogether, distributed across four semesters. These include colloquia, seminars, and dissertation work. Additionally, two four-credit courses in Elementary Mathematics are given in the first and second semesters for students who have not studied mathematics at the plus two level.

The dissertation research on an approved topic will take up the third and fourth semesters. The student's contribution to the dissertation (either original or some developmental work) and the dissertation's actual text will be the two criteria used to grade it.

C. delivering a talk in a public seminar (defense), and d. have a deep comprehension of the topic.

**Courses of Study:**

Digital libraries, aspects of research methodology and statistics, and information sources, systems, and services are among the topics covered in the second semester. Semester 1 covers Foundations of Computer & Information Technology; Library Management & Library Automation (4 credits each); Elements of Mathematics-I (credit or non-credit); Information Organization (Theory and Practice); Cataloguing and Metadata (Theory and Practice). Programming and Data Structures; Two courses: Elements of Mathematics-II (credit or non-credit) and Colloquium (4 credits each). Third semester courses include informatics and scientometrics; content management systems (CMS); information storage, retrieval, and DBMS; four credits of seminars; and dissertations. Session 4: Electives (4 credits each) and Dissertation (8 credits); Knowledge Management Systems; Semantic Web; Networking Technologies and Library Networks. Extracurricular Activities: Pupils are required to choose one of the following courses as an elective. TQM; Method of Evaluation; Agricultural Information Systems; Social Science Information Systems; Business & Corporate Information Systems; Health Information Systems Candidates will be assessed based on their

performance in examinations, seminars, and colloquia on a particular subject each semester.

**Minimum Passing Score:** In order to pass a credit or non-credit course, a student must acquire at least 35% of the possible points. Students who do not get at least 35% on a paper will be given a second chance to take the course test (a back paper exam). However, a student is limited to taking two back-paper examinations in a semester.

If a student meets the following requirements to progress to the next semester: i) they demonstrate good behavior and attendance throughout the semester; ii) they get passing grades in every subject; and iii) their average composite score across all completed courses is at least 45%. A student will not be permitted to continue if they withdraw from the program during the first or second semester. However, if a student fails in the third or fourth semester, they will be given another chance to retake the relevant semester without receiving support. All eligible candidates will receive an M.S. in Library and Information Science from the Master of Science program. (Library & Information Science)] at the end of the fourth semester from the Indian Statistical Institute. All eligible candidates will be divided into the following categories: • Candidates who pass all of the papers on their first attempt and have an aggregate score of 75% or higher will be considered to have passed in first class with distinction; • Candidates who receive 60% or higher overall but less than 75% overall after taking into account all courses will be considered to have passed in first class. • After taking into consideration all courses, students who get an overall grade of 45% or above but less than 60% overall will be considered to have passed in second class.

### **Salary, Bonus, and Book Grant**

A stipend of Rs. 5,000 would be given to each student each month. However, should he repeat that semester the following semester, failure in either the third or fourth semester will result in the complete revocation of the student's stipend and dependent award. In rare situations, the teachers' committee may opt to only provide a student a half stipend if their attendance or behavior is considered undesirable.

**Contingency Grant:** A contingency grant of Rs. 5,000 per year for books, calculators, stationery, etc. would be awarded based on the academic success of a student.

### **Notification of Admission**

The Dean of Studies at ISI Kolkatta will usually announce the courses during the third week of January or the first week of February each year. If you would want to sign up for a library course, please check national daily.

### **Infrastructure and Facilities:**

Location: The courses will be held in Bangalore.

**Library and Other Facilities:** Over the years, the center's library has transformed into a hybrid, providing "state of the art library service" to its clients. It has subscriptions to 300 esteemed periodicals that address subjects related to the center. In addition to having a collection of over 25,000 books, 500 CDs, and 15,000 back issues of journals, the library provides access to approximately 450 e-journals. Journals that are accessible at other Institute locations can be accessed through the ISI Library consortium. In addition, PC users can access full-text and secondary e-journals as well as the library's OPAC.

The Library has a vast collection of books and articles on topics related to information and library science. There are over 10,000 volumes available, and the library subscribes to more than 75 credible national and international journals in this specific sector. You may also get the Library and Information Science Abstract (LISA) online. Prof. S.R. Ranganathan's particular collection, which includes more than 500 rare volumes, is kept in the ISI (BC) Library.

**Computer Facilities:** The DRTC has a centralized 2 MB Internet connection and 12 P IV PCs in a separate computer cell. The Institute also has a Computer Center with eleven P IV PCs and a DEMO Lab with many PCs. These can be utilized by all teachers and students.

**Hostel:** You can get to a hostel.

### **The Prize**

The "M.S in Library and Information Science" from the Indian Statistical Institute is granted upon passing the course, which is accessed via performance evaluation.

**Faculty 1:** Dr. A.R.D. Prasad, Head and Professor

2. Devika P. Madalli, associate professor

3. Professor M. Krishnamurthy, assistant professor

4. Biswanath Dutta, an assistant professor, Dr.

### **Scholarly Visitors/Guest Instructors**

The visiting faculty includes experts in computer science, linguistics, management science, operations research, simulation, communication sciences, and research methods, among other areas of expertise. Additionally, invitations from foreign and other Indian colleges are sought for.

### **3.11 Work Report Fulfilled via the Program for Employment Information:**

I have contacted several recruiting organizations in India in order to complete this program, and I have advised them to call DRTC anytime they

need highly skilled personnel. Many of these groups have given positive responses. More than half of the students at DRTC have been able to find employment thanks to the program. All of the people who finished the DRTC training program are currently employed at different commercial, academic, and research libraries and information centers. Many of them now occupy positions of great responsibility. The services rendered by the DRTC-trained professionals are now highly regarded on a national and worldwide scale. Several DRTC alumni are now employed in reputable jobs overseas.

### 3.12 Report on Work Completed for the Continuing Education Initiative

The DRTC holds two regular seminars a year as part of its continuing education program: the DRTC annual seminar and the DRTC refresher seminar. In addition, DRTC, overseen by a faculty member; and monthly research colloquia; facilitated by faculty members. Additionally, a few full or half-day seminars on subjects of contemporary interest are planned each year.

DRTC has hosted the following yearly seminars since 1963:

**Table No. 3.2: Annual Seminars: 1963- 2002**

<b>Sr. No.</b>	<b>Year</b>	<b>Subject</b>
1	1963	Documentation periodicals; coverage, Arraignment, Scatter, Seepage and Compilation.
2	1964	Document Retrieval: Classification
3	1965	Depth Classification: Subject Heading.
4	1966	Universe of Knowledge: Depth Classification: Documentation List.
5	1967	Developments in classification: Management of Reprographic service: Subject Headings and Feature headings.
6	1968	Theory and Practice of Abstracting: Developments in Classification: Teaching techniques in Documentation
7	1969	Subject analysis for Document Retrieval Systems: quantification and Libra metric Studies: Management of Translation Service.

8	1970	Library cataloguing: Rendering of names of Corporate Bodies: Subject analysis with special reference to social sciences: Documentation Systems for industry.
9	1971	Abstracting, Indexing and Reviewing periodicals: Pattern of Use of Documents by Specialists, Comparative study of schemes of library classification.
10	1972	Course leading to the Master's Degree in Library Science/Documentation. Orientation of Readers.
11	1973	Planning of Library and Documentation Systems.
12	1974	Information Systems for Business and Industry.
13	1975	Thesaurus in information systems.
14	1976	Library and Information Manpower Development: National, regional and international aspects.
15	1977	Development planning: Classification and Indexing in Social Sciences.
16	1978	Primary communications in Science and Technology.
<b>Sr. No.</b>	<b>Year</b>	<b>Subject</b>
17	1979	Industrial Information Systems and Services (IISS).
18	1981	Information analysis and consolidation.
19	1982	Collection Development and Document Circulation
20	1983	DRTC Annual Seminar-20: Classification & Indexing in Science & Technology
21	1987	DRTC Silver Jubilee Seminar on Information Personnel Development & Emerging Information Society
22	1990	DRTC Annual Seminar 24 Information Economics
23	1991	3rd International Conference on Informetricis

24	1993	Seminar on Library Networks in India
25	1994	DRTC Annual Seminar-28: Teaching, Research & Practice in Classification & Indexing Languages
26	1995	Libraries and Information centers as Profit-Making Instauration
27	1996	Advances in Information Technology: Impact on Library and Information Field
28	1998	DRTC Workshop-31: Practical Orientation to Internet (January)
	1998	Informatrics and Scientomertics (March)
29	1999	Information Management Including ISO QMS (Jan.)
	1999	Application of Optical Characteristics Recognition Techniques to Library and Information Work (Mar.)
30	2000	Electronic Sources of Information
31	2001	Multimedia Internet Technology (Feb.)
	2001	Digital Libraries: Managing Convergence Continuity and Change (Mar.)
32	2002	Information Resource Management (Mar.)

Since 1969, DRTC has organized the following Refresher Seminars:

**Table No. 3.3: Refresher Seminars**

<b>Sr. No.</b>	<b>Year</b>	<b>Subject</b>
1	1969	Colon Classification, edition 7.
2	1970	Cataloguing.
3	1971	Reference Service.
4	1972	Design of Depth Classification.
5	1973	Subject Indexing Languages.

6	1974	Information Services for Business and Industry.
7	1975	POPSI and PRECIS.
8	1976	Information for Small Scale Industries.
9	1977	National Information Network for Science and Technology.
10	1978	Application of Computers to Bibliographic Description Principles and Practice.
11	1979	Standardization of Bibliographic Description Principles and Practice.
12	1980	Data Accessibility and Dissemination.
13	1981	New Developments in Library and Information Science in India.
14	1982	DRTC Refresher Seminar-14: Library Automation
15	1984	DRTC Refresher Seminar-15: Current Trends in Information Sources & Communication Media
16	1985	DRTC Refresher Seminar-16: Planning of Library & Information Systems & Services
17	1988	DRTC Refresher Seminar-17: Colon Classification, Theory & Practice
18	1989	Regional Seminar On Biomedical Library And Information System
19	1992	DRTC Workshop on Library and Information Management
20	1993	DRTC Refresher Workshop Artificial Intelligence Application to Library and Information Work

### 3.13 Report on Work Completed for the Faculty Development Initiative

It will be clear that the DRTC faculty members' active involvement in the aforementioned programming is anticipated to secure their own intellectual and professional growth. Furthermore, DRTC utilizes particular chances

provided by organizations and professional institutions under this initiative. In 1974, for instance, M.A. Gopinath participated in the international course on online information retrieval and information systems in Katowice, Poland, which was hosted by UNISIST (Unesco). Mr. S. Seetharama participated in the 1975 Unesco-hosted Information System on Research in Documentation course in Paris, France. Attending the International Course on Handling OF Experimental data in 1976 was Shri M A Gopinath. held at Varazdin, Yugoslavia, and organized by CODATA and the University of Zagreb. Mr. F.J. Devadason participated in the Unesco-hosted computerized documentation system course in Paris in 1977. Professor G. Bhattacharyya and Mr. F.J. Devadason participated in the Unesco-organized training on integrated information system software package at Manila in 1979. In November 1981, Dr. I.K. Ravichandra attended a conference at ILS of the University of the Philippines in Manila on AV and CAI as teaching aids for information science. Ph.D.s have been completed by Professor G. Bhattacharyya and Shri I.K. Ravichandra Rao. The doctoral thesis of Shri M.A. Gopinath has been turned in. Currently pursuing their doctorates are Shri S. Seetharama and Shri F.J. Devidason.

### **3.14 FINAL REMARKS**

In this paper, the actions of DRTC under its several programmers have been compiled. It spans the years 1962–2002. Information on the accomplishments included in this report may be found in all of the many publications listed under the DRTC publication program.

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# 4 DATA ANALYSIS AND INTERPRETATION

## 4.0 Introduction

The Indian Statistical Institute (ISI) formed the Documentation Research and Training Centre (DRTC) in Bangalore in January 1962. In April 1962, it officially started operating as a training and research center. In light of the International Congress of Libraries and Documentation Centers' recommendation, which was made in Brussels in 1955, ISI decided to create such a center. Forming specific groups at train document lists would be beneficial, according to the recommendation. The recommendation represented the recognition among academics that a necessary corollary to the rapid advancements in science, technology, and industry was the extension of the scientific library service to incorporate information and involvement in scientific research. The following is a summary of the main factors that encouraged the creation of this recommendation: An institution of higher education and advanced research must have all the facilities required for a library, documentation, and information services. In the setting of a major institution, these facilities should unavoidably have the tools, techniques, and processes necessary for more effective and efficient information services, necessitated by ongoing adjustments to the elements that influence the service. These are all basically the largest facilities needed to train people to perform sophisticated information job and services. Consequently, a straightforward reorientation of these facilities can enhance the system and function as the most cost-effective and efficient way to build information personnel at the same time. Such a system would provide labor that would, on the one hand, guarantee a ready supply for the relevant institution and, on the other, serve as a source of labor for the entire nation.

A variety of factors were used to examine the data, which is shown as tables and figures.

1 Distribution of Seminar Proceedings

1.1 Distribution by year

2 As Per Citation in Seminar Publications

3 Distribution of referenced literature according to form.

4 Citation distributions by chronology.

Five citation authorship patterns.

6 Journal Ranking.

6.1 The scattering law of Bradford

7 Books are ranked.

8 Citation distributions by language.

9 Citation distributions between India and outside

9.1 Country-wise geographic distribution of citations

9.2 The geographical distribution of Indian states' citations.

9.3 Citation distribution geographically by place.

10 Website Ranking

11 Author ranking.

Twelve Publishers in Ranking

#### **4.1. Seminar proceedings distribution**

The present study covers DRTC publications from 1993 to 2002, in the seminar proceedings, Documentation Research and Training Center, Bangalore.

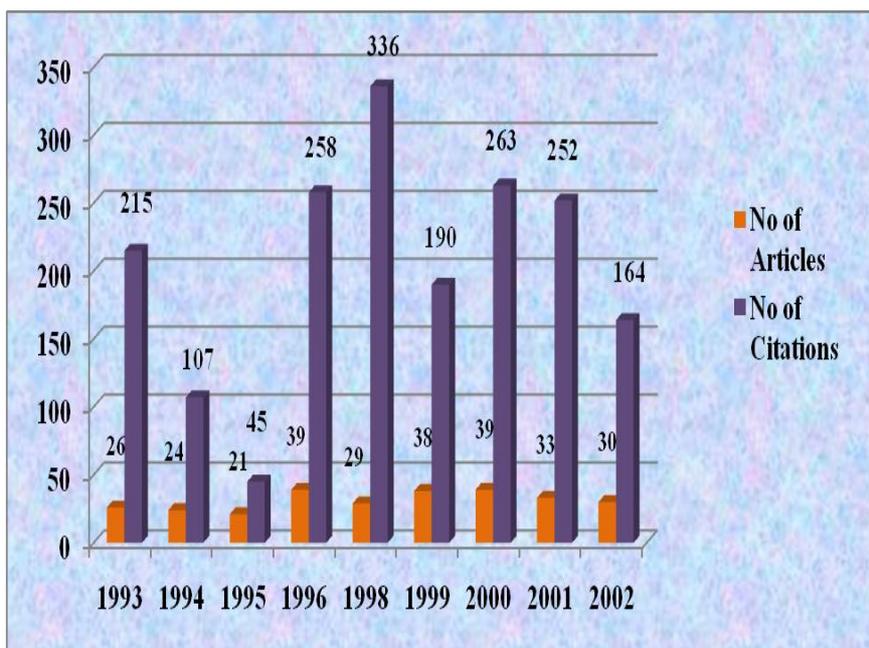
##### **4.1.1 Year wise distribution**

The attempt was made to analyze the seminar proceedings year wise and is presented in table no. 4.1.1

**Table 4.1.1: Year wise distribution**

<b>Sr.No.</b>	<b>Year</b>	<b>No of Proceedings</b>	<b>No of Articles</b>	<b>No of Citations</b>
1	1993	1	6	107
2	1993	1	20	108
3	1994	1	24	107
4	1995	1	21	45
5	1996	1	39	258
6	1997	0	0	0
7	1998	1	15	52
8	1998	1	14	284
9	1999	1	24	153
10	1999	1	14	37
11	2000	1	39	263

12	2001	1	21	164
13	2001	1	12	88
14	2002	1	30	164
	<b>Total</b>	<b>13</b>	<b>279</b>	<b>1830</b>



**Fig. No. 4.1: Year wise distribution**

The Table 4.1.1 and the Fig. Number 4.1 indicates that out of the total of 13 seminar proceedings, 12 (91.66%) were available for the study, and 1 (8.34%) were not. Furthermore noted is the fact that most of the seminar proceedings were accessible.

#### **4.2 Per seminar proceedings citation**

The current study examines 13 seminar proceedings from the Document Research and Training Center in Bangalore, with an average citation count of 1830 per seminar session. Include all references, including those from books, reports, journals, conference proceedings, websites, and other sources. It has been defined in a variety of ways, including significance, impact, utility, and efficacy, but no one has been able to give it a more concrete definition. The average citation per seminar sessions is displayed below.

**Table 4.2: Per Seminar proceeding citations**

Sr.No	Year	journals	books	conferenc e	Web site	rep ort	Encyclo pedia	Other s	Tota l
1	1993	77	20	6	0	1	3	0	107
2	1993	56	27	3	3	12	0	7	108
3	1994	32	36	12	0	5	0	22	107
4	1995	15	5	12	0	7	0	6	45
5	1996	122	63	21	22	4	0	26	258
6	1998	9	37	1	5	0	0	0	52
7	1998	182	73	15	0	7	0	7	284
8	1999	80	26	5	22	1	8	11	153
9	1999	7	10	1	13	2	0	4	37
10	2000	89	58	14	93	2	0	7	263
11	2001	33	13	5	109	0	0	4	164
12	2001	23	15	6	44	0	0	0	88
13	2002	58	46	7	56	0	0	1	164
	<b>Total</b>	<b>783</b>	<b>429</b>	<b>108</b>	<b>367</b>	<b>41</b>	<b>11</b>	<b>91</b>	<b>1830</b>

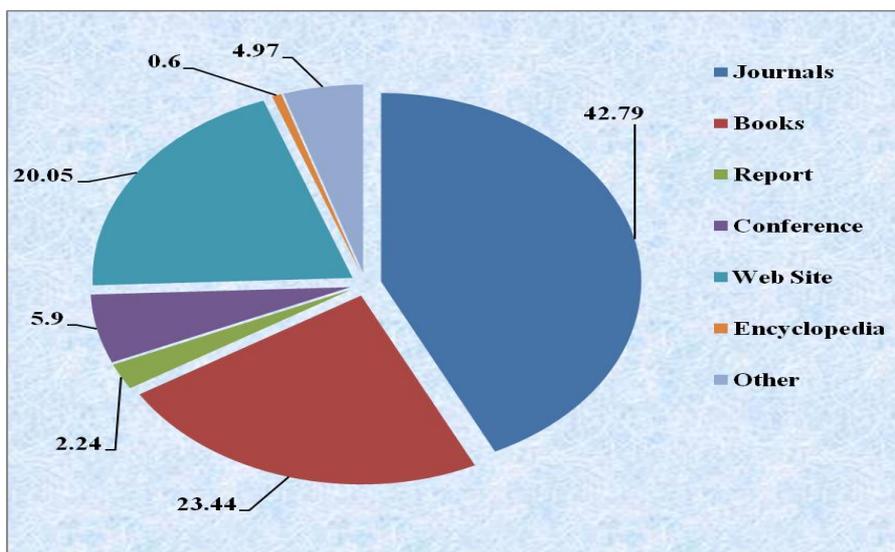
### 4.3 Form-wise distribution

A total number of 1830 citations of 13 seminar proceedings are distributed in different sources as shown in Table No.4.3 and Figure No.4.3.

**Table 4.3: Form-Wise Distribution**

Sr. No	Type of Document	Citation	Percentage
1	Journals	783	42.79
2	Books	429	23.44

3	Report	41	2.24
4	Conference Proceedings	108	5.90
5	Encyclopedia	11	0.60
6	Web site	367	20.05
7	Others	91	4.97
	<b>Total</b>	<b>1830</b>	<b>100</b>



**Fig. No. 4.3: Form-Wise Distribution**

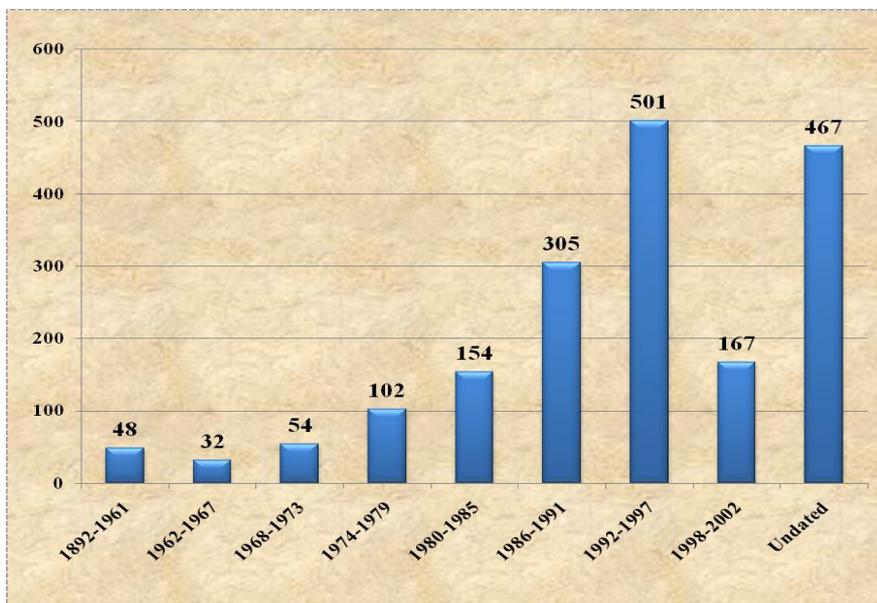
Researchers' usage of non-periodical materials such as books for their research greatly influences the frequency distributions of various types of literature that they employ in proceedings. It was shown that, with 783 (43.69%) citations, journals are the most commonly utilized kind of media, while books are used in 429 (23.44%) citations. In terms of citations, Report 41 (2.24%), Conference 108 (16.91%), Encyclopedia 11 (0.60), Website 367 (20.05%), and Other 91 (4.97%) were included. This suggests that the second hypothesis—**The journals are the primary documents mentioned most frequently**—is true. (No. 4.3 in the Table)

#### **4.4 Chronological distribution of citations**

A total number of 1830 citations of 13 seminar proceedings are distributed among different groups of year as shown in table No.4.4 and Figure No.4.4.

**Table 4.4: Chronological Distribution of Citation**

Sr. No.	Year	Citations	%
1	1892-1961	48	2.62
2	1962-1967	32	1.75
3	1968-1973	54	2.95
4	1974-1979	102	5.57
5	1980-1985	154	8.42
6	1986-1991	305	16.67
7	1992-1997	501	27.38
8	1998-2002	167	9.13
9	Undated	467	25.52
	<b>Total</b>	<b>1830</b>	<b>100</b>



**Fig. No. 4.4: Chronological Distribution of Citation**

The number of years that passed between a cited document's publications was used to measure the period-wise distribution of citations. For this reason, the entire period covered by the materials used was split up into five-year

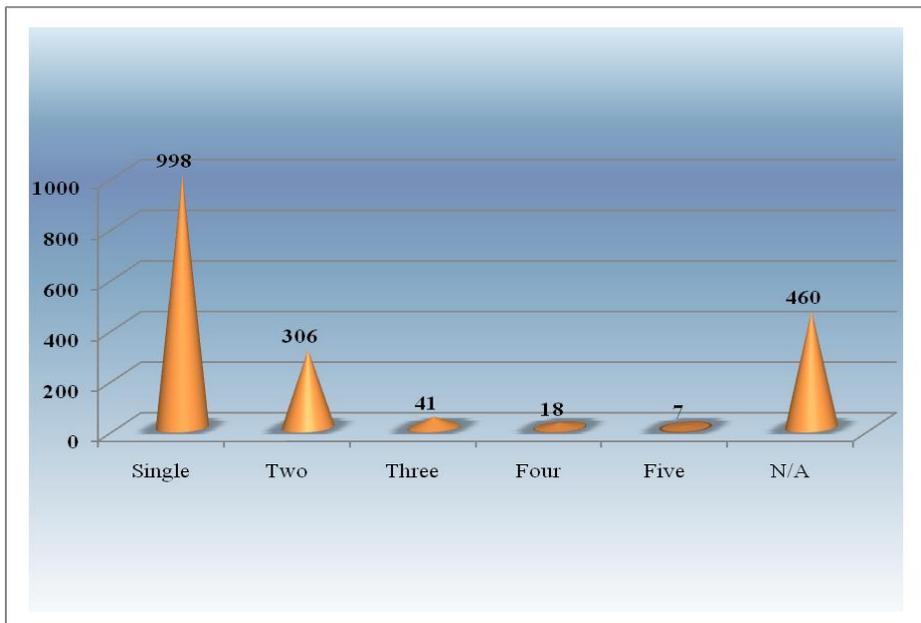
period groupings. The maximum number of citations are covered during the period of 1992-1997 accounting to 501 (27.38), followed by year 1998-2002 accounting to 167 (9.13%) citations. Table 4.4 and figure 4.4 show that the 1892-1961 accounting to 48 (2.62%), followed by year 1962-1967 accounting to 32 (1.75%) citations. Additionally, 467 (25.52%) citations lack a year.

#### 4.1.5 Authorship pattern of total citations

The total numbers of 1830 citations of 13 seminar proceedings are cited by single author, two authors, three authors, four authors, five authors, which is shown in the table No. 4.5 and figure no 4.5.

**Table 4.5: Authorship Pattern of Total Citations**

Sr. No.	Authorship	Citations	Percentage
1	Single	998	54.54
2	Two	306	16.72
3	Three	41	2.24
4	Four	18	0.98
5	Five	7	0.38
6	N/A	460	25.14
	<b>Total</b>	<b>1830</b>	<b>100%</b>



### Fig. No. 4.5: Authorship Pattern of Total Citations

The basic publishing pattern is just one of the characteristics of any subject literature; the writers themselves were also evaluated to ascertain the percentage of one, two, three, and more authors. The authors' analysis results are offered to provide a clear picture. Table 4.5 and Figure 4.5 show that of the total 1830 citations, 998 (54.54%) are by a single author, followed by joint authors in 306 (16.72%), three authors in 41 (2.24%), and four authors in 18 (0.98%) citations. The results also indicate that the authors with the fewest citations – 07, or 0.38% – are five authors. Additionally, there are 460 (25.14%) citations without an author. This suggests that Hypothesis No. 3 – **"Multiple authors are predominant than Single author" – is untrue. (See Table 4.5)**

### 4.6 Ranking of Journals

A total number of 1830 citations of 13 seminar proceedings, out of those 783 citations are journal citations. The journal ranking is shown in the Table No. 4.6.

**Table 4.6: Ranking of Journals**

Sr.No	Title of Journal	Rank	Citations	%
1	Journal of Documentation	1	36	4.60
2	Scientometrics	2	34	4.34
3	Journal of the American Society for Information science	3	32	4.09
4	ASLIB	4	16	2.04
5	JASIS	5	13	1.66
6	Bulletin of Medical library Association	6	9	1.15
7	Electronic Library	7	7	0.89
8	IASLIC Bulletin	8	6	0.77
9	Journal of information science	8	6	0.77
10	Library Hi Tech	8	6	0.77
11	Library Trends	8	6	0.77
12	FID News Bulletin	9	5	0.64
13	IFLA Journal	9	5	0.64
14	INSDOC	9	5	0.64

15	Journal of American society for information science	9	5	0.64
16	Managing information	9	5	0.64
17	computers in libraries	10	4	0.51
18	DESIDOC Bulletin of information technology	10	4	0.51
19	LIBRI	10	4	0.51
20	Social Indicators Research	10	4	0.51
21	NISSAT	11	3	0.38
22	UNESCO	11	3	0.38
23	University news	11	3	0.38
24	Am.Sociological Review	12	2	0.26
25	American Documentation	12	2	0.26
26	American scientist	12	2	0.26
27	Business executive	12	2	0.26
28	communications of the A.C.M	12	2	0.26
29	Computer technology Research corporation	12	2	0.26
30	Education and Information	12	2	0.26
31	Financial times	12	2	0.26
32	Information studies	12	2	0.26
33	Information world Review	12	2	0.26
34	J.Amer.Soc.For Inf.Sc	12	2	0.26
35	Journal of the American Society for information science	12	2	0.26
36	Journal of academic Librarianship	12	2	0.26
37	Journal of library Admin iteration	12	2	0.26
38	LIBRA	12	2	0.26
39	Library Quarterly	12	2	0.26

40	AID BULLETIN	13	1	0.13
41	ALCTS Newsletter	13	1	0.13
42	American journal of Documentation	13	1	0.13
43	Annals of Human Genetics	13	1	0.13
44	Annual Review of Information Science and Technology	13	1	0.13
45	ARIST	13	1	0.13
46	Asian Age	13	1	0.13
47	ASTINFO NEWS letter	13	1	0.13
48	Atlantic Monthly	13	1	0.13
49	Australian library Journal	13	1	0.13
50	Business India	13	1	0.13
51	Business standard	13	1	0.13
52	Caliber	13	1	0.13
53	CMC Magazine	13	1	0.13
54	Collection Building	13	1	0.13
55	Computer and Libraries	13	1	0.13
56	Data Communication	13	1	0.13
57	D-Lib magazine	13	1	0.13
58	EMAP Business publications	13	1	0.13
59	FID Bulletin for information and communication	13	1	0.13
60	General information programmer and UNISIST	13	1	0.13
61	IBID	13	1	0.13
62	ICSSR	13	1	0.13
63	IEEE Multimedia	13	1	0.13
64	Indian Journal of Medical Research	13	1	0.13

65	Indian association of special libraries & Information centers	13	1	0.13
66	Indian Management	13	1	0.13
67	Information Resources Management Journal	13	1	0.13
68	Information & Control	13	1	0.13
69	Information communications world	13	1	0.13
70	Information Management Review	13	1	0.13
71	Information Media and Technology	13	1	0.13
72	Information Outlook	13	1	0.13
73	Information processing and Management	13	1	0.13
74	Information Processing and Management	13	1	0.13
75	Information System management	13	1	0.13
76	Information Technology and libraries	13	1	0.13
77	Information Today	13	1	0.13
78	International organizations	13	1	0.13
79	Internet World	13	1	0.13
80	J.DOC	13	1	0.13
81	J.Inf,Science	13	1	0.13
82	JAI Press	13	1	0.13
83	Journal of Documentation	13	1	0.13
84	Journal of Documentation	13	1	0.13
85	Journal of Information science	13	1	0.13
86	Journal	13	1	0.13
87	Journal of Education for library	13	1	0.13

	and information science			
88	Journal of ASIS	13	1	0.13
89	Journal of human society for science	13	1	0.13
90	Journal of Librarianship	13	1	0.13
91	Journal of marketing	13	1	0.13
92	Journal of Physics D Applied Physics	13	1	0.13
93	Journal of Scholarly publishing	13	1	0.13
94	Journal of the Washington academy of Science	13	1	0.13
95	Journal of Washington Academy of science	13	1	0.13
96	Journals of Academic Librarianship	13	1	0.13
97	Knowledge Organization	13	1	0.13
98	Library Association Record	13	1	0.13
99	Library Consortia and Information Technology	13	1	0.13
100	Microcomputers for Information management	13	1	0.13
101	Nauchoro Tekhnicheskaya info.	13	1	0.13
102	Nauchye I tekhnicheskije biblioteki SSSR	13	1	0.13
103	New Scientist	13	1	0.13
104	NICNET	13	1	0.13
105	OCLC Newsletter	13	1	0.13
106	Ohio journal of science	13	1	0.13
107	Operation Research Quarterly	13	1	0.13
108	PC Magazine	13	1	0.13
109	PC Magazine	13	1	0.13
110	PC World	13	1	0.13

111	PUDOC BULLETIN	13	1	0.13
112	RFC	13	1	0.13
113	Russiona stress and network morphology	13	1	0.13
114	Social Studies of Science	13	1	0.13
115	scientific american library	13	1	0.13
116	SIAM Journal of Numerical Analysis	13	1	0.13
117	Span	13	1	0.13
118	Special libraries	13	1	0.13
119	Standardization in the tea industry	13	1	0.13
120	Studies in Romanticism	13	1	0.13
121	Technology and human values	13	1	0.13
122	The Australian Library journal	13	1	0.13
123	The Chronicle of Higher Education	13	1	0.13
124	The Electronic Library	13	1	0.13
125	The Electronic Library	13	1	0.13
126	The Electronic Library	13	1	0.13
127	The Indian Journal of Radio Physic	13	1	0.13
128	The International information & Library Review	13	1	0.13
129	The NLM/NSF grant program	13	1	0.13
130	The Professional Geographer	13	1	0.13
131	The Serials librarian	13	1	0.13
132	Wiley - Eastern	13	1	0.13
133	Not Available		437	55.81
	<b>Total</b>		<b>783</b>	<b>100.00</b>

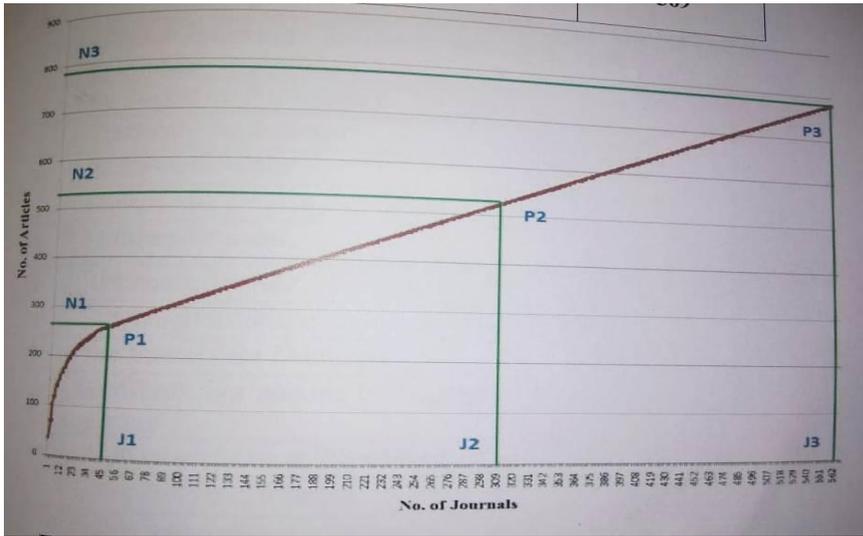
In essence, the journal rating list is a useful tool that research scientists and librarians may use to choose journals that will be most helpful in terms of how well they cover recent and significant work in a given field. The most popular publications that scholars employ for their research are journals. The preceding table takes into account the citations that are mentioned in the journals. With 36 (04.60%) citations, the "Journal of Documentation" ranks highest, followed by "Scientometrics" with 34 (04.34%) and "Journal of the American Society for Information science" with 32 (4.09%) citations.

#### 4.6.1 Bradford’s Law of Scattering

According to Bradford’s law, scientific journals can be divided into several zones of groups with the same number of articles as the nucleus and a nucleus of periodicals more specifically devoted to the subject if they are arranged in decreasing productivity of articles on a given subject. The zone will be as follows: 5a: (5a) 2 the current data set's journal numbers are arranged according to the diminishing productivity of article numbers (Table No. 4.1.6). They were split up into three equal zones in the center. Each zone had almost the same number of articles, as illustrated in 4.6.1.

**Table No. 4.6.1: Bradfords Law of Scattering in DRTC Proceedings**

<b>Zone</b>	<b>No of Article</b>	<b>No of Journal</b>
I	261	47
II	261	261
III	261	261
Total	783	569



**Figure no. 4.6.1: Bradford's Law of Scattering in DRTC Seminar Proceeding.**

Bradford's Law of scattering was attempted to be tested, as Table No. 4.6.1 and Figure No. 4.6.1 demonstrate. Three equal zones, with 261 articles in each zone, were created from the entire amount of journal articles. The number of journals in each zone is 47:261:261, whereas the number of articles in each zone is found to be within the same range. The information both verbally and mathematically fits within Bradford's Law of Scattering. Core journals are the 47 journals that fall under the first zone.

#### 4.7 Ranking of Books

Since books are the most dependable form of information dissemination and communication. Books served as a primary research source for DRTC seminar proceeding. Book citations make up 429 of the 1830 citations. The order in which the specific books are ranked is determined by how frequently they were mentioned.

**Table 4.7: Ranking of Books**

Sr. No	Rank list of cited books	Rank	Number of Citations	%
1	The Internet Unleashed	1	5	1.17
2	The Whole Internet - User's Guide & Catalog	1	5	1.17

3	Artificial Intelligence	2	4	0.93
4	Little science Big science	2	4	0.93
5	Multimedia Madness	2	4	0.93
6	Prolegomena to library classification	2	4	0.93
7	Citation Indexing-Theory and application in science	3	3	0.70
8	Finding it on the Internet	3	3	0.70
9	Mastering the Internet	3	3	0.70
10	Multimedia bible	3	3	0.70
11	Multimedia Developers Guide	3	3	0.70
12	Multimedia main	3	3	0.70
13	Reference Service	3	3	0.70
14	Sources of information on specific subjects	3	3	0.70
15	The Internet for Dummies	3	3	0.70
16	Bradford's law and the bibliography of Sci.	4	2	0.47
17	colon classification 7th edition	4	2	0.47
18	Computers in Libraries	4	2	0.47
19	Erfolgsghemnisse der Wahrnehmung Stuttgart:Deutsche Verlags-Anstalt	4	2	0.47
20	Expert system for reference and information retrieval	4	2	0.47
21	HTML for Dummies Quick Reference	4	2	0.47
22	Library Classification : Fundamental & procedures	4	2	0.47
23	Little Science, Big Science	4	2	0.47
24	The Internet	4	2	0.47
25	The Internet Connection : System Connectivity & Configuration	4	2	0.47
26	The Internet guide for new users	4	2	0.47
27	The use of quality and quantity of publication	4	2	0.47
28	The world wide web Unleashed	4	2	0.47

	One Time Cited Journals(93X1)		350	81.59
	<b>Total</b>		<b>429</b>	<b>100</b>

To prevent bulkiness, the popular book bibliography is displayed in Table No. 4.7. Books with many citations have had their titles taken into account. With 5 (1.17%) citations, the books "The Internet Unleashed" and "The Whole Internet - User's Guide & Catalog" are ranked highest. "Artificial Intelligence," "Little science Big science: Columbia University press," and "Multimedia Madness" are ranked second and third, respectively, with 4 (0.93%) citations.

#### 4.8 Language-wise distribution of citations

A total number of 1830 citations of 13 seminar proceedings are distributed among languages used is shown in Table No. 4.8.

**Table 4.8: Language-Wise Distribution of Citations**

Language Wise Distribution of Citations			
Sr. No.	Language	Overall	(%)
1	English	1830	100

The table shows that 1830 (100%) documents are cited in English language only. This indicates that, "**English language is a predominant language**" (**hypothesis no. 4**) is valid. (Table No.4.8)

#### 4.9 Geographical distribution of citations in Place wise

Table No. 4 displays the distribution of 1830 mentioned documents across various geographical regions in 13 seminar proceedings.<sup>9</sup> The geographical distribution of citations reveals the relative contribution and standing of Places in a given topic area.

**Table 4.9 Geographical Distribution of Citations**

Sr. No	Place	Rank	No. of Citation	%
1	New York	1	275	15.03
2	London	2	194	10.60

3	New Delhi	3	163	8.91
4	Bangalore	4	134	7.32
5	USA	5	89	4.86
6	Washington	5	89	4.86
7	California	6	77	4.21
8	New Jersey	6	77	4.21
9	Cambridge	7	49	2.68
10	Chennai	7	49	2.68
11	Vienna	7	49	2.68
12	Bombay	8	25	1.37
13	Paris	8	25	1.37
14	Ahmadabad	9	7	0.38
15	Berlin	9	7	0.38
16	Calcutta	9	7	0.38
17	Geneva	9	7	0.38
18	India	9	7	0.38
19	Massachusetts	9	7	0.38
20	Menlo park	9	7	0.38
21	Hyderabad	10	4	0.22
22	North Holland	10	4	0.22
23	oxford	10	4	0.22
24	U.K	10	4	0.22
25	Agra	11	2	0.11
26	Auckland	11	2	0.11
27	Baroda	11	2	0.11
28	Basil Blackwell	11	2	0.11
29	Bhubaneswar	11	2	0.11
30	Bizet	11	2	0.11

31	Boston	11	2	0.11
32	Brighton	11	2	0.11
33	Brussels	11	2	0.11
34	Champaign	11	2	0.11
35	Chicago	11	2	0.11
36	Calcutta	11	2	0.11
37	England	11	2	0.11
38	Golgotha	11	2	0.11
39	Great Britain	11	2	0.11
40	Haryana	11	2	0.11
41	Japan	11	2	0.11
42	Karnataka	11	2	0.11
43	Kula Lumpur	11	2	0.11
44	Luck now	11	2	0.11
45	Madras	11	2	0.11
46	Maharashtra	11	1	0.05
47	Midnapore	11	1	0.05
48	Mumbai	11	1	0.05
49	Mysore	11	1	0.05
50	Nagpur	11	1	0.05
51	Newzealand	11	1	0.05
52	Singapore	11	1	0.05
53	Tioga	11	1	0.05
54	Tokyo	11	1	0.05
55	US	11	1	0.05
56	Virginia	11	1	0.05
57	Unknown		417	22.79
	<b>Total</b>		<b>1830</b>	<b>100.00</b>

The table shows that “New York” scored the top position with 275(15.03) citations, Second rank goes to “London”& “New Delhi” with 194 (10.60) citations, followed by the third rank goes to “New Delhi” with 162 (8.91) citations respectively.

#### 4.9.1 Geographical distribution of Citations State wise

The distribution of the 1830 cited documents in the 13 Seminar proceedings is broken down geographically, as Table No. 4.9.1 illustrates. This information reveals the relative contribution of each state and its standing in the particular subject field.

**Table 4.9.1 Geographical distribution of Citations State wise**

Sr. no	State Wise	Rank	No. of Citation	%
1	New York	1	275	15.03
2	London	2	194	10.60
3	New Delhi	3	163	8.91
4	Karnataka	4	134	7.32
5	USA	5	89	4.86
6	Washington	5	89	4.86
7	California	6	77	4.21
8	New Jersey	6	77	4.21
9	Tamilnadu	7	51	2.79
10	Cambridge	8	49	2.68
11	Vienna	8	49	2.68
12	Maharashtra	9	28	1.53
13	Paris	10	25	1.37
14	Ahmadabad	11	7	0.38
15	Berlin	11	7	0.38
16	Calcutta	11	7	0.38
17	Geneva	11	7	0.38
18	Massachusetts	11	7	0.38
19	Menlo park	11	7	0.38

20	Hyderabad	12	4	0.22
21	North Holland	12	4	0.22
22	oxford	12	4	0.22
23	U.K	12	4	0.22
24	Karnataka	13	3	0.16
25	Agra	14	2	0.11
26	Auckland	14	2	0.11
27	Baroda	14	2	0.11
28	Basil Blackwell	14	2	0.11
29	Bhubaneswar	14	2	0.11
30	Bizet	14	2	0.11
31	Bosten	14	2	0.11
32	Brighton	14	2	0.11
33	Brussels	14	2	0.11
34	Illinois	14	2	0.11
35	Chicago	14	2	0.11
36	West Bengal	14	2	0.11
37	England	14	2	0.11
38	Great Britain	14	2	0.11
39	Haryana	14	2	0.11
40	Japan	14	2	0.11
41	Luck now	14	2	0.11
42	Newzealand	15	1	0.05
43	Singapore	15	1	0.05
44	Tokyo	15	1	0.05
	Unknown		417	22.79
	<b>Total</b>		<b>1830</b>	<b>100</b>

The table no 4.9.1 shows that New York scored the top position with 49 (2.68%) citations, second rank goes to New Delhi & London with 45 (2.46%) citations, the third rank goes to Karnataka with 22 (1.20) citations respectively.

#### 4.9.2 Geographical distribution of Citations country wise

As indicated in Table No. 4.9.2, the total number of 1830 mentioned documents in 13 seminar sessions are dispersed throughout several geographic regions. This information about the geographic distribution of citations reveals the relative contribution and standing of the various countries involved in a certain topic area.

**Table 4.9.2 Geographical distribution of Citations country wise**

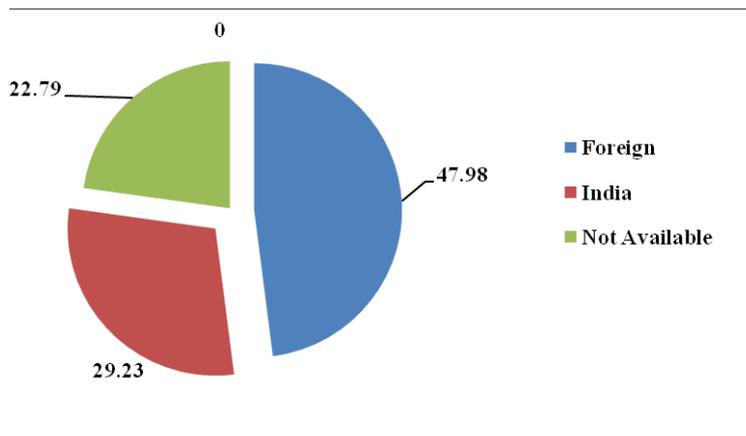
Sr.No	Country Wise	Rank	No.Of Citation	%
1	India	1	535	29.23
2	US	2	292	15.96
3	New york	3	265	14.48
4	England	4	187	10.22
5	Austria	5	49	2.68
6	Japan	6	23	1.26
7	France	7	17	0.93
8	Canada	8	13	0.71
9	Russia	8	13	0.71
10	Germany	9	7	0.38
11	Switzerland	9	7	0.38
12	Netherlands	10	5	0.27
13	Unknown		417	22.79
	<b>Total</b>		<b>1830</b>	<b>100</b>

The table shows that Country wise Distribution of citation of India scored the top position with 100 (5.46%) citations, second rank goes to New York with 97 (5.30%) citations, without place with 1546 (84.48%) Citations respectively.

#### 4.9.3 Indian and Foreign distribution of citations

**Table 4.9.3: Indian and Foreign Distribution of Citations**

Country	Rank	No. Of Citation	%
Foreign	1	878	47.98
India	2	535	29.23
Not Available		417	22.79
Total		1830	100



**Figure No.4.5 Indian and foreign distribution of citations**

Figure 4.5 and Table 4.9.3 illustrate the geographic distribution of the coverage of foreign and Indian countries. Of the 1830 citations, 100 (or 5.46%) are from India, and the remaining 184 (or 10.5%) are from outside the country. And as the nation has not been stated in the remaining 1546 (84.48%) Citations, the notion that "**Researchers in seminar proceedings mostly prefer Indian publication**" is false. (First Hypothesis) (See Table 4.9.3)

#### 4.10 Ranking of Website

A total number of 1830 cited documents of 13 seminar proceedings is shown in Table No. 4.10, out of that 367 citations have mentioned their Website. The Website ranking is shown in Table No. 4.10.

**Table 4.10 Website Ranking**

Sr.No	Cited website	Rank	Number of citations	Percentage
1	www.w3.org	1	11	3.00

2	www.dlib.org	2	10	2.72
3	www.ukoln.ac.uk/metadata	3	8	2.18
4	www.cs.cf.ac.uk	4	7	1.91
5	www.purl.org	4	7	1.91
6	www.orc.rsch.oclc.org	5	5	1.36
7	www.bib.wau.nl.isis/keyser/isodb3.html	6	4	1.09
8	www.macromedia.com	6	4	1.09
9	www.mirror.ac.uk	6	4	1.09
10	www.ncsi.iisc.ernet.in	6	4	1.09
11	www.oclc.org/home	6	4	1.09
12	www.pcworld.com	6	4	1.09
13	www.press.umich.edu	6	4	1.09
14	www.brint.com	7	3	0.82
15	www.getty.edu./gri/standard/intrometadat	7	3	0.82
16	www.microsoft.com	7	3	0.82
17	www.xml.com	7	3	0.82
18	www.albany.edu	8	2	0.54
19	www.asp101.com	8	2	0.54
20	www.cookiecentral.com	8	2	0.54
21	www.-db.stanford.edu/~gravano/starts	8	2	0.54
22	www.dictionary.com	8	2	0.54
23	www.dstc.edu.au/RDU	8	2	0.54
24	www.educate.lib.chalmers.html	8	2	0.54
25	www.findarticles.com	8	2	0.54
26	www.gpu.srv.ualberta.ca	8	2	0.54
27	www.isinet.com	8	2	0.54
28	www.learnasp.com	8	2	0.54
29	www.members.com	8	2	0.54
30	www.scit.wlv.ac.uk/seed	8	2	0.54
31	www.whatis.com	8	2	0.54
32	One Citation Website		251	68.39
	<b>Total</b>		<b>367</b>	<b>100.00</b>

Table No. 4.10 shows the bibliography of popular Website. The “www.w3.org” Website scores the top position with 11 (3.00%) citations, second rank goes to [www.dlib.org](http://www.dlib.org) with 10 (2.72%) citations and One time citation of website 251 (68.39) citations respectively.

#### 4.11 Ranking of authors

A total number of 1830 cited documents of 13 seminar proceedings is shown in Table No. 4.11, out of that 2213 citations have mentioned their authors and 443 citations are without authors. The author ranking is shown in Table No. 4.11.

**Table 4.11: Author Ranking**

Sr. No.	Author	Citations	%
1	Ravichandra Rao I.K.	45	2.03
2	Neelmeghan A.	42	1.90
3	Bhattacharyya G.	37	1.67
4	Ranganathan S.R.	35	1.58
5	Seetharama S.	33	1.49
6	Gopinath M.A.	23	1.04
7	Egghe L.	19	0.86
8	Lancaster F.W.	17	0.77
9	Brookes B.C.	13	0.59
10	Raizda A.S.	13	0.59
11	Devdason F.J.	12	0.54
12	Garfield E.	12	0.54
13	Rousseau R.	12	0.54
14	Bookstein Abraham	9	0.51
15	Bradford S.C.	9	0.51
16	Glanzel W.	9	0.51
17	Schubert A.	9	0.51
18	Tague Jean M.	9	0.51

19	Burrell Q. L.	8	0.45
20	Haravu L.J.	8	0.45
21	Arunachalam S.	7	0.40
22	Gupta D.K.	7	0.40
23	Price D.J.D.	7	0.40
24	Simon H.A.	7	0.40
25	Bourne Charles P.	6	0.34
26	Gupta R.C.	6	0.34
27	Vickey B.C.	6	0.34
28	Cronin Blaise	5	0.28
29	Guha B.	5	0.28
30	Kent Allen	5	0.28
31	Lotka A.J.	5	0.28
32	Narin F.	5	0.28
33	Rao N.S.V.	5	0.28
34	Sichel H.S.	5	0.28
35	Singh U.N.	5	0.28
36	Taylor Robert S.	5	0.28
37	Venkatraman S.	5	0.28
38	Caruso E.	4	0.23
39	De Leeuw J.	4	0.23
40	Kendall M. G.	4	0.23
41	Koenig M.	4	0.23
42	Leimkuhler F.F.	4	0.23
43	Raghvan K.S.	4	0.23
44	Raghvan M.C.	4	0.23
45	Rajan T.N.	4	0.23
46	Salmon Stephen R.	4	0.23
47	Salton G.	4	0.23

48	Sen B.K.	4	0.23
49	Tijssen R.J.W.	4	0.23
50	Yablonsky A.I.	4	0.23
51	Allen Thomas J.	3	0.17
52	Arora A.M.	3	0.17
53	Athrton P.	3	0.17
54	Baiser Karl	3	0.17
55	Balasubramanian V.	3	0.17
56	Blezer Jack	3	0.17
57	Cooks T.M.	3	0.17
58	Debones A.	3	0.17
59	Gilchrist A.	3	0.17
60	Groos O.V.	3	0.17
61	Hall James L.	3	0.17
62	Hecht Myron	3	0.17
63	Ijiri Y.	3	0.17
64	Indian Statistical Institute	3	0.17
65	Iyengar S.S.	3	0.17
66	Kessler M. M.	3	0.17
67	King Donald W.	3	0.17
68	Koenig Michael E.D.	3	0.17
69	Korennoi A.A.	3	0.17
70	Kretschmer H.	3	0.17
71	Magson M.S.	3	0.17
72	Malathi N.	3	0.17
73	McGarry Kevin	3	0.17
74	McGill Michael J.	3	0.17
75	Mohandas M.K.	3	0.17
76	Nicholls Paul	3	0.17

77	Oppenhem Charles	3	0.17
78	Patwardhan D.V.	3	0.17
79	Peritz B.C.	3	0.17
80	Potter Williams G.	3	0.17
81	Pratap Lingam P.	3	0.17
82	Repo A.J.	3	0.17
83	Saracevic Tefko	3	0.17
84	Sharada B.A.	3	0.17
85	Shera J.H.	3	0.17
86	Subramanyam K.	3	0.17
87	Suriya M.	3	0.17
88	System Development Corporation	3	0.17
89	Vlachy J.	3	0.17
90	Williams Martha E.	3	0.17
91	Wilson Alex	3	0.17
92	Zipf G.K.	3	0.17
93	Allison P.D.	2	0.11
94	Armstrong C.J.	2	0.11
95	Bearman toni Carbo	2	0.11
96	Becker Joseph	2	0.11
97	Beheshti J.	2	0.11
98	Bentley J.L.	2	0.11
99	Bernal J.D.	2	0.11
100	Bhatiya K.K.	2	0.11
101	Bhattacharyya S.	2	0.11
102	Bhavani V.	2	0.11
103	Borko Harold	2	0.11
104	Boulding K.E.	2	0.11

105	Brinbers H.R.	2	0.11
106	Brown Marjorie J.	2	0.11
107	Carter M.P.	2	0.11
108	Chakraborty Arun Kumar	2	0.11
109	Cleveland Harlan	2	0.11
110	Coile R.C.	2	0.11
111	Cooper M.D.	2	0.11
112	Cronin B.	2	0.11
113	De Solla Price D.K.	2	0.11
114	Deshmukh S.	2	0.11
115	Dhawan S.M.	2	0.11
116	Einstein A.	2	0.11
117	Elchesen D.R.	2	0.11
118	Eyre J.	2	0.11
119	Fairthone R.A.	2	0.11
120	Flowerdew A.D.	2	0.11
121	Frame J.D.	2	0.11
122	Galvin Thomas J.	2	0.11
123	Gopalakrishanan N.K.	2	0.11
124	Greenacre M.J.	2	0.11
125	Griffith Belver C.	2	0.11
126	Griffiths Jose Marie	2	0.11
127	Gupta B.S.S.	2	0.11
128	Haitun S.D.	2	0.11
129	Harmon Glynn	2	0.11
130	Hemlatha Iyaer	2	0.11
131	India, University Grants	2	0.11
132	Kanasy J.E.	2	0.11
133	Kanter Rosabeth Moss	2	0.11

134	Kasiviswanadhan S.	2	0.11
135	Kaula P.N.	2	0.11
136	Kertesz F.	2	0.11
137	Keshava Kumar B.S.	2	0.11
138	Kriegal H.P.	2	0.11
139	Kuppuswamy S.	2	0.11
140	Lamerton D.M.	2	0.11
141	Large J.A.	2	0.11
142	Machlup F.	2	0.11
143	Mahapatra m.	2	0.11
144	Malwad N.M.	2	0.11
145	Mandelbort B.	2	0.11
146	Maron M.E.	2	0.11
147	Marschak J.	2	0.11
148	Martin James	2	0.11
149	Martin John	2	0.11
150	Mason D.	2	0.11
151	Metcalf John R.	2	0.11
152	Millner Alan R.	2	0.11
153	Mishra K.N.	2	0.11
154	Mitsuko Collver	2	0.11
155	Moed H.F.	2	0.11
156	Murthy D.S.R.	2	0.11
157	Nageswara Rao B.	2	0.11
158	Nederhof A.J.	2	0.11
159	Needleman H.L.	2	0.11
160	Nelson Micheal J.	2	0.11
161	Ojha S.R.	2	0.11
162	Oldman Christine	2	0.11

163	O'Neill E.T.	2	0.11
164	Palmour V.E.	2	0.11
165	Pao M.L.	2	0.11
166	Parthsarathy S.	2	0.11
167	Penland P.R.	2	0.11
168	Penna C.V.	2	0.11
169	Politt A.S.	2	0.11
170	Pratt A.D.	2	0.11
171	Qiu Junping	2	0.11
172	Rajagopalan T.S.	2	0.11
173	Rajshekhar T.B.	2	0.11
174	Ramchandran M.	2	0.11
175	Randall G.E.	2	0.11
176	Ranjita Maitra	2	0.11
177	Rowley J.E.	2	0.11
178	Rusi Brij	2	0.11
179	Satyanarayan R.	2	0.11
180	Seethraman M.N.	2	0.11
181	Sen S.K.	2	0.11
182	Shah P.C.	2	0.11
183	Shera Jasse H.	2	0.11
184	Simpson Alan	2	0.11
185	Small H.	2	0.11
186	Soergal D.	2	0.11
187	Sur S.N.	2	0.11
188	Sweeney E.	2	0.11
189	Tedd L.A.	2	0.11
190	Tedd Lucy A.	2	0.11
191	Theiler J.	2	0.11

192	Urquhart D.J.	2	0.11
193	Veni Madhavan C.E.	2	0.11
194	Vijaylakshmy V.	2	0.11
195	Voss H.	2	0.11
196	Warren K.S.	2	0.11
197	Wilkinson E.A.	2	0.11
198	Wills Gordon	2	0.11
199	Wood J.B.	2	0.11
1109	One time cited authors	998	45.10
	N/A	460	20.79
	<b>Total</b>	<b>2213</b>	<b>100</b>

Author ranking is crucial to both librarians and researchers, as Table No. 4.11 demonstrates which author is most favored by researchers and which document should be kept in the library for that reason. With 45 (2.03%) citations, "Ravinchandra Rao I.K." is the most referenced author. Neelmeghan A. comes in second with 42 (1.90%) citations, while Bhattacharya G. comes in third with 37 (1.67%) citations.

#### 4.12 Ranking of publisher

Table No. 4.12 displays the total number of 1830 cited publications from the 13 seminar sessions; 112 of these citations include the publisher, while 1718 (93.09%) do not. In Table 4.12, the Publisher ranking is displayed.

**Table no 4.12: Ranking of publisher**

Sr.No.	Publisher	Rank	Number of Citations	%
1	Sams Publication	1	22	1.20
2	DRTC	2	9	0.49
3	ALIB Proceedings	3	8	0.44
4	BPB Publications	4	4	0.22
5	Library Association Publishing	5	3	0.16
6	MIT press	5	3	0.16

7	Academic press	6	2	0.11
8	Cambridge University press	6	2	0.11
9	Columbia University Press	6	2	0.11
10	Englewood Cliffs	6	2	0.11
11	IGNOU	6	2	0.11
12	McGraw-Hill Book	6	2	0.11
13	Oxford university press	6	2	0.11
14	Abacus	7	1	0.05
15	Addison - Wesley press	7	1	0.05
16	Addison Wesley	7	1	0.05
17	Asia Publication House	7	1	0.05
18	ASLIB	7	1	0.05
19	BSE national index of equity prices	7	1	0.05
20	Butterworth's Press	7	1	0.05
21	clive bingley	7	1	0.05
22	Comdex Computer publishing	7	1	0.05
23	Csir Publication	7	1	0.05
24	DSWO Press	7	1	0.05
25	Elsevier science publisher	7	1	0.05
26	ESS-ESS	7	1	0.05
27	Frances printer	7	1	0.05
28	Gower publishing company	7	1	0.05
29	Grand Rapids	7	1	0.05
30	Harvard University press	7	1	0.05
31	IEEE Press	7	1	0.05
32	Indianapolis:Que corporation	7	1	0.05
33	Information Resource Press	7	1	0.05
34	Jaico Publishing House	7	1	0.05

35	Library association publishing	7	1	0.05
36	Macmillan Computer Publishing	7	1	0.05
37	Macromedia Press	7	1	0.05
38	madrass library association	7	1	0.05
39	measurement and seal- Organization of scientific communication	7	1	0.05
40	Melville Publishing	7	1	0.05
41	Narosa publishing house	7	1	0.05
42	New Age International Publisher	7	1	0.05
43	New age International Publishers	7	1	0.05
44	New Riders Publication	7	1	0.05
45	NJ:Princeton University	7	1	0.05
46	Paragon press	7	1	0.05
47	Prentice hall	7	1	0.05
48	Publishing of Indianapolis	7	1	0.05
49	Queue Corporation	7	1	0.05
50	R & D Management	7	1	0.05
51	Ranking of publishers	7	1	0.05
52	RFC	7	1	0.05
53	Sage publication	7	1	0.05
54	Social studies of science	7	1	0.05
55	T.R.Publication	7	1	0.05
56	Tata McGraw-Hill Publishing Company limited	7	1	0.05
57	UBS Publishers	7	1	0.05
58	University of Chicago Press	7	1	0.05
59	West publishing company	7	1	0.05
60	Wiley Eastern Ltd	7	1	0.05

61	Wrox Press Inc	7	1	0.05
62	Ziff-Davis press	7	1	0.05
	N/A		1718	93.9
	<b>Total</b>		<b>1830</b>	<b>100</b>

Author ranking is crucial for researchers and librarians alike. The publisher that researchers choose is the one whose document should be kept in the library for that reason. With 22 (1.20%) citations, "Sams Publication" is the most cited publisher. "DRTC" comes in second place with 9 (0.49%) citations, while "ASLIB Proceedings" comes in third place with 8 (0.44%). "BPB Publications" came next, receiving 4 (0.22%) citations.

\*\*\*\*\*

## 5 FINDINGS, CONCLUSIONS AND SUGGESTIONS

### 5.1 Summary of findings

The results are derived from 1830 citations that are included in the 13 Annual Proceedings on DRTC Seminars (written exclusively in English). A ten-year period, from 1993 to 2002, was taken into consideration.

1. The frequency distribution of various types of literature that researchers utilize in yearly seminars is mostly dependent on the utilization of 13 proceedings.
2. The number of years that passed between a cited document's publications was used to gauge the period-wise distribution of citations. For this reason,

the entire period covered by the materials used was split up into five-year period groupings. The maximum number of citations are covered during the period of 1992-1997 accounting to 501 (27.38), followed by year 1998-2002 accounting to 167 (9.13%) citations. Table 4.4 and figure 4.4 show that the 1892-1961 accounting to 48 (2.62%), followed by year 1962-1967 accounting to 32 (1.75%) citations. Additionally, 467 (25.52%) citations lack a year.

3. The percentage of one author, two authors, three authors, four authors, and five authors was ascertained by analyzing the writers. The largest amount of citations – 1830 – is 998 (54.54%) by a single author, followed by joint writers with 306 (16.72%), three authors with 41 (2.24%), and four authors with 18 (0.98%) citations. The results also indicate that the authors with the fewest citations – 07, or 0.38% – are five authors. Additionally, 460 (25.14%) citations are missing the author.

4. Among the 783 journals, "Journal of Documentation" has the most citations – 36 (04.60%) – followed by "Scientometrics" (34 (04.34%) and "Journal of the American Society for Information science" (32 (4.09%) – in order of ranking.

5. The most popular publications used by scholars are books. Two books stand out among the 429 books: "The Internet Unleashed" and "The Whole Internet - User's Guide & Catalog," with five (1.17%) citations. "Artificial Intelligence," "Little science Big science: Columbia University press," and "Multimedia Madness" are ranked second and third, respectively, with four (0.93%) citations.

6. Only English-language citations are found in the top 1830 (100%) documents in the seminar proceedings.

7. That for their research, research experts do not rely solely on online resources. There are 12 seminar proceedings with a total of 1561 citations; web citations are not available.

9. Among the 2213 writers having citations, "Ravinchandra Rao I.K." receives the highest ranking with 45 (2.03%), followed by "Neelmeghan A." with 42 (1.90%) and "Bhattacharya G." with 37 (1.67%) citations.

10. "Sams Publication" is the most referenced publisher, receiving 22 (1.20%) citations. "DRTC" comes in second place with 9 (0.49%) citations, while "ASLIB Proceedings" comes in third place with 8 (0.44%). "BPB Publications" came next, receiving 4 (0.22%) citations.

## 5.2 Final Thoughts

The conclusions drawn from the data analysis attached to the 13th Annual Proceedings on DRTC Seminars are presented in a way that aligns with the study's goals.

#### 1. Distribution of cited literature according to form

Books from non-periodical sources are a major source of information for scholars using various forms of literature in proceedings. With regard to citation counts, it was shown that journals account for the majority of media used—783 (43.69%) of all literature read, compared to 429 (23.44%) for books. Report 41 (2.24%), Conference 108 (16.91%), Thesis 15 (0.82%), Encyclopedia 11 (0.60), Website 367 (20.05%), and Other 76 (4.14%) are among the citations. This suggests that Hypothesis No. 2, "Journals are the major documents cited in maximum," is true. (Table 4.3)

#### 2. Citation distribution across time

The number of years that passed between a cited document's publications was used to measure the period-wise distribution of citations. For this reason, the entire range of the used papers was split up into ten-year period groupings. The maximum number of citations are covered during the period of 1992-1997 accounting to 501 (27.38), followed by year 1998-2002 accounting to 167 (9.13%) citations. Table 4.4 and figure 4.4 show that the 1892-1961 accounting to 48 (2.62%), followed by year 1962-1967 accounting to 32 (1.75%) citations. Additionally, 467 (25.52%) citations lack a year. (See Table 4.4.)

#### 3. The overall citations' authorship pattern

The basic publishing pattern is just one of the characteristics of any subject literature; the writers themselves were also evaluated to ascertain the percentage of one, two, three, and more authors. The authors' analysis results are offered to provide a clear picture. Table 4.5 and Figure 4.5 show that of the total 1830 citations, 998 (54.54%) are by a single author, followed by joint authors in 306 (16.72%), three authors in 41 (2.24%), and four authors in 18 (0.98%) citations. The results also indicate that the authors with the fewest citations—07, or 0.38%—are five authors. Additionally, there are 460 (25.14%) citations without an author. This suggests that Hypothesis No. 3—"Multiple authors are predominant than Single author"—is untrue. (See Table 4.5)

#### 4. Journal ranking

In essence, the journal rating list is a useful tool that research scientists and librarians may use to choose journals that will be most helpful in terms of how well they cover recent and significant work in a given field. The most popular publications that scholars employ for their research are journals. The preceding table takes into account the citations that are mentioned in the journals. With 36 (04.60%) citations, the "Journal of Documentation" ranks highest, followed by "Scientometrics" with 34 (04.34%) citations and "Journal

of the American Society for Information science" with 32 (4.09%) citations (Table No. 4.6).

#### 5. Book rankings

The popular book bibliographies in order to minimize bulk. Books with many citations have had their titles taken into account. With 5 (1.17%) citations, the books "The Internet Unleashed" and "The Whole Internet - User's Guide & Catalog" are ranked highest. "Artificial Intelligence," "Little science Big science: Columbia University press," and "Multimedia Madness" are ranked second and third, respectively, with 4 (0.93%) citations. (See Table 4.7)

#### 6. Citation distribution by language

According to the table, 1830 documents (or 100%) include solely English citations. This suggests that hypothesis number four – "English language is a predominant language" – is true. (Table 4.8).

#### 7. Citation distribution by geography

According to the overall geographic distribution of citations, "New York" came in first place with 49 (2.68) citations, followed by "London" and "New Delhi" with 45 (2.46) citations and "Bangalore" with 22 (1.20) citations for third place.

India ranked first in the country-wise distribution of citations with 100 (5.46%), followed by New York with 97 (5.30%) and without place with 1546 (84.48%) citations.

The covering of foreign and Indian countries by geography. Of the 1830 citations, 100 (or 5.46%) are from India, and the remaining 184 (or 10.5%) are from outside the country. And as the nation has not been stated in the remaining 1546 (84.48%) Citations, the notion that "Researchers in seminar proceedings mostly prefer Indian publication" is false. (First Hypothesis) (See Table 4.9.3)

8. Website Positioning the prominent website's bibliography. The website "www.w3.org" receives the highest ranking with 11 (3.00%) citations, followed by www.dlib.org in second place with 10 (2.72%) citations, and a single citation from the website with 251 (68.39) citations. Table No. 4.10

#### 9. Author Ordering

Author ranking is crucial for both researchers and librarians since it indicates which author is most chosen by researchers and which document should be kept in the library for that reason. With 45 (2.03%) citations, "Ravinchandra Rao I.K." is the most referenced author. Neelmeghan A. comes in second with 42 (1.90%) citations, while Bhattacharya G. comes in third with 37 (1.67%) citations. (See Table No. 4.11)

## 9. Ranking of Publishers

Author ranking is crucial for researchers and librarians alike. The publisher that researchers choose is the one whose document should be kept in the library for that reason. With 22 (1.20%) citations, "Sams Publication" is the most cited publisher. "DRTC" comes in second place with 9 (0.49%) citations, while "ASLIB Proceedings" comes in third place with 8 (0.44%). "BPB Publications" came next, receiving 4 (0.22%) citations. (Table 4, Page 420)

### 5.3 Advice

When referencing the work of other authors, research researchers in seminar proceedings should provide all relevant bibliographical information, including the author's name, the title of the work, the source of publishing, the volume and issue numbers, the year and location of publication, and the publisher. Fourteen hundred and forty-three (20.01%) of the eighteen citations (the source data) have an author, and fifteen hundred and forty-six (84.48%) have a place. Therefore, it is quite difficult to analyze citations properly; bibliographical information should be provided in order to solve this issue. Citation analysis of seminar proceedings will assist librarians in finding essential journals, subscribing to helpful journals, and managing the entire library while upholding standards. It also assists researchers in choosing the document that provides up-to-date information on the subject of interest for their work.

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## 6 Appendix

Sr. no	Year	Title	Page no.	No. of Citation
1	1993-I	Title - Seminar on Library Networks in India		
	Sr. no	Editor - Rao, I.K.Ravichandra	1-107	107
	1	Introduction to Artificial Intelligence	1 to 10	17
	2	Expert Systems : Its Design and Development	11 to 21	5
	3	Computer-Based Knowledge	22 to 49	17

		Representation and Models		
	4	A Fuzzy SET Approach to Information Retrieval : An Example of Artificial Intelligence Application to IR	50 to 65	12
	5	Natural Language Processing	66 to 87	37
	6	Logic and Logic Programming	88 to 107	19
2	<b>1993-II</b>	<b>Title - Artificial Intelligence Application to Library and Information Work</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. no</b>	<b>Editor - Prasad, A.R.D</b>	<b>1-253</b>	<b>108</b>
	1	International and regional Information Systems and Networks: Examples of Recent Experiences in Developing Countries	1 to 38	7
	2	DELNET: A brief introduction	39 to 56	0
	3	Security and control in Wide Area Network: INDONET Experience	57 to 68	0
	4	Development of Nagpur Library Network (NAGNET) : A Proposal For Carrying Out Feasibility Study	69 to 78	0
	5	Establishment of a City Library Network Experiences of Puente Network of Libraries and Information Centers in the Pune Metropolitan Area	79 to 99	11
	6	Bibliographic Database Access through E-Mail	100 to 115	11
	7	MLIBNET- Genesis and Organization	116 to 121	0
	8	Information Services on MALIBNET	122 to 128	0
	9	Network Architecture and System Requirements for MALIBNET	129 to 136	0
	10	Searching online Databases through INTERNET : Tips, Techniques and Words of Wisdom	137 to 146	0
	11	A Draft Proposal for Cochin Library Network	147 to 158	14
	12	Library Networks : Objectives,	159 to	8

		Functions and Requirements	174	
	13	Information Systems, Inter-Connection and Networking : Problems and Implications	175 to 192	12
	14	Education of Information Professionals for Library Networks	193 to 202	0
	15	Wide Area Networks : A Facilitator for Library Resource Sharing	203 to 214	12
	16	Software and Hardware Requirements for INFLIBNET: An Evaluation	215 to 228	9
	17	Bangalore Library Networks	229 to 230	0
	18	SIRNRT: A Case Study	231 to 240	4
	19	Education of Information Professionals for Library Networks	241 to 243	0
	20	Information Resources on Worldwide Networks : Possibilities of Network Information Services in India	244 to 253	20
3	1994	<b>Title - Teaching, Research &amp; Practice in Classification &amp; Indexing Languages</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. no</b>	<b>Editor - Gopinath, M.A</b>	<b>1-254</b>	<b>107</b>
	1	Research in Classification : A Pointer Towards Knowledge Representation	1 to 15	9
	2	A Comparative Study of Universal Decimal Classification in Terms of Structural Engineering	16 to 26	2
	3	Development of a Subject and Classification Schedules : A Historical Study of Superconductivity	27 to 32	2
	4	Document Scatter in Classification Literature	33 to 38	1
	5	Subject Scatter in Classification Literature	39 to 42	1
	6	Indexing Language : Its Structure and Development	45 to 76	7
	7	Natural Language Processing Technique in Keyword Identification	77 to 90	6

		from Book Titles		
	8	Index Language in Kannada: An Experimental Study	91 to 101	10
	9	Addax System of Classification for Newspaper Clippings Adapted in APAU Library - A Case Study	103 to 108	2
	10	Computer Assisted Indexing	109 to 121	8
	11	Hypertext : Application with Emphasis to Indexing	123 to 131	7
	12	Curricula in Teaching Classification and Indexing in Advanced Courses in Library and Information Science : A Case Study	133 to 144	3
	13	Role of Computers in Improving Teaching Effectiveness in Classification	145 to 150	0
	14	Computer - Assisted Instruction (CAI) Package on Vocabulary Control and Thesaurus	151 to 158	5
	15	Computer Assisted instruction for Classification (CAIC)	159 to 174	11
	16	Online Assistance for Classifying and Indexing	175 to 178	2
	17	Teaching and Learning Library Classification Through Simplified Terminology : Contribution of Dr.S.R.Ranganathan	179 to 184	0
	18	Learning Classification Through Normative Principles and Their Application	185 to 193	3
	19	Teaching of Classification : Thoughts to Ponder	195 to 203	4
	20	Classification and Representation of Knowledge	205 to 214	5
	21	Classification and Indexing for Stock Market Information : A Case Study in Design and Development	215 to 230	9
	22	Computer Assisted Thesaurus Construction	231 to 240	3

	23	Statistical Approach to Automatic Indexing	241 to 250	7
	24	Microseism Utilities for Classifying, Indexing and Retrieval Consistency in Classifying & Indexing	251 to 254	0
4	1995	<b>Title - Libraries and Information centers as Profit-Making Instauration</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. No</b>	<b>Editor - Seetharama, S</b>	<b>1-243</b>	<b>45</b>
	1	Resource Generation In Libraries And Information Centers: An Overview	1 to 13	12
	2	A comparative Study of Universal Decimal Classification in Terms of Structural Engineering	14 to 19	3
	3	Income Generating Services At Nichem : A Case Study	20 to 32	1
	4	Photocopy Supply Service Developed At NCL / Nichem	33 to 46	0
	5	Gujarat Vidyapith Library A Proposal For Generating Financial Resources	47 to 51	0
	6	Resource Generation Through Metalworking Database : A Case Study	52 to 69	0
	7	Revenue From Library And Information Service : A Case Study	70 to 75	0
	8	Marketing Of INSDOC Services : A Report	76 to 89	0
	9	Development And Marketing Of Information Products : The SMDT Women's University Library Experience	90 to 102	0
	10	Costing Of Information Packages	103 to 111	6
	11	Marketing of Information Services in Newspaper Industry	111 to 120	8
	12	Marketing of Information Services at Indian Institute of Management Bangalore : A Case Study	121 to 131	5
	13	Grab and survive Nictas Experience in information Marketing	132 to 146	0

	14	Advertising Information Services and Products	147 to 158	0
	15	Prerequisites for Information Marketing a Case Study of NPL Library	159 to 165	0
	16	Devinsa : A Quest for Sustainability	166 to 193	5
	17	Vending Information Services to IT Industry	194 to 199	2
	18	Marketing of services At National Neurosciences Information Centre Nimhans, Bangalore : A Case Study	200 to 209	0
	19	Costing Computerized SDI Service	210 to 216	3
	20	Cost Effective Approach to Database Creation : An Experience at Infflibnet	217 to 228	0
	21	Costing and Pricing an Electronic Information Product: A Case Study	229 to 243	0
5	1996	<b>Title - Advances in Information Technology: Impact on Library and Information Field</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. No</b>	<b>Editors - Rao, I.K.Ravichandra &amp; Prasad, A.R.D</b>	<b>1-373</b>	<b>258</b>
	1	Advanced Information Technologies for Libraries in India Status and Problems	1 to 7	3
	2	Impact of Information Technology on the scientific and Technological Information Retrieval and Utilization for Research & Development	8 to 20	10
	3	Some Reflection on the Impact of IT on LIS Profession	21 to 23	0
	4	Internet Protocols and Applications	24 to 33	4
	5	The Internet : A Global Cluster of Computing Networks - ITS Presence & Impact	34 to 39	7
	6	LIS-Forum: E-mail Discussion Forum for Library and Information Services	40 to 52	6
	7	Internet as a source of useful Information: Case Studies and	53 to 61	8

		Experiences		
	8	Internet and ITS Impact on Academic Libraries	62 to 68	23
	9	Internet and ITS Impact on Library and Information Centers	69 to 78	23
	10	The Internet Services and ITS Connectivity Requirements	79 to 96	9
	11	The Internet & ITS Role in Global Biomedical Information System: A Professional Challenge in India	97 to 110	21
	12	Multimedia Technology : An Overview of the Hardware Aspects	111 to 117	4
	13	Media Components of Multimedia Systems	118 to 125	5
	14	Multimedia Technology and ITS Impact on Education	126 to 134	6
	15	Multimedia tools in Education	135 to 140	7
	16	Applications of Hypermedia in Libraries	141 to 153	6
	17	Creation and Manipulation of Files for Sound in Multimedia	154 to 162	3
	18	Application of Multimedia Technology in Information Society	163 to 172	8
	19	An Overview of Multimedia File Formats	173 to 181	5
	20	An Hypertext System to Support Spiritual, Moral, Ethical Studies : Some Design Considerations	182 to 194	4
	21	Wipro CD-Serv : A Network CD-Rom Server	195 to 203	0
	22	Multimedia Applications for Internet / Internet using Basic Web Server	204 to 211	0
	23	Managing Modernization Library Services Using IT : Potentials & Problems	212 to 225	25
	24	Impact of IT Products on Technical Processing in Libraries : Multimedia Aspect	226 to 232	8

	25	Design & Development of a Home Page for Indian Statistical Institute (BC)*	233 to 238	2
	26	WEB Accessible Science Bibliographic Databases : An Overview	239 to 248	5
	27	Designing A Database : Object - Oriented Approach	249 to 265	6
	28	Producing In-House CD-ROM Databases	266 to 275	7
	29	Data basing VIS-À-VIS-DATA Processing A 4GL Candidate For RDBMS	276 to 281	6
	30	Automation of Karnataka University Library : A Proposal	282 to 288	1
	31	Access To CD-ROM Databases On IISC Campus Network : Experience Of NCSI	289 to 295	6
	32	Sources Of Health Information In Internet	296 to 311	8
	33	Design Of User Interface To Support User Interaction In CD-ROM Databases : An Overview	312 to 318	8
	34	Let's Put Nissan On Internet!!	319 to 327	2
	35	Re-Engineering Information Services Using Internet	328 to 334	2
	36	Use Of Software Packages For Information Repackaging A Case Study	335 to 344	3
	37	JAVA: The Language Of The Near Future	345 to 351	1
	38	Library Automation : The British Library Experience	352 to 362	6
	39	CD-ROM Networking	363 to 373	0
6	<b>1998-I</b>	<b>Title - Practical Orientation to Internet (January)</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. no</b>	<b>Editor - Madalli, Devika.P</b>	<b>1-377</b>	<b>52</b>
	1	Internet - A General Overview	1 to 49	8
	2	INTERNET: Connectivity Issues	50 to 62	4

	3	Practical Approach To Internet Services And Other Utilities	63 to 101	0
	4	World Wide Web: Hotlink to Information	102 to 119	4
	5	Browsers: Interface to the Web	120 to 227	3
	6	Search Engines and Locating Information On The Net	228 to 239	3
	7	Customize Web Browsing Through Internet Channels	240 to 253	4
	8	Interfacing the Web: An Overview Of Alternatives	254 to 260	3
	9	Practical Approach to Browsers And Search Engines	261 to 281	0
	10	An Introductory Course On Webpage Authoring	282 to 294	0
	11	The Internet: Regulatory Issues, Organizing its Resources, Retrieval Engines And Its Impact	295 to 326	12
	12	A Case For Internet In LIS Curriculum	327 to 339	4
	13	Internet Resources For LIS Profession	340 to 354	7
	14	Practical Approach To LIS Information On The Net	356 to 366	0
	15	Exploring Bibliographic Services On Internet	367 to 377	0
7	<b>1998-II</b>	<b>Title - Informatics and Scientometrics (March)</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. No</b>	<b>Editor - Rao, I.K.Ravichandra</b>	<b>1 to 2422</b>	<b>284</b>
	1	INFORMETRICS : Scope, Definition, Methodology and Conceptual Questions	1 to 14	11
	2	Classical Laws Of Informatics : An Overview	15 to 51	55
	3	Growth, Obsolescence, Collaboration and Circulation Statistics	52 to 71	17

	4	What's Behind a Citation? A Project to Investigate the Role and Meaning Of the Citation In Scholarly Communication	72 to 87	19
	5	Random Reflection on Some Aspects Of Informatics	88 to 120	10
	6	Mathematical Modeling And Applications In Informatics	121 to 150	29
	7	Collaboration in Science Since Three Centuries	151 to 168	13
	8	Changing Conditions Of the research Process and the Adaptation of Collaboration Structure	169 to 200	13
	9	Some Methods For Measuring Productivity of Individual Scientists	201 to 222	32
	10	Recent Advance In S & T Indicators	223 to 234	16
	11	Using the Macro and Micro Level Science Indicators to Map a Research Area	235 to 360	51
	12	Bibliometric : A Data Base Design and Application Programs for Bibliometric Analysis Using CDS/ISIS	361 to 404	15
	13	Determining Measures of the Quality and Impact of Journals	405 to 409	3
	14	Informatics Scattering : Theoretical and Empirical Studies	410 to 422	0
8	<b>1999-I</b>	<b>Title - Information Management Including ISO QMS (Jan.)</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. No</b>	<b>Editors - Rao, I.K.Ravichandra</b>	<b>1-328</b>	<b>153</b>
	1	Information Management : Scope, Definition, Challenges & Issues	1 to 16	6
	2	Information Management : An Overview on Human Resources Planning	17 to 22	4
	3	Information Warehousing Vs Learning Organization : The More Dynamic Information Professional	23 to 30	14
	4	The Non-Technological aspects of	31 to 36	8

		Information Management		
	5	Document Delivery System in Digital Environment	37 to 51	1
	6	Quality Management in Collection Development of Electronic Resources	52 to 67	0
	7	Measurement of Quality in Collection Development : Impressionistic Method of Survey at ISI Library	68 to 80	11
	8	Quality in collection Management : Measuring Book Availability Performance of Academic Libraries	81 to 98	15
	9	Information Management : Tools and Techniques	99 to 126	11
	10	Selection of Journals Based on The Impact Factors : A Case Study	127 to 133	2
	11	Decision Support Systems : A tool for Information Managers	134 to 149	8
	12	Standards for Information Handling	150 to 174	8
	13	Application of 'Estimation Theory' in Libraries and Information Centers	175 to 179	8
	14	Application of Queuing Theory to Libraries and Information Centers	180 to 185	3
	15	Productivity in Library Management	186 to 194	2
	16	Quality Management Through Library & Information Science Education	195 to 202	0
	17	An Overview Of RQM in Libraries	203 to 216	7
	18	Quantity V/S Quality in Information Management	217 to 221	10
	19	Document Control of Standards And Codes In ISO 9000 Quality Management System - A Case Study	223 to 238	5
	20	An International Standard : ISQ Quality Management System	239 to 269	4
	21	How to Conduct an Internal Quality Audit for ISO 9000 Quality Management Systems	270 to 298	11

	22	Implementation of ISO 9000 : A Case Study of NAL Information Centre	299 to 310	1
	23	Chaos! Thy Name is Internet	311 to 317	9
	24	Managing Libraries and Information with Technology	318 to 328	5
9	<b>1999-II</b>	<b>Title - Application of Optical Characteristics Recognition Techniques to Library and Information Work (Mar.)</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. No</b>	<b>Editors - Prasad, A.R.D</b>	<b>1-164</b>	<b>37</b>
	1	An Introduction to Retrospective Conversion	1 to 9	3
	2	Software for Retro conversion	10 to 16	3
	3	Pygmalion	17 to 32	2
	4	IDA Version 2:A Retrospective Conversion Software for LC,OCLC,BNB & Book find CD-ROM Databases	33 to 47	0
	5	IDA Version J:A Retrospective conversion Program in Java	48 to 56	5
	6	Optical Character Recognition Technology : An Overview	57 to 70	2
	7	OCR Software Review	71 to 88	5
	8	A Procedure to identify a core Collection for Retrospective Conversion	89 to 93	3
	9	Computer Aided Teaching Package on Scanners	94 to 109	0
	10	Computer Aided Teaching Package on OCR	110 to 122	3
	11	A Model for Interactive Online Examination	123 to 132	3
	12	A Heuristic approach for Automatic Identification of Bibliographic Data Elements using the Physical Layout of the Title pages of Books	133 to 149	5
	13	Conflicts Analysis	150 to 157	0

	14	A Study on the Sequence of Major Data Elements in the Title Pages of Monographs	158 to 164	3
10	2000	<b>Title - Electronic Sources of Information</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. No</b>	<b>Editors - Rao, I.K.Ravichandra</b>	<b>1-401</b>	<b>263</b>
	1	Sources of Information With Emphasis on Electronic Resources	1 to 18	5
	2	Electronic Publication : Issues and Concerns	19 to 31	20
	3	Science News Services on The Internet	32 to 41	12
	4	E-Journals In Social Sciences, Arts & Humanities : A Critical Study	42 to 52	17
	5	Scholarly Communication And the Internet	53 to 60	8
	6	The Electronic Experience : USIA E-Journals and Infousa	61 to 69	0
	7	Effective Research Strategies For the Internet	70 to 70	0
	8	Electronic Sources Information at NICMP	71 to 90	0
	9	Electronic Resources on Management & Related Topics	91 to 106	5
	10	Collection Development in An Electronic ERA	107 to 116	27
	11	Use of Internet by The Academic Community : A Case Study	117 to 124	2
	12	Comparative Study of Print and Electronic References Sources : A Case Study On Encyclopedia	125 to 128	0
	13	Library Resources Sharing on The Internet and World Wide Web	129 to 131	0
	14	Information Meta Morphosis Physics and Astronomy Libraries	132 to 150	15
	15	Electronic Journals : Access and Delivery Models	151 to 164	2
	16	Utilization of Electronic Information at IPR Library : A Case Study	165 to 173	4

17	Electronic Resources in Health Care	174 to 180	8
18	Current Awareness Services on Internet : A Case Study with ETOC (E-Mail Delivery of Table of Contents)	181 to 198	0
19	AGNIC: Agriculture Network Information Center	199 to 211	6
20	Secondary and Tertiary "Electronic "Sources of Information	212 to 225	5
21	Online Newspapers & Magazines - Aspects & Issues	226 to 234	6
22	Internet Resources in Medical Science	235 to 243	8
23	Newspapers On Internet the Experiences of the Hindu Group of Publications	244 to 267	0
24	Presentation of Information on the Internet : Case Studies of Web Page Designing	267 to 279	4
25	Web Page Designing : An Introduction	280 to 293	9
26	Bibliographic Search Instructions for Web-Users	294 to 299	8
27	Document Identification and Classification Using Transform Coding of Gray Scale Projections And Neural Tree Network	300 to 306	23
28	Digitization : Vision And Task	307 to 315	16
29	Online Public Access Catalog Through Libsys : An Experience	316 to 320	4
30	Design and Development of Web-Based Databases of current Periodicals At Indian Institute of Technology, Kharagpur	321 to 334	8
31	Visualizing Electronic Data Interchange (EDI) And Virtual Information System (VIS) For Manipal Institutions	335 to 344	3
32	Structure And Architecture of The World wide Web Virtual Library	345 to 351	2

	33	Need For A System Design For Reference Services In The Electronic Environment	352 to 354	3
	34	DML : A New Way To Create Information Content on Internet	355 to 365	15
	35	International Nuclear Information System : An Overview	366 to 373	0
	36	An Approach to Design A Report Search Engine For Library Intranet	374 to 380	0
	37	Information Design For the Web	381	0
	38	On-Line Electronic Sources of Information On Non-Metallic Materials	382 to 390	10
	39	Evaluation Of Electronic Journals In Library & Information Science	391 to 401	8
11	2001-I	<b>Title - Multimedia Internet Technology (Feb.)</b>	<b>Page no.</b>	<b>No. of Citation</b>
	<b>Sr. No</b>	<b>Editors - Prasad, A.R.D &amp; Madalli, Devika</b>	<b>1-263</b>	<b>164</b>
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