Chapter 1
Introduction
CHAPTER – 1
INTRODUCTION

1.1 Preamble

The objective of the present chapter is to highlight need and importance of the study, objectives, hypotheses, sample, and methodology of the study.

Bibliometrics is the most active field of “Library and Information Science”. Citation analysis study is the major portion of it. Bibliometric is a sub subject in the information science field, it is first known to have been applied by ‘E.J. Cole’ and ‘N.B.Eales’ in 1917. They analysed comparative anatomy paper by counting the number of publication by country. A subsequent study was conducted by ‘Hulme’ in 1923. Both of this studies designate it as the statistical bibliography and defined it as the application of quantitative techniques to library, and bibliographical work. ‘Alan Pritchard’ in 1969 have coined the term bibliometrics. For this term ‘Dr.S.R.Ranganathan’ used another term ‘Librametry’ in 1948 (Kabir, 1999).

According to Alan Pritchard (1969) bibliometrics, “The application of mathematics and statistical method to books and other media of communication”. Fairthorne (1969) defined bibliometrics as, “Quantitative treatment of properties of recorded discourse and behavior appertaining to it. Bibliometrics is also named as quantitative analysis of bibliographic features of a body of literature”. Nicholas and Riche (1978) defined, “Bibliometrics is the statistical or quantitative description of a literature”.(p.180) According to Sengupta (1990) bibliometrics is 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.(p.156) The importance of bibliometrics can be judged from the fact that it is not merely a theoretical discipline as many think. It has practical applications in library management or in measuring the quality of journals. Extensive research and studies are however, needed in bibliometric, owing to its immense importance not only in library documentation and information centres, but also application in science policy research (Kabir,
Above definition shows bibliometrics aims at the examination of the statistical distribution of the processes related to –

- The Utilization of document
- Library staff and library users.
- Library users.

It helps to evaluate information and to handle the information in libraries and information centers by the quantitatively analyzed information.

1.1.1 Scientometrics

Scientometrics is a newly emerging field that investigates quantitative aspects of science, it is the quantitative arm of the science of science, scientific communication studies, and science policy studies, the term ‘scientometrics’ is very recent term. It is often used with the same meaning as the bibliometrics to mean the application of quantitative methods to the history of science, but is now generally used as a generic term for a variety of research approaches with in the study of science. That quantifiable aspect of science can be utilized to access the characteristics of science (Conference Reports Library Hi Tech News, 2001). It is a formed structural part of science of science methodology including, the complex of mathematical and statistical method, used to analyse the quantitative characteristics of science as an enterprise (Voverience and Trumpiene, 1994). According to Nalimov and Mulchenk (1969) “Scientometrics is the investigation of science as development of information process”.

1.1.2 Informetrics

Informetrics is a term synonymous and analogous to bibliometrics. It is a concept introduced and practiced by “International Federation of Documentation” (IFD) considered information a very important commodity which is the basic component for the growth and development of the socioeconomic structure of a country. The term “informetrics” was suggested by German scientists Blackert and Zygel in 1982 as a newly formed branch of science, using mathematical and statistical methods to investigate scientific and technical information on theoretical level and practical information activities (Blackert and Stegel, 1979). In 1980 the term was proposed for research, while bibliometrics and scientometrics refer to all
quantitative aspect and modes of printed media and services, informetrics is not limited to media or scientific communication. Neither it is restricted to scientific research. Informetrics is, thus an emerging sub-field in information science, which is based on the combination of advance of information retrieval and quantitative studies of information flow. The scope of informetrics is –

• Definition and measurement of information.
• Time and characteristics of retrieved performance measure

1.1.2 Webometrics

Webometrics is a new research field in Library and Information Science applying quantitative bibliometric methodology such as publication analysis, citation, cluster analysis to the 3Ds that is distributed, diverse and dynamical information space of the web, including webpage content, links structures, search engine and user searching and browsing behavior. Webometrics is quantitative and quantitative study of web related phenomena, originated in the realization that method originally designed for bibliometrics analysis of scientific journal articles. Citation pattern could be applied to web with commercial search engines, providing the raw data. The web impact factor (WIF) was developed by Ingwerson to measure the impact of a web area by the number of links it receives. WIF calculations were found to be a crude instrument for webometric studies webometric research want search engines and an academic web crawler have been used. The both have advantages and disadvantages. Some times it is ore appropriate to use a search engine at other times it is more suitable to use a personal web crawler (Li, 2003). Cybermetrics is a generic term for the study of quantitative aspect of the construction and use of information resources, structures and technology on the whole internet, drawing on bibliometrics and informetric approaches cybermetrics thus can compass statistical studies of discussion grouping mailing list and other computer communication on internet including www webometrics and cybermetrics are currently the two widely adopted terms used as synonymous (Kretschmeter, 1999; Wormell, 1998).

1.1.4 Three laws of Bibliometrics

The three fundamental laws which leads to the formation of bibliometrics.
1.1.4.1 Lotka’s Law

This law provides a fundamental theoretical base for bibliometrics study involving authorship. Scientific productivity is frequently measured in terms of the publish output, mostly because the data on the number of publication by authors can be easily collected and are quite reliable. In other words, the law correlates the number of contributions. “The original statement of what has made in Lotka’s journal article in 1926. The frequency distribution of scientific productivity” (Potter, 1981).

1.1.4.2 Bradford’s law

Bradford’s law provides the fundamental history of bibliometrics. Bradford’s law made in 1934, described the scattering pattern of journal in the area of applied geophysics lubrication. Law of scattering describe the distribution of documents usually journal in the discipline or problem area. Bradford’s law begins with a regularity which is observed in the retrieval or use of published information (Drott, 1981; Singh, 2007; Bandyopadhyay, 1999; Afolabi, 1983).

1.1.4.3 Zipf’s law

“Describing word frequency ranking”, it develop an external or empirical law, governing a relation between the ranks of the word and frequency occurrence in a long text. The word are arranged in their decreasing order of frequency then the rank of any word of the text will inversely proportional to the frequency of occurrence of the words. One commentator the statistician Gustav Hwerdan, has put it : “Mathematicians believe in (Zipf’s law) because they think that linguists have established it to be linguistic law, and linguists believe in it because they, on their part, think that mathematicians have established it to be a mathematical law” (Gustav, 1966; Wyllys, 1981).

1.1.5 Other Empirical laws

K.P.Vijayakumar in his article ‘Applications of bibliometrics in Library and Information Centres’ says that much of the later bibliometric studies were made either to substantiate, modify, extend, link or challenge these three empirical laws:

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1.1.5.1 Price’s square root law of scientific productivity

This law states that “half of the scientific paper are contributed by the square root of the total number of scientific authors.

1.1.5.2 Garfield law of concentration

Garfield talked about the number of journals involved in publishing the literature of a single field.

1.1.5.3 Sengupta’s law of bibliometrics

This is basically an extension of the Bradford’s law. It states that “during phases of rapid growth of knowledge in a scientific discipline, articles of interest to that discipline appear in increasing number of periodicals distant from the field (Mahapatra, 1992).

1.1.6 Citation Analysis

Citation analysis is worthwhile area of research. “Citation analysis” refers to references in one text to another text, with information on where that text can be found. Citation analysis is useful for understanding subject relationship another effectiveness, publication trends, and so on. The first recorded citation analysis was made by Gross and Gross, 1927 who looked at citation patterns to determine the journals to be subscribed to and back volumes to be acquired for the library of Pomona College. They studied the citation frequency in the references given in the journal of the American Chemical Society. With citation analysis one can evaluate and interpret citations received by articles, authors, institutions, and other indications of scientific activity (Gupta, 1983). The citation analysis is also a way to understand users. Studying references cited by your faculty’s publications or your student’s papers shows you the type of sources most commonly used and valued locally in their disciplines. It makes use of bibliographic, references, which are an essential part of scientific communication. Citation analysis is a major area of bibliometric research, which uses various methods of citation analysis to establish relationships between authors or their work (Ane’s Encyclopedic Dictionary of Library and Information Science, 2006). Citation analysis are to evaluate and to interpret citations received by articles, authors. Institutions and other aggregate of scientific activities. It is also used as a tool for measuring communication links in sociology and science. Each of any authors cited works
along with its citing authors and their papers is arranged in chronological order, which helps the researchers to easily trace developments, since the publication of a particular article by identifying the authors and the their papers related to the primary works (Kumar, 2002). Citation analysis is a technique of bibliometrics. It is an important research tool understanding the subject, which we analyse the structure and direction of the subject. It measures the utility of documents and relationship between documents in the subject and relationship between authors and their documents. According to Bose (1986) citation analysis is defined as, “A reference to a text identifying the document in which it may be found. The citation have more importance that what is generally assumed. An important use of citation lies in bibliographical work. The bibliography on a recent topic can easily be compiled by noting down the citation (or references as is generally called) given at the end of the relevant article and then arranging them in manner”. (p.90) Citation analysis is an important tool used by the librarians, teachers and information scientists to represent the relationship which exist between the cited and the citing document, the technique of citation analysis involve the process of collection, counting and analysis given in various types of literature. This is the direct method to analyse the library record to determine the actual use of the documents. These types of information can provide useful idea for acquisition of important material selection of document etc. This can helps librarians, it also help the information system designers, to plan their products and services. The citation analysis is useful for identifying: i) Playing homage to pioneers. ii) Giving credit for related work (homage to peers). iii) Identifying methodology, equipment etc. iv) Providing background reading. v) Correcting one’s own work. vi) Correcting the work of others. vii) Criticizing previous work. viii) Substantiating claim. ix) Alerting forthcoming work. x) Providing leads to poorly disseminated. Poorly indexed or ancited work (Kumar, 2002).

1.2 Relevance of the Study

Dr. Babasaheb Ambedkar Marathwada University, formerly known as Marathwada University was established in 1958 at Aurangabad in the Marathwada region of Maharashtra. It plays a significant role in the economics educational, social and cultural development of people of Marathwada.
Building up comprehensive collection is one of the art of modern librarianship. Moreover number of the librarians of the University in India have pointed out that the condition of most of Indian University libraries is far from satisfactory. Especially opinions of Hingewe (1982), Deshpande (1997), Tejomurty (1987), Krishnan Kumar are the opinion that the Indian university libraries located in backward areas suffer from inadequate stock of reading material, poor service and insufficient facilities. Against such back ground large number of Bibliometric studies in the form of citation analysis has been conducted in India.

1.3 Definitional analysis
The definition of the study of the used terms in the present study are as under:

1.3.1 Citation Analysis
Paul and Roy (1983) defined citation analysis as, “Citation analysis is one branch of bibliometrics where the unit of analysis is a document, that is a document, that is being cited as a bibliographic reference or as a foot note in a citing document”.(p.226) Martyn (1976) has rightly defined citation analysis as, “The analysis of citations or references or both which form part of the scholarly apparatus of primary communications. The technique is used for putting items of references in some kind of rank or order whether they are journals of authors cited”.

1.3.2 Thesis (Ph.D.)
Sengupta (1991) defined thesis as, “A thesis is a statement of investigations of research presenting the authors findings and any conclusions reached, submitted by the author in support of his candidate for a Ph.D. degree in science”. In the present study term thesis is confined for which Dr. Babasaheb Ambedkar Marathwada University awarded Ph.D. in science. Anne’s Encyclopedia Dictionary of Library and Information Science (2006) defined thesis as, “Often refers to the treatise written by candidate for the degree as distinct from doctoral dissertation”.(p.99) Anne’s Encyclopedia Dictionary of Library and Information Science (2006) defined thesis as, “A proposition advanced and defended in a formal disputation, especially by a candidate in particular fulfillment of university requirements for a master’s degree. Master’s theses are indexed annually by discipline, subject and author”.(p.265)
1.3.3 Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

The state legislature passed the Marathwada University Act, 1958 to establish and incorporate a teaching and affiliating university at Aurangabad. The act received assent of the governor on May 5 and the university was inaugurated on August 23, 1958. From May 21, 1974 the university is governed by Act No.XXV of 1974 passed by the Marathwada legislature and assented to by President of India. The University was renamed as Dr. Babasaheb Ambedkar Marathwada University in January 1994. At present the university has 33 departments. Economics is one of the oldest departments.

1.3.4 Social Sciences

The Encyclopedia of Social Sciences (1937) defines social sciences as “Mental and cultural activities of the individual as member of a group” Webster Encyclopedic dictionary (1978) defines social science as “The branches of science that deal with the institution and functioning of human society and with the interpersonal relationships of individuals as members of society” and also “a science such as economics or political science dealing with particular phase or aspect of human society “ and Webster adds” compare behavioral science” for which it gives “a science such as psychology, sociology or anthropology, dealing with human action and aiming at the establishment of generalizations of man’s behaviour in society.”

Social sciences may be defined as all the disciplines which deal with men in their social contacts. They are concerned with orderly investigation of the behavior of man in society with the aim of formulating a body or relevant theory. The focus of their study is behavioral analysis of human groups, collectivities, communities etc.

It may be said that social sciences are a combination of multiple disciplines having social implications. Generally speaking social science include economics, Political science and sociology, social and cultural anthropology, social psychology, social and economics social context of learning and the relation of the school to the social order.

In the context of the present study the term social science includes the subjects comprised under section 27(3) of the Marathwada University Act 1974 as History, Ancient Indian Culture, Archaeology, Political science, Public
administration, Economics, Sociology, Logic, Philosophy, Psychology, Geography, Journalism, Home Science, Library Science, Dramatics & Music etc.

1.4 Objectives of the study
The main objective of the present study is –
1. To analyze the citation of Ph.D. theses on Social Sciences submitted to the Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
2. To find out (form-wise) the types of cited documents.
3. To find out the chronological distribution of the cited documents.
4. To find out the authorship pattern of cited document
5. To rank the cited journal.
6. To rank the cited books.
7. To find out the language-wise distribution of cited documents.
8. To find out the geographical distribution of cited documents.
9. To find out the Indian and Foreign distribution of citations.
10. To rank the cited web-resources.
11. To rank the cited authors.
12. To rank of the publisher.

1.5 Hypotheses
The following hypotheses are formulated in the study.
1. Male researchers are dominant than female researchers in their subject area.
2. Books are the major documents cited in maximum.
3. Multiple authors are pre-dominant than single author.
4. Marathi language is a pre-dominant language.
5. Researchers mostly prefer Indian Publications.

1.6 Scope and Limitation
The study is based on citations given at the end of the theses of which the researcher has used for the preparation of theses. The present study is based on 25994 citations appended at the end of 222 Ph.D. theses in Social Sciences, submitted to the Dr.Babasaheb Ambedkar Marathwada University, Aurangabad. The span of 10 years was taken into consideration that is from 2001 to 2010.
1.7 Population sample

Social Science includes History, Ancient Indian Culture, Archaeology, Political science, Public administration, Economics, Sociology, Logic, Philosophy, Psychology, Geography, Journalism, Home Science, Library Science, Dramatics & Music etc.

Out of the above subjects only 6 subjects were taken for the study, viz. Economics, History, Political Science, Sociology, Psychology and Public Administration. The subject wise distribution of theses covered under study is given in table no. 1.1.

Table No. 1.1: Number of theses

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Departments</th>
<th>Total Theses</th>
<th>Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Economics</td>
<td>63</td>
<td>5842</td>
</tr>
<tr>
<td>2</td>
<td>History</td>
<td>32</td>
<td>3691</td>
</tr>
<tr>
<td>3</td>
<td>Political Science</td>
<td>42</td>
<td>4549</td>
</tr>
<tr>
<td>4</td>
<td>Sociology</td>
<td>31</td>
<td>3588</td>
</tr>
<tr>
<td>5</td>
<td>Psychology</td>
<td>27</td>
<td>4590</td>
</tr>
<tr>
<td>6</td>
<td>Public Administration</td>
<td>27</td>
<td>3830</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>222</strong></td>
<td><strong>26090</strong></td>
</tr>
</tbody>
</table>

1.8 Research Methodology

Research is common parlance refers to a search for knowledge. Redman and Mory in 1923 defined research as, “Systematized effort to gain new knowledge” (Kothari, 1990). Research methodology is a way to systematically solving the research problem. It may be understood as a science of studying how research is done scientifically. According to P.V. Young, “Research methodology, is the systematic method of discovering new facts and verifying old facts, their sequence, inter-relationships, casual explanations and natural laws which govern them” (Kothari, 1990).

There are various types of research method as follows:

- Descriptive and Analytical research.
- Applied and Fundamental research.
- Quantitative and Qualitative research.
- Conceptual and Empirical research.
- Field and Table research.
- One time and longitudinal research
The present study adopted sampling method. The method is very old and popularly known in all human societies. Present day it is widely used. A sample means, a smaller representation of large whole (Kothari, 1990; Panneerselvam, 2004). The present study entitled, “Citation analysis of the Ph.D. theses on economics submitted to the Dr.Babasaheb Ambedkar Marathwada University, Aurangabad during 2000 to 2010. For this study 222 Ph.D. theses of Social Sciences were chosen as a sample from the year 2000 to 2010, there are 26090 citations appended in 222 theses. The data was collected from the bibliographical entries listed at the end of the theses, which was used by the researcher for completing the theses. The citations were photocopied and the data was collected. The analysis was done by using various parameters.

1.8.1 Data collection

The bibliographical entries listed at the end of the 222 Ph.D. theses of Social Sciences submitted to the Dr.Babasaheb Ambedkar Marathwada University were photocopied for further Analysis.

1.8.2 Data Analysis

Analysis of 26090 citations appended at the end of the 222 Ph.D. theses was done by using various parameters like to identify the core journals, to rank the cited author, to rank the cited journal, to find out chronological distribution of citation, to find out the geographical distribution of citations, to find out the types of cited document.

1.9 Summary of major conclusions

The analysis of data on the basis of the different variables considered helped in reaching some important conclusions.
1. The Present Study cover the theses submitted during 2001 to 2010. Over all 361 theses were submitted to the university from social science faculty of the subjects undertaken in the study. Only 222 (61.50 %) theses were available for the study, remaining 139 (38.50 %) theses were not available. Hence, 222 theses were considered for the present study.

2. Out of the total 361 theses submitted to the university, maximum are submitted in 2002-2003 (21.88%), 2008(11.4%), 2009(12.47 %) and 2010 (13.50 %). A steady growth can be seen in research of Social Science.

3. Out of total 222 theses under taken for the study, the submission of theses are maximum in 2002-2003 i.e 58 (26.13%) and in 2010 i.e 30 (13.5%). The reason of submission during 2002-2003 might be the UGC Circulation regarding the relaxation of Ph. D degree from the Exception of NET examination.

4. Amongst the total theses 361 submitted, 291 (80.61% ) are male researchers while, 70 (19.39 %) are females. This indicates that, “Male researchers are dominant than female researchers in their subject area” (hypothesis no.1) is valid. This scenario is observed in Economics, History, Political Science, Sociology, Psychology and Public Administration.

5. The average citation per thesis for Economics, History, Political Science, Sociology, Psychology and Public Administration is 1.08; 0.87; 0.92; 0.86; 0.59; 0.70 and 0.85 respectively. The overall average citation per thesis for 222 theses is 0.78.

6. Of the total 26090 citations the highest percentage i.e. 63% of citations were books, followed by 23% citations were from Journals, 6% from reports, 2% from Newspaper, 1% from Internet and remaining 5% citations from seminars, symposia, etc. This indicates that, “Books are major documents cited in maximum” (hypothesis no. 2) is valid.

7. It was found in the subject Psychology, that the Journal are the major form of media used with citation count, of 2772 (60.39%) of total literature used, where as the Books is used in 1513 (32.96%). Amongst citations of Theses 138 (3.1%) of citations, while the Internet 83 (1.81%) ,Report 60 (1.31%), Encyclopedia 12 (0.26%), Dictionary 8 (0.17%) & Newspaper occupy 4 (0.09%). This indicates that, “Books are the major documents cited in
maximum” (hypothesis no. 2) is invalid. (Table no. 4.5.3 and Figure no. 4.5.3)

8. During the years 1981 to 2010 (30 years) time period the citations are 18343 (70.13%), followed by 3281 (12.58%) during the year 1971-1980 and 3640 (13.95%) citations during 1820-1970 (90 years) time period and 826 (3.17%) citations do not have any year of publication.

9. Out of total number of 26090 citations 17480 (67%) are by single author, followed by 6783 (26%) citations by multiple authors and 1826 (7%) citations have no authors. This indicates that, “Multiple authors are predominant than Single author” (hypothesis no. 3) is invalid. This has been observed in all the subjects.

10. “Economic and Political Weekly” Journal is cited in majority of the subjects and hence tops among all the journals.

11. Out of 26090 citations, 18550 (71.10%) are cited in English language, Marathi Language 6277 (24.06%) citations, Hindi language 961 (3.68%) citations and 302 (1.15%) citations are from other languages, includes Urdu, Arabic, Thai, Sanskrit, Parsi and Modi. This indicates that, “Marathi language is a predominant language” (hypothesis no. 4) is invalid.

12. In the subject Economics, Political Science, Sociology and Public Administration majority of the citations are in English. In the subject Psychology 100% citations are in English language only. This indicates that, “Marathi language is a predominant language” (hypothesis no. 4) is invalid. While in the subject History, 3691 (100%) documents are cited and in Marathi language 2954 (80.03%) English language 486 (13.17%), Urdu 81 (2.19%), Hindi Language 50 (1.35%), Modi language 29 (0.79%), Sanskrit 17 (0.46%), Parsi 12 (0.33%) and Arabic 3 (0.08%) only and unknown is 59 (1.60%). This indicates that, “Marathi language is a predominant language” (hypothesis no. 4) is valid.

13. Out of 26090 citations, 12447(47.71%) citations are Indian, 8768 (33.61%) are foreign citations while 4875 (18.69%) geographical area could not be traced out. This indicates that, “Researchers mostly prefer Indian publications” (hypothesis no. 5) is valid. This hypothesis is valid in all subjects.
14. In overall citations, New Delhi tops the position having maximum citations, followed by Uttar Pradesh, Maharashtra and London. This indicates that, “Researchers mostly prefer Indian publications” (hypothesis no. 5) is valid.

15. In overall citations, New Delhi tops the position having maximum citations, followed by Mumbai, Lucknow, Pune and London. This indicates that, “Researchers mostly prefer Indian publications” (hypothesis no. 5) is valid.

16. The ranking list of web-resources to help the research scientist to select the web-site of maximum utility in relation to their coverage of new and important literature in particular subject area. Out of 26090 citations only 287 (1.10%) citations are cited as web resources. This indicates that their in lack of awareness of use of Internet amongst the social science researchers.

The result of the study would be useful to researchers to select the documents for their studies and useful to librarian for planning and managing the information sources.

1.10 Conspectus

The dissertation has been presented in five chapters.

Chapter No.1
The objective of the present chapter is to highlight need and importance of the study, objectives, hypotheses, sample, and methodology of the study.

Chapter No.2
The purpose of the present chapter is to focus on scanned literature on citation analysis.

Chapter No.3
The chapter consists of the history of Department of Economics, History, Political Science, Sociology, Psychology and Public Adminstration, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

Chapter No.4
The basic purpose of the present chapter is to analyse collected data, presented in the forms of tables and figures.

Chapter No.5
The present chapter deals with findings, conclusion and suggestions.

Bibliographical references.

Appendix
References


