

## **CHAPTER 1**

### **Introduction**

#### **1.0. BACKGROUND OF THE STUDY**

The role of print media in the field of education and research is of special importance for scholarly communication. Due to development of electronic media there is tremendous increase in production of information resources in various forms and subjects. Information is a basic resource for academic, professional, social and cultural life of an individual. The quality of our life gets poorer without information. Information Communication Technology (ICT) has emerged as the most vital tool to collect, process, organize and disseminate information to the people on a large scale through communication network. Today, there were large scale productions in research literature in various disciplines which need to be processed, reorganized and transmitted to the users. The aim of library and information centres is to provide right information to the right user in right time in right way. So, there is a need to process and reorganize the available information to be acquired by the users. Bibliometric study is needed to identify the statistical pattern in variables such as authorship, sources of information, subjects, geographical origins and citations.

Evolution of discipline is noticed on the basis of scholarly communication in different subjects which belong to three major disciplines like the science and

technology, humanities and social sciences. Citation analysis and content analysis are the two important methods of Bibliometrics. Citations analysis plays a vital role in assessment of scientific productivity in the different fields of research activities. Due to information explosion, the literature in various disciplines is scattered over a large number of different forms of documents that are originating from different geographical location. With the exponential growths in scientific research activity, there is diversity of forms of literature, increasing users' demands, subscription cost and budget constraint which poses many problems. So, it is necessary to develop a viable tool to frame an information and service system which will fulfill the information requirement of the users. Bibliometrics is most popular and important area in the field of library and information science. Bibliometrics uses statistical and mathematical parameters to assess the scholarly contents present in library and help in collection developments process, budget planning and information retrieval. Bibliometric studies are needed to identify the pattern of publication, authorship and citation analysis which can give an insight into the dynamics of the area under consideration.

Bibliometrics is needed to measure the quality and worthiness of written communication. Today, growing academic research output in different document types such as, journals, books, edited books, reports, etc. require detailed assessment of their usability. Bibliometric is defined by Alan Pitchard as "the application of mathematical and statistical methods to books and other media of communications." When statistical methods were applied to analyze bibliographies, evolved a new dimension known as "Bibliometrics". Bibliometric Analysis is one of the essential methods to identify the pattern of publication. The

continued research in a particular can, at some future time, provide librarians with the means to effectively design and evaluate the library systems.

Bibliometrics has displayed an almost classic developmental pattern, if one considers the bibliometric aspect as a basic research and the evaluative aspect as an applied research. Bibliometric techniques were initially developed to aid the library professionals. Gross and Gross first suggested the use of citations counts in measuring the adequacy of a college library. Over the ensuing decade that followed, dozens of paper appeared applying this bibliometric technique to other scientific literature.

Bibliometrics is a set of methods to quantitatively analyse scientific and technological literature. The term was coined by Alan Pritchard in 1969. Citation analysis and content analysis are commonly used bibliometric methods. While bibliometric methods are most often used in the field of library and information science, bibliometrics have wide applications in other areas also. In fact, many researchers use bibliometric methods to explore the impact of their field of study. Bibliometric methods are now used in quantitative research assessment exercises of academic outputs which is starting to threaten practice based research.

Citation analysis, which involves examining an item's referring documents, is used in searching for materials and analyzing their merit. Data from citation indexes can be analysed to determine the popularity and impact of specific articles, authors, and publications. In the present study, the researcher wants to identify the citation pattern in the doctoral theses in Life Science submitted to Assam University, Silchar.

Assam University was established in 1994 through Assam (Central) University Act, 1989 (Established under an Act of Parliament). The campus is situated in Dargakona, about 20 kms from Silchar town. The University has sixteen schools on major disciplines. There are 35 departments under these sixteen schools. The university sustains a multidisciplinary approach to higher education.

The School of Life Sciences was established in 1996 with an emphasis on interdisciplinary teaching and research in modern biology. The School consists of three Departments: 1) Department of Life Science and Bioinformatics, 2) Department of Microbiology, and 3) Department of Biotechnology. The Life Sciences comprise the fields of science that involve the scientific study of living organisms, such as microorganisms, plants, animals, and human beings, as well as related considerations like bioethics. Life Sciences helps in improving the quality and standard of life. It has applications in health, agriculture, medicine, pharmaceutical industry and food science industry.

### **1.1. NEED OF THE STUDY**

The innovative developments in Information Communication Technology had provided new avenues for research in the field of science, humanities and social sciences. The present study is based on research in the field of life sciences. The life science research is growing in the faster rate. So, the literature productions in the field of life science are more and scattered. Bibliometrics literally mean “book measurement” but the term is used about all kind of document forms. The measurements are not physical properties of documents but statistical patterns in variables such as authorship, sources, subjects, geographical origin and citations.

This study helps the librarians to collect process and disseminate the information to the respective users in right formats. The findings of present study will help in collection development and financial planning for procurement of documents which are most significant in the field of life sciences.

## **1.2. STATEMENT OF THE PROBLEM**

Today it is the high time to pay attention to the research output in the field of life science. There is need to apply scientific methodology to assimilate these scattered research literature. The research in the field of Science and Technology is growing in rapid pace. There is a tremendous growth of literature in different fields of study, so innovative methodology need to be applied to arrange theories and experimental results produced by the researchers. Bibliometrics is the statistical analysis of bibliographic data, commonly focusing on citation analysis of research outputs and publications, i.e., how many times research outputs and publications are being cited. Bibliometric analysis is becoming an increasingly important way to measure and assess research impact of individuals, groups of individuals or institutions. The present study is undertaken to quantify the scientific output in the field of Life Science, and to identify its most important aspects such as growth of literature, most producing journal, authors' collaboration, most prolific authors and author productive and also to find out the citation pattern in each year. This investigation is aimed to analyze the Doctoral theses in Life Sciences submitted to Assam University during 1996 to 2012 by using Bibliometric methods to provide insight into the development of Life Science research.

### **1.3. OBJECTIVES OF THE STUDY**

The study is aimed to make bibliometrics analysis of Doctoral theses in Life Sciences submitted to Assam University, Silchar during 1996-2012 (From the year of establishment to the year of starting this research study). The study has the following main objectives:

- i) To determine the year wise distribution of theses submitted in the subject Life Sciences of Assam University, Silchar during 1996-2012.
- ii) To find out the number of citations per thesis.
- iii) To identify the average number of citations in Doctoral theses in Life Sciences submitted to Assam University during 1996-2012.
- iv) To prepare a ranking list of most cited document forms.
- v) To identify the most cited documents by researchers in the field of Life Sciences.
- vi) To find out the year wise distribution of citation pattern.
- vii) To find out the year wise distribution of citation pattern of more cited document form.
- viii) To prepare ranking list among different titles more cited documents form based on the frequency of citations in Doctoral theses in Life Sciences submitted to Assam University during 1996-2012.
- ix) To find out the authorship pattern and collaborative pattern of journal citations.
- x) To identify the most prolific authors and author productivity.
- xi) To study the geographical distribution of core journals.
- xii) To verify the results with the Bradford's law of scattering.

- xiii) To find out the half life of literature and obsolescence of literature used by the researcher in Life Sciences.
- xiv) To make a comparison of researchers preferences between India with Foreign journals.
- xv) To suggest an accurate need-based acquisition policy to the organization library for journal subscription in the school of Life Sciences based on the findings of citation study of literature used by the researchers in Life Sciences.

#### **1.4. METHODOLOGY**

Methodology chosen for the present study is bibliometric analysis which is used to study in detail the bibliographic feature of the doctoral theses and citation analysis of reference appended at the end of each thesis, submitted to the Life Sciences, Assam University from 1996 to 2012 (from the year of establishment to the year of undertaking this study). The study covers 40 Ph D theses submitted to School of Life Sciences for award of doctoral degree. The study encompasses all Life Science subjects. Each of the theses contains approximately average of 253 numbers of citations in the reference part and total of 10012 citations are found and taken for the present study. The methodology adopted for the present study includes collection of information regarding life science subject. All the bibliographic details were noted and a computerized database was created with the help of MS Access for indepth analysis. There are forty numbers of life science doctoral theses found in Central Library, Assam University. The present study aims to understand the attributes of information sources used by researchers in Life Science discipline particularly Assam University. Complete information regarding

these theses was taken. All the citations appended at the end of these theses were collected. Two databases were created for the keeping record of these theses. One is for entering bibliographic details of each thesis and another is for entering the citations appended at the end of 40 numbers of theses. The present study attempted to rank the more cited documents particularly on the basis of their usage and listed the most productive document forms. The study also attempted to identify the most prolific author and chronological distribution of citations.

### **1.5. TECHNIQUES OF BIBLIOMETRIC STUDY**

In the present study an attempt has been taken to analyse the citations cited in the 40 number of theses submitted in the School of Life Sciences during the period 1996 to 2012 which were available in the Central Library, Assam University, Silchar. The purpose was to collect all the references appended at the end of the theses. Two databases were created with the MS Access for data analysis. One database containing records of all the theses submitted during the period and another for all the citations.

The first database contains all the bibliographic records of 40 number of theses.

The few of the bibliographic fields of first database are as follows:

- i) ID: It is the unique identification numbers of all the theses.
- ii) Thesis No.: Each thesis has given a unique number serially for their identification as T01, T02, T03.....T40 according to their year of submission.
- iii) Accession Number: Accession Number allotted to each thesis by the Central Library, Assam University Silchar



- iv) Title of the Thesis: This is the title of the thesis given by the research scholar in his thesis.
- v) Researcher Name: Name of the particular research Scholar
- vi) Supervisor Name : Name of the Supervisor/Guide of the thesis
- vii) Keywords : Main Key words used by the researchers in his/her study
- viii) Page No.: Total number of pages in the thesis.
- ix) Year of Submission: Year of Submission of the thesis

The second database was been created with all the bibliographical details of all references which were collected from each thesis. The few of the fields of second database are listed below:

- i) Citation No: This is the Serial Number of each bibliographic records/citations.
- ii) Thesis No.: It is the Serial Number of the thesis submitted from 1996 to 2012. This number is given to each entry of citation to relate both the databases.
- iii) Title of the Book / Journal / Conference /Seminar Proceedings: Title of the document form.
- iv) Title of the Journal Articles (if Journal articles) or Edited Book: Title of the article or chapter.
- v) First Author: It is the name of the first author
- vi) Second Author : It is the name of the second author
- vii) Three and more than Three Authors: The name of three and more than three author
- viii) Publisher's Name: Publisher name of respective source

- ix) Year of Publication: Year of publication of the literature
- x) Place of Publication: Geographical area of publication for books or journals etc.
- xi) Keyword(s): Keywords used in the title/literature.
- xii) Document Type: Document form of the citation. In this study all the document form are divided in to ten major groups namely Journals, Books, Edited books, Conference/ Seminar Proceedings, Reports, Web resources, Theses/Dissertations, Reference Books, Unpublished documents and Miscellaneous.

The data sheets were created with application of MS Access software for analysis of citations to explore various kind of fact analysis as shown in Figure 1.1 for records of all 40 numbers of theses submitted in the School of Life Sciences and Figure 1.2 for data entry of bibliographical details of all the collected citations.

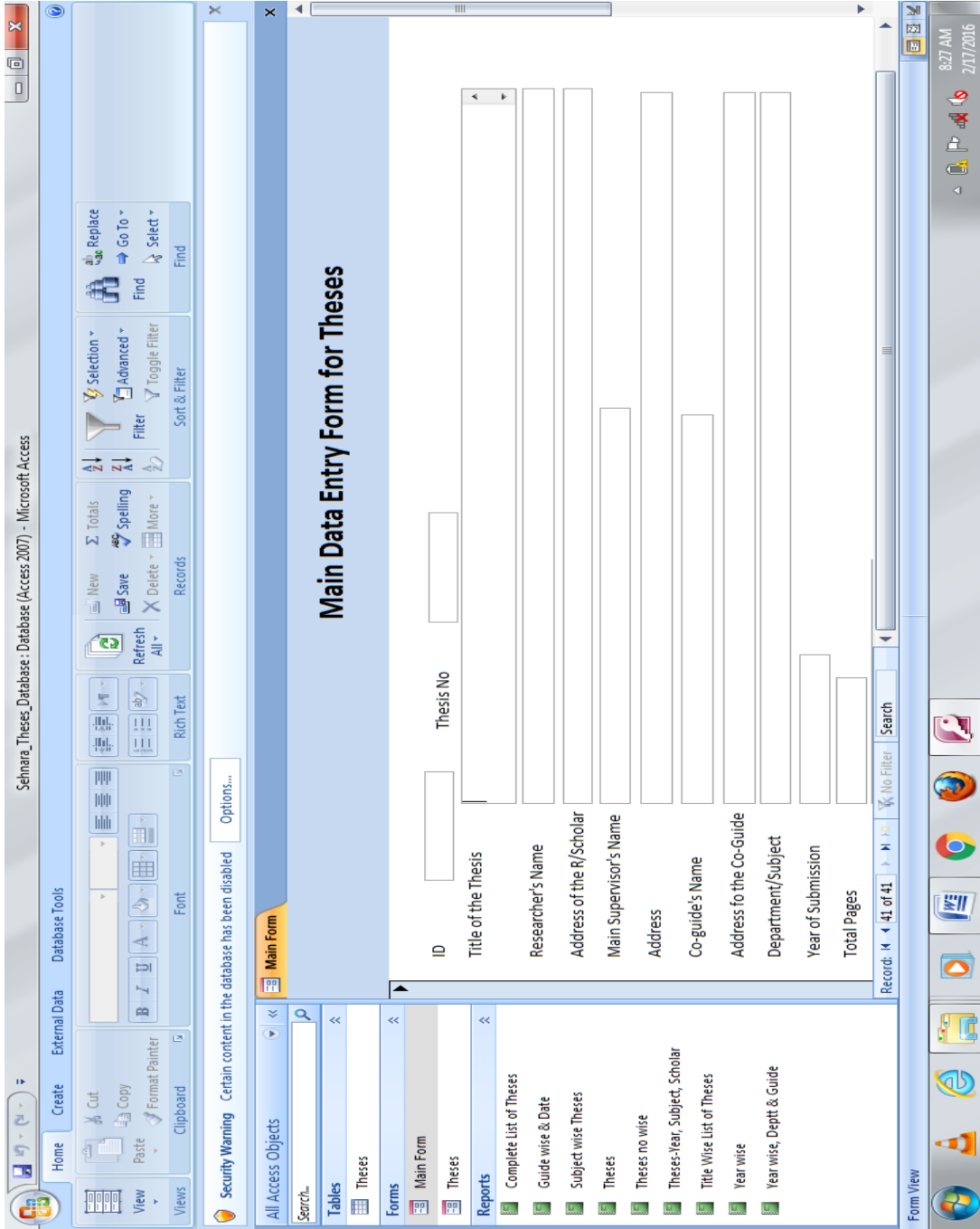


Figure 1.1.1.Data Entry form for Bibliographic data of Theses

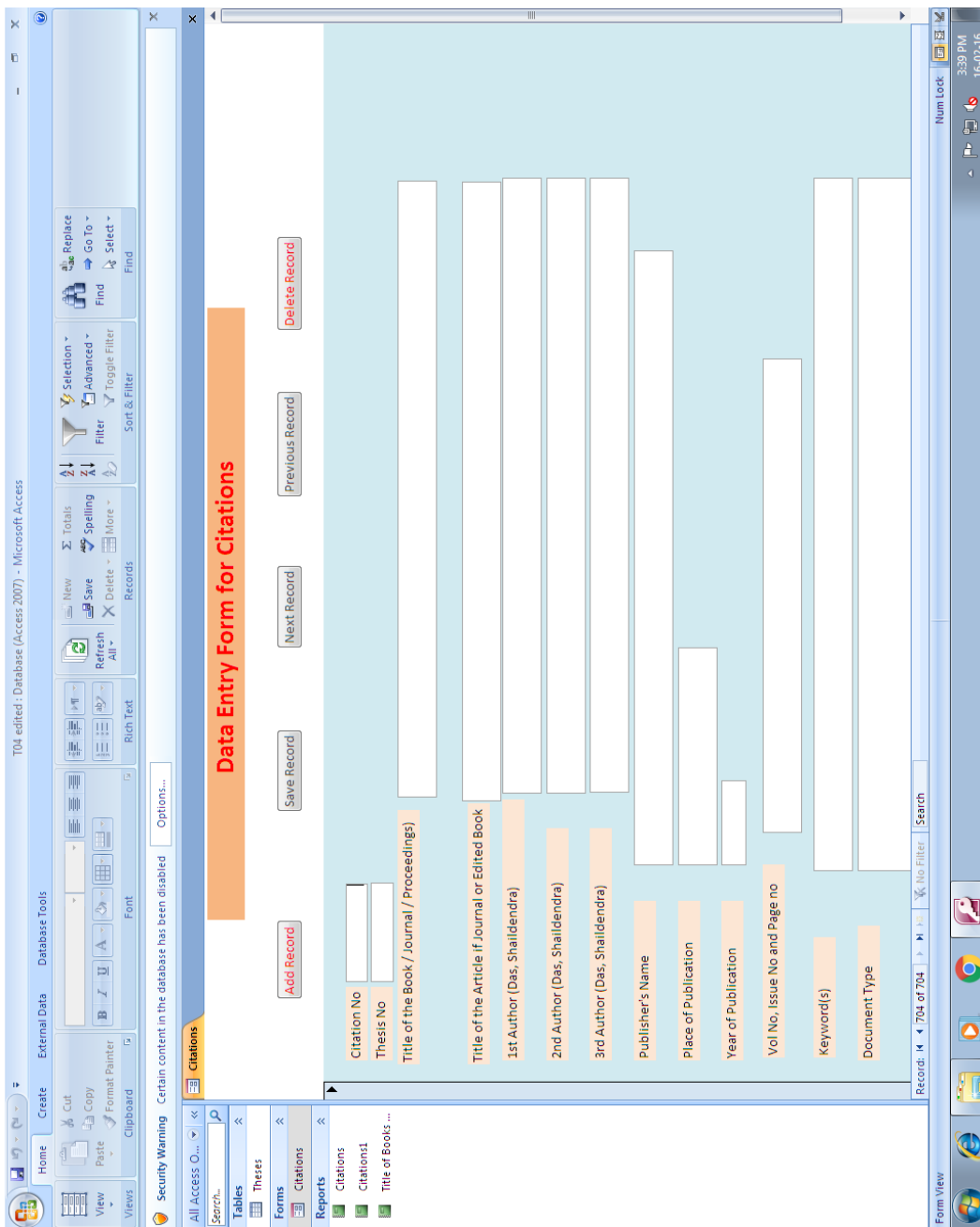


Figure 1.2.Data Entry Form for Citations

After entering all the bibliographic data into the databases the data were exported to MS Excel for sorting, filtering and finally presenting the tabular and graphical representations.

## **1.6. SCOPE AND LIMITATIONS OF THE STUDY**

The present study is to cover all the doctoral theses in Life Sciences submitted to Assam University during 1996 to 2012. The Department of Life Science started in the year 1996 but the research work started later and first thesis was submitted in the year 2001 by the scholar Sarbani Giri. There are three departments under the School of Life Sciences. These are Department of Life Science and Bioinformatics, Department of Microbiology, and Department of Biotechnology. It was found that there were 40 numbers of theses available in the Central Library, Assam University. Each of the theses contains approximately average 253 numbers of citations in the reference part and a total of 10012 citations were found which had been taken for the present study. As the theses are scattered in the library and detail information about the availability of theses were missing. So, it took time to compile the research outputs of School of Life Sciences. The researchers found incomplete bibliographic details of the citations in some of the theses which was considered as another limitation during the present research study.

## **1.7. CHAPTERISATION**

The present study is organized and presented in six chapters in the thesis as follows:

### **CHAPTER 1: INTRODUCTION**

It deals with introduction which includes discussion on the background of the study, statement of the problem under study, objectives, scope and limitations, methodology used for the study and chapterisation of the thesis in the present study.

### **CHAPTER 2: LITERATURE REVIEW**

This chapter presents literature review of previous investigations done both in India and abroad for the development of the subject. Reviews of the related

literature on the basis of studies of the printed and e-resource have been mentioned.

### **CHAPTER 3: CONCEPTUAL FRAMEWORK OF BIBLIOMETRIC STUDY**

This chapter describes the conceptual framework of Bibliometric study especially history and genesis of bibliometrics, its application, empirical laws of bibliometrics etc.

### **CHAPTER 4: SCHOOL OF LIFE SCIENCES, ASSAM UNIVERSITY: RESEARCH OUTPUTS**

The chapter presents the brief description about the School of Life Sciences, Assam University and its overall research outputs during the period 1996(from the year of establishment) to2012.

### **CHAPTER 5: DATA ANALYSIS AND INTERPRETATION**

It focuses on detailed citation data collected from theses in Life Sciences and their analysis. The data is presented and analyzed in the light of the objectives stated in chapter 1. The statistical tools have been used in presenting and interpreting this data.

### **CHAPTER 6: MAJOR FINDINGS, SUGGESTIONS AND CONCLUSION**

This chapter provides major findings, suggestions, issues for further research and conclusion of the present study.

At the end of the thesis references with APA style arranged alphabetically have been attached.