

# Application of Scientometric Analysis in Library Net Work: A Comprehensive Study

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## Abstract-

*The 20<sup>th</sup> century may be described as a century of the development of metric sciences. In this century it self there have been the developments of bibliometrics, Scientometrics, Webometrics and informatics. Library and information Science is a multidisciplinary multicultural field of activity. It has the capacity to assimilate relevant ideas from different field of knowledge. The paper presents a scientometric study of library and information science to standardize the techniques of library and information science to understand the productive pattern of authors. Scientometrics is related to and has over lapping interests with bibliometrics informatics and webometrics. Bibliometrics is a study of relationship of numbers and patters in bibliographic data and use i.e. number of papers, growth of literature and patterns of library and data base usage. Webometrics is a quantitative analysis of web phenomena, which includes link analysis, web citation analysis, search engine etc. These terms refer to component fields related to the study of dynamics of disciplines as reflected in the production of their literature. These terms are used to describe similar and overlapping methodologies. Various definitions of each of the terms are provided from an examination of literature. Accordingly bibliometrics is the study of quantitative aspect of production, dissemination and use of recorded information. Webometrics is the study of quantitative aspect of web/website. Scientometrics is the study of quantitative aspect of science as a discipline or economics activity and informatics is the study of quantitative aspect of information in any form. All are interlinked and same but differ at their subject.*

**Keywords-** *Bibliometrics, Webometrics, Scientometrics, Informetrics, Multidisciplinary, Multicultural, discipline quantitative aspect*

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## I. INTRODUCTION

The 20<sup>th</sup> Century may be called as the century of metric sciences can be said metriometrics science. In this century there have been the developments of biblometrics, Scientometrics, biometric, Webmetries and informatics etc. The term bibliometric was first used by Pritchard in 1969<sup>(1)</sup> as the application of mathematical and statistical methods to books and other media of communication. It included relationship among number of papers growth of literature and patterns of library database usage. Bibliographic databases are representative samples of publication activity in the field of knowledge (Vijay Kumar p. 2004)<sup>(2)</sup> Bibliometric methods are most often used in the field of library and information science: many research fields<sup>(3)</sup> use bibliometric methods to explore the impact of their field. Bibliometrics has changed out all recognition since 1958. It is taken into accounts in a number of countries when making important policy decisions about the future of government funded research. It is co-related with scientometrics also. Webometrics is the quantitative analysis of web phenomena includes link analysis. It was triggered by the realization that the web is an enormous document repository with many of these documents being academic- related. The whole scientometric development is for community net work for scientific data. Many bibliometric, Scientometric studies have been reported in the field of Science and Engineering research in India. Webometrics is an unexplored area concerned with WebPages, link structure of websites and so on. The institutions without its website are unimaginable at present. All these scientometric technologies are interlinked and having much importance in analysis the data. According to Hood and wilson the methods of bibliometrics are closely related specialized of scientometric and webometrics.<sup>(4)</sup> Research in library and information science means the collection and analysis of data on a functions & working of librarian and library managers.

## II. PURPOSE OF STUDY

The main purpose of the study are to create awareness of research analysis in the field of academic library and to search out the furthers scope and area for research.

### **III. SCOPE OF THE STUDY AND METHODOLOGY**

There is a vast scope of analytic study in research fields by analyzing data and information. For the purpose of this study, sources have been searched out through websites and after going through the available study material required information were collected. Updated information's also collected from the various universities. Personal discussions have also been done with university librarians of well known universities such as – Rajasthan university, Rajasthan Technical University, JP University, Noida, O.P. Jindal University Sonipat, Manipal University, Jaipur, Banasthali University Banasthali (Rajasthan) etc.

### **IV. BIBLIOMETRICS**

Bibliometrics is a set of quantitatively analyze academic literature <sup>(5)</sup> with the advent of “Bio Science “bibliometric techniques formed a new application in the realms of science administration as a research management and policy tools. Bibliometrics methods are most often used in the field of library and information science. Apart from this it used in other areas also. Many research fields use this method to explore the impact of their field of researches. Historically bibliometric methods have been used to trace relationships amongst academic journals citations, which allow users to search forward in time from available articles to more recent publications. It determines the popularity and impact of specific articles, authors and publications. Information Scientists also use citation analysis to quantitatively assets the core journal titles. According to Henderson, M.Shurville, S. and Fernstorm, K. (2009) Bibliometrics are now used in quantitative research assessment exercise of academic out put.<sup>(6)</sup> Through citation analysis all the details of articles like authors, their distribution and contribution, year of publication, institutional affiliation etc, can be accessed. Citation analysis and content analysis are commonly used bibliometric methods. Tracking citations and understanding their trend in context is a key to evaluating the impact and influence of research. In this way bibleometric techniques are being used for a variety of purpose like determination of various scientific indicators, evolution of scientific output, selection of journals for libraries and even forecasting the potential of a particular field. The popularity in the adaptation of bibliometric techniques in various disciplines stimulated stupendous growth of literature on bibliometrics and related areas.

### **V. DEFINATION OF BIBLIOMETRIC**

There are many definitions of the term “bibliometrics” out of them few notable can be viewed. According to Broadus (1987 b.p. 376)” The quantitative study of physical published units or of bibliographic units or of surrogates of either” In contrast to this Brokes (1990, P. 42) defines it- “Bibliometric must now be conceded to library studies only its works not yet ended as libraries continue to adapt to the changing world around them.” White & Me Cain (1989,p. 119) explained it “ bibliometrics is the quantitative study of literatures as they are reflected in bibliographics.

Over the years, a number of reviews and bibliographics of the bibliometrics have been published some are general in their scope where as others are specific. One of the interesting features of bibliometric term used to describe part or all of this discipline. According to Porter, A.(2004) (8) Bibliometrics is a set of tools for analyzing publication data.

This technique of analysis and study has created opportunities for librarians to really engage with their academic colleagues. University librarians can plan and recast service models, refocus collection and develop staff skills to support research needs of their academic communities by demonstrating expertise, which can support other areas such as information literacy programs for students. Librarians need to understand the uses that are being made of bibliometrics and to ensure that professional development for library staff is provided. Traditionally, librarians have focused on hands on searching instruction through workshops, responding to request from academics and research students. The university of New South Wells library has taken a different approach with more specialized Grant Application Statements for academic staff. At the University of Melbourne, the era initiative provided the impetus for librarians to forge links with academics chairing the evaluation clusters. Victoria University has undertaken a range of activities to provide support for academic staff. Like wise many other universities of many countries have adopted and molded their programs as per their needs and requirements.

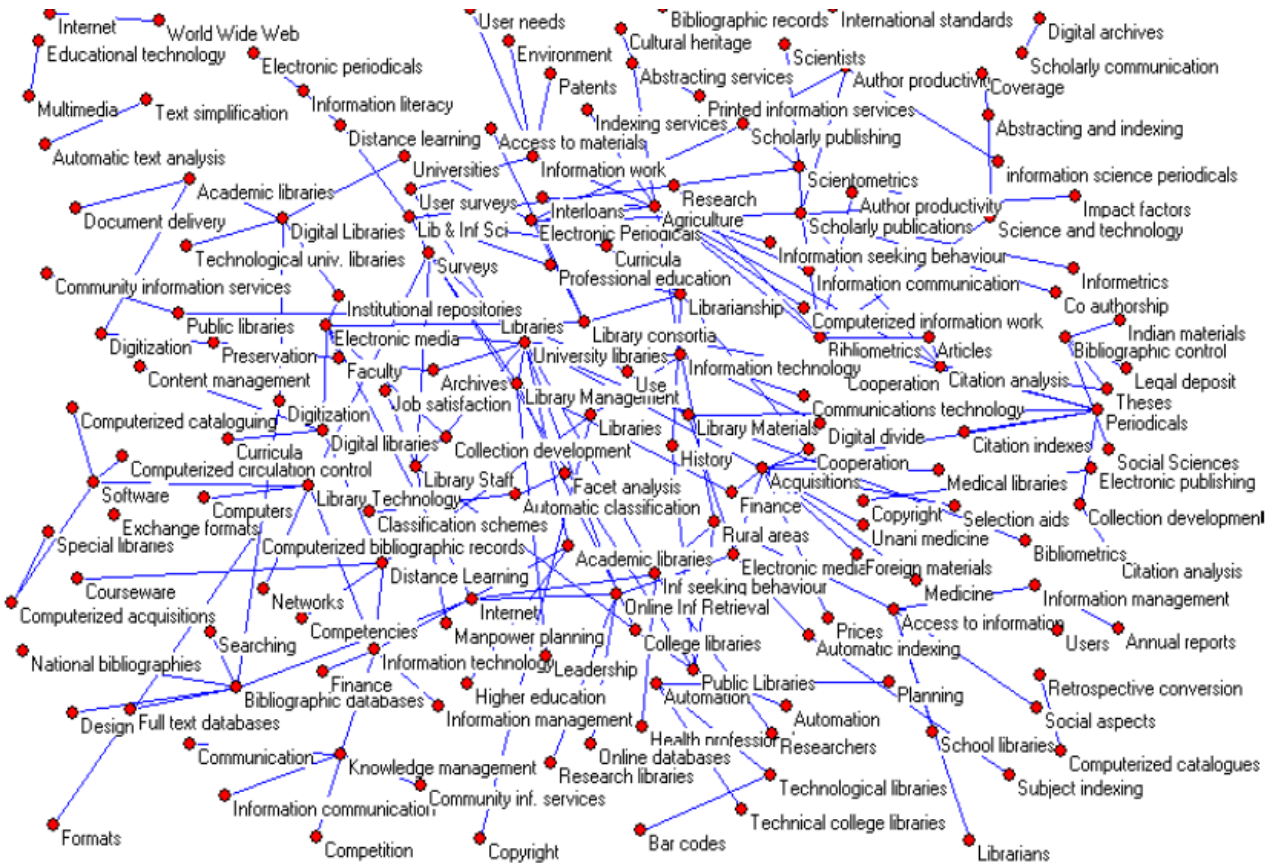
Research is a means of continuously developing a discipline with ability. It makes use of scientific methods. In this context Tejomurthy & Kumar explained research as the collection and analysis of original data any problem of librarianship done with in library schools according to scientific and scholarly standards.

### **VI. APPLICATION AND ADAPTATION OF BIBLIOMETRIC TECHNOLOGY IN INDIA LIBRARIES**

Libraries and library schools in India have been carrying out research activities on varied topic of library and information Science. Dr. S.R. Rangnathan, the father of library Science, laid down the foundation of research in India with his pioneering efforts. He introduced formal education in library and information science discipline in universities. Bibliometrics study of research out put is the most commonly used research methods in India. Most of these studies used

bibliometric techniques such as citation analysis to analysis library and information science research. One of the well known relational bibliometric methods is co-word analyses, which projects a specific visual representation of the data. Co-wards analysis as a viable approach for identifying research trends. Its results have produce a great deal more than statistical artifact indicating that there is high interest in bibliometrics/ Scientometrics/informetrics library system university libraries.

Information and Library Network (INFLIBNET) is also providing bibliographic information services by extending technical help and guidance from time to time to academic libraries in automation and net working. The aim of the training program is to give the participants sound overview of bibliometric methods, performance indicators and tools & techniques related to bibliometrics analysis and mapping. As bibliometrics is a branch of library and information Science which explain out puts resources and inputs in terms of organizational structure its object is to analysis the number of papers published (year wise) as shown in following table to study the reference made by author and to understand the authorship pattern.



Ann. Lib.Inf. Stu, December 2011

Fig. 1 – Co-Ward network in Journal articles index in LISA (1990 June 2010)

Table shows the year wise distribution of articles in University News

Year	No. of Articles	Percentage
2007	270	19.85
2008	219	16.10
2009	229	16.88
2010	328	23.10
2011	310	25.07

Bibliometric study becomes unavoidable in doctoral research now a days. Considering this aspect University Grant Commission is coming forward and is issuing guidelines to all the university librarians to adopt the bibliometrics techniques for processing the research work fast and accurate. For that UGC will impose some important changes in rules governing research student. Now most of the Indian university libraries have switched bibliometrics system and analysis for study and study activities.

## VII. WEBOMETRIC ANALYSIS

The different metrics studies such as bibliometrics, Scientometrics and informatics are well known and used to measure scholarly communication identify users of different subject, authorship and its trends in documents on various subjects of an entire discipline. Bibliometrics research methodologies of library and information science have always been used to provide tools for understanding the dynamics of disciplines, developing policy and justifying research funding. Recent years have witnessed the emergence of webometrics or cybermetrics, which covers research of all net work-based communication using Informetrics. The globalization has made a remarkable impact on academic education system and internet is the constant source of energy.

The webometrics is a new concept with increasing dimension and based on bibliometrics but some part of webometrics study is beyond the boundaries of bibliometrics. As far as concern of bibliometrics technology which itself is a very broad phenomenon but webometrics study is measurable and useful study tool related with search engine performance. Thus it can be said that, on the basis of origin, the bibliometrics. The base of all other metrics but due to some unique features it differentiates between all of them. In fact webometrics is a science based on informatics methods.

<sup>(1)</sup>. In this science the content analysis of web pages are performed through calculating and analyzing their out links and in links. Websites have become powerful means of communication, which is hosted on at least on web server, accessible via internet or private local area network.

The growing use of internet in libraries and advent of webpage revolutionized the process of library publicity and dissemination of information pertaining to library Sections, collections, staff and services. Webometric techniques are still in experiential stage in testing whether the classical bibliometric methods applied to the web are reliable and feasible means of comparing the analysis of websites.

## VIII. SCIENTOMETRICS

The term Scientometrics is mainly used for the study of all aspects of the literature of Science and technology. It includes all quantitative aspects of the science, communication in science and science policy<sup>(9)</sup> (Wilson 2001) Scientometrics has typically been defined as the “Quantitative study of Science and technology: “(Van Raan (1998,P.5)<sup>(10)</sup>. According to Brookes (1990-P.42)” “The term Scientometrics has become fruitful in science policy studies. The term has now established a significant role in the social sciences.” Distinguishing it with bibliometrics he added further that “Though the techniques of scientometrics and bibliometrics are closely similar their different roles are distinguished by their very different context.”

Another definition is provided by Tague-sutcliffe (1992 a, p.1) as a discipline or economic activity. It involves quantitative studies of scientific activities”.

As per definitions it is clear that Scientometry is a wider term of analysis having symmetrical and scientific out look of the articles. It is very systematic study of the subject and through this system library can be able to upgrade its quality of standard.

## IX. INFORMATRICS

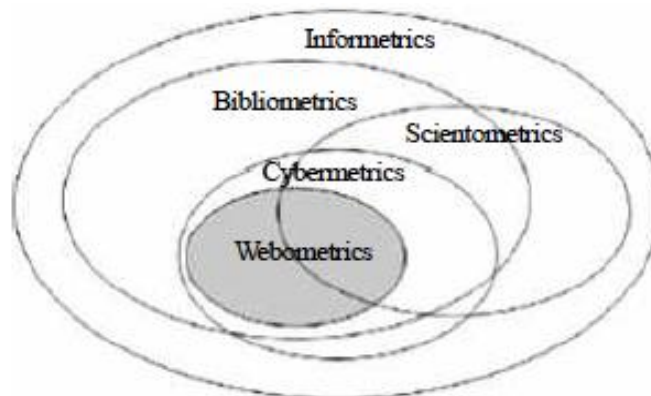
The most recent metric term, ‘informatics’ comes from the German term “informatic” and was first proposed in 1979 by Nacke to cover that part of information science dealing with the measurement of information phenomena and the application of mathematical methods to the disciplines problems, Bonitz (1982) sees this new term as necessary to distinguish informatics main concerns i.e. with scientific communication from the science of science and library science. Nacke consider it as a generic term for both bibliometrics and scientometrics. Brookes (1990) endorsed informetrics as a general term for scientometrics and bibliometrics with scientometrics taken as learning to policy studies and bibliometrics conceded more to library studies.

The term informetrics is perhaps the most general of the three terms. Informetrics may subsume scientometrics and more specially bibliometrics. A very definition is implicitly provided by Egghe & Rousseau (1990 b.p. iii) - “Informatics is a quantitative methods in library, documentation and information science” It covers the empirical studies of literature and documents. According to Togue – Sutcliffe (1992 a p.1) “Informatics is the study of the quantitative aspects of information in any form, not just records or bibliometrics, and in any social group, It can utilize and extend the many studies of the measurement of information that lie outside the boundaries of both bibliometrics and scientometrics. These definitions are putting a comparative view of scientometrics aspects.

## X. RELATIONSHIP BETWEEN METRIC SCIENCES

Between these metric sciences bibliometrics first came in existence in 1969. It is a statistical analysis method of publication pattern. The other metric sciences are also statistical methods and have their origin on the basis of

bibliometrics, but all of them have their different subjects areas. All the metric systems are having quantitative analysis but their subject are different. In this following figure it is clear that informatics covers all the metrics circles while bibliometrics and scientometrics are over leaping to each other, like wise webometrics is also over lapping the bibliometrics.



## **XI. CONCLUSIONS**

Worldwide, library practices are under going revolutionary changes that stem from the proliferation of the internet and its futures. Librarian can now effectively perform previously labor intensive task over the internet using applications such as electronic mail, text images and sound files. Technological development in information technology and communication brought tremendous changes in the field of library functions and management. It has transformed the library structure and set up at different level of standard based on scientometrics patterns. Due to these development new phenomena of metric system emerged with some standard parameters known as Bibliometrics, webometrics, Scientometrics and informatics.

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