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A Scientometric studies on Library and Information Science in India as Reflected in Digital Databases: A Review Using R

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ABSTRACT

The scientometric research productivity and scholarly communication on library and information science papers indexed in the Web of Science and Scopus database from 2002 to 2021 are explored in this article. The main focus of scientometric research in the field of library science was on the range of research production over time. This paper presents a scientometric analysis to know the academic overview of LIS in India in terms of annual growth of publications, most prominent authors, most preferred journals, country and Institute collaboration etc.

Key Words

Scientometrics, Bibliometrics, Librar and Information Science, Bibliometrix in R Programming, WoS, Scopus and Scholoarly Productivity

INTRODUCTION

In library and information science discipline metric is currently used with variety of ways. Metric Studies in LIS domain has multidimensional evolution, development has been classified as Librametrics, bibliometrics, scientometrics, cyber metrics, or webometrics, and informatics. In academic environment, analytical studies play a vital part in decision and policy-making process. Scientometric studies primarily focused on evaluating scientific production and investigating various aspects of scholarly communication. The Scientometricis is systematic survey tool of trustworthy and important for tracking research trends and intellectual activities. Hence, in order to trace the developments in scientometrics study on library and information science field this

study has been carried out based on articles indexed in the two most important and widely covered digital databases: Clarivate's Web of science and Elsevier's Scopus.

Literature Review

Numerous scientometrics studies have been undertaken in diverse subjects during the previous few decades. Most of the scientometrics studies authors belongs to library and information science discipline. Library and information science research continues to be strong in collaboration, Some research work is based on library science publications, most of the materials preferred in the field of Library Philosophy and practice, library management, journals study, citation, author productivity etc., Majority of the researchers used Scopus and Web of Science databases for their study and some were used Indian Citation Index

(Taşkın, 123 C.E.) analysing 97 years of publishing and citation patterns, has attempted to paint a picture for the future of the library and information science (LIS) field. Law, librarianship, health information, information retrieval and management, and information systems were separated into four sub-fields.

(David Bawden and Lyn Robinson , 2016) Library and information science is a reported discipline that examines the creation, organisation, management, communication, and use of recorded information. It aids librarianship, archiving, and records management professionals in their work. As it adapts to new types of documents and collections, the discipline is changing.

(Thompson et al., 2020) Access to published research is becoming increasingly vital for demonstrating the impact of research. This article presents a bibliometric analysis of publications in the Web of Science (WOS) database from 2007 to 2016. The statistics show that the majority of articles are published by researchers with US institutional connections.

(Horri, 2004) has published a review article based on 17 years of library and information science research in Spain. The conceptual and methodological paradigm of L&IS research was used to assess a total of 354 articles. Individual authorship (68 percent) and isolated cases of publication in non-Spanish language publications are found in the authorship patterns

METHODOLOGY

A methodology proposed by Michan and Munoz Velasco is used to perform the scientometric analysis. It consists of following 5 stages:

Recovery: Identify the databases and construct the search strategy to conduct the search, which includes setting generic query phrases, logical operators (e.g., AND, NOT OrR), database criteria (e.g., language, type of article), and the literature selection that will make up the studies database.

Migration: It entails extracting data from the selected studies, transferring it, and loading it into a new database or software application.

Analysis entails answering the research questions and conducting a quantitative literature evaluation. ScientoPy and Bibliometrix are used to accomplish this.

The quantitative strategies that were applied were as follows:

- Indicators of bibliometric and scientometric value
- Mathematical models and procedures
- Semantics or text mining
- Statistical approaches
- Social network analysis

Visualization: It is the process of determining and identifying parameters, as well as the use of figures, graphs, diagrams, and maps to depict statistics and analysis results.

Interpretation: Based on the analysis and interpretation of results, research trends can be identified in respect to a certain research group, institution, country, area, topic, discipline, or field of knowledge, many channels of theory, methodology, and influence, as well as societal factors, can be identified.

RESULTS AND DISCUSSION

Sources of Information, Literature Search and Selection

Sources: To perform the scientometric analysis, the digital databases Clarivate Web of Science (WoS), and Scopus were chosen. These databases are considered as high-quality, wider coverage reliable, curated multidisciplinary data sources for bibliometric and academic research.

Area: Library and Information Science, Scientometric Studies and India

Period: 2002 to 2021

Search String: The search string for this analysis was “Scientmetric” OR “Bibliometric” or OR “Webometric” OR “Librometric” AND Library and Information Science OR Library Science This string was further filterd with the Country “India” for the period of 2002 to 2021. With this search criteria, the data set was extracted within a day on 26th January 2022.

Limitations: This study does not include the informal publications and others that are not covered by SCOPUS and WoS for the period from 2002 to 2021.

Bibliographic Data Analysing Tools:

To examine the results of Scopus and Web of Science searches, we used the Bibliometrix - An R program.

The extraction, cleaning and loading processes

The metadata of the search made in both the digital databases i. e. Scopus and WoS was stored in the bibtext format for processing in R Bibliometrix.

Analysis , Visualization and Interpretation

The data curate consists on identifying and eliminating duplicate. The extracted data was loaded into Bibliometrix, R tool which is an open-source scientometric analysis tool that allows for quantitative research in scientometrics.

Brief Profile of the Results

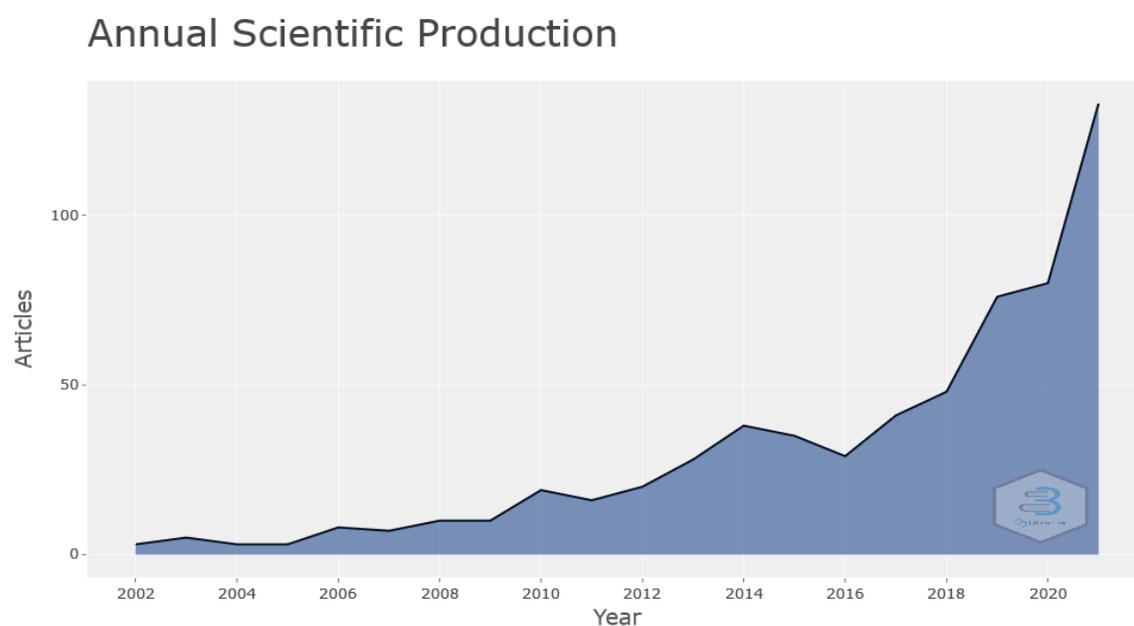
Table 1 represents the brief profile of Scientometrics in library and Information Science trends were seen through the Biblioshiny window from the period 2002 to 2021. For 618 documents were appeared in 173 documents with 17767 reference. The journal articles were most frequently identified and accounted for 507 followed by 45 reviews. 15 documents were grouped as others: letters, editorials, and notes.1025 authors wrote a total 618 documents with 1597 appearances. With a collaborative index of 2.11 multi-authored documents contribution is highest with 913 and 180 authors published solely.

Table 1: MAIN INFORMATION					
ABOUT DATA		DOCUMENT TYPES		AUTHORS	
Sources (Journals, Books, etc)	173	Journal Articles	507	Authors	1025
Documents	618	Reviews	45	Author Appearances	1597
Sources (Journals, Books, etc)	8.327	Conference proceeding papers	11	Authors of single-authored documents	112
Average citations per year per doc	1.387	Books	13	Authors of multi-authored documents	913
References	17767	Book chapters	19	AUTHORS COLLABORATION	
		Others	15	Single-authored documents	180
				Documents per Author	0.597
				Authors per Document	1.67
				Co-Authors per Documents	2.61
				Collaboration Index	2.11

Growth of Publications

Figure 1 depicts the growth of the annual publication with time. During the study period in 2002 the publication journey began with three publications and ended with 618 articles. The annual growth rate of publications is about 22.09%, The average citations per paper for publication is 1.38%.

Figure 1 Year wise Growth of Publications after removing the duplicated documents

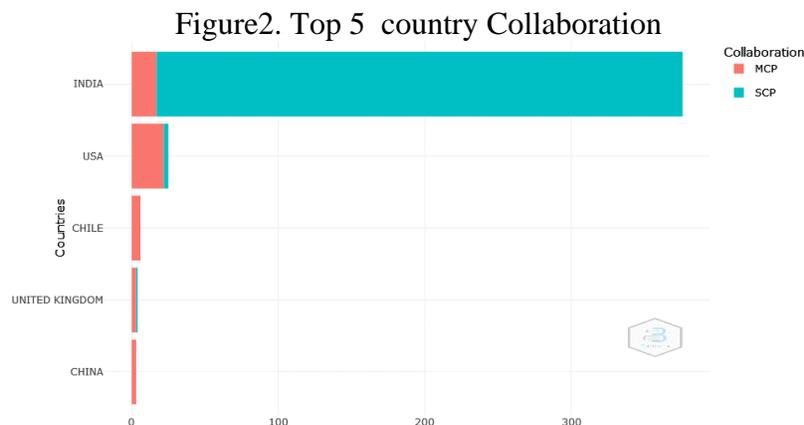


Author, Country and Institutions Productivity

In our analysis set of 618 publications, there were a total of 1025 related authors appearing in the authors' list. Table 3 identifies the most productive authors with an h-index. Prathap G is the leading author with 37 documents, 415 citations, and an h-index of 9. Followed by Kumar S with 18 papers and 354 citations with the h-index of 9. Garg K, Madhusudhan , Mergo, PatnaikD, Mukharjee B and Singh H are among the list of prominent Authors.. furthermore Most of these authors have received highest citations for their publications

Table 2. Top 10 Authors						
Author	h_index	g_index	m_index	TC	NP	PY_start
PRATHAP G	9	19	0.692	415	37	2010
KUMAR S	9	18	0.643	354	25	2009
GARG K	5	9	0.357	101	9	2009
MADHUSUDHAN M	5	9	0.333	85	9	2008
MERIGO J	6	9	1.2	150	9	2018
PATTNAIK D	7	9	2.333	202	9	2020
MUKHERJEE B	5	8	0.357	83	8	2009
SINGH S	5	8	0.25	83	8	2003

As shown in Figure 2. USA shares the highest collaborative country with 17 documents. Other countries with a more significant number of collaborations are Chile, United Kingdom and China.



From the data analysis, as per the institution affiliation, it is identified that the University of Delhi leads the top position (26) followed by APG Abdul Kalam Technological University (19) and Banaras Hindu University (13). Table 7 shows the top 10 most productive affiliation Institutions

Figure :3

Most Relevant Affiliations

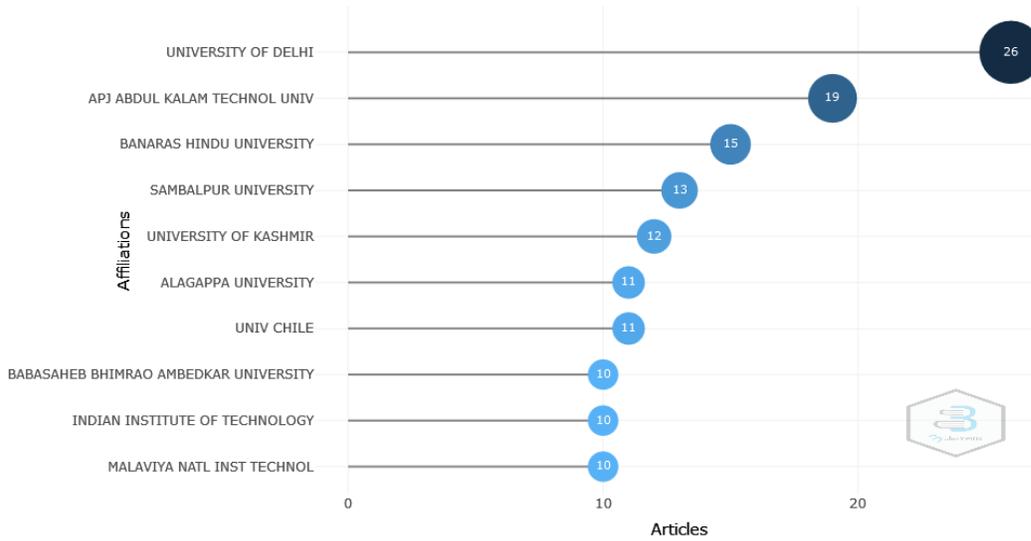


Figure: 4. Source Growth

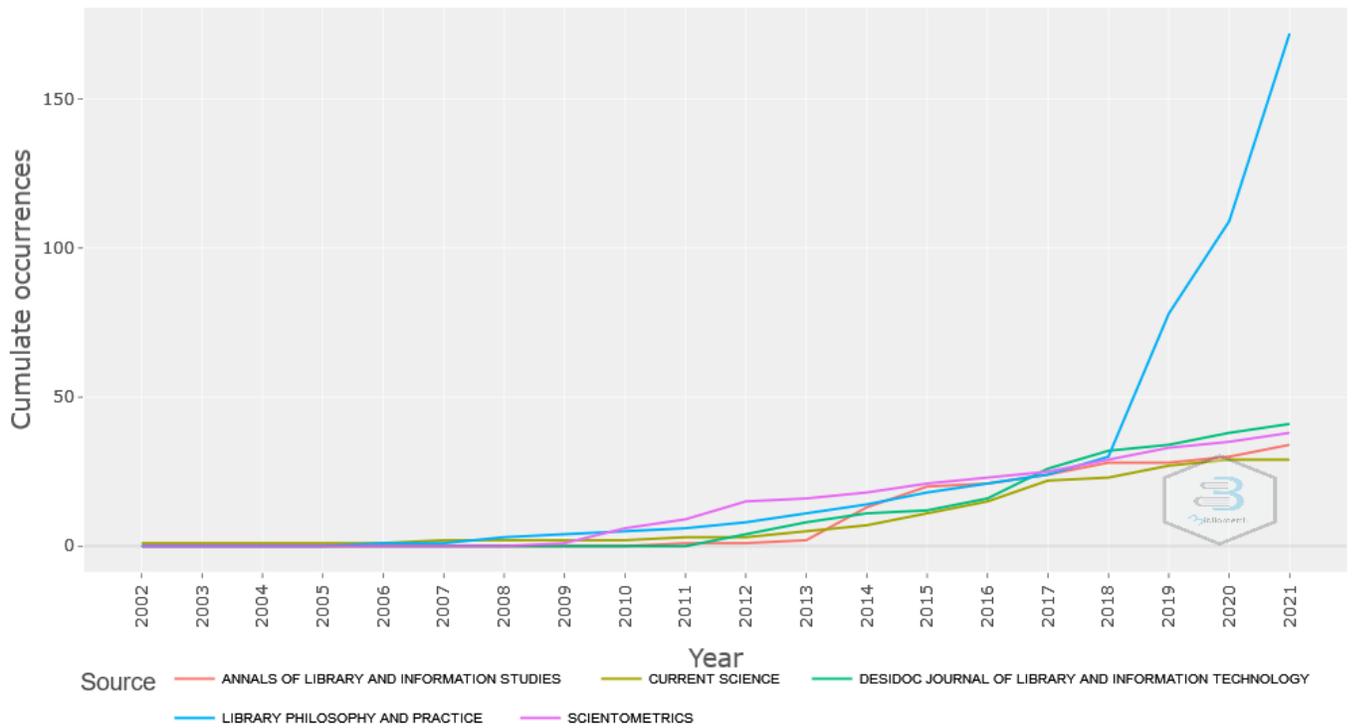


Figure4 shows the top 10 Journals with the total amount of publications published over time. The figure 4 shows the journal titled Library Philosophy has the highest publication (173) followed by DESIDOC Journal of Library and Information Studies (41), Scientometrics (38), and Annals of Library and Information Studies (34) Current Science (29) so on.

Figure 5 Co citation network structure reveals the most cited people are Hirsch, Kessler and Pritchard

Figure 5 Co-Citation Network of Scientists

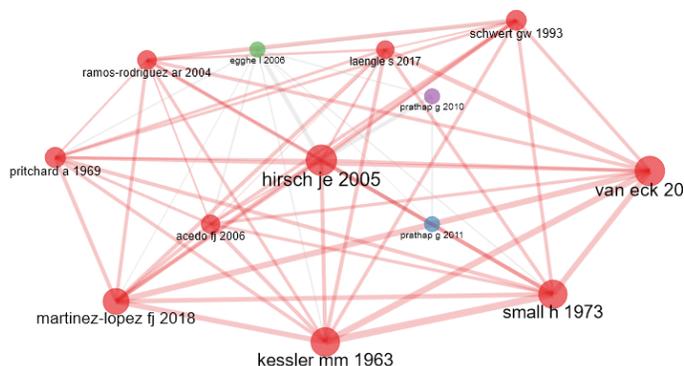
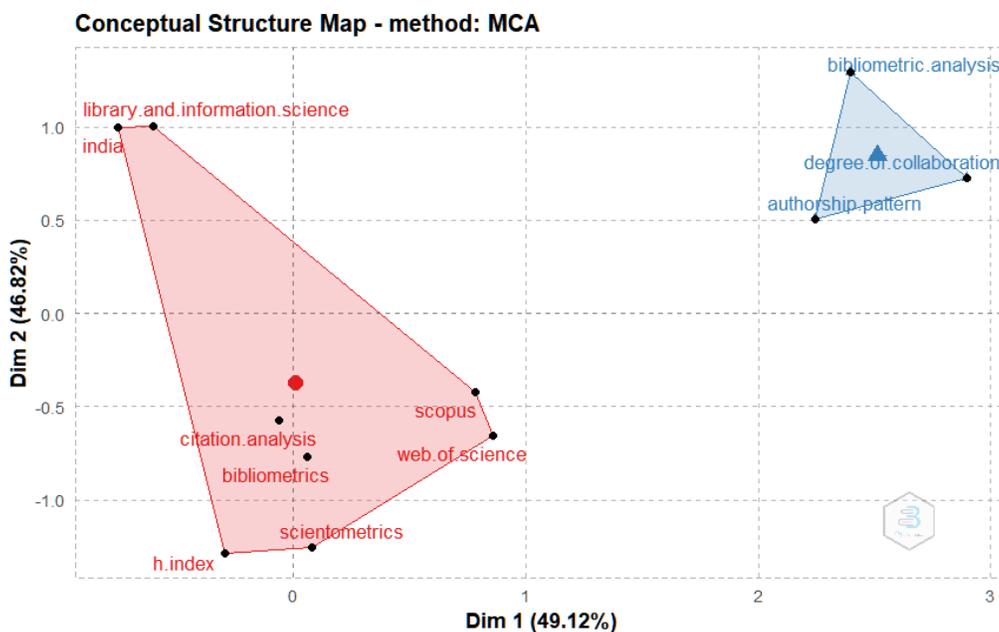


Figure 6 shows the temporal structure of the words from 2002 to 2021 depicted research development in the field of scientometrics in Library and Information Science in India. Two main clusters are consisting the terms h-index, degree of collaboration, authorship pattern citation analysis and scopus and web of science databases.

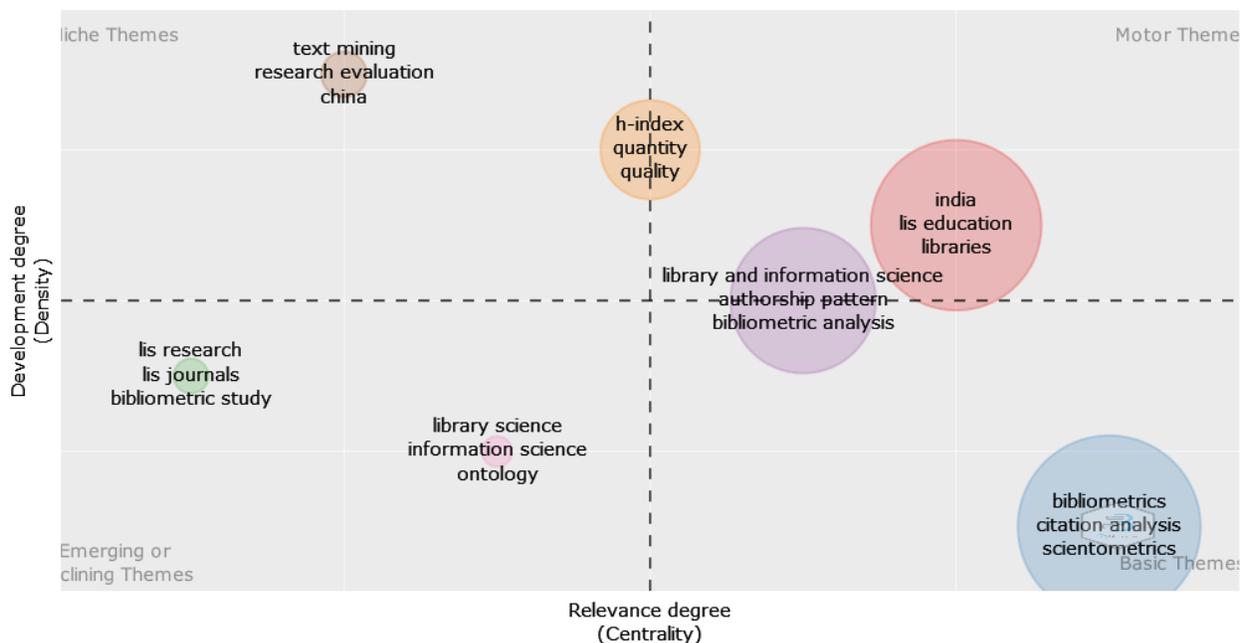
Figure 6.



A thematic map based on co-word network analysis and grouping is shown in Figure 7. This map is based on Cobo et al method 's for detecting, quantifying, and displaying a research field's evaluation. A thematic map allows for the definition of four topologies of themes based on the quadrant in which they are located.

The motor themes are the topics in the first quadrant. They are distinguished by a high degree of centralization and density. This indicates that they have been developed and are important in the field of research. The highly developed and isolated themes are found in the second quadrant. They have well-developed high-density internal links, but low-density external links are of relatively minor value in the area. In the third quadrant, you'll find emerging or fading topics. They are underdeveloped and marginalised due to their poor centrality and density. Finally, there are fundamental and transversal motifs in the fourth quadrant. They have a high degree of centralization and a low density. These themes are critical to a study field's success and address broad topics that cut across the field's several research areas.

Figure 7. Thematic Map of Clustering



CONCLUSION

The analysis reveals that the literature on scientometric studies on library and information science, based on 618 documents retrieved from both the digital databases: WoS and Scopus. It is observed that the number of publications has been increasing. As far as the format of these research documents published is concerned, a large majority belongs to the Journals followed by reviews and conference papers. It also insights that, more documents were collaborative as a result multi authored articles publications are quite common. USA stood first place with more authors collaboration. Delhi University has highest number of publications in scientometric study on library and information science literature. During the study period we found 22.9 of overall growth rate.

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