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Analysis of Bibliometrics Research in Library Philosophy and Practice from 1998-2021

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Abstract

This study aimed to analyse the trend of bibliometrics research articles on Library Philosophy and Practice (LPP) journal from the year 1998 to 2021. There are 651 bibliometrics articles in the LPP journal. Bibliometrics articles were first published in the LPP in 2000 and the number of bibliometrics research\ has been increasing over the last 10 years, particularly in 2019-2020, and this year is expected to increase further. The bibliometric article received the most contributions from India, followed by Saudi Arabia, Nigeria, Pakistan, and Iran. The topics covered in bibliometric studies include library and information science, coronavirus, artificial intelligence, machine learning, deep learning, social sciences and physics. The dataset used were mostly were from Scopus and Web of Science, with a few from DOAJ and Google Scholar. Citation analysis, productivity analysis, and collaborative analysis are three types of analysis that are commonly used in bibliometric articles in the LPP. The research recommendation provides a comprehensive overview of the development of publications, particularly bibliometrics, which can be used by researchers and journal managers to determine the direction of future journal topics. For further research, researchers can conduct a systematic literature review to delve deeper into the subject.

Keywords: *bibliometrics, research trend, citation analysis, keywords analysis*

Introduction

Bibliometrics are well known since the publication of bibliometrics studies conducted by psychologists in the 1950s. Furthermore, Price, who is also known as the founder of bibliometrics and scientometrics publishes the results of bibliometrics research in various areas of science. Some sources indicate that bibliometrics originates from librarian publications, whereas others argue that bibliometric studies emerged from the field of

chemistry. Until now, the writing of bibliometric history has been ongoing. Bibliometrics are identical to statistical calculations from the output of a study or publication (Godin, 2006).

Bibliometric is closely associated with counting statistics, according to Pritchard (1969), the proposed bibliography or bibliometrics statistical term was first used in 1922 in a lecture bibliography by E. Wyndham Hulme at the University of Cambridge. The term was then applied by Hulme to the illumination of science and technology through the use of counting documents. Gosnell used obsolescence of literature in his paper after two decades without acknowledging its previous use (Pritchard, 1969). Bibliometrics is closely linked to statistical, mathematical calculations used for measuring a publication.

Bibliometrics research is currently expanding at a rapid pace. Bibliometrics is a form of scientific communication that allows researchers to track the progression of a field of science, identify trends in research topics across disciplines, and learn how scientists develop knowledge and disseminate findings. Bibliometric studies can also be used to knowledge evolution. The library field was one of the pioneers of bibliometrics, and there numerous bibliometric studies on the subject of libraries and information available today. However, studies analyzing bibliometric research articles in the field of library and information science in open access journals are still rare. From 1981 to 2018, bibliometric research was conducted in the DESIDOC journal, a journal of information science and libraries, with the recommendation that researchers investigate more topics that are rarely researched in India, such as open access, virtual libraries, online exhibitions, multimedia libraries, and library management systems (Lamba & Madhusudhan, 2019). Prieto-Gutiérrez and Segado-Boj (2019) also conducted a bibliometric analysis of the Annals Library and Information Studies journal from India, covering the years 2011 to 2017. The authors examined authorship patterns, collaborative networks, and research topics in this study. The Malaysian journal of library and information science has also been studied using the bibliometrics method, with a time span of 2001 to 2006, and the result shows an increase in the number of papers and citations (Bakri & Willett, 2008). Verma and Shukla (2018) conducted a bibliometric analysis in the journal of advanced in library and information science from 2012 to 2016. In addition, Haq and Al Fouzan (2019), conducted bibliometric research on the Pakistani library and information journal from 2008 to 2017. In 2019 bibliometric research was conducted in the LPP journal using articles from 1998 to 2019; using Google Analytics, and looking at keyword clustering and authorship (Saber, Barkhan, & Hamzehei, 2019). Kannan and Thanuskodi (2019) also conducted the same study but used the Scopus database to extract metadata from articles published between 1998 and 2018. Saini and Verma (2018) also researched the LPP journal between 2008 and 2017, focusing on the contributions of writers from India and Pakistan. Haque, Islam, Hasan and Akanda (2019) look at articles from 2014 to 2018. Veram, Yadav and Singh (2018) on the other hand examined research patterns in the LPP journal from 2008 to 2017. period.

Since 1998, LPP has been publishing in an e-journal format with open access. Library Philosophy and Practice is a peer-reviewed journal managed by the University of Nebraska-Lincoln in Nebraska USA. LPP publishes articles that examine the relationship between library practice and the philosophy that underpins it. These include explorations of current, past, and emerging theories of librarianship and library practice, as well as reports of successful, innovative, or experimental library procedures, methods, or projects in all areas of librarianship, all of which are set in the context of applied research. Until 14 March 2021, 3,758 Scopus indexed articles have been published by the LPP.

In the above context, the purpose of this bibliometric study is to investigate the trend of bibliometric research in the LPP journal, and the research questions are as follows:

1. How do the bibliometric study trends in Library Philosophy and Practice journal?
2. How is the publication productivity of the bibliometrics study in Library Philosophy and Practice journal?
3. How does the co-occurrence of bibliometrics study in Library Philosophy and Practice journal work?

Literature Review

Bibliometrics

Bibliometrics is defined as “to shed light on the processes of written communication and of the nature and course of development of a discipline (in so far as this is displayed through written communication), using counting and analysing the various facets of written communication” (Pritchard, 1969). Following that Raisig (1962) defines bibliography as “the assembling and interpretation of statistics relating to books and periodicals; it might be used in a variety of situation for an almost unlimited number of measurements. It is to demonstrate historical movements, to determine the national or universal research use of books and journals, and to ascertain in many local situations the general use of books and journals”. These two definitions mean that bibliometrics is a method, or process of analysing written communication, in this case; it is possible to develop scientific disciplines, show historical movements, and determine the direction to which the research takes place through journals or books by collecting articles or using statistical interpretations, for example, counting.

The use of the term statistical bibliography has fallen out of favour and has become quite rare, due to which the term bibliometrics has taken the forefront. This term is very closely related to biometrics, econometrics, and scientometrics. Moreover, all studies use bibliometrics widely to locate the number of written communication processes and the term is accepted quickly, particularly in the field of information science (Pritchard, 1969). Broadus, 1987, added that all studies involving journal physics, bibliography, citations, and surrogates. Logically measuring these items is called bibliometrics.

Bibliometrics functions

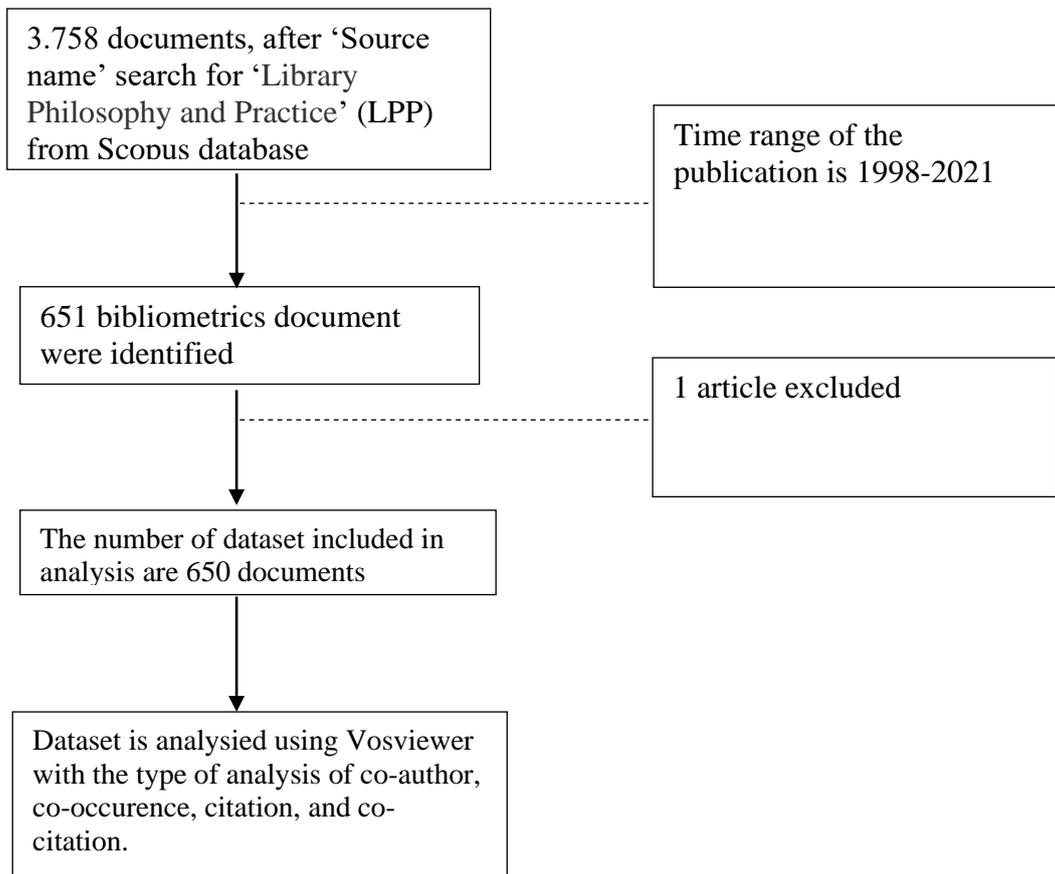
Bibliometrics techniques can be used to evaluate the technical activity at 3 different levels. At the policy level, where the performance of a country or region will be evaluated; at the strategic level, the performance of the organization or university or department to be analysed; and at the tactical level, important aspects of technological development will be identified and evaluated. The fundamental process for all three is the same; assembling data, defining indicators, playing characteristics, evaluating key activities, and conducting database evaluations. In this study, the purpose of using bibliometrics is more towards the tactical application level, where at this level, the analysis can be used by management for research development. Bibliometric research can be conducted before an organization conducts research; the tactical analysis aims to create a model related to what happens in a research area, see its development, progress, and future direction from a broader perspective than traditional analysis (Narin, Olivastro & Stevens, 1994). Thus, the development of bibliometrics research in the field of library and information science in the LPP journal will be seen in this study.

In the LIS field, bibliometrics analysis is critical for evaluating library services, collection development, policy formulation and refinement, decision making, resource allocation, curriculum analysis and research output quality assessment. This includes identifying issues confronting the LIS profession (Naseer & Mahmood, 2009). In bibliometrics research, there are many types and units of analysis that can be done. Unit analysis or sampling unit, sampling categories, an object of study, tokens, cohort, or items about which interference are made. The use of the term unit analysis is inconsistent and variable (McGrath, 1996). Up to now, no theory has attempted to explain the unit analysis, so many bibliometrics researchers have used the term unit analysis differently.

Methodology

This study employs bibliometric methods for the analysis of data sets from the Library Philosophy and Practice journal, which were downloaded from the Scopus database. Data collection was performed on March 14, 2021. The dataset was compiled from LPP publication documents indexed by Scopus, which totalled 3,758 articles, from 1998 to 2021. In accordance with the purpose of this study, the following 3,758 articles were filtered using the term “bibliometric”. There are 650 articles as a result of the filtering. The dataset of 650 articles is downloaded in .csv format and it includes citation information, bibliographical information, abstract and keywords, and references. All collected data is then analysed using bibliometrics tool VOSviewer and Scopus analytics. In line with the study objectives, the types of analysis used is are therefore co-authorship with authors analysis unit, organization and countries; co-occurrence with the author keywords analysis

unit; citation with the document analysis unit, bibliographic links to the documents analysis unit, authors, and countries. The stages in this study are illustrated in Graph 1 below.



Graph 1: Study Design

Result and Discussion

Publication Trend and Citation

Bibliometric study in LPP journal first appeared in the year 2000 with article title 'Environmental Impact: A Preliminary Citation Analysis of Local Faculty in a New Academic Program in Environmental and Human Health Applied to Collection Development in an Academic Library' (Johnson, 2000), and there are no bibliometric studies performed from the year 2001 to 2006 in LPP. Furthermore, bibliometric studies began to appear beginning in 2007, despite the fact that the number of publications is still small (Table 1). Bibliometric methods have been known for a long time, but there was not much research identified in LPP in the first decade. In the second decade of 2011-2021, bibliometrics research at the LPP increased substantially, particularly during the last 2 years, to 166 titles in

2019 and 216 in 2020. There are several reasons for the rise in bibliometrics research, including scholarly communication's openness, easy access to published metadata, and the emergence of bibliometrics applications (Persson, 1986; Saberi et al., 2019). In the coming years, it is expected that research using the bibliometrics method and systematic literature review will continue to advance.

Table 1 - The Number of Publication Per Year

Year	Number of Publication
2000	1
2001	0
2002	0
2003	0
2004	0
2005	0
2006	0
2007	1
2008	1
2009	3
2010	7
2011	15
2012	12
2013	32
2014	35
2015	25
2016	17
2017	24
2018	60
2019	166
2020	216
2021	35
Total	650

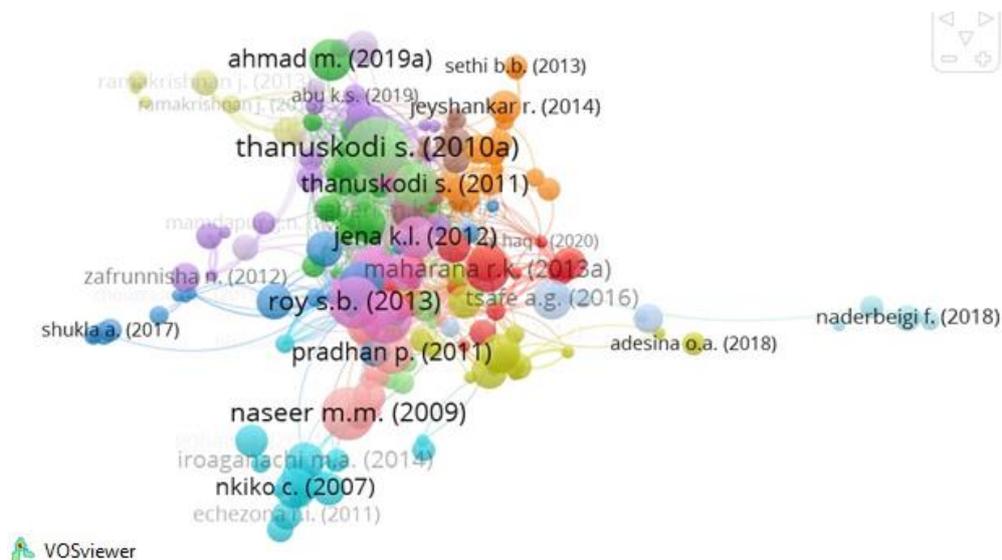
The most cited bibliometric research in LPP journals is from a diverse field of study; “Bibliometric Analysis of the Journal Library Philosophy and Practice from 2005-2010” by Thanuskodi (2010), followed by Patil and Kumar (2020), “Discuss the diagnosis of plant leaf diseases with artificial intelligence approach”, and outside of the library field there is a topic titled “Publication Trends of Pakistan Heart Journal: A Bibliometric Study” (Ullah et al., 2019). The numerous disciplines discussed using the bibliometrics method demonstrated that LPP is open with disciplines other than library science, but that bibliometric as is a method that is related to libraries and can be applied to all areas of science up to this point. Table 2 depicts the most cited paper of bibliometric study in LPP.

Based on the information presented above, it can be concluded that the bibliometric articles in the LPP primarily contributed to the publication of new papers. The relationship

between paper-based document citation can be visualized in Graph 2 which is also consistent with Table 2. Graph 2 shows that Thanuskodi (2010) has the largest (dominant) node among the other no -node nodes.

Table 2 - The Most Cited Paper

Rank	Total Citation	Title	Author
1	21	Bibliometric analysis of the journal library philosophy and practice from 2005-2009	(Thanuskodi, 2010)
2	20	A Bibliometric Survey on the Diagnosis of Plant Leaf Diseases using Artificial Intelligence	(Patil & Kumar, 2020)
3	19	Citation analysis of theses in library and information science submitted to the University of Pune: A pilot study	(Chikate & Patil, 2008)
4	16	LIS Research in Pakistan: An analysis of Pakistan library and information science journal 1998-2007	(Naseer & Mahmood, 2009)
5	15	Journal of documentation: A bibliometric study	(Roy & Basak, 2013)
6	15	Library philosophy and practice, 2004-2009: A scientometric appraisal	(Swain, 2011)
7	11	Publication trends of Pakistan Heart Journal: A bibliometric study	(Ullah et al., 2019)
8	11	Bibliometric survey on incremental clustering algorithms	(Chaudhari, Joshi, Mulay, Kotecha, & Kulkarni, 2019)
9	11	A bibliometric analysis of the research output of Sambalpur university's publication in ISI web of science during 2007-11	(Maharana & Bihari, 2013)
10	11	Bibliometric analysis of the Indian Journal of Chemistry	(Thanuskodi, 2011)



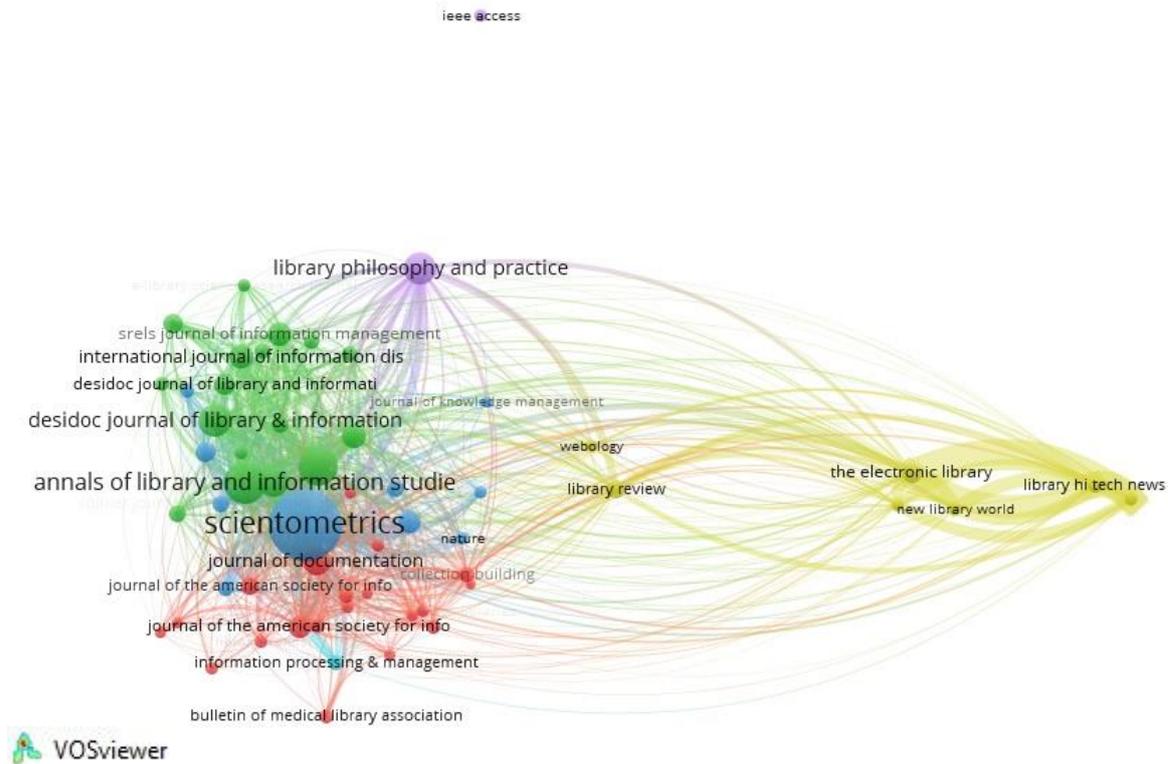
Graph 2: Citation of Document

This bibliometric study document also provides an overview of the LPP Journal's positioning in terms of the citations used. Several bibliometric study articles in the LPP also cite a few papers from sources other than the LPP publication. Table 3 provides information from the top 10 journals used as references in bibliometrics research in the LPP journal. The co-citation analysis includes two different journals cited simultaneously by the third party journal (Small, 1973). It also describes two articles from different journals that were cited simultaneously by several journals (Gaviria-Marin, Merigo, & Popa, 2018).

If there are articles in the LPP that cite articles from other journals other than the LPP, it is possible to say that the LPP has a connection with these other journals. Graph 3 shows some of the most widely cited journals, including *Scientometrics*, *Annals of Library and Information Studies*, *Library Philosophy and Practice*, *DESIDOC Journal of Library & Information Technology*. *Scientometrics* is the most-cited journal by many bibliometric study articles in the LPP, given that *Scientometrics* is a journal published since 1978 and focuses on scientific research using a mathematical-statistical approach. This journal publishes various types of scientific papers, including original studies, preliminary reports, review papers, short communications, and editorial letters.

Table 3 - The Top 10 Most Cited Journals

Rank	Journal Title	Citations
1	<i>Scientometrics</i>	896
2	<i>Annals of library and information studies</i>	304
3	<i>Library philosophy and practice (e-journal)</i>	275
4	<i>DESIDOC journal of library & information technology</i>	188
5	<i>Library philosophy and practice</i>	174
6	<i>Journal of information science</i>	156
7	<i>Journal of documentation</i>	138
8	<i>Malaysian Journal of library & information science</i>	106
9	<i>International journal of information dissemination and technology</i>	105
10	<i>SRELS journal of information management</i>	96



Graph 3: Co-Citation of Journal

Productivity Analysis

According to the productivity analysis based on country productivity, shows that India is the most frequent to publish bibliometric research in LPP. The top 10 countries that contributed to bibliometric publications in the LPP journal were all from Asia and Africa (Table 4). Researchers who conducted the bibliometrics analysis in LPP came from India (463 papers), Saudi Arabia (52 papers), Pakistan (28 papers), Iran (18 papers), Indonesia (14 papers), Malaysia (9 papers), Africa and Nigeria (38 paper), Ghana (6 papers), and South Africa (5 papers). These countries have a network which is described in Graph 4. The visualization depicts India as the centre of a network with connections to other countries. The networking line between India and Saudi Arabia appears to be very thick, indicating that Indonesia and Saudi Arabia have a strong relationship in comparison to other countries.

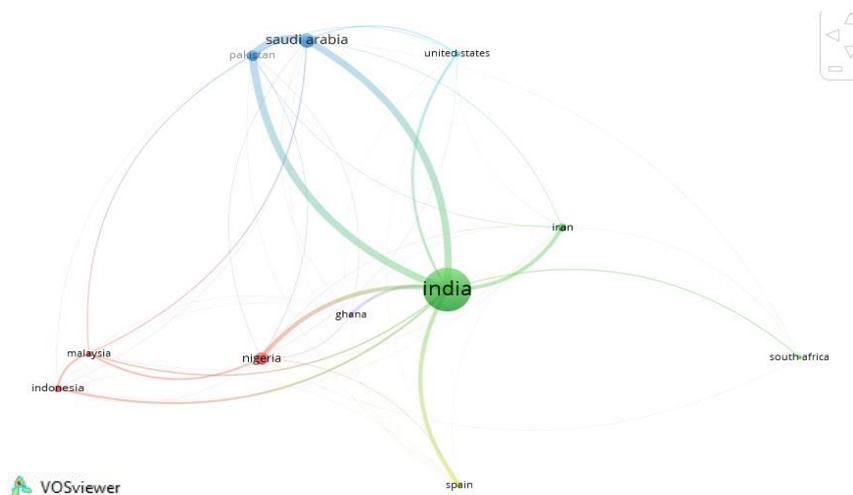
Many authors are from India, and they are essential to the library science education in India, which has existed since 1903, and the father of the library, S. R. Ranganathan was also from India. Until 2015, 234 institutions offered library education at various levels, including university, institute and college, ranging from diploma to doctorate. These institutions made significant contributions to bibliometric research in the LPP (Yadav & Gohain, 2015).

The distribution of bibliometric researchers in LPP, which is almost evenly distributed across various countries, suggests that this bibliometric research is feasible. The bibliometrics study is also low cost and can be performed by many researchers (Persson, 1986;

Salmerón-manzano & Manzano-agugliaro, 2020). Researchers are increasingly conducting bibliometrics studies as a result of this convenience, particularly during the Covid-19 pandemic, as well as easy access to databases, the availability of open access data, technological advancements and information retrieval skills. Researchers with a limited funding can already conduct research and publish because it is classified as low-cost.

Table 4 - The Top 10 Productive Country

Rank	Country/Territory	Documents
1	India	463
2	Saudi Arabia	52
3	Nigeria	38
4	Pakistan	28
5	Iran	18
6	Indonesia	14
7	Malaysia	9
8	United States	9
9	Ghana	6
10	South Africa	5



Graph 4: Bibliography Coupling of Country

The top 10 authors from India with the most contributed papers are Thevamani K. with 14 papers, followed by Ahmad S. and Baladi ZH from Saudi Arabia with 12 and 11 papers, respectively, while 7 other authors from India 8 to 11 papers (Table 5).

Table 5 - The Top 10 Productive Author

Rank	Author	Institution	Country	Total Document
1	Thavamani, K.	The Tamil Nadu Dr MGR Medical University	India	14
2	Ahmad, S.	Imam Abdulrahman Bin Faisal university	Saudi Arabia	12
3	Baladi, ZH	King Saud bin Abdulaziz University for Health Sciences	Saudi Arabia	11
4	Gupta, BM	National Institute of Science Technology and Development Studies India	India	11
5	Ramakrishnan, J.	The Tamil Nadu Dr MGR Medical University	India	11
6	Mohanty, B.	Homi Bhabha National Institute	India	10
7	Sahoo, J.	Khallikote University	India	10
8	Thanuskodi, S.	Alagappa University	India	10
9	Thirumagal, A.	Manonmaniam Sundaranar University	India	10
10	Batcha, MS	Annamalai University	India	8

With 31 documents, Symbiosis International Deemed University is the most productive of the top 10 institutions (Table 6). The Tamil Nadu Dr MGR Medical University holds the lowest number of papers, with 14 in total. Both of the universities are based in India. This condition is predictable because, according to a country productivity analysis, India contributes the most to bibliometric articles in the LPP Journal. There are also 2 universities from Saudi Arabia, Imam Abdulrahman Bin Faisal University and King Saud bin Abdulaziz University for Health Sciences which are ranked 5 and 6 with 24 and 23 titles respectively.

Table 6 - The Top 10 Productive Institution

Rank	Institution	Country	Total Document
1	Symbiosis International Deemed University	India	31
2	Symbiosis Institute of Technology	India	31
3	Alagappa University	India	26
4	Periyar University	India	25
5	Imam Abdulrahman Bin Faisal U niversity	Saudi Arabia	24
6	King Saud bin Abdulaziz University for Health Sciences	Saudi Arabia	23
7	Annamalai University	India	22
8	Banaras Hindu Universi ty	India	17

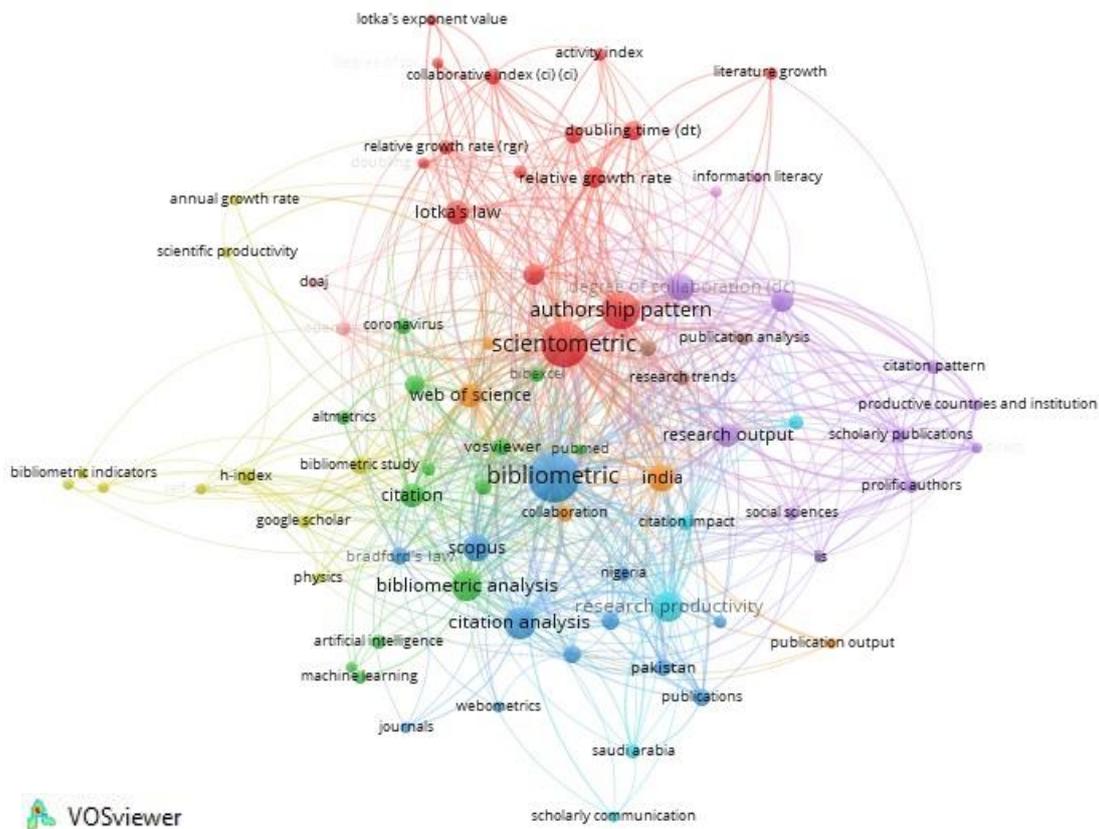
9	Manonmaniam Sundaranar University	India	16
10	The Tamil Nadu Dr.MGR Medical University	India	14

Co-Occurrences of Author Keyword

According to the results of the co-occurrence analysis of the author's keywords in bibliometrics articles published in the LPP journal, the most commonly used keywords by authors are *bibliometrics* and *scientometric*, *author pattern*, and *citation analysis*. The keyword has a strong relationship with each sub-topic. There are 3 large clusters; the first is scientometric, which is associated with authorship pattern, collaborative index, doubling time, citation analysis, citation impact, and literature growth; the second cluster has bibliometrics connected to the citation, alt metrics, artificial intelligence, machine learning, Covid 19 and VOSviewer; and the third cluster has citation analysis, which associated with Scopus, bibliometrics, journals. Table 7 shows keywords that are commonly used in bibliometric studies, which are then analysed using the network visualization in Graph 5.

Table 7 - Top 25 Author Keywords

Rank	Keyword	Total Link Strength	Occurrences
1	bibliometric	214	457
2	scientometric	156	353
3	authorship pattern	99	308
4	citation analysis	65	116
5	bibliometric analysis	55	93
6	research productivity	55	129
7	degree of collaboration (dc)	42	180
8	India	42	107
9	scopus	41	102
10	citation	33	70
11	web of science	33	79
12	lotka's law	32	80
13	research output	30	97
14	author product ivity	27	108
15	scientometric analysis	24	53
16	relative growth rate	23	66
17	covid-19	17	45
18	doubling time (dt)	17	55
19	bradford's law	15	42
20	collaborative coefficient	15	53
21	pakistan	14	34
22	research	14	32
23	vosviewer	14	30
24	bibliome tric study	13	26

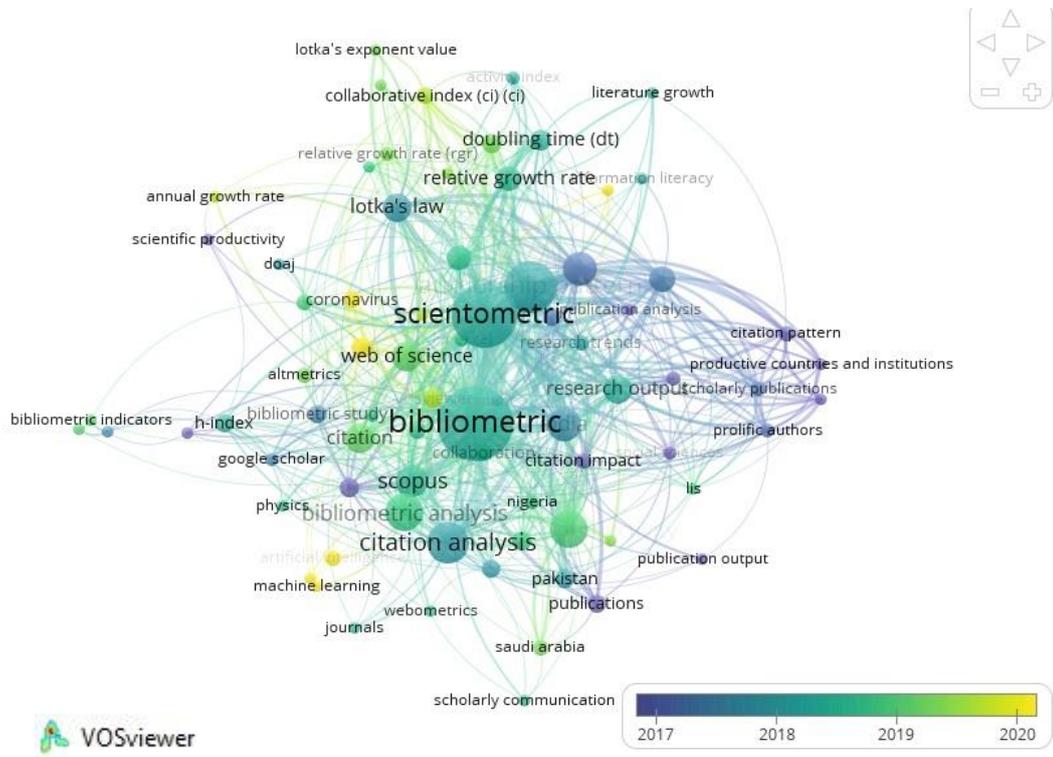


Graph 5: Co-occurrence of Author Keyword

According to the keyword analysis, it can be identified that the methods used in the articles in LPP include bibliometrics, scientometrics, webometrics, and altmetrics. This method is used to calculate the unit of analysis based on the research question. Unit analysis, that which appears in bibliometrics articles in the LPP journal, among others, is related to productivity in terms of author productivity, country productivity, scientific productivity and co-authorship; second largest is citation analysis consisting of citation patterns, citation impact, highly cited, publication output and eigenvector score next is to measure collaboration including the collaboration index, degree collaboration, and followed by research growth including research trends, relative growth rate and doubling time. The last and least analysed is the activity index, which analyses topics based on keywords. The term unit of analysis is also used differently in this bibliometric research, as many authors use the terms respectively (McGrath, 1996). The inequity in the use of the name of the unit of analysis is due to the fact that bibliometric theory of the unit of analysis has not been widely studied.

The sources of datasets from bibliometric studies in the LPP journal are diverse, but the most commonly used are Scopus and Web of Science, followed by Google Scholar, Pubmed, Science Direct, and DOAJ- VOSviewer and Bibixel, both free software that

supports research and education development, were used as bibliometrics software. The most recent studies in the LPP publication are biblical studies related to Covid 19, VOSviewer, machine learning, artificial intelligence. Graph 6 depicts a visual representation of the distribution of keywords by year. The most recent keywords are represented by nodes in yellow.



Graph 6: Bibliometric Study Topics Based on Density Visualization

Despite the fact that LPP is a library journal, philosophy and theory, other topics are also discussed in this bibliometrics study, including LIS, artificial intelligence, deep learning, machine learning, physics, social sciences, the majority of which are related to coronavirus. The Lotka and Bradford laws are the bibliometrics laws used in the LPP articles.

Conclusion

Bibliometrics studies in the LPP journal have expanded rapidly over the past 10 years, yielding 650 titles of bibliometrics research on a variety of topics. In addition to library science, coronavirus, artificial intelligence, social science, and physics are all widely studied topics. The terms bibliometrics and scientometrics are used interchangeably. This study successfully explored various unit of analysis which included citation pattern, citation impact, publication output, and highly cited; productivity analysis, including author productivity, country productivity, and scientific productivity; collaborative analysis such as collaborative indexes, degree of collaboration and collaboration coefficients. Meanwhile, because the numbers are still small, doubling time analysis, index relativity, RGR, and trend research needs to be explored further. The research on bibliometrics articles in the LPP journal can

provide a comprehensive overview of the development of publications, particularly bibliometrics, which researchers and journal managers can use to determine the direction of future journal topics.

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