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A Bibliometric Study and Visualization of Library Philosophy and Practice during 1998-2018

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Abstract

Purpose- The purpose of this paper is to analyze bibliometrics and visualization of Library Philosophy and Practice (LPP).

Design/methodology/approach- Scopus citation database was used to gather the data. Using advanced search in the database, bibliographic data of the articles published in the journal over the past twenty years were extracted. Then, the analysis was performed using bibliometric indicators and some applications, such as Microsoft Excel and VOS viewer.

Findings- The data indicated that the process of publications (R^2=0.69) and citations received by papers (R^2=0.85) was ascending. The paper of W. Fang (2007), "Using Google analytics for improving library website content and design: A case study", is the most highly cited paper of LPP. Bhatti, R. (19 papers), Nigeria (549 papers), University of Ibadan (78 papers) are the most productive and influential authors, universities, and countries in LPP, respectively. Keyword clustering of published papers indicates that the most frequent keywords can fall into five clusters and the first and most important cluster is "bibliometrics study". In addition, the analysis of references of LPP articles showed that "*Library Philosophy and Practice*" "*Scientometrics*", and "*The Electronic Library*" are the top journals, Aina, I., Wilson, T.D.O., and Mahmood, K. are the top authors cited in LPP.

Practical implications- The bibliometrics analysis and LPP visualization can be a useful for either library and information science (LIS) scholars or the people interested in bibliometric studies; therefore, they can use it as a pattern to review other journals.

Originality/value- This study suggests a general outlook for the performance of an international LIS journal using bibliometric indicators and visualization. The results of this study will be beneficial for all the LIS authors and researchers around the world.

Keywords: Bibliometric analysis, Visualization, Citation analysis, VOS viewer, Scopus.

Introduction

Bibliometrics is one of the most common tools to assess scientific activity (Lopez-Munoz et al, 2003). Bibliometrics is a research method (Laengle et al., 2017) and the most prominent quantitative approach of library and information science (LIS) (S. Pareek, 2013). The term "bibliometrics" as an interdisciplinary research field (Glanzel, 2003) was first coined by Alan Pritchard in 1969 (Senel & Demir, 2018). As suggested by Pritchard, the term "bibliometrics" has been defined several times. The first and most ingenuous definition is related to Pritchard (1969). According to Pritchard (1969), "bibliometrics is the application of mathematical and statistical methods for books and other communication media." In 1977, Pritchard defined "bibliometrics as the application of various statistical analyses to study patterns of authorship, publication, and literature use." (Glazel, 2003). Following the development of bibliometrics, its indicators have been extensively used to analyze and assess a diverse range of scientific journals. Today, with advancement of different types of bibliometric software, scholars can use visualization techniques to assess journals in addition to conventional analyses such as identification of the best papers, authors, institutions, and countries. The term "Visualization" was first used in one of the publications of *National Science Foundation* in the USA. Visualization helps users analyze and examine a great deal of data, have a macro look at the data, and interpret them more easily (Buckley, 1997). Visualization represents a broad part of structures, which some of them are well-defined and some are tagged as new-thought (Chen, 2013). Generally, it can be said that visualization consists of some practices used to optimally develop information and display methods. In this way, given high capacity of information provided by images, efforts have been made to increase the ability of understanding and learning through data visualization. There are numerous journals in the subjectarea of LIS. One of the most active journals of this field is Library Philosophy and Practice (LPP). This is a peer-reviewed electronic journal published by the University Libraries of the University of Nebraska in the US. LPP publishes LIS papers (LPP, 2018).Since 1998, this journal has been indexed in Scopus and several scholars worldwide have published their papers in LPP. Due to the assessment of Scopus Journal Metrics (2018), LPP contains H index 14, 0.33 CiteScore, 0.240 SJR, and 0.554 SNIP. LPP is considered as an old international journal by a large part of LIS society. This bibliometrics study will suggest a general perspective of the journal operations in 1998-2018. The data can be a plot helping LIS authors and researchers around the world and also journal officials continue the journey.

Literature Review

A historical review of bibliometrics indicated that the first bibliometric study was conducted by Cole and Eales (1917). In their study, they developed a statistical analysis of the literature in *Science Progresses journal* in 1543-1860. They also analyzed the comparative anatomy of publications by simply counting the number of titles of books and journal articles. In the second study, Hulm (1923) examined entries and authors of "English International Catalog of Scientific Literature". In fact, the term "Statistical Bibliography" was first coined by Hulm. In 1927, the third study of bibliometrics and first citation analysis were conducted by Gross & Gross in an article in the *Journal of American Chemical Society*. Eventually, Pritchard (1969) replaced the obscure term of "Statistical Bibliography" with "Bibliometrics". Following the popularity of bibliometrics, numerous journals in the various fields have been reviewed using bibliometric techniques; the journals include *The Indian Forester* (Hazarika et al., 2003), *Indian Journal of Fibre and Textile Research* (Jena, 2006), *Annals of Library and Information Studies* (Verma et al., 2007), *Pakistani Journal of Library and Information Science* (Warraich & Ahmad, 2011), *Library Herald* (Thanuskodi, 2011), *Journal of Documentation* (Roy, & Basak, 2013), *The Journal of Information Literacy* (Panda et al., 2013), *Journal of Informetrics* (Das, 2013), *Journal of School Health* (Zhang et al., 2017), *Journal of Religion and Health* (Şenel & Demir, 2018).A review of previous studies indicated that most bibliometric analyses have been performed on LIS journals. However, bibliometrics studies of journals of other subject areas are being prevalent. Naturally, the origin of bibliometrics and other related matrices, such as Informatics, Scientometrics, Webometrics, and altmetrics is believed LIS and this field has been moved to other subject areas. Today, these matrices have been turned into interdisciplinary research fields and used by scholars of all majors. We hope the bibliometrics analysis and LPP visualization will be beneficial for either LIS scholars or the people interested in bibliometric studies; therefore, they can use it as a pattern to review other journals. A1so we hope to see several high-quality studies in different journals and fields.

Objectives

There were eight primary objectives of this study:

(1) To study the development process of LPP papers and citations

(2) to find out the top highly-cited papers of LPP

(3) to study the visualization of LPP highly-cited papers

(4) to find out the most productive and influential authors, universities, and countries

(5) to study the visualization of the most productive and influential authors, countries, and organizations

(6) to find out keywords clustering of LPP papers

(7) To identify the cited sources in LPP papers

(8) To identify the cited authors in LPP papers

Methodology

This study was a bibliometric analysis. Bibliometrics is a research field developing a comprehensive view through studying bibliographic information of scientific publications (Laengle et al, 2017). Advanced search in Scopus database was used in this study. The data of 1397 papers published in LPP were mined through advanced search in Scopus database. After data extraction, bibliometric analysis and visualization were developed. To analyze bibliometrics, Microsoft Excel software and other indicators were applied , including the number of total papers and citations, highly-cited papers, the most productive and influential authors, universities, and countries. The visualization was conducted using VOS viewer software (Van Eck and Waltman, 2009), and some indicators, such as citations, co-occurrence, and co-citation. VOS viewer software visualizes bibliographic information of scientific publications through the indicators of bibliometrics. Indicators and thresholds must be considered for each plot on visualization. In this study, visualization was developed based on the following Criteria and indicators:

- For the map display of highly-cited papers, threshold of 10 was considered and the papers with 10 or more citations could be included.

- Visualization of the most productive and influential authors, countries, and organizations was performed based on the citation indicator.
- To develop author map, threshold of 5 was considered and 39 authors publishing at least 39 papers in LPP were visualized.
- To extract country map, a threshold was not necessary because totally 46 countries participated in publication of LPP papers. Therefore, the whole countries were used to draw the density map.
- Visualization of keywords of the papers published in LPP journal was developed through co-occurrence and clustering technique and the most frequent keywords were clustered.
- Visualization of resources and authors cited in LPP papers was performed using co-citation indicator and the top 20 sources and authors were visualized.

Finally, the results of bibliometric analysis and visualization were synthetically developed to better understand the trend of progress and evolution of the journal.

Results

Development process of LPP Papers and Citations

A total of 1397 LPP papers indexed in Scopus were reviewed in this study. Fig.1 shows the progress trend of published papers in LPP from early 1998 to late 2018. Most papers (n=195) were published in 2011. 159 papers in 2018 156 papers in 2014 occupied the second and third rank, respectively.

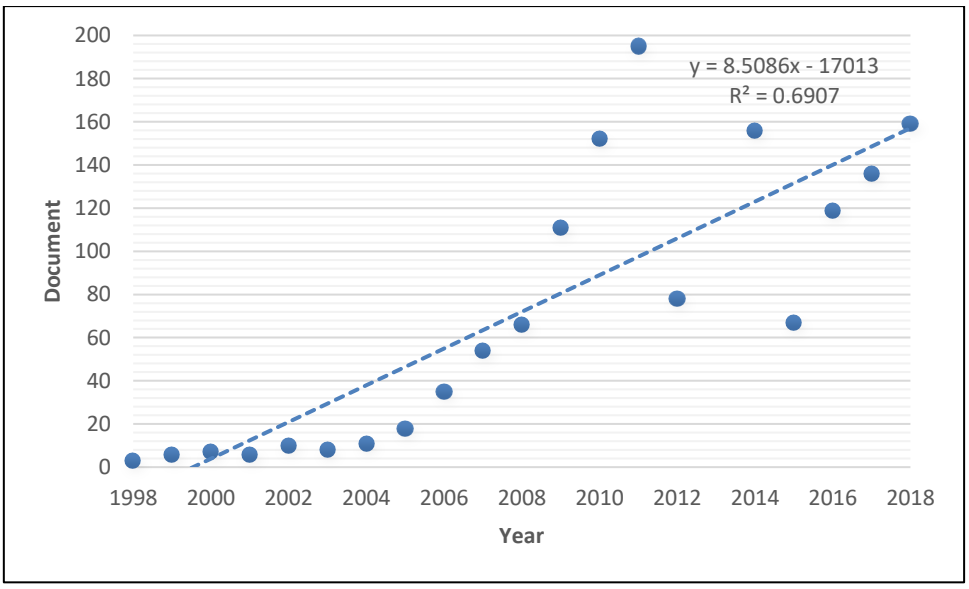

Figure1. The publication trend of LPP journal

As shown in Fig.1, in total, the publication trend of LPP journal has increased during 1998-2018. The Trend line or Line of Best Fit drawn on Scatter chart obviously shows the growth process (R^2=0.69).

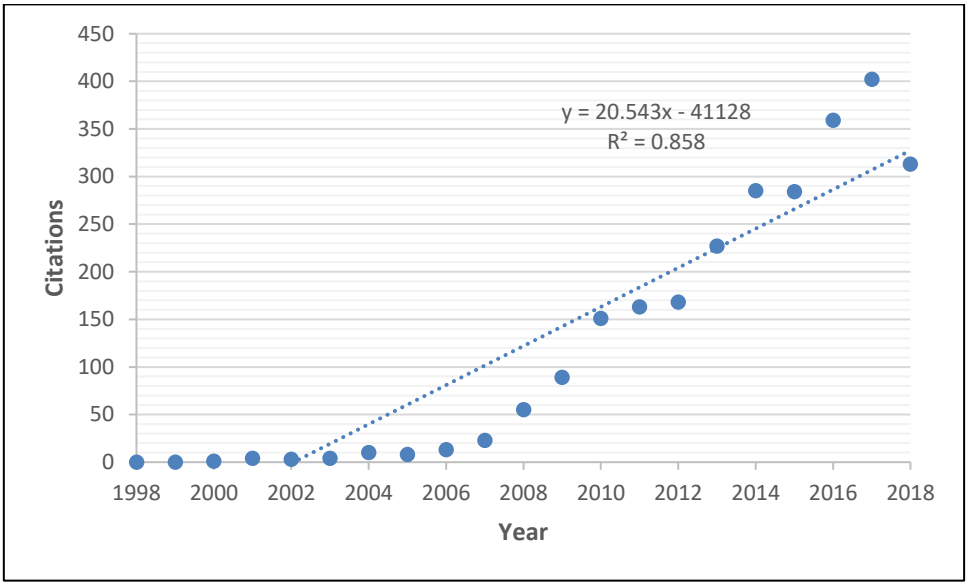

Figure2. The citation trend of the papers published in LPP

A review of citations indicated that the articles of LPP journals received 2563 citations from 1998 to 2018. The citation trend of the papers published in LPP is shown in Fig. 2. The distribution of the data in Fig. 2 indicated that the trend of citations received by LPP publication was ascending. Comparison of publication (Fig. 1) and the process of citations received (Fig. 2) can lead to interesting and useful results. The comparison of two charts indicated that the growth rate of the received citations (R^2=0.85) was higher than that of papers (R^2=0.69).

Highly-Cited Papers of LPP

The analysis of citations received by the papers indicated that 728 out of 1397 articles published in LPP, had received one or more citations. In other words, over 50% of LPP papers had been cited. In Table 1 shows the characteristics of the papers received over 10 citations. As seen in Table 1, the paper of W. Fang (2007) "Using Google analytics for improving library website content and design: A case study" has received 65 citations; therefore, it is considered as the most highly-cited LPP paper. The paper of Popoola, S.O., Ayeni, C.O., and Tella, A. (2007) "Work motivation, job satisfaction, and organizational commitment of library personnel in academic and research libraries in Oyo state, Nigeria" with 50 citations is ranked second. The third rank of highly-cited LPP papers is assigned to Shahid, S.Md (2005) "Use of RFID

technology in libraries: A new approach to circulation, tracking, inventorying, and security of library materials" with 29 citations.

Table1. Characteristics of the Highly-Cited Papers of LPP

R	Title	Authors	Year	Cited by	Document Type
1	Using google analytics for improving library website content and design: A case study	Fang, W.	2007	65	Article
2	Work motivation, job satisfaction, and organizational commitment of library personnel in academic and research libraries in Oyo State, Nigeria	Tella, A., Ayeni, C.O., Popoola, S.O.	2007	50	Article
3	Use of RFID technology in libraries: A new approach to circulation, tracking, inventorying, and security of library materials	Shahid, S.Md.	2005	29	Review
4	The use and impact of electronic resources at the university of Lagos	Egberongbe, H.S.	2011	20	Article
5	No longer the sacred cow - No longer a desk: Transforming reference service to meet 21st century user needs	Sonntag, G., Palsson, F.	2007	20	Review
6	Concepts of information seeking and their presence in the practical library literature	Kingrey, K.P.	2002	20	Article
7	The role of academic libraries in universal access to print and electronic resources in the developing countries	Anunobi, C.V., Okoye, I.B.	2008	18	Short Survey
8	On libraries and the public sphere	Buschman, J.	2005	18	Article
9	Librarianship and the philosophy of information	Herold, K.R.	2001	18	Article
10	Effects of information literacy skills on the use of E-library resources among students of the university of Ilorin, Kwara State, Nigeria	Issa, A.O., Blessing, A., Daura, U.D.	2009	17	Article
11	Librarian faculty status: What does it mean in academia?	Hosburgh, N.	2011	16	Article
12	Internet use by researchers: A Study of Panjab University, Chandigarh	Mahajan, P.	2006	16	Article
13	The state of information and communication technology (ICT) in Nigerian university libraries: The experience of Ibrahim Babangida Library, Federal University of Technology, Yola	Womboh, B.S.H., Abba, T.	2008	14	Article
14	The challenges of computerizing a University Library in Nigeria: The case of Kashim Ibrahim Library, Ahmadu Bello University, Zaria	Nok, G.	2006	14	Article
15	The history of academic libraries in the United States: A review of the literature	Weiner, S.G.	2005	14	Review
16	Closing the gap: Investigating the search skills of international and us students: an exploratory study	Martin, C.K., Maxey-Harris, C., Graybill, J.O., Rodacker-Borgens, E.K.	2009	12	Article
17	Citation analysis of theses in library and information science submitted to university of Pune: A pilot study	Chikate, R.V., Patil, S.K.	2008	12	Article
18	Empowering the intentional learner: A critical theory for information literacy instruction	Doherty, J.J., Ketchner, K.	2005	12	Article
19	Online tutorials: Tips from the literature	Bianco, C.	2005	12	Review
20	Digital reference: What the past has taught us and what the future will hold	Zanin-Yost, A.	2004	12	Review
21	Deterring plagiarism: A new role for librarians	Burke, M.	2004	12	Article
22	Placing value on information	Fenner, A.	2002	12	Article
23	Patron-driven purchase on demand programs for printed books and similar materials: A chronological review and summary of findings	Tyler, D.C.	2011	11	Article
24	Factors affecting information and communication technologies (ICTS) use by academic librarians in Southwestern Nigeria	Haliso, Y.	2011	11	Article
25	Use of electronic resources among academics at the university of Karachi	Ansari, M.N., Zuberi, B.A.	2010	11	Article
26	LIS Research in Pakistan: An analysis of Pakistan library and information science journal 1998-2007	Naseer, M.M., Mahmood, K.	2009	11	Article
27	Web-based services in university libraries: A pakistani perspective	Mirza, M.S., Mahmood, K.	2009	11	Article
28	Importance of information and communication technologies (ICTs) in making a heathy information society: A case study of ethiope east local government area of Delta State, Nigeria	Ogbomo, M.O., Ogbomo, E.F.	2008	11	Article
29	Obstacles to information access and use in developing countries	Ugah, A.D.	2007	11	Review
30	Unclear on the context: Refocusing on information literacy's evaluative component in the age of google	Williams, G.	2007	11	Review
31	Human capital for Nigerian libraries in the 21st century	Igun, S.E.	2006	11	Article
32	Teaching information skills in the information age: The need for critical thinking	Doherty, J.J., Hansen, M.A., Kaya, K.K.	1999	11	Article

33	Awareness and usage of electronic databases by geography and resource development information studies graduate students in the University of Ghana	Kwadzo, G.	2015	10	Article
34	The use of social networking sites among the undergraduate students of university of Nigeria, Nsukka	Eke, H.N., Omekwu, C.O., Odoh, J.N.	2014	10	Article
35	Application of ICTs in Nigerian secondary schools	Adomi, E.E., Kpangban, E.	2010	10	Article
36	"Can't anyone be a teacher anyway?": Student perceptions of academic librarians as teachers	Polger, M.A., Okamoto, K.	2010	10	Article
37	Online social networking sites and privacy: Revisiting ethical considerations for a new generation of technology	Fernandez, P.	2009	10	Article
38	Use of ICT in libraries: An empirical study of selected libraries in Bangladesh	Islam, Md.S., Islam, Md.N.	2007	10	Review
39	What do faculty want?: A focus group study of faculty at a mid-sized public university	Weber, M.A., Flatley, R.	2006	10	Article

Visualization of LPP Highly-Cited Papers

Visualization of highly-cited papers was performed by VOS viewer software. Fig. 3 shows the map of highly-cited papers. The color strip below the map and the color of the circles represent the number of citations per paper. For example, 6 papers are yellow. Papers with a yellow circle are for Egberongbe (2011), Sonntag (2007), Kingrey (2002), Shahid (2005), Tella (2007), Fang (2007) with 20 or more citations. The larger the number of citations of papers is, the larger the circle size. Full characteristics of these papers are shown in Table 1.

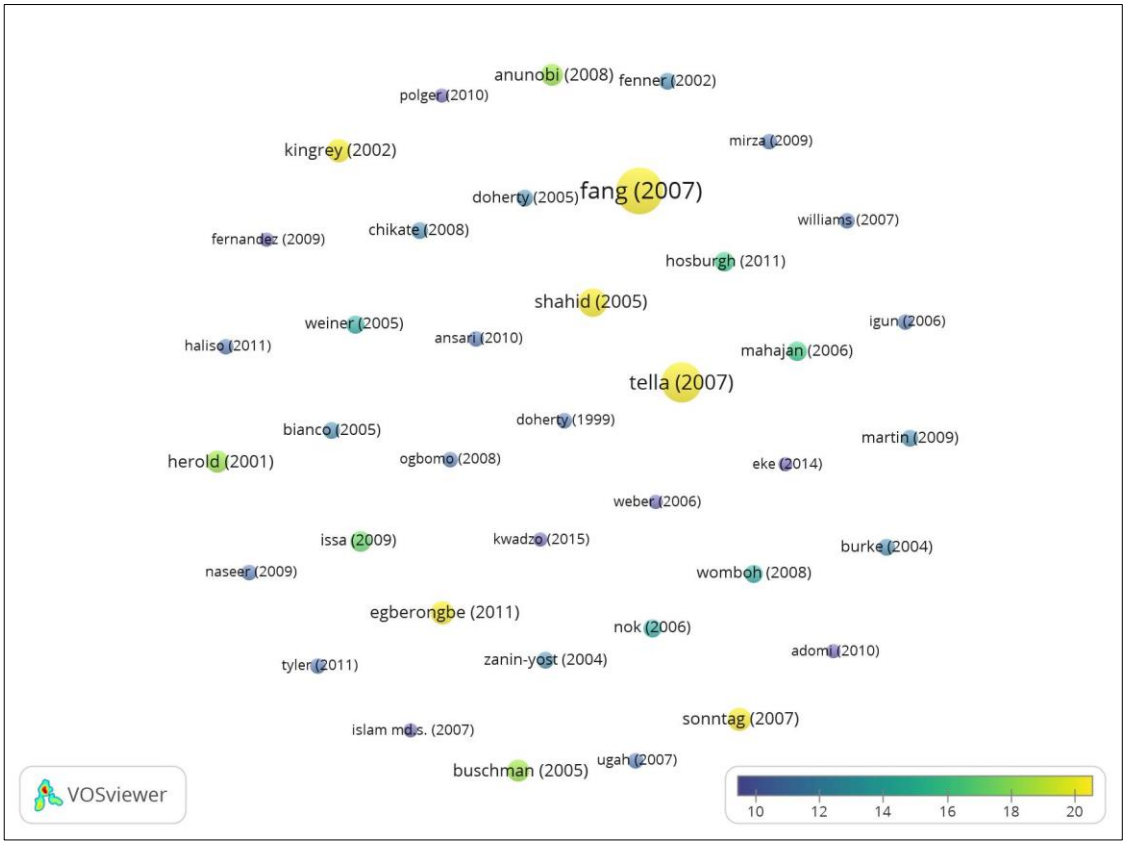

Figure3. the map of highly-cited papers

Most Productive and Influential Authors, Universities, and Countries

The most productive and influential authors, universities, and countries publishing LPP papers are presented in Table 2. As shown in Table 2, Bhatti, R. with 19 papers, Mahmood, K., and Thanuskodi, S. with 15 papers, Mahajan, P. and Ugha, A.D. with 12 papers as the most active authors were in the first , second and third ranks, respectively. The survey of the countries that' showed that Nigeria as the most hard-working country with 549 papers was the first rank. India and the United States with 310 and 210 papers were in the second and third ranks, respectively. Affiliation review demonstrated that three universities, including University of Ibadan, Delta State University Nigeria, and University of Nigeria as the most productive universities in LPP with 78, 55, 54 papers were in the first, second and third ranks, respectively

Table2. The most productive and influential authors, universities, and countries

Author name	TP (R)	Country/Territory	TP (R)	Affiliation	TP (R)
Bhatti, R.	19 (1)	Nigeria	549 (1)	University of Ibadan	78
Mahmood, K.	15 (2)	India	310 (2)	Delta State University Nigeria	55
Thanuskodi, S.	15 (2)	United States	210 (3)	University of Nigeria	54
Mahajan, P.	12 (3)	Iran	67 (4)	Covenant University	31
Ugah, A.D.	12 (3)	Pakistan	62 (5)	Islamia University	29
Shafique, F.	9	Ghana	54	University of the Punjab, Lahore	27
Khan, S.A.	7	Malaysia	25	University of Kashmir	20
Maharana, B.	7	Bangladesh	16	University of Lagos	19
Okello-Obura, C.	7	South Africa	14	University of Ghana	19
Ameen, K.	6	Tanzania	13	Nnamdi Azikiwe University	18
Eke, H.N.	6	Uganda	10	Annamalai University	18
Ogunniyi, S.O.	6	Indonesia	9	Obafemi Awolowo University	17
Sambo, A.S.	6	Saudi Arabia	8	Michael Okpara University of Agriculture	17
Sethi, B.B.	6	Kenya	4	Sambalpur University	15
Ugwu, C.I.	6	Turkey	4	San Jose State University	15
Akerele, J.A.	5	Australia	3	University of Uyo	14
Amusa, O.I.	5	Botswana	3	Federal University of Technology, Owerri	13
Anyira, I.E.	5	Fiji	3	Bayero University	13
Asogwa, B.E.	5	Greece	3	University of Agriculture, Abeokuta	13
Dhanavandan, S.	5	United Kingdom	3	University of Ilorin	13
Edewor, N.	5	China	2	International Islamic University Malaysia	12
Fasae, J.K.	5	Ireland	2	Islamic Azad University	12
Gupta, B.M.	5	Israel	2	University of Cape Coast Ghana	12
Gupta, R.	5	Italy	2	Alagappa University	11
Isfandyari-Moghaddam, A.	5	Jordan	2	Panjab University	11
Kupfer, D.C.	5	Malawi	2	Aligarh Muslim University	11
Mohanty, B.	5	Oman	2	Adeyemi College of Education	10

Nkiko, C.	5	Philippines	2	Madurai Kamaraj University	10
Nwezeh, C.M.T.	5	Spain	2	University of Nebraska - Lincoln	10
Ogbomo, M.O.	5	Sri Lanka	2	University of Delhi	10
Okon, H.I.	5	Zambia	2	Texas Woman's University	10
Orlu, A.D.	5	Afghanistan	1	Babcock University	9
Sahoo, J.	5	Antigua and Barbuda	1	Ladoke Akintola University of Technology	9
Saleh, A.G.	5	Canada	1	Banaras Hindu University	9
Thavamani, K.	5	Ethiopia	1	University of Maiduguri	9
Thirumagal, A.	5	Finland	1	Adekunle Ajasin University	9

Visualization of the Most Productive and Influential Authors, Countries, and Organizations

Visualization of the most active LPP authors is shown in Fig. 4. In total, 1765 authors participated in LPP journal. For mapping, threshold was considered to be 5 and 39 authors with at least 5 papers in LPP could enter the map. In this map, the circle sizes represent the number of papers. In other words, the larger the number of papers an author has, the larger the author's size. As shown in the map, the authors, including Bhatti, R., Mahmood, K., Thanuskodi, S., Mahajan, P. and Ugha, A.D. were considered as the most productive authors of LPP.

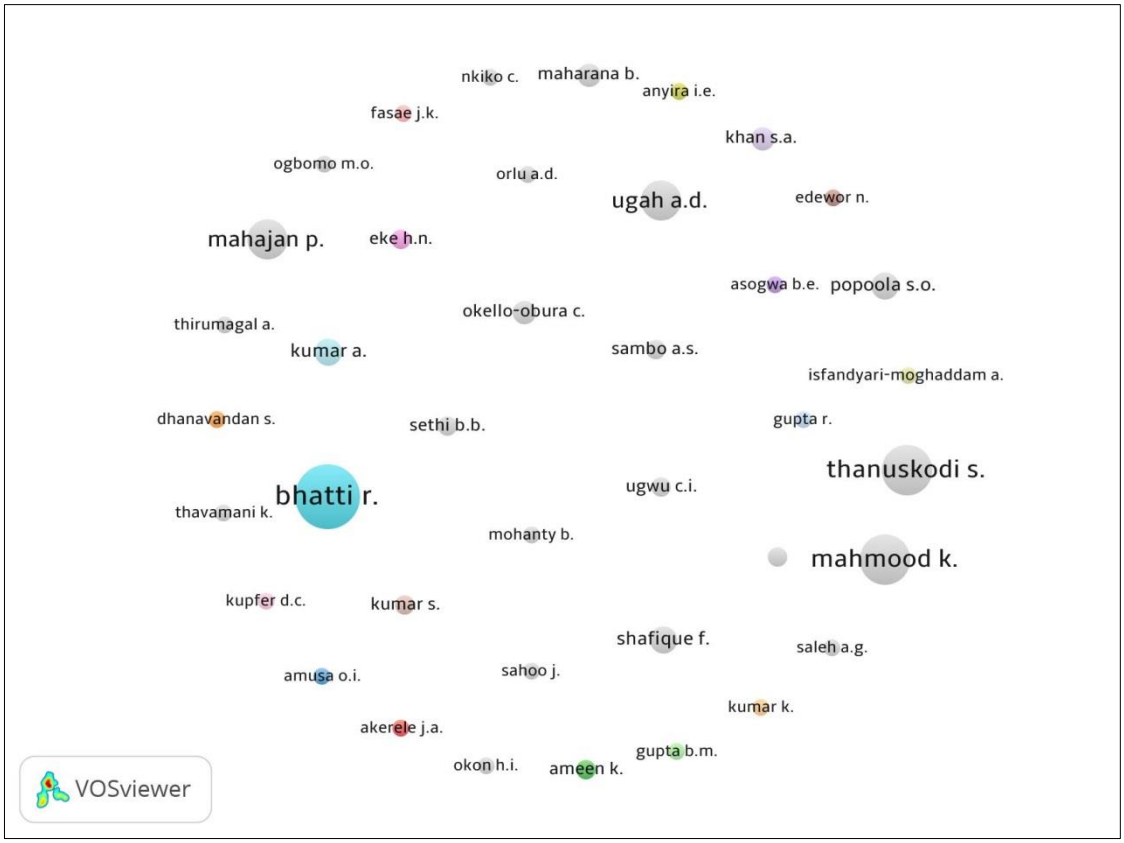

Figure4. Visualization of the most active LPP authors

The density map of the most productive countries is shown in Fig. 5. The data of visualization indicated that authors of 46 countries published papers in LPP. All countries were used for mapping. In this map, the font size and background color represent the number of papers— the larger the number of a country's papers, the bigger the country's size, and the more yellow the background. As shown in the map, Nigeria, India and the United States published the most papers in the LPP.

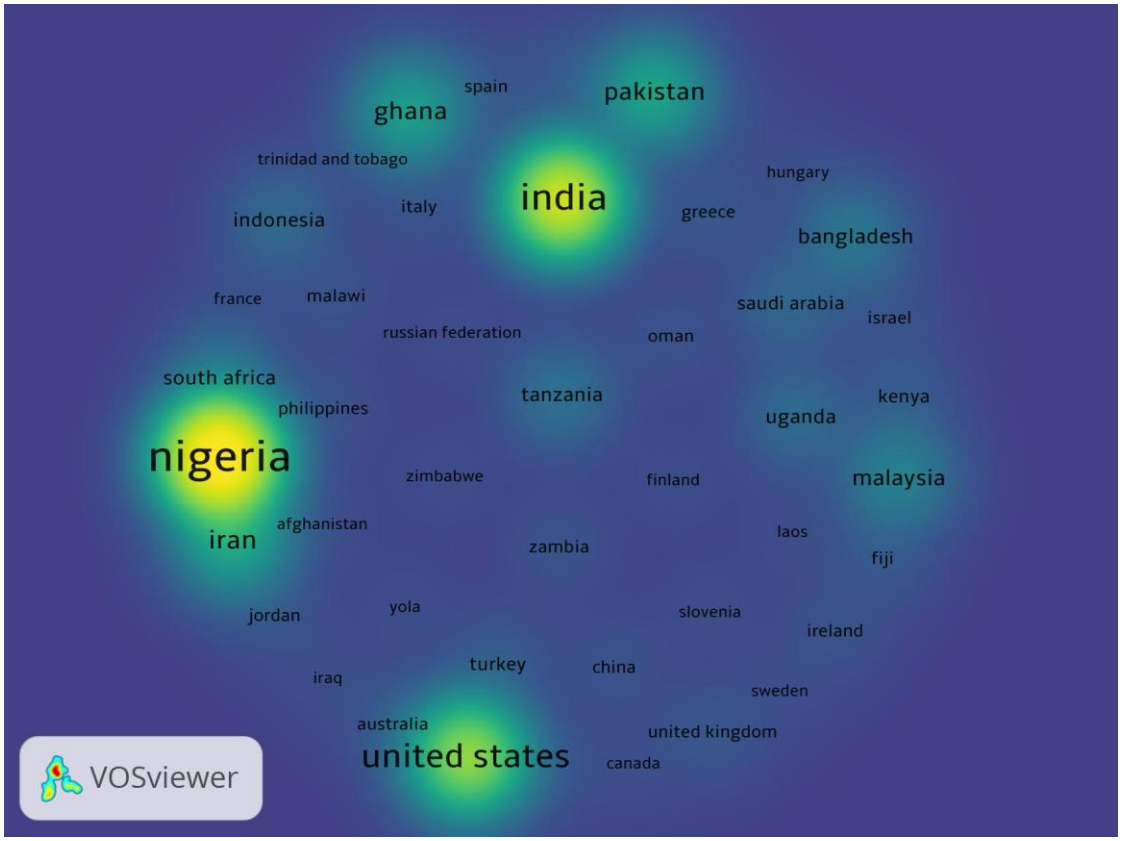

Figure5. the density map of the most productive countries

Visualization of the most productive organizations and departments participating in LPP papers is shown in Fig. 6. As shown in Fig. 6, in the density map, the font size of three departments was larger and the background color was more yellow than other departments. Therefore, the three departments were most productive in LPP. Departments were as follows: Nnamdi azikiwe library, university of Nigeria, Nsukka, Nigeria; Department of library and information science, delta state university, abraka, Nigeria; Department of library and information science, university of Punjab, Lahore, Pakistan.

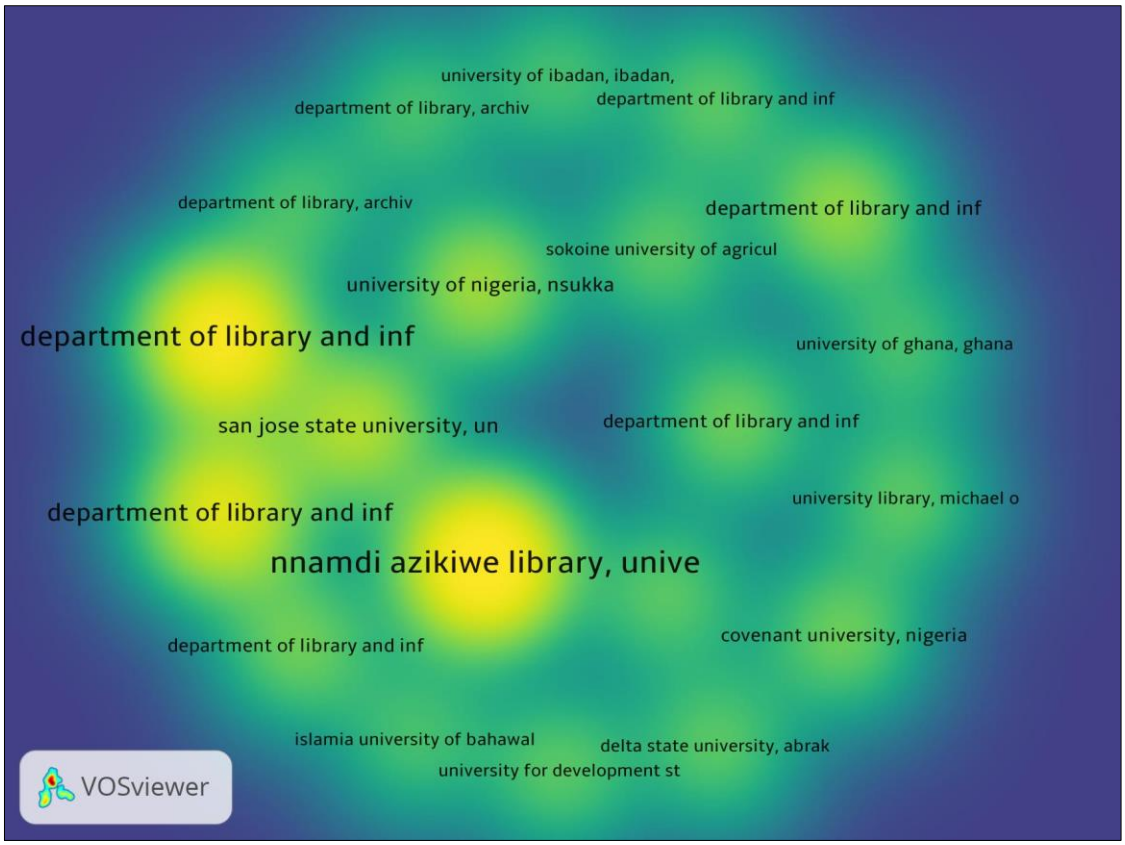

Figure6. Visualization of the most productive organizations and departments

Keywords Clustering of LPP Papers

The analysis of Keywords of the papers published in LPP journal indicated that totally 1725 unique keywords were used in the journal papers. To better identify the most frequent keywords, clustering technique is applied. In Fig 7, the co-occurrence map of the keywords of LPP papers is developed. As seen in Fig. 7, the most frequent keywords fall into five clusters. The first and most important cluster can be realized with the red color. "Bibliometrics" and "research output" are the most fundamental keywords of this cluster. The first cluster can be called "bibliometrics". In the second cluster in green, "information" and "information needs" were the top keywords. This cluster said "information seeking"is based on its keywords. The third cluster in blue consists of keywords, including "library" and "university library". The best title for this cluster is "library administration". In the fourth cluster in yellow, there are keywords such as “internet” and “ICT”. An appropriate title for this cluster can be “information technology studies”. The fifth cluster is “open access” because “open access” and “institutional repositories” are its main keywords.

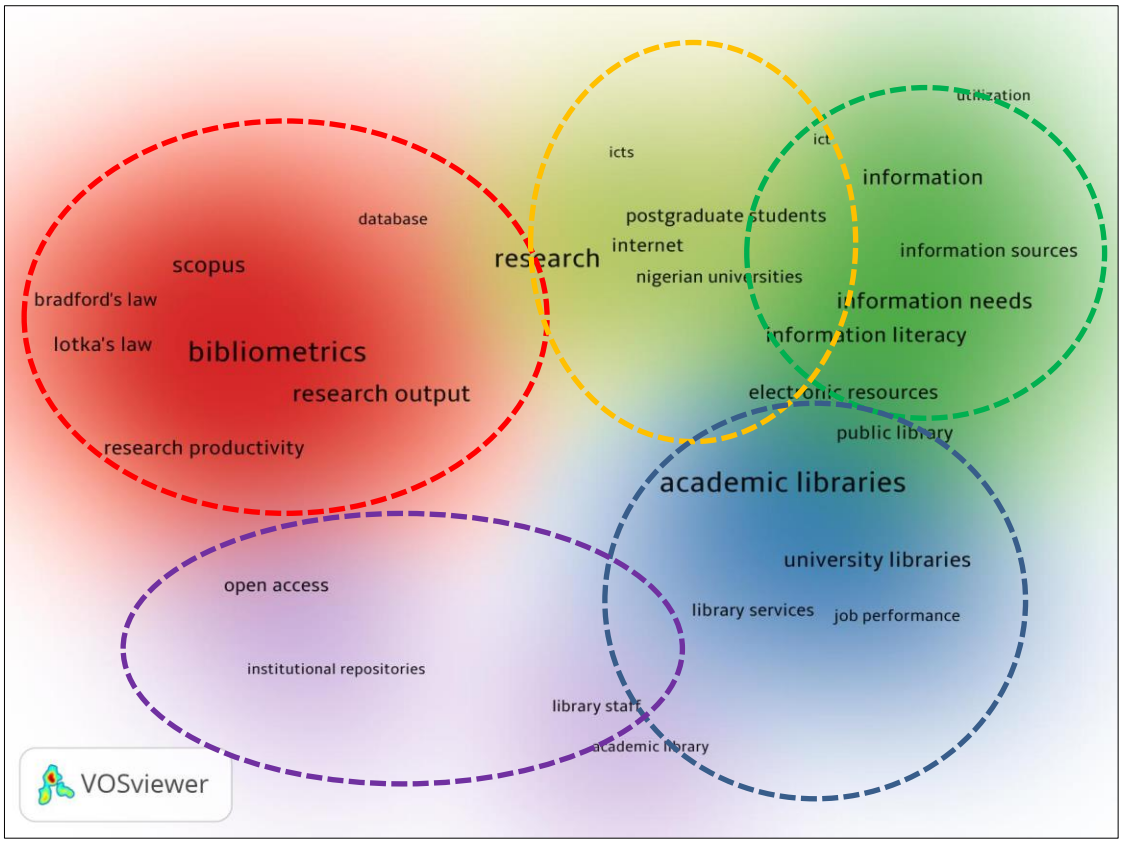

Figure 7. the co-occurrence map of the keywords of LPP papers

Cited Sources in LPP Papers

Survey of references of 1397 papers published in LPP indicated that totally 15750 sources were cited in these papers. Fig. 8 shows the co-citation map of 20 sources cited in LPP papers. As shown in the map, "*Library Philosophy and Practice*" with 324 citations and 19 links was in the first rank. "*Scientometrics*" and "*The Electronic Library*" with 266 and 227 citations and 18 and 19 links were in the second and third ranks, respectively.

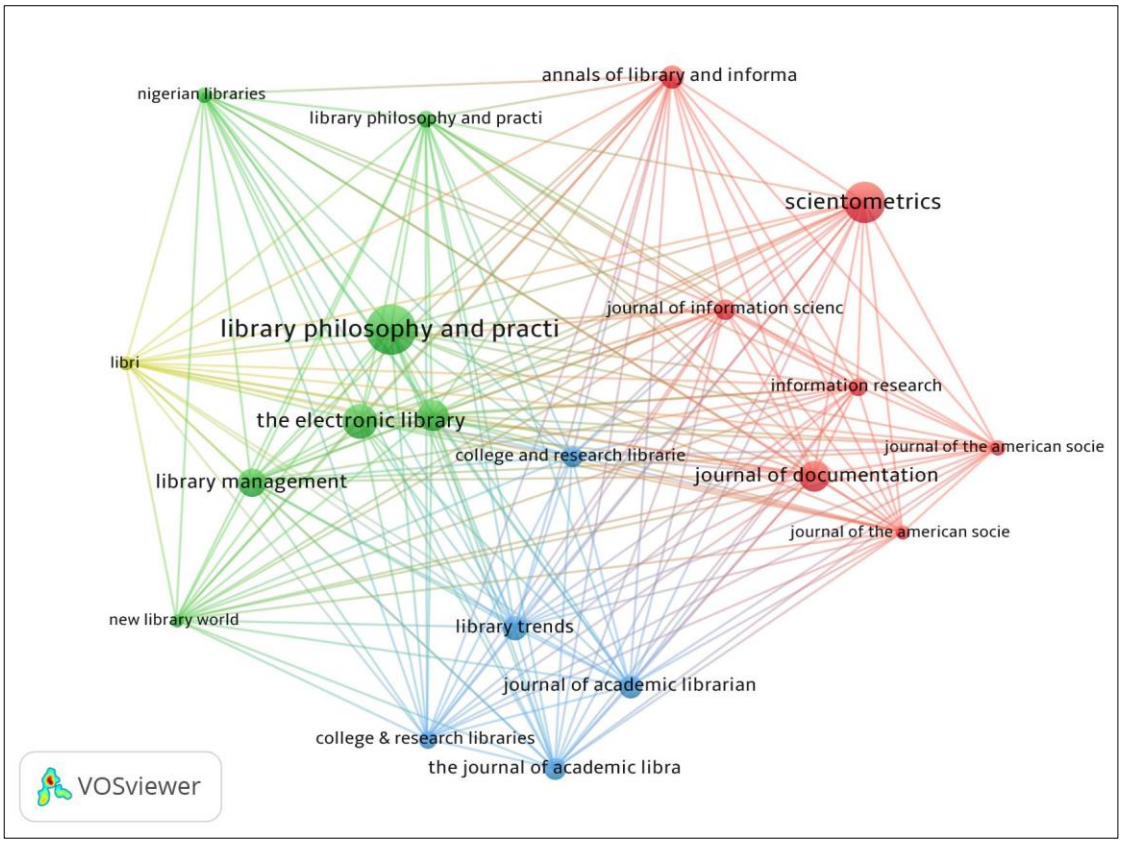

Figure 8. the co-citation map of 20 sources cited in LPP papers

Cited Authors in LPP Papers

Overall, 26815 authors have been cited in 1397 papers published in LPP. The co-citation of 20 authors with the most citations received is shown in Fig. 9. Aina, I.O. was the most highly-cited author in references of LPP papers with 112 citations and 14 co-citations. Wilson, T.D. and Mahmood, K. with 85 citations and 11 co-citations and 79 citations and 17 co-citations were ranked second and third respectively.

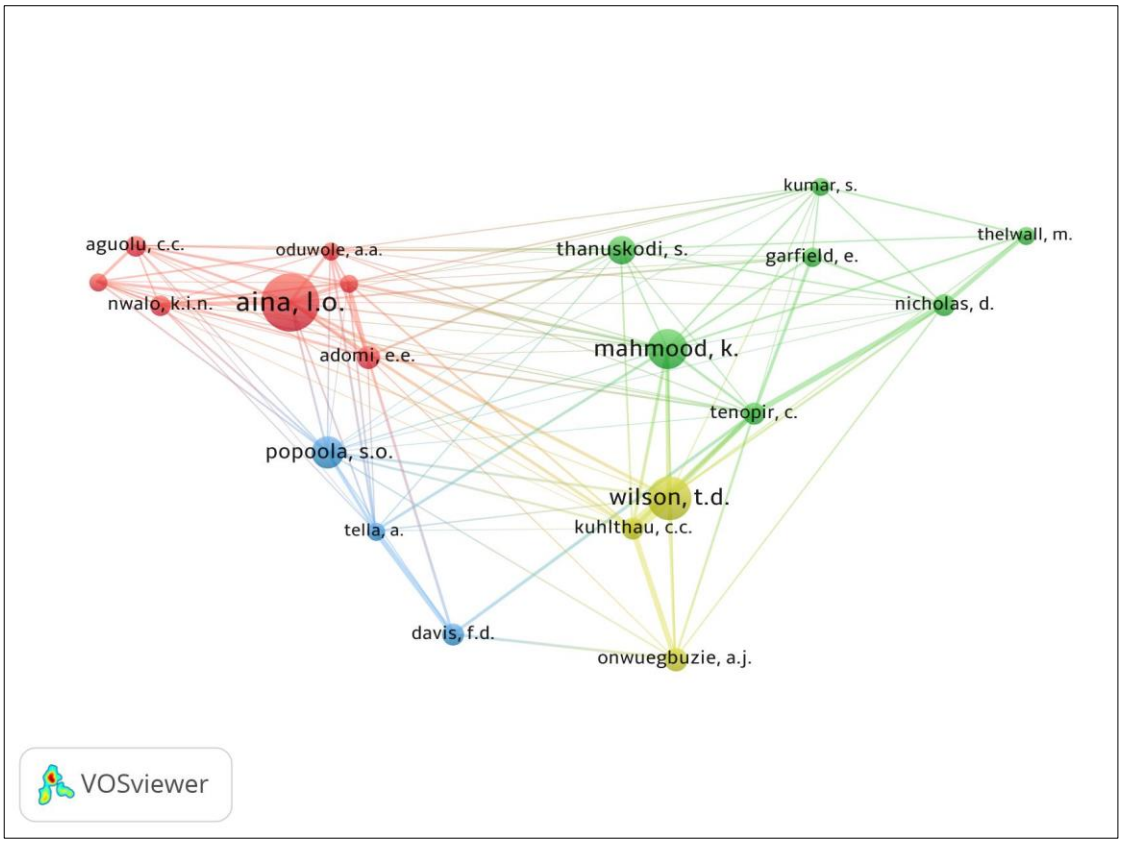

Figure 9. the co-citation map of 20 authors cited in LPP papers

Discussion and conclusion

Undoubtedly, scientific journals are considered as one of the most substantial processes for knowledge exchange. In other words, scientific journals are like a university where research findings can be discussed (Van Raan, 2003). Due to the variety and rapid dissemination of information, scientific journals have more audiences compared to other information interfaces (Saberi, 2009). In fact, increasing the number of scientific journals and scholars' widespread tendency, assessment and analysis of scientific journals seem very necessary. One method for assessing scientific journals is the bibliometric analysis. Bibliometrics is a field evaluating collection of publications (papers) using quantitative methods (Tang et al, 2018).

The success of the bibliometric analysis depends on the accuracy of information retrieval. In the past, such analyses were done manually and showed lower accuracy. Fortunately, today, there are valuable databases to analyze bibliometrics. One of the most massive and common resources for the bibliometric studies is Scopus citation database. This database can be used to assess and analyze journals indexed in Scopus. In this study, the data of 1397 papers published in LPP was mined and reviewed through Scopus. The study data indicated that the process of publications

and received citations of LPP papers has been ascending during 1998-2018. 39 LPP papers have received at least 10 citations. The paper of W. Fang (2007) "Using Google analytics for improving library website content and design: A case study" has received 65 citations. Overall, LPP received citations were considered as relatively acceptable because 728 (50%) out of 1397 papers published in LPP (50%) received citations. In addition, the growth rate of received citations (R^2=0.85) was higher than that of papers (R^2=0.69). The most productive author and country of LPP were Bhatti, R. and Nigeria and the most influential university was University of Ibadan. The data indicated the extensive collaboration among Nigerian and Indian authors in LPP. The co-occurrence map of LPP keywords showed that the papers published in LPP could fall into five clusters: bibliometrics studies, information seeking studies, library administration studies, information technology studies, and open access studies. The best and most remarkable cluster is bibliometrics studies. In other words, Bibliometrics and its related matrices, such as Informatics, Scientometrics, Webometrics, and altmetrics are considered as the most prominent and active LIS fields. In the studies of Bauer et al (2016), Noruzi (2017), Saberi & Ekhtiyari (2018), similar findings could be found. The research data of Bauer et al (2016) based on analyzing highly-cited papers of Web of Science (WoS) indicate that "Scientometrics" is one of the most important fields of LIS. "Hot Papers in Library and Information Science from Point of View of Research Methods" conducted by Norouzi (2017) indicated that 2 out of 6 Hot paper of LIS, have used Bibliometrics. One paper, however, employs empirical analysis in Bibliometrics. The research data of "Characteristics of Classic Papers of Library and Information Science: A Scientometric Study" conducted by Saberi & Ekhtiyari (2018) showed that 5 out of 10 classic papers are in Scientometric. The clustering result of the keywords of LPP papers and the mentioned researches represents LIS scholars' passion to Bibliometrics and Scientometric. In other words, these research fields are the most popular and attractive ones in LIS. The analysis of co-citation of cited sources and authors in LPP papers shows that "*Library Philosophy and Practice*", "*The Electronic Library*", and "*Scientometrics*"; and Mahmood, K., Wilson, T.D., and Aina, I.O. are the most sources and authors cited in LPP papers, respectively. Scholars tend to cite well-known sources and authors in their papers. Therefore, the reason for citing authors mentioned and sources can be their high scientific credibility. Moreover, the subject clusters derived from LPP keywords are almost identical with the research field of authors and sources cited. For example, *Scientometrics* journal is the most authentic and prominent journal in the field of bibliometrics and scientometrics . The first keyword cluster is also Bibliometrics studies. Professor Wilson, T.D. is the Editor in Chief of *Information Research* journal and the pioneer of Information Seeking studies.

The second cluster is information seeking studies. These two research fields are commonly used. Eventually, we hope the Bibliometric study and visualization can be beneficial for all LIS/non-LIS scholars practicing in Bibliometrics field. We hope this study can use as a Bibliometric pattern for scientific journals.

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