Roles of Library Research Institutions in Disseminating Research Publications: A Bibliometric Study

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ABSTRACT

This study seeks to ascertain the distribution of research publications concerning the roles of libraries and librarians in research institutions listed in the Scopus database. A literature search uncovered 1637 articles on the subject. R-Bibliometrix (Biblioshiny) software was used to evaluate these publications in considerable detail. The findings indicated that Library Philosophy and Practice was the publication that published the most significant number of articles on the relevant themes, with Pandita R. being the most productive author. Scientometrics received the most citations (515), followed by The Journal of Academic Librarianship (410), College Research Libraries (399), and Library Management (317 times). The Journal of Academic Librarianship and Library Philosophy and Practice had the highest h-index scores, 9 and 7, respectively. The United States contributed the most to collaboration; of the 260 papers where 246 documents have collaborated across the country, and 14 papers collaborated with authors from several countries. The widely studied topics include libraries, medical libraries, library science, organization and management, librarian of biomedical research, scientific libraries, qualitative research, meta-analysis, systematic reviews, and Cochrane libraries.

Keywords: Research publications; library roles; librarian; research institutions

1. INTRODUCTION

Research institute libraries have an essential role in developing and integrating research data services through repositories, educating researchers on data collection, and curating research data. On the other hand, libraries also have a role in research data sharing through open access policy (Chiware & Mathe, 2015; Higman & Pinfield, 2015). Meanwhile, Chiware (2020) stated that libraries of research institutions, such as the Directorate of Repositories and Multimedia in the National Research and Innovation Agency of Indonesia, have a vital role in managing open research data framed in the broader context of open science. The four areas that libraries should oversee to assist open science are open access and open access publication, resource data management (RDM), e-research infrastructure, and citizen science. They can be inferred from this point.

Research institute libraries are often referred to as research libraries because their primary function is to provide facilities for research, which is one of the main activities in research institutions. The library of research institutions is a center for scientific information

services that require capabilities in collecting, processing, storing, searching, and providing access to information for users in the form of data, processing results or documents (Abankwa & Run, 2019; Kurniawan, 2016).

Libraries and librarians in research institutions are responsible for distributing research results and innovations made by their institutions in the form of publications so that the wider community can be informed of them to support open science. Novianto (2020) stated that the public could acquire the research findings from the institutions' libraries through the scientific publications such collections publish. Additionally, the scientific subject of librarianship can benefit from the publications made by librarians. Through this context, the librarian's professional expertise and recommendations for library development in scientific papers will be beneficial if extensively disseminated. Moreover, scientific publications produced by librarians can contribute to the scientific field of librarianship. Scientific publications of librarians also contribute to improving the image of the librarian profession as writing scientific papers is one of the scientific dissemination efforts to the public regarding various matters related to the profession

Furthermore, Iswati et al. (2018) and Aribowo & Wirapraja (2017) mentioned that the role of librarians in research institute libraries is to support researchers in conducting research in their fields by providing data and references needed by researchers. Moreover, several research reveal that the role of research librarians tends to lead to research activities. Research librarians are expected to help solve research activity problems in finding scientific information needed by researchers to support research activities (Harumiaty, 2014; Kurniawan, 2016; Andayani, 2016; Maniso, 2017; Puspitasari, 2018; Manaf, 2020; Satriani et al., 2021).

In order to support the performance of research institutions, it is essential to understand how the distribution of publications regarding the role of libraries and librarians has been carried out so far. One of the best ways to answer this research question is through a bibliometric study. Here, publications published in databases can be analyzed so that the distribution of publications globally on the role of libraries and librarians in research institutions can be known.

This study aims to determine the distribution of research publications on the role of libraries and librarians in research institutions indexed in the Scopus database using bibliometric analysis. Scopus is a bibliographic database produced by Elsevier that indexes almost 20.000 journals in all scientific disciplines (Rodrigues et al., 2014). The distribution of publications studied includes publications years, the number of citations per year, the relationship between journal names, the authors and keywords, the most relevant sources, the most cited sources, journal categories based on Bradford's Law, the journal impact and growth factors, influential and productive authors, topic trends, co-occurrence, and the conceptual structure map-method: MCA.

2. METHODS

Publication analysis on the role of libraries and librarians in research institutions was carried out by simple searching method through the Scopus database using (TITLE-ABS-KEY (role AND of AND librarians AND in AND research AND institutions) OR (TITLE-ABS-KEY (library AND in AND research AND institutions). The study only used articles published from 2016 to 2021. The articles regarding the role of libraries and librarians were further evaluated using a bibliometric method using open-source software, bibliometrix R-package (Aria & Cuccurullo, 2017). Details on the search results are as follows.

Table 1. Brief information about the search results

Descriptions	Results
Timespan	2016:2021
Sources (Journals, Books, etc)	547
Documents	1637
Average years from publication	3.12
Average citations per document	2.987
Average citations per year per doc	0.6243
References	54079
DOCUMENT TYPES	
article	1637
DOCUMENT CONTENTS	
Keywords Plus (ID)	2478
Author's Keywords (DE)	4767
AUTHORS	
Authors	4069
Author Appearances	4500
Authors of single-authored documents	465
Authors of multi-authored documents	3604
AUTHORS COLLABORATION	
Single-authored documents	493
Documents per Author	0.402
Authors per Document	2.49
Co-Authors per Documents	2.75
Collaboration Index	3.15

3. RESULTS AND FINDINGS ANALYSIS

Number of Scientific Publications By Year

Based on the data, the number of publications has been continuously increasing since 2016. The increase started in 2017, and the highest occurred in 2019 and 2021.

Table 1. The number of scientific publications by year

Year	Number of articles	%
2016	183	11,17
2017	225	13,74
2018	239	14,59
2019	318	19,43
2020	301	18,39
2021	371	22,66
Total	1637	100

The Average Number of Citations Per Year

Based on the data, most publications were published in 2019 and 2021 with a total of 318 and 371 documents, respectively. The highest total average citation for each article occurred in 2016, with 7.54644808 citations. Meanwhile, the highest total average citations per year also occurred in 2016, with an average value of 1.257741348. These results indicate that the publications published in 2016 were the most cited papers.

Table 1. The average number of citations per year

Year	Publication number	Average citations per article	Average citation per year	Citation year
2016	183	7.546448087	1.257741348	6
2017	225	4.995555556	0.999111111	5
2018	239	3.711297071	0.927824268	4
2019	318	2.462264151	0.820754717	3
2020	301	1.860465116	0.930232558	2
2021	371	0.417789757	0.417789757	1

The Relationship between Journal Names, Authors, and Keywords

It is seen in Figure 1 three elements: a list of journal names, a list of authors, and a list of keywords used. The three elements are plotted in a grey plot showing the relationship between one another, starting with the journal names. Each journal indicates the authors, and each author corresponds to the keywords used in publications regarding the role of libraries and librarians in research institutions. The size of each rectangle indicates the number of publications associated with that element. For the first element, namely the journal, there were 11 journals indexed in three plot fields that published papers on the role of libraries and librarians in research institutions. The journal that published the most article on this theme was Library Philosophy and Practice, depicted in a red rectangle and connected with several authors, namely Pandita R., Singh S., Chisita Ct., Idees H., and Anyaoku En.

The second element in the middle is the author's name. Several published journal authors were seemingly related to the same former elements (the same journal names), such as Pandita R., Singh S., Chicta Ct., Idrees H., Anyaoku En., Shoaib M., Mutula S., Kumar A., Ali N., and Anwar B. They were related to the Library Philosophy and Practice on the journal name element. Each of these authors would be associated with frequently used keywords on the right. Nineteen top authors publish articles on the role of libraries and librarians in research institutes. The rectangle size indicates the number of publications written by each author. In this plot, Pandita R. occupies the widest rectangle, which shows that Pandita R. was the author who mostly writes about the theme.

The third element is the most appeared keyword of the publications, which is the research object. Each keyword is associated with an author who might use multiple keywords. There were 18 keywords listed, with the most frequently used keywords including higher education, academic libraries, and libraries according to the size and color of the rectangle.

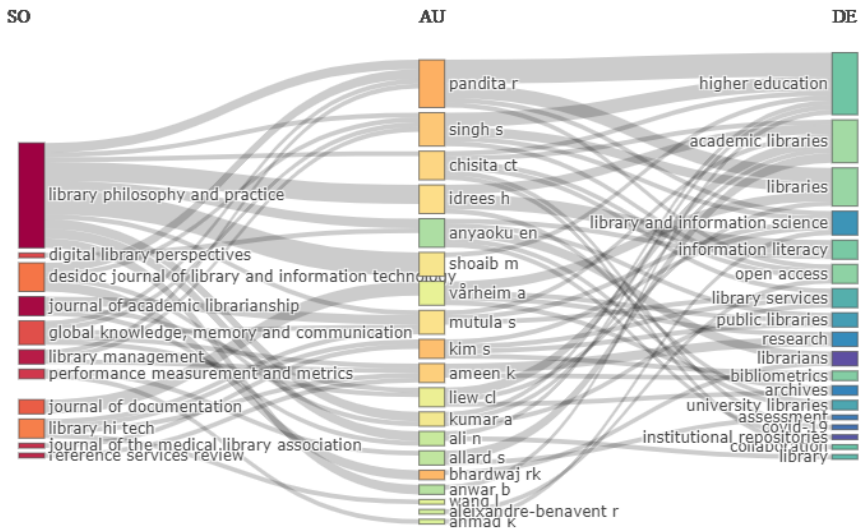

Figure 1. Three areas of the role of libraries and librarians in research institutions

The Most Relevant and Most Cited Sources

Figure 2 shows the number of publications published by each journal based on relevance to the research theme the role of libraries and librarians in research institutions. Journal has the most published articles on the Y axis, while the number of documents published is on the X axis and is presented in blue. The darker blue indicates more quantity and relevance to the research theme (the number of documents published by all journals is in the range from 0 to 250 documents). The Philosophy and Practice Library was the top source with 213 documents, as shown by the darkest blue bar chart. It is darker than other journal bars because it is more relevant to the topic discussed. The bottom sources were the Medical Reference Service Quarterly and the Portal, each with 12 documents with the brightest blue bar chart. In addition to these three journals, there were 20 journals listed in the data sources that are most relevant to the publication of the role of libraries and librarians in research institutions. This is in line with Siddique et al. (2018) and Kharabati-Neshin et al. (2021) that Library Philosophy and Practice is the most productive journal in publishing library and information science.

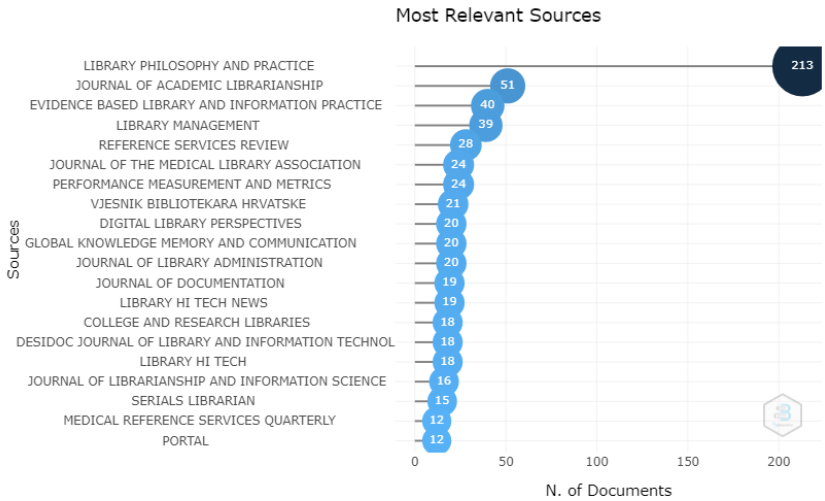

Figure 2. The most relevant sources discuss the role of libraries and librarians in research institutions

Figure 3 shows that the most cited sources related to publications of libraries and librarians' roles in research institutions were, Scientometrics cited 515 times, followed by The Journal of Academic Librarianship cited 410 times, College Research Libraries cited 399 times, Library Management cited 317 times. The least cited source was Plos One, cited 149 times.

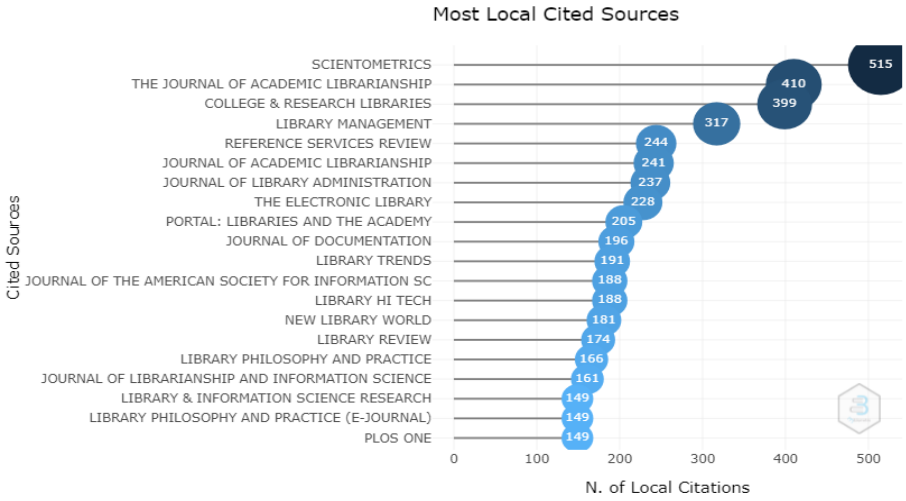

Figure 3. Most cited sources

Bradford's Law

Journals' classification based on Bradford's Law is shown in Figure 4. The journals are classified into several sections based on productivity levels, including the core group journals, intermediate journal groups, and broad journal groups. The core group journals are indicated by shaded sections and annotated core sources. Journals that fall into the core category are journals with the highest productivity levels that contain publications on the role of libraries and librarians in research institutions. These journals were the Library Philosophy and Practice with 200 documents, the Journal of Academic Librarianship with 50 documents, and the Evidence Based Library and Information Practice, with less than 50 documents.

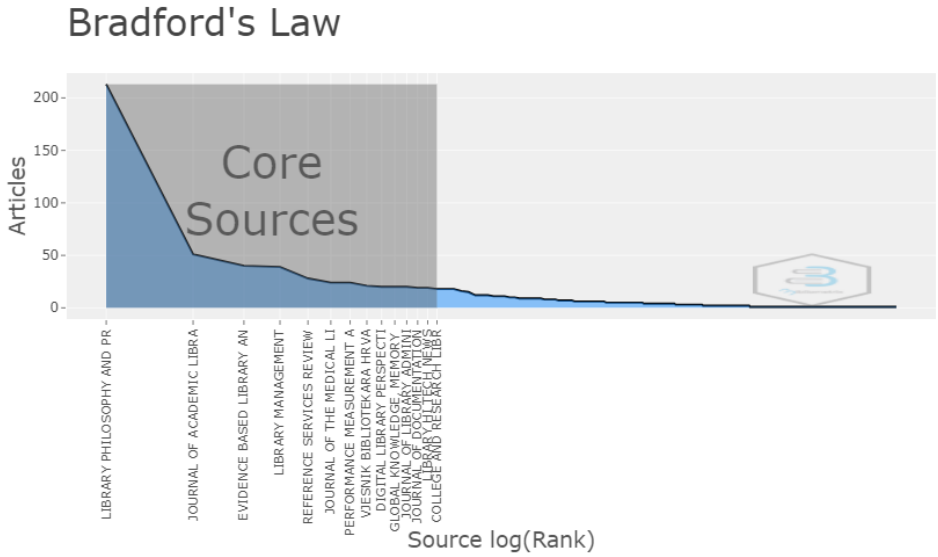

Figure 4. Journal categories based on Bradford's law

Sources (Journals) That Have An Impact On Publications Regarding the Role of Libraries and Librarians in Research Institutions

The journal impact published can be seen not only from the quantity or relevance but also the impact of each journal that publishes research, which in this case, related to the role of libraries and librarians in research institutions. The journal impact can be calculated from the journal's h-index, which is then depicted in a blue bar chart (Figure 5). In addition, to show each journal's h-index value, this diagram also shows each journal's impact through the blue color displayed. The darker the blue color in the chart, the more significant the journal's impact, so does the higher the h-index.

The data found that the Journal of Academic Librarianship and Library Philosophy and Practice were in the top journals with h-index values of 9 and 7, respectively (as shown by the darkest blue bar color). It indicates that these two journals had the largest h-indexes compared to other journals. Meanwhile, nine journals had the lowest h-index of 4, as shown in a light blue color in the chart.

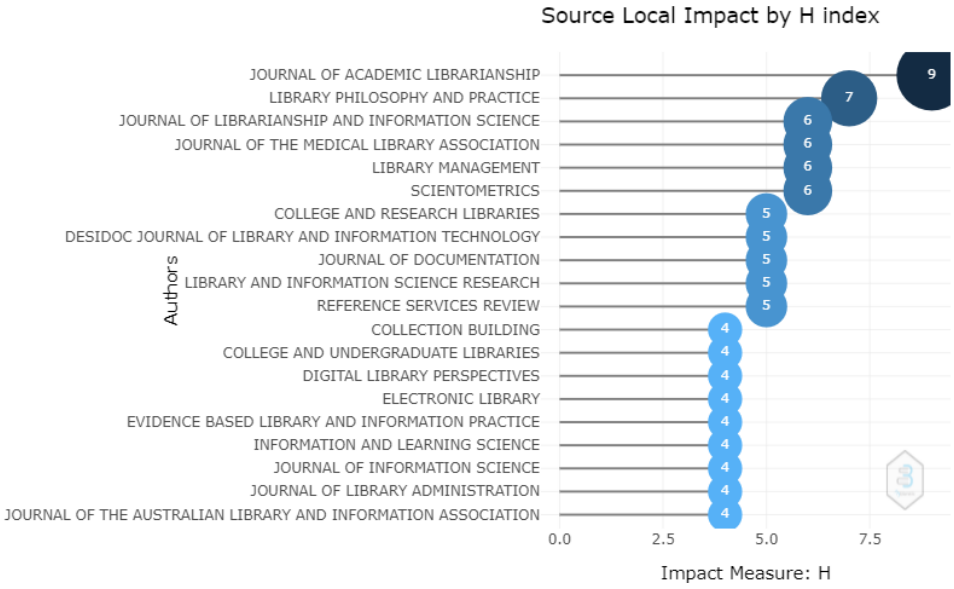

Figure 5. Journal with the most impact regarding the research topic

The Growth of Publication Sources

This section discusses the growth of journals that become research sources in finding publications related to the role of libraries and librarians in research institutions. The annual publication growth of each journal from 2016 to 2021 is shown in Figure 6. The figure illustrates the growth of journals in curved lines during the research period. Based on the figure, it is shown that the growth of several journals began to develop in 2016 and continues to increase, for example, the Library Philosophy and Practice (as shown in the blue line). As for the growth, the Evidence Based Library and Information Practice, Journal of Academic Librarianship, Library Management, and Reference Services Review showed almost constant growth during the analysis period.

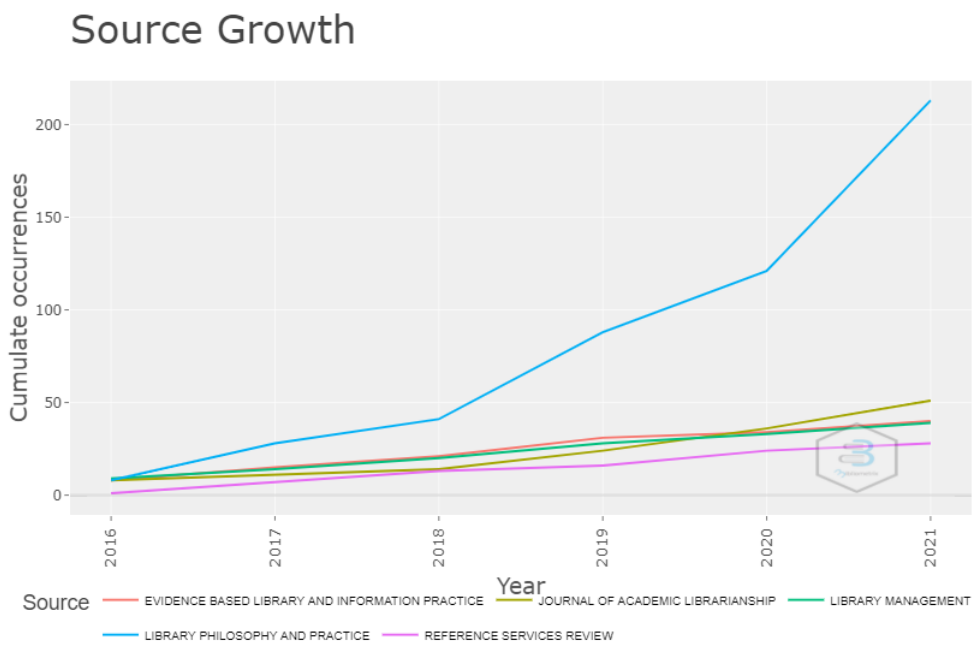

Figure 6. The growth of publication sources

The Authors' Impact

The authors who have published their papers can be ranked based on their publications' impact using the h-index rank. The h-index has values ranging from 0 to 4, and the degree of impact is shown in blue in the bar chart. The darker the color, the more significant the impact. Figure 7 shows five authors achieved the highest h-index score of 3 (marked in dark blue): Allard S., Baro EE., Bardwaj RK., Jabem M., and Tenopir C. Moreover, there were 15 authors with a medium h-index score of 2, namely Ahmad K., Al-Daihani SM., Al-Qallaf CL., Alam SL., Ali N., Ameen K., Anwar B., Anyaoku EN., Balas E., Balayan A., Bangani, S., Barnett W., Batoll SH., Belter CW., and Berman A.

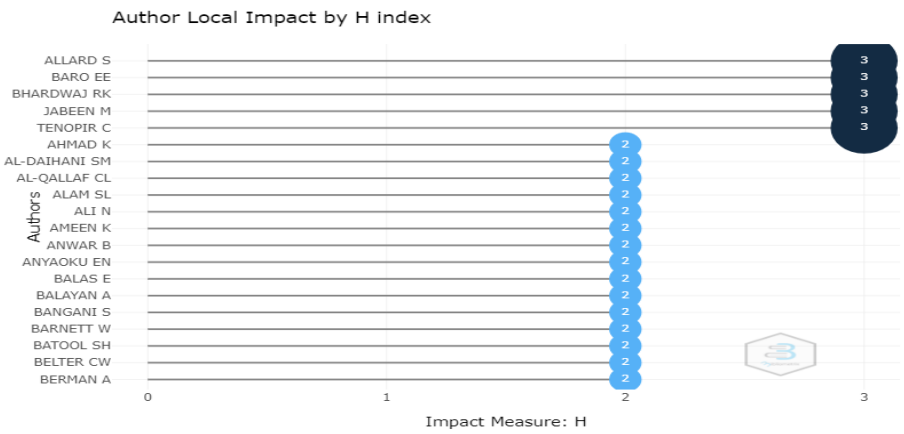

Figure 7. The author's impact based on the h-index

The Most Prolific Authors

Figure 8 shows some of the most productive authors during the research period 2016 to 2021, which is indicated by a red line from the authors' initial year publication to the last year when

the authors published their papers. In addition, the circle mark on the red line shows the number of papers published in the publication year. Based on the figure, some authors have started writing papers on the role of libraries and librarians in research institutions since 2016, and some have just started recently. The author who had started publishing in 2016 was Bhardwaj RK. Meanwhile, Allard S. had started from 2016 to 2018, Anyaoku N started writing from 2016 to 2019. Three authors started writing from 2016 to 202, namely Liew CL., Ali N., and Alexandre Benavent R.

Figure 8. The most prolific authors

The Number of Documents Based On the Authors' Country of Origin Collaboration

Table 8 shows the number of documents based on the author's country in collaboration, which is listed in each article. The number is generated by calculating the total form of SCP collaboration (one country collaboration) and MCP (a collaboration between several countries). There were 10 countries with the highest collaboration rankings, namely the United States with a total of 260 articles, which consist of 246 articles were collaborations with one country and 14 articles in collaboration between several countries. India ranked second with 74 publications, 72 articles were collaborations of one country, and 2 articles were collaborations between several countries. China occupied the next rank with 43 publications, where 33 articles were collaborations of one country, and 10 articles were collaborations between several countries.

Table 4. The number of documents by country collaboration

Country	Articles	Freq	SCP	MCP	MCP_Ratio
USA	260	0.28698	246	14	0.0538
India	74	0.08168	72	2	0.027
China	43	0.04746	33	10	0.2326
United Kingdom	42	0.04636	36	6	0.1429
Nigeria	38	0.04194	35	3	0.0789
Malaysia	31	0.03422	28	3	0.0968
Australia	29	0.03201	25	4	0.1379

Pakistan	28	0.03091	21	7	0.25
Canada	27	0.0298	26	1	0.037
Spain	27	0.0298	22	5	0.1852

Trending Topics

This section discusses the development of the topic related to the role of libraries and librarians in research institutions, as shown in Figure 9. The occurrence of topics is indicated by the keywords' frequency found in publications regarding the role of libraries and librarians in research institutions. The higher the number indicates the more frequent keywords are used. In addition, the further to the right (to the more recent year), the more recently the keywords are used. Based on the figure, it can be seen that the "institutional repositories" topic was primarily discussed in the 2017 publications. Moreover, keywords such as publishing, librarians, and libraries were most used in 2018. Further, the most recent trending topic was information professionals.

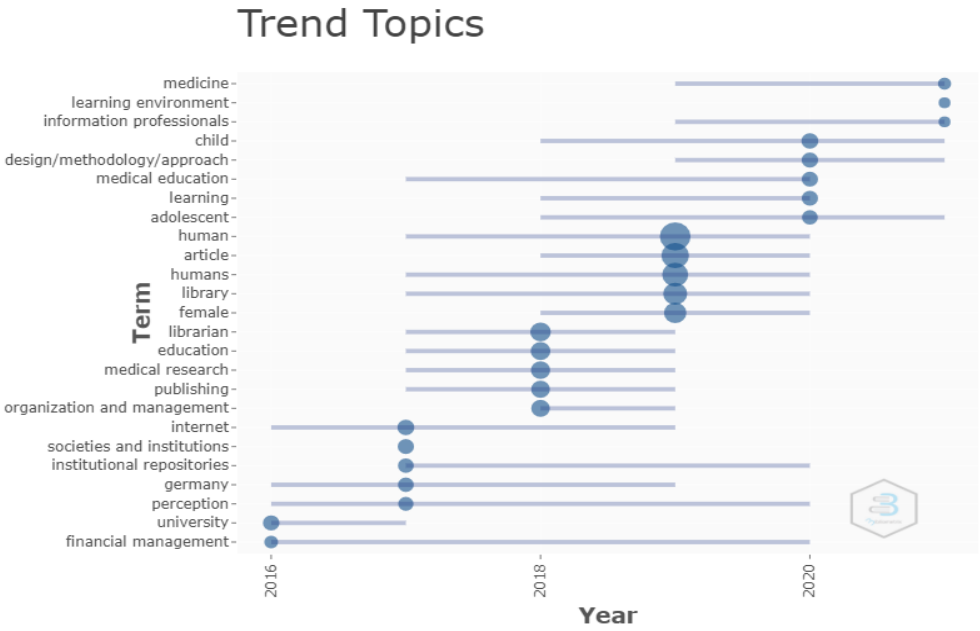

Figure 9. The trending topics

Co-Occurrence Network

Figure 10 shows the results of the co-occurrence network analysis using the software R-Bibliometrix (Biblioshiny). Based on the analysis, the co-occurrence network of topics related to the role of librarians and libraries in research institutions is divided into five clusters: the red cluster related to the systematic review and meta-analysis; the blue cluster includes topics about the librarian, library, medical librarian; the yellow cluster discusses bibliometrics, publications, and medical research; the purple cluster includes topics about digital libraries, information management, information services and publishing; and the green cluster discusses leadership, software, and qualitative research.

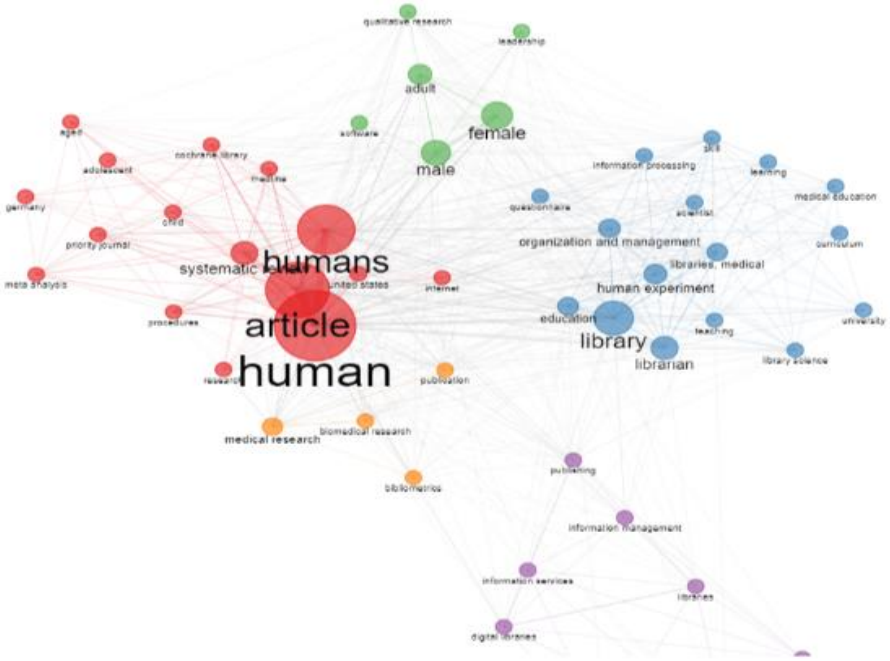

Figure 10. The co-occurrence network

Conceptual Structure Map-Method: MCA

This section explains the concept of a structure map or contextual map for each keyword that often appears in research publications on the role of libraries and librarians in research institutions. The structure map can be created by dividing and mapping the relationship between one keyword and another through regional mapping. Each keyword occupies an area with Dim 1 and Dim 2. The mapping between keywords is divided into two parts: the red and blue areas. Each area contains words related to each other. Based on Figure 11, the red area shows more numbers and more keywords included than the blue area. It shows that many research papers link between the words listed in the red zone.

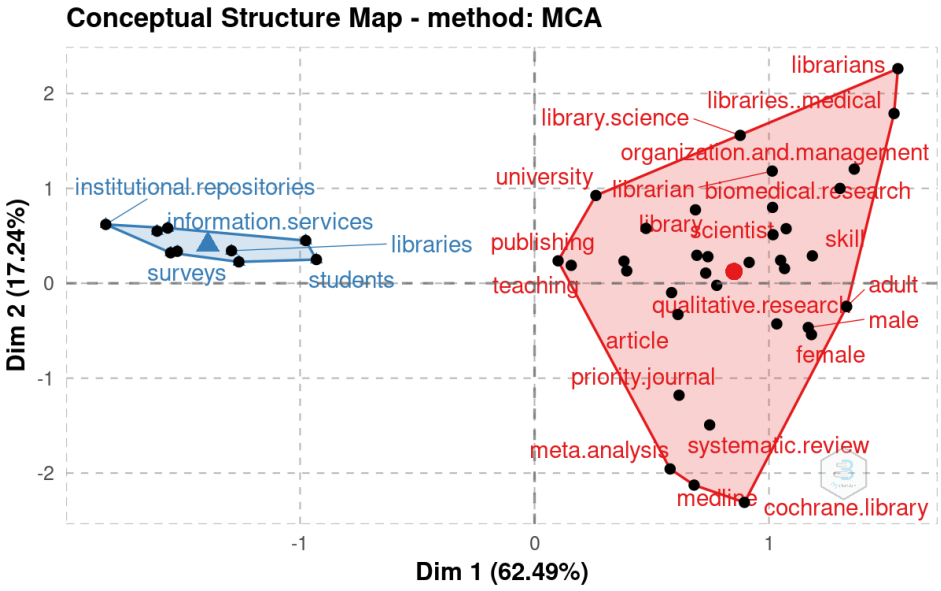

Figure 11. Conceptual Structure Map- method: MCA

The results and findings analysis described informs the research distribution on this topic. The distribution of the research publications can be useful for LIS researchers, librarians, or research library management in conducting research (e.g. to find relevant literature, reference authors, important and influential sources, and opportunity to collaborate) to improve libraries and librarians' capability in providing service for researchers.

Based on the analysis, publications on the role of libraries and librarians in research institutions in the Scopus database has been carried out since 2016, and the peak occurred in 2019 and 2021. According to van Nunen et al. (2018), publication growth may indicate the development of scientific research on a subject. Thus, the increase in the number of publications related to the topic indicates that research in this area is growing, particularly in 2019 and 2021.

The highest average citation for each article occurred in 2016, with an average of 7.54644808 citations. The average citation per year also occurred in 2016, with an average value of 1.257741348. The highest citation number per article and the average annual citation value show that articles published in 2016 were the most cited articles.

Based on the relationship between journal names, authors, and keywords, it is found that Library Philosophy and Practice was the journal that publishes the most publications regarding the roles of librarians and librarians in research institutions. The most productive author of the journal, Pandita R., used the most keywords, such as higher education, academic libraries, and libraries. The Library Philosophy and Practice journal also published 213 documents relevant to the role of libraries and librarians in research institutions, greater than other journals. This finding is in accordance with the research results of Sahu & Parabhoi (2020) that the Library Philosophy and Practice is a core library journal in the library and information science field during 2014-2018. Moreover, the most cited sources were Scientometrics, which was cited 515 times, followed by the Journal of Academic Librarianship cited 410 times, College Research Libraries cited 399 times, Library Management cited 317 times, and the fewest sources cited was Plos One cited 149 times. In addition, the analysis also found that the Journal of Academic Librarianship and Library Philosophy and Practice were journals that had the highest h-index values, namely 9 and 7, respectively. Hence, it can be said that scientometrics, the Journal of Academic Librarianship, and Library Philosophy and Practice are more influential than other journals and can be used as a reference source for researchers who wish to conduct research regarding the topic, the role of libraries and librarians in research institutions.

Additionally, judging from the collaboration between countries, it is found that the United States was the country with the highest number of publications. Of 260 documents carried out in collaborations, 246 articles were created from collaborations in one country and 14 articles of collaboration between several countries. Based on this results, it can be said that the United States researchers are more productive in writing publications regarding the role of libraries and librarians in research institutions. Apart from the large number of publications, this may indicate the influence of United States publications and researchers in this field of research.

Regarding the trending topics, librarians' and libraries' roles in research institutions could be divided into 4 clusters. The red clusters covering systematic review and meta-analysis, which might indicate the most utilized research methods; the blue cluster discusses librarian, library, librarian medical; the yellow cluster discusses bibliometrics, publications, and medical research; the purple cluster discusses digital libraries, information management, information services and publishing; while the green cluster discusses leadership, software, and qualitative research.

Mapping between keywords with a conceptual structure was divided into red and blue areas. The red section has more keyword relationships, including librarian, medical libraries, library science, organization and management, librarian of biomedical research, scientific libraries, qualitative research, meta-analysis, systematic review, and Cochrane library. Meanwhile, the blue areas have fewer keywords, namely institutional repositories, information services, and libraries. The blue and yellow clusters might indicate that most publications discussing the role of libraries and librarians in research institutions occur in medical areas involving medical librarians and libraries. Meanwhile, the purple cluster might illustrate how libraries and librarians could take part and what competence they should have, such as leadership capability, information services, library management, and IT skills.

4. CONCLUSION

The bibliometric method used in this study can provide publication distribution regarding the role of libraries and librarians in research institutions, which can be useful for LIS researchers, librarians, or research library management in conducting research to improve libraries and librarians capability in providing service for researchers. The distribution of publications studied reveals that the Library Philosophy and Practice was the journal with the most published articles on the role of librarians and librarians in research institutions, with the most prolific author was Pandita R. The most cited sources were Scientometrics cited 515 times. The Academic Librarianship and Library Philosophy and Practice journal had the highest h-index scores, namely 9 and 7, respectively. The United States was the country that contributed the most publications: 260 documents. The widely studied topics cover librarian, medical libraries, library science, organization and management, librarian biomedical research, scientific library, qualitative research, meta-analysis, systematic review, and Cochrane library. These keywords might indicate the research focus, which may involve research method used, research library area, or skills needed to support libraries and librarians in research institutions.

Regarding the limitations of the study, the researcher realizes that the information in this study is limited to only one database source. Further research must make use of more complete keywords and extra information from other databases to produce analysis results that are more thorough for academics looking to explore the role of libraries and librarians in research institutes.

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