



Bibliometric Analysis of Author Collaboration in Khizanah al-Hikmah: Journal of Library, Information and Archival Science in 2018-2022

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KEYWORDS

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Scholarly Communication
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ABSTRACT

This study presents a bibliometric analysis of author collaboration in Khizanah al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi dan Kearsipan from 2018 to 2022. The objective is to determine the level of author collaboration, identify the most frequent collaborating authors, and examine which institutions are most actively involved in collaborative research published in the journal during the stated period. This research employed a quantitative approach. The sample consisted of all 98 articles published in the journal between 2018 and 2022. Data collection and processing were conducted from August to December 2023 using the Publish or Perish application. Data analysis was carried out using VOSviewer and bibliometric techniques based on Subramanyam's formula for measuring collaboration. The findings reveal a high level of author collaboration, with a collaboration index of 0.73 (73%). A total of 72 articles were produced through collaborative research, while 26 were authored individually. The author named Tupan emerged as the most collaborative contributor, having co-authored eight published articles during the study period. This indicates that Tupan has made significant contributions to the journal's scholarly development. Furthermore, Universitas Indonesia was identified as the most frequently collaborating institution, contributing eight articles (11.1%) of the 35 documented in the journal from 2018 to 2022.

KATA KUNCI

Analisis Bibliometrik
Kolaborasi Pengarang
Komunikasi Ilmiah
Publikasi Ilmiah
Journal Khizanah al-Hikmah

ABSTRAK

Tujuan penelitian ini adalah untuk mengetahui tingkat kolaborasi pengarang, mengidentifikasi pengarang yang paling sering melakukan kolaborasi, serta mengkaji lembaga-lembaga yang paling aktif terlibat dalam riset kolaboratif yang dipublikasikan dalam jurnal tersebut. Penelitian ini menggunakan pendekatan kuantitatif. Sampel penelitian terdiri atas seluruh artikel yang diterbitkan dalam kurun waktu tersebut, yaitu sebanyak 98 artikel. Pengumpulan dan pengolahan data dilakukan pada bulan Agustus hingga Desember 2023 menggunakan aplikasi Publish or Perish. Analisis data dilakukan dengan bantuan VOSviewer serta teknik bibliometrik berdasarkan rumus kolaborasi Subramanyam. Hasil penelitian menunjukkan bahwa tingkat kolaborasi pengarang tergolong tinggi, dengan indeks kolaborasi sebesar 0,73 (73%). Sebanyak 72 artikel dihasilkan melalui kolaborasi, sementara 26 artikel ditulis secara individu. Penulis bernama Tupan merupakan pengarang yang paling sering berkolaborasi, dengan total 8 artikel yang diterbitkan dalam jurnal selama periode penelitian. Hal ini menunjukkan bahwa Tupan memberikan kontribusi signifikan terhadap perkembangan keilmuan dalam jurnal tersebut. Selain itu, Universitas Indonesia teridentifikasi sebagai lembaga yang paling sering terlibat dalam kolaborasi, dengan kontribusi sebanyak 8 artikel



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(11,1%) dari total 35 lembaga yang tercatat melakukan kolaborasi pada jurnal ini selama tahun 2018 hingga 2022.

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1. Introduction

The development of science within universities continues to advance alongside technological and informational progress. A key factor influencing the growth of a scientific discipline is research activity within the field. Research is carried out to discover new knowledge and advance science, addressing problems and challenges specific to each discipline.

In many cases, conducting research, evaluation, and development in a scientific field requires collaboration rather than individual effort. Collaborative research often involves multiple authors contributing to a scientific paper. Such collaboration provides opportunities to share knowledge, expertise, and techniques, facilitating the division of labor and enhancing productivity.

Collaboration is defined as cooperation among parties to achieve a common objective. The level of collaboration among authors can be calculated using a collaboration formula. It occurs when more than one individual or institution contributes intellectual input, knowledge, data, or materials to a research project. As both creators and users of scientific information, researchers play a crucial role in generating knowledge through research and studies. Therefore, they must possess sufficient and relevant knowledge to produce research that is valid and credible.

In research, collaboration is often essential for completing scientific work and addressing challenges specific to a discipline. Seeking assistance or the perspectives of others is sometimes necessary to ensure quality and comprehensiveness.

Bibliometrics is a method used to measure the extent of author collaboration. This approach employs quantitative and qualitative statistical techniques to analyze changes in collections of documents or other media. Bibliometric analysis is widely applied to assess scientific research outputs in terms of publication quantity. It assumes that most scientific findings are eventually published in accessible, readable, and citable journals, available online without temporal or spatial limitations.

Previous studies have examined the level of author collaboration in scientific publications. Arlianis (2019:18) found that from 2015 to 2018, the level of collaboration among authors in the *Journal of Education and Culture* was 0.23, indicating that individual authors produced more articles than collaborative teams.

In Contrast, Rasmila (2017:70) reported a collaboration index of 0.55 for the *Reference Service Review Journal* during 2012–2016, showing that collaborative publications were more common than individual ones. Safitri (2019:45) found an even higher collaboration rate of 0.89 (89%) in *The International Journal of Geomechanics* from 2006–2010, involving 176 collaborative authors and 22 single authors. The most frequent collaborations involved three authors, with Mark F. Randolph the most prolific contributor, with seven publications.

Additionally, Rohanda (2019:14) conducted a bibliometric analysis of collaboration, author productivity, and article characteristics in information and library studies journals from 2014–2018. Out of 76 articles, the majority were written by three authors (45 articles), while only three articles were written by four authors. Overall, the analysis of publications in the *Journal of Information and Library Studies (JKIP)* indicated that collaborative authorship dominated over single authorship.

Based on these findings, the present study aims to determine the level of author collaboration in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018–2022, identify the authors who collaborate most frequently, and examine which institutions have the highest collaboration rates during the same period.

2. Research Methodology

This study is a quantitative research project that employs bibliometric analysis methods. The population consists of articles published in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* between 2018 and 2022, totaling 98 articles. Data collection was conducted using the Publish-or-Perish application and supplemented with manual data collection from August to December 2023. The articles were categorized based on the Number of authors, ranging from one to six authors, as summarized in the following Table.

Table 1

Percentage of Articles in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* by Number of Authors

No	Number of Authors	Frequency	Percentage
1.	1	27	28%
2.	2	37	38%
3.	3	19	19%
4.	4	9	9%
5.	5	4	4%
6.	6	2	2%
Total		98	100%

The research data were processed using VOSviewer. The analysis of research data uses bibliometric analysis with Subramanyam's collaboration formula. Data analysis is carried out with the following steps:

- 2.1. Checking or recording the results of research (articles) contained in the scientific journal.
- 2.2. The creation of tables. The Table is made in several volumes (year taken). In this case, three tables will be made (2005-2007), each consisting of four categories based on the Number of issues each year. In the Table, each year, Nm and Ns will be grouped along with their amounts.
- 2.3. The recapitulation table. This Table contains the total totals for each year. In the recapitulation table, the total Number of Nm and Ns each year will be calculated, along with C.
- 2.4. Determining the level of collaboration

To measure (determine) the level of collaboration in one research area in a given year based on the Subramanyam formula as follows:

$$C = \frac{Nm}{Nm + Ns}$$

C = Writer's level of collaboration

Nm = The Number of authors who collaborate with more than one

Ns = Number of single authors

The overall C grade per year is recapitulated, then the C grade is calculated, and the C grade is interpreted for the entire year.

3. Research and Discussion Results

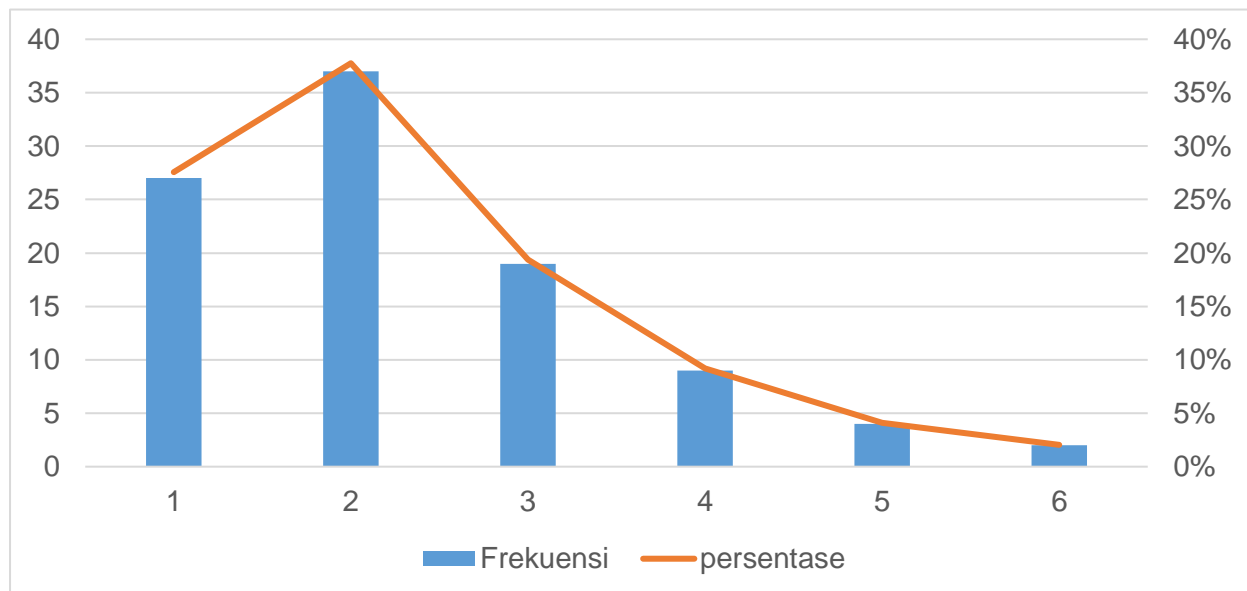
3.1. Percentage of Articles in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* by Number of Authors

Khizanah al-Hikmah: Journal of Library, Information and Archival Science publishes articles biannually, in June and December. Between 2018 and 2022, the journal published 98 articles, based on data from the Publish-or-Perish application and manual data collection. Among these 98 articles, some were authored collaboratively, while others were written individually.

The following graph illustrates the percentage and Number of articles based on the Number of authors in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* during 2018–2022

Chart 1

Percentage and Number of Articles Produced Based on the Number of Authors in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* in 2018-2022



The graph above indicates that the Number of articles produced through collaborative research exceeds those produced individually. The difference between articles from individual research and collaborative research is approximately 5%. The graph also shows that collaborations involving two authors dominate the collaborative research articles. The Number of articles authored by two-person teams is significantly higher than those produced by collaborations of three, four, five, or six authors. Since the level of collaboration in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* surpasses that of individual authorship, the journal is developing rapidly.

3.2. The Level of Author Collaboration in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* in 2018-2022

Author collaboration in research allows for more diverse feedback and perspectives, benefiting both the authors and the journal. It also provides greater opportunities for sharing knowledge and resources, leading to more comprehensive, credible, and impactful research. The high level of collaboration in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* suggests that the journal is developing rapidly. The following Table summarizes the level of author collaboration in the journal from 2018 to 2022.

Table 2

Collaboration Level of Khizanah al-Hikmah, Authors: Journal of Library, Information and Archival Science, 2018-2022

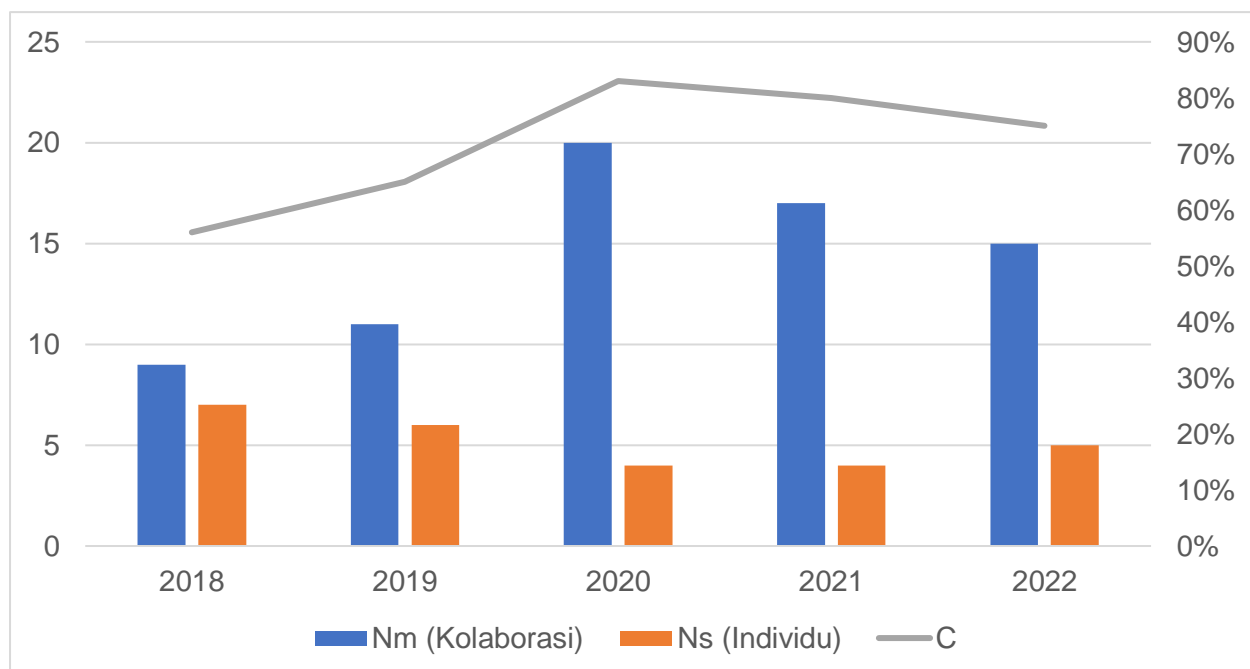
No	Year	Nm	Ns	Total	Percentage
1.	2018	9	7	16	56%
2.	2019	11	6	17	65%
3.	2020	20	4	24	83%
4.	2021	17	4	21	80%
5.	2022	15	5	20	75%
Total		72	26	98	73%

The Table above shows that author collaboration reached its highest point in 2020, with a rate of 83%, comprising 24 articles 20 produced collaboratively (Nm) and four authored individually (Ns). In 2021, the collaboration rate declined slightly to 80%, with 21 articles in total, including 17 collaborative and four individual works. By 2022, the collaboration rate in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* was 75%, comprising 15 collaborative articles and five authored individually.

The data above indicate that, out of 98 articles published in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018 to 2022, 72 were produced through collaborative research (Nm) and 26 by individual authors (Ns). Using the Subramanyam method, the level of author collaboration (C) during this period was calculated at 0.73 (73%). This value, greater than 0.5 but less than 1 ($0.5 < C < 1$), indicates that collaborative articles outnumber individually authored articles. Such a high level of collaboration contributes to research that is more comprehensive, credible, and impactful. The significant collaboration among authors also reflects the journal's rapid development.

Chart 2

Collaboration Level of Khizanah al-Hikmah Authors: Journal of Library, Information and Archival Science 2018-2022



The diagram above shows that author collaboration in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* steadily increased from 2018 to 2022. The peak collaboration rate was 83% in 2020, while the lowest was 56% in 2018, based on 98 articles. The level of author collaboration in a journal can serve as a benchmark for evaluating academic careers and making research funding decisions. In many scholarly fields, collaboration is regarded as a key factor for successful scientific publications. Universities, research institutions, and funding agencies often view author collaboration as an important indicator of research quality and productivity.

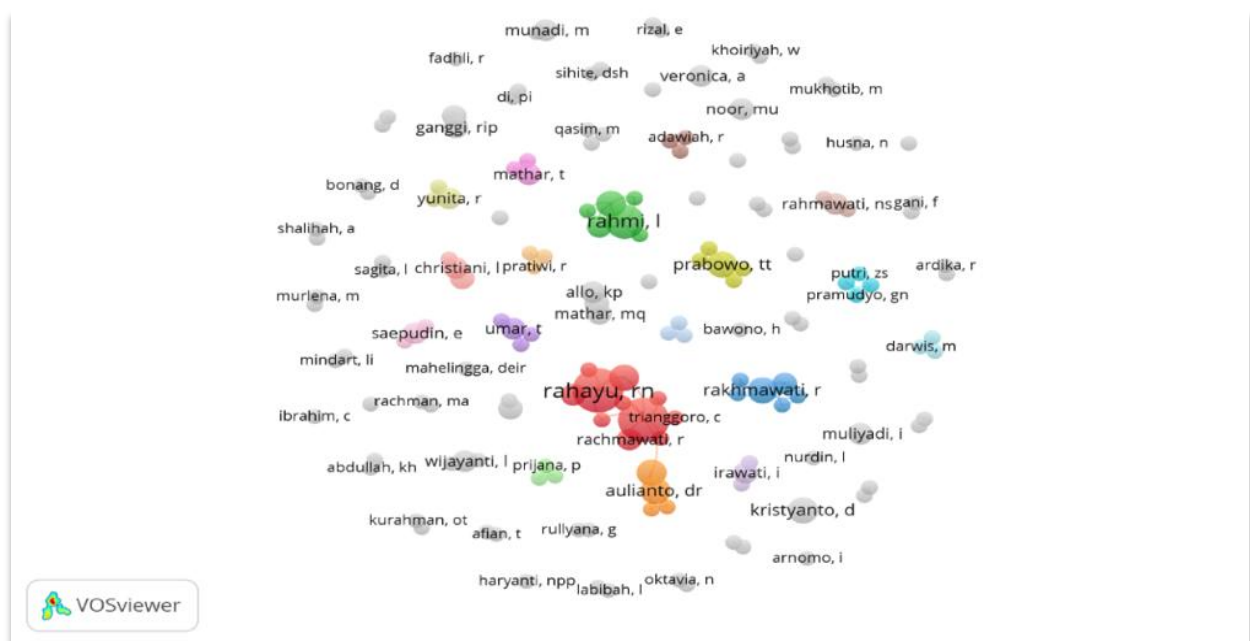
3.3. Most Collaborating Authors in *Khizanah al-Hikmah: Al-Hikmah Journal of Library, Information and Archival Science* 2018-2022

An author is an individual who creates written works, such as books, articles, reports, or literary pieces like poems, short stories, or novels. In this study, the author refers to someone who participated in the production of a scientific article through collaborative research published in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018 to 2022.

The authors who most frequently collaborate on a scientific paper include not only the lead author but also the entire team that contributed to the research. The Number of authors who most often engaged in collaborative research in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* during 2018–2022 is illustrated in the following figure:

Figure 1

Network Visualization Author on *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* 2018-2022

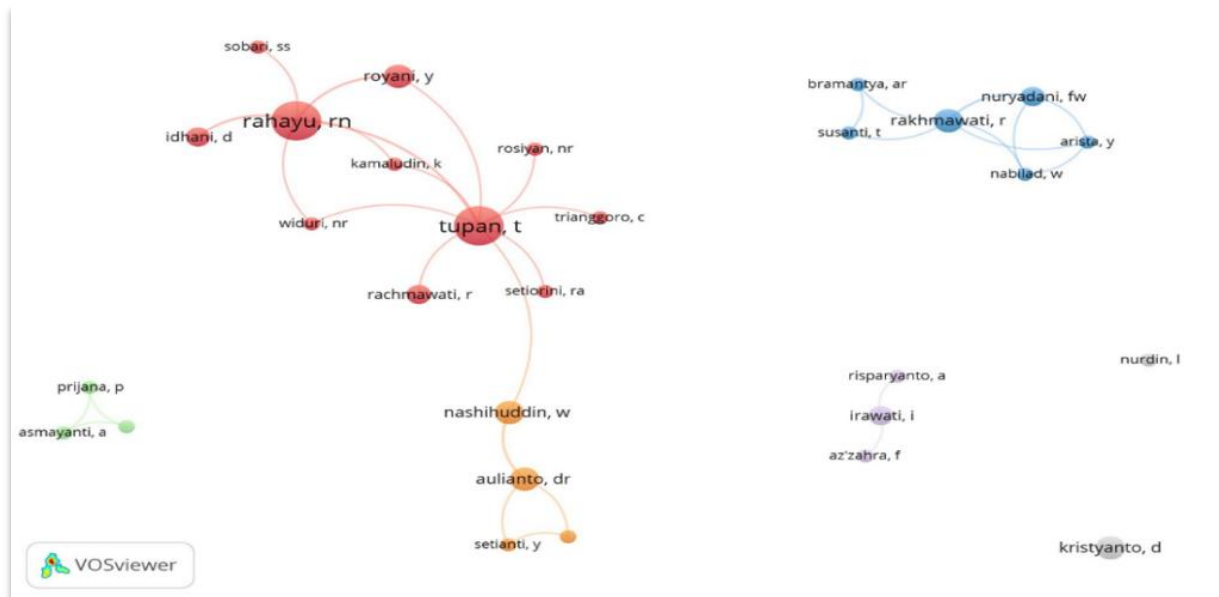


The image above indicates that articles in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* are predominantly authored collaboratively. The author network comprises 71 clusters with a total link strength of 128. The most prominent clusters are those of Tupan and Rahayu, which are highlighted in red to indicate their significance. In the visualization, the color intensity corresponds to the level of collaboration: the brighter the color, the higher the author's collaboration, while a faded color indicates lower collaboration.

In detail, the following list presents the authors who collaborated most frequently in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018 to 2022, based on the most prominent clusters:

Figure 2

Cluster 1 Most Collaborating Authors in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science*

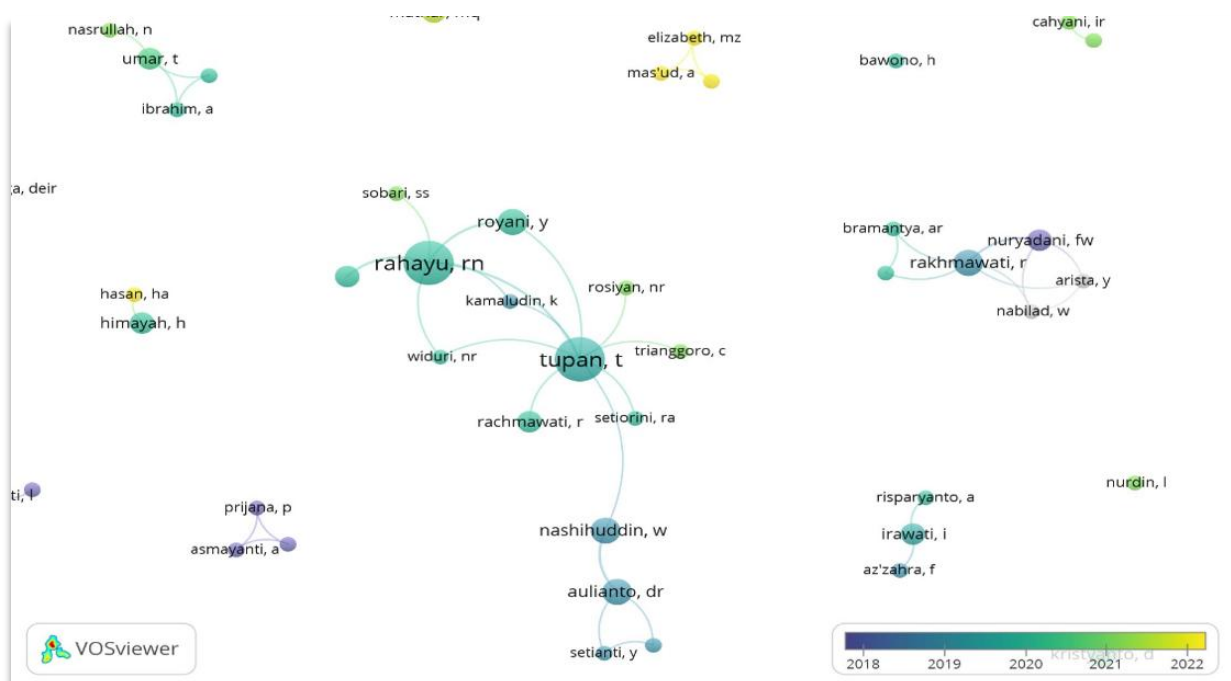


The image above illustrates that Tupan is the author who collaborated most frequently in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018 to 2022. Tupan serves as the central figure in cluster 1, with 10 network links and eight articles. Following Tupan is Rochani Nani Rahayu, who established six collaborative networks and authored five articles. These findings indicate that Tupan has a relatively extensive research collaboration network compared to other authors in the journal during this period.

The overlay visualization of the author network further depicts the development of these collaborative connections, as shown in the following image.

Figure 3

Overlay Visualization of the Author on *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* in 2018-2022



The image above illustrates that the earliest author cluster, the Nuryadani cluster, emerged in 2018 and contributed to scientific advancement through collaborative research. In 2019, the Rakhmawati cluster was formed, followed by the Tupan and Rochani Nani Rahayu clusters in 2020. Subsequent clusters include the Nurdin cluster in 2021 and the Mas'ud cluster in 2022.

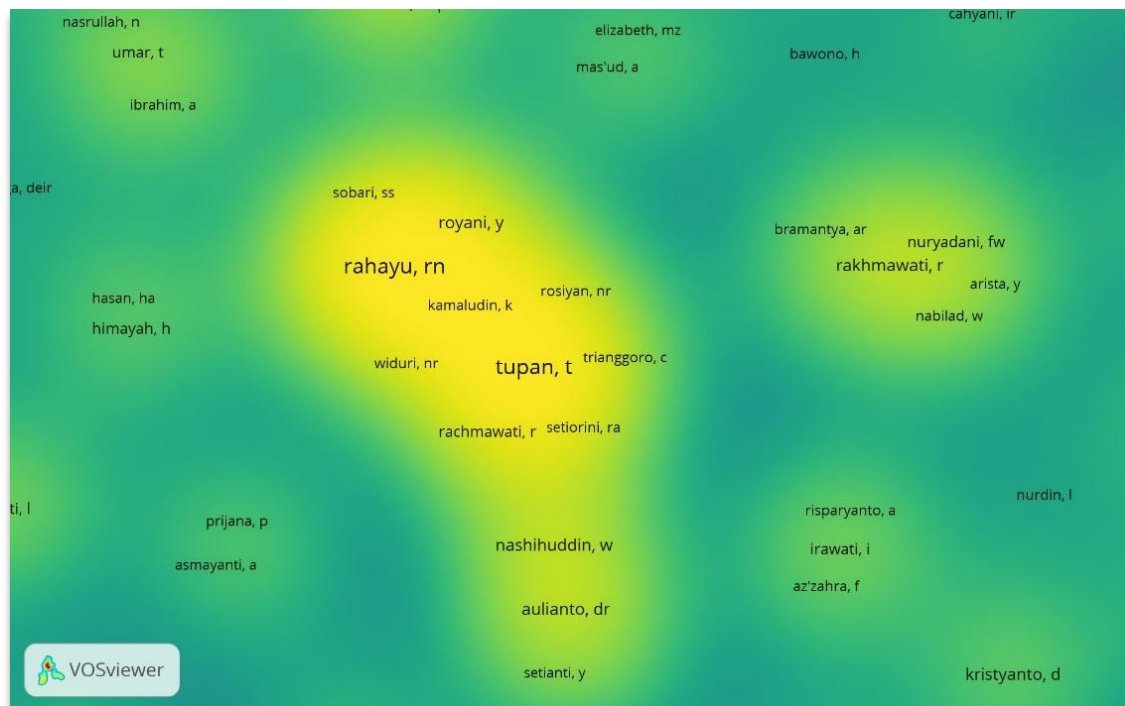
This visualization demonstrates that authors in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* consistently formed collaborative networks each year from 2018 to 2022, indicating a robust development of the author network during this period.

Network density refers to the proportion of all possible connections in a network that actually exist. In social network analysis, it measures how frequently interactions or relationships occur among individuals. In this context, network density represents the level of collaboration among authors and their colleagues in research activities.

A high level of author network density in a journal reflects authors' strong commitment to expanding their knowledge and perspectives, thereby enhancing the quality of the research produced. The author network density in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018 to 2022 is shown in the following image:

Figure 4

Network Density Author on *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* in 2018-2016



The image above shows that Tupan is the most frequently published author in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018 to 2022. Authors who are nearly equivalent to Tupan in terms of networking and collaborative research include Rochani, Nani Rahayu, and Rakhmawati, who have similar network densities but belong to different clusters. Other authors, except Nurdin and Bawono, shown in the image, share the same collaboration network and density level.

For further details, the results processed using the VOSviewer application are also presented in a table listing the top 25 collaborating authors, as follows:

Table 3

Top 25 Authors of Collaboration in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* in 2018-2022

No	Writer	Nm
1.	Tupan (PDII-LIPI)	8
2.	Rochani Nani Rahayu (PDII-LIPI)	4
3.	Wahid Nashihuddin (PDII-LIPI)	3
4.	Yupi Royani (PDII-LIPI)	3
5.	Thoriq Tri Prabowo (UIN Sunan Kalijaga Yogyakarta)	3
6.	Rina Rakhmawati (Universitas Gadjadara)	2
7.	Muhammad Usman Noor (Universitas Indonesia)	2
8.	Dwi Ridho Aulianto (PDII-LIPI)	2
9.	Karmila Pare Allo (UIN Alauddin Makassar)	2
10.	Dian Hasfera (UIN Imam Bonjol)	2
11.	Ayu Trysnawati (UIN Alauddin Makassar)	2
12.	Touku Umar (UIN Alauddin Makassar)	2
13.	Muh. Quraissy Mathar (UIN Alauddin Makassar)	2
14.	Rulina Rachmawati (LIPI)	2
15.	Luki Wijayanti (Universitas Indonesia)	2
16.	Lailatur Rahmi (UIN Imam Bonjol)	2
17.	Encang Saepudin (Universitas Padjadjaran)	2
18.	Lydia Christiani (Universitas Diponegoro)	2
19.	Andri Yanto (Universitas Padjadjaran)	2
20.	Fadhila Nurul Husna Zalmi (UIN Imam Bonjol)	2
21.	Irvan Mulyadi (UIN Alauddin Makassar)	2
22.	Dian Kristyanto (Universitas Kusuma Surabaya)	2
23.	Sukirno (Universitas Gadjadara)	1
24.	Himayah (UIN Alauddin Makassar)	1
25.	Gani Nur Pramudyo (Universitas Brawijaya)	1

The total Number of authors involved in both collaborative and individual research is 183. Among them, Tupan stands out as the most frequent collaborator, having published eight articles in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* from 2018 to 2022. This indicates that Tupan has established the most extensive network with other authors in the research community.

3.4. The Most Collaborating Institutions in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* in 2018-2022

Khizanah al-Hikmah: Journal of Library, Information and Archival Science demonstrates a relatively high level of author collaboration across the 98 articles published over five years (2018–2022). According to the study results, 70% of these collaborations involved authors from multiple institutions.

An institution is an organized forum or workplace where authors or researchers collaborate in a structured, guided manner, using available resources to achieve specific goals. Identifying the institutions that collaborate most frequently is important for supporting scientific development within those organizations.

Based on the data analysis of *Khizanah al-Hikmah: Journal of Library, Information and Archival Science*, the following section describes the Number and percentage of institutions that engaged in the most frequent collaborations from 2018 to 2022:

Table 4

Number and Percentage of Institutions Most Often Collaborating in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* 2018-2022

No	Name of Collaborating Institution	Nm	Percentage
1.	Universitas Indonesia	8	11,1%
2.	PDII-LIPI	7	9,7%
3.	Universitas Padjajaran	7	9,7%
4.	UIN Alauddin Makassar	7	9,7%
5.	UIN Sunan Kalijaga Yogyakarta	5	6,9%
6.	Universitas Diponegoro	3	4,2%
7.	LIPI	3	4,2%
8.	UIN Imam Bonjol	3	4,2%
9.	Universitas Brawijaya	3	4,2%
10.	Perpustakaan Puslitbangtek Migas "LEMIGAS"	1	1,4%
11.	Universiti Teknologi MARA, Malaysia	1	1,4%
12.	Universitas Persada Indonesia	1	1,4%
13.	IAIN Curup	1	1,4%
14.	Universitas Mataram	1	1,4%
15.	IAIN Salatiga	1	1,4%
16.	Universitas Pembangunan Nasional	1	1,4%
17.	IAIN Surakarta	1	1,4%
18.	Universitas Terbuka	1	1,4%
19.	Armanesia	1	1,4%
20.	UIN Walisongo Semarang	1	1,4%
21.	Universitas Muhammadiyah Makassar	1	1,4%
22.	Universitas Muhammadiyah Sidoarjo	1	1,4%

23.	Universitas Ahmad Dahlan	1	1,4%
24.	Universitas Pat Petulai Rejang Lebong	1	1,4%
25.	Universitas Airlangga	1	1,4%
26.	Universitas Pendidikan Indonesia	1	1,4%
27.	IAIN Tulungagung	1	1,4%
28.	Universitas PGRI Yogyakarta	1	1,4%
29.	Universitas Bina Nusantara	1	1,4%
30.	Universitas Sains Islam Malaysia	1	1,4%
31.	Universitas Halu Oleo Kendari	1	1,4%
32.	Universitas Negeri Makassar	1	1,4%
33.	UIN Sunan Gunung Djati Bandung	1	1,4%
34.	Pusat Manajemen Informasi	1	1,4%
35.	Universitas Majalengka	1	1,4%
Total		72	100,0%

The Table above shows that 35 institutions contributed to collaborative research in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science*, excluding those that produced works individually.

The study results indicate that the University of Indonesia is the institution that most frequently participated in collaborative research, with eight collaborations, representing 11.1% of the 35 collaborating institutions in the journal from 2018 to 2022. Compared to other institutions, the University of Indonesia has made the most significant contribution to scientific development in *Khizanah al-Hikmah: Journal of Library, Information and Archival Science*. It also maintains an extensive network with other institutions across various disciplines, which enriches resources such as funding, technology, infrastructure, knowledge, and expertise.

4. Conclusion

From 2018 to 2022, *Khizanah al-Hikmah: Journal of Library, Information and Archival Science* published 98 articles, of which 72 were produced through collaborative research (Nm), and 26 were authored individually (Ns). Using Subramanyam's formula, the level of author collaboration (C) was calculated at 0.73, or 73%. A C value greater than 0.5 but less than 1 ($0.5 < C < 1$) indicates that the articles in the journal during this period were predominantly collaborative. A high level of collaboration provides authors and the journal with valuable feedback and diverse perspectives, as well as opportunities to share knowledge and resources, resulting in more comprehensive, credible, and impactful research. This strong collaboration also reflects the journal's rapid development. Among the 183 authors who contributed both collaboratively and individually, Tupan is the most frequent collaborator, having published eight articles between 2018 and 2022. This highlights Tupan's significant contribution to scientific development in the journal. The University of Indonesia is the institution that most frequently engages in collaborative research, with eight collaborations, representing 11.1% of the 35 institutions involved in *Khizanah al-Hikmah* during 2018–2022.

The level of collaboration varies across disciplines, with higher rates in the sciences and technology than in the humanities. The extent to which authors collaborate within a discipline contributes valuable intellectual resources to that field. This study aims to provide data on collaboration within library science disciplines to support future research.

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