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Bibliometric Analysis of the Radio Da'wah Research

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Keywords

Bibliometrics, Vosviewer, radio, preaching, information

Abstract

This research aims to understand the research trends in radio da'wah, identify relationships between scientific concepts, and determine the radio da'wah science network based on keywords and author collaboration. The method used in this research is descriptive bibliometric analysis, and the data used was taken from 2013-2023. Data was collected from the Scopus and Google Scholar databases with the keyword da'wah radio. Data collection was carried out using Publish or Perish software as metadata. Data analysis was carried out using Vosviewer software as a bibliometric analysis medium. The research results show that da'wah radio publications experience fluctuating development, with Scopus publications being very low. Meanwhile, publications in nationally accredited journals and national journals have increased significantly. From the visualization Vosviewer, it can be seen that Islamic institutions or universities dominate research on radio da'wah.

Kata kunci

Bibliometrik, Vosviewer; radio, dakwah, informasi

Abstrak

Penelitian ini bertujuan untuk mengetahui arah tren penelitian radio dakwah, mengidentifikasi adanya hubungan antar konsep keilmuan, serta mengetahui jaringan ilmu radio dakwah berdasarkan kata kunci serta kolaborasi penulis. Metode yang digunakan pada penelitian ini adalah analisis bibliometrik deskriptif, data yang digunakan diambil dalam rentang tahun 2013-2023. Pengumpulan data dilakukan berdasarkan database Scopus dan Google Scholar dengan kata kunci radio dakwah. Pengumpulan data dilakukan menggunakan software Publish or Perish sebagai metadata. Analisis data dilakukan menggunakan software Vosviewer sebagai media analisis bibliometrik. Hasil penelitian menunjukkan bahwa publikasi radio dakwah mengalami perkembangan fluktuatif, pada publikasi Scopus sangat rendah. Sedangkan publikasi pada jurnal terakreditasi nasional dan jurnal nasional mengalami peningkatan yang signifikan. Dari visualisasi Vosviewer lembaga atau perguruan tinggi Islam dominan dalam penelitian radio dakwah.

Introduction

The media ecosystem has altered due to the swift advancement of information technology (Amar et al., 2019). The interaction between radio and its listeners has changed due to technological advancements. Radio broadcasts can be listened to online

using interactive multimedia (Tarmawan et al., 2021). Radio must modify its communication technologies usage to accommodate media convergence (Ahmad, 2017; Astuti & Harliantara, 2021). Radio is a mass media platform that injects messages into the audience (S Kholil, 2021).

Meanwhile, comfortable listeners can form loyalty. The more comfortable they are, the stronger their loyalty (Vincent, 2021). While radio is a blind medium, it stimulates a variety of sounds and helps listeners imagine the announcer's voice or factual information through their ears. For this reason, radio has the most significant potential as a medium for imagination (Ali, 2019). Radio has become a personal medium for consumers (Innayah, 2017). Because radio is at the forefront of delivering accurate and truthful information, it has endured despite the assault of new media. Additionally, radio disseminates information devoid of falsehoods, which are frequently seen in new media. Direct communication with sources is typically done through live broadcasts or recordings in the radio news process.

Furthermore, technological developments have changed the relationship between radio and listeners (Ismandianto et al., 2022; Lathifah, 2021) The stages of media development are then grouped into the principles of metamorphosis, namely the principles of coevolution, convergence, and complexity. The positive side of the presence of technology is that we can get various information about developments in various sectors, including religion, education, economics, social culture, and politics (Sikumbang, 2024). The ability of a radio program to maintain its existence can be achieved because of the human resources that manage it (Rahayu & Dewi Katili, 2019).

There are some barriers of transforming conventional radio to digital radio. First, radio organizations cannot adapt to developments in the digital era in a technology-based era, both internal and external changes. Second, obstacles to digital transformation are security issues and cyber attacks. Third, there needs to be a workforce with digital skills. Fourth, the right technology partners are absent, and there is an uncertain economic environment. Fifth, government policies and supporting information and communication technology infrastructure are lacking. It is significant as a technology that can enable increased performance and more efficient spectrum use (Neel et al., 2004).

Then, various studies related to radio include radio da'wah to convey messages by communicators to communicants through the media as an intermediary tool for da'wah (Efendi, 2021). The practice of da'wah, or sharing religious teachings with others sensibly and appropriately, aims to develop communities and individuals that value and uphold religious principles in all facets of life. Da'wah operations are made feasible by the availability of communication activities, and preaching is a means of carrying out communication chores (Sikumbang & Siahaan, 2020). The role of da'wah media is vital, especially when determining a da'wah strategy based on the principles of effectiveness and efficiency (Nasution, 2012).

Religious organizations always have a large part in religious da'wah contests, which intrigues the growth of radio da'wah study. Noble character and the ability to

serve as an example for listeners or society are prerequisites for da'wah. Radio is a potent tool for da'wah since, in addition to entertaining, it can educate and raise awareness (Sunarwoto, 2021). Information about Islam and its interpretation could be disseminated via radio.

This research aims to identify publications regarding preaching radio and describe the characteristics of the research. Bibliometric analysis was used in this research to explore the characteristics of radio da'wah research publications and to understand the research trend in da'wah. Researchers can increase the quality of their research by using bibliometric analysis to provide research data effectively (van Eck & Waltman, 2014; Zahra et al., 2021; Zakiyyah et al., 2022). The mapping obtained by Vosviewer can later be used as a reference in conducting accurate content analysis based on the name of the researcher, year of publication, researcher productivity, and research trends in da'wah radio. In this research, bibliometric analysis was carried out to analyze author collaboration in research in da'wah radio science and bibliometric relationships based on keywords.

Interestingly, until now, there has been no bibliometric research regarding the development of Da'wah radio research. Therefore, this research tries to visualize the results of radio da'wah research on a bibliometric map of publications in the Google Scholar and Scopus databases using Vosviewer software. This research can provide valuable data for future researchers to understand research trends and discover new research for researchers in the radio field.

Research Method

Descriptive bibliometric analysis with publication data is the methodology employed in this study (van Eck & Waltman, 2010). A deep publication search was utilized to get data. The previous ten years (2013–2023) in radio research about da'wah radio. The bibliometric analysis results are presented by deductively combining keywords so that readers can follow the information from broad to more specialized information (Karakus et al., 2019).

The researchers took four steps in the bibliometric analysis procedure. First, conduct keyword research or identify the preaching radio keywords. The second step involves reducing the initial search volume by classifying or grouping searches only to include da'wah radio keywords selected based on topic descriptions and data needs using the Vosviewer program. Third, visualization Vosviewer has the potential to be developed and offers data representation in the form of a map of variables associated with keywords.

Fourth, the data is acquired and saved as a Research Information Systems Citation file to visualize network patterns or relationships between bibliometrics. The file is then imported into the Vosviewer software and categorized into three categories: network visualization, overlay visualization, and density visualization.

Results and Discussion

Radio is one of the most user-friendly and privacy-respecting electronic media. (Sun et al., 2020) Content broadcast terrestrially is consumed by people all over the world. It provides information through audio signals in the form of broadcasting. Broadcast media as a form of mass media has different characteristics and characteristics from other mass media, including radio.

Radio communication studies generally discuss two main things. First, they examine the role of radio on the broader community and its institutions. This view describes the relationship between the media and various other institutions, such as political, economic, educational, religious institutions, and so on. Theories relating to this matter attempt to explain the position or the position of radio in society and its mutual occurrence influence between various societal structures and the media. Second, Mass communication studies examine the relationship between the media and their audiences, both as a group and individually. Theories regarding the relationship between media audiences mainly emphasize individual and group effects due to interactions with the media. (Morissan, 2015).

The growth of publications on radio topics, especially da'wah radio in the 2013–2023 period, taken from the Google Scholar database via the Publish or Perish software, shows fluctuating developments. Of the total publications indexed by Google Scholar, there are 322 documents. Meanwhile, from the data dimensions, there are 151 research studies on radio da'wah, with a graph of the development of radio da'wah research, which can be seen in Figure 1.

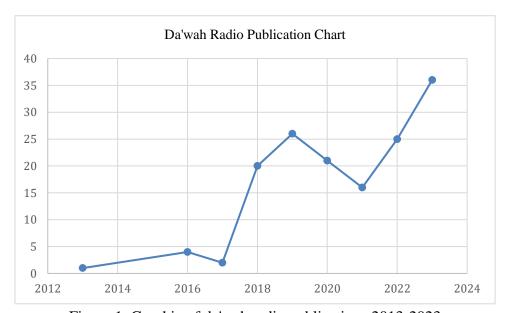


Figure 1. Graphic of da'wah radio publications 2013-2023

From Figure 1, there was a significant increase. This means that radio da'wah attracts researchers to conduct research. In da'wah, radio is a very important field of science in informing the public of da'wah messages. The highest growth in da'wah

radio publications occurred in 2023, reaching 36 publications (24%); in 2022, there were 25 publications (17%); in 2021, 16 publications (115); in 2020, 21 publications (14%), in 2019 26 publications (17%), in 2018 20 publications (13%), in 20116 4 publications (3%). Meanwhile, the lowest number of publications occurred in 2013 and 2017, with several publications (at 2%).

The results show that research on da'wah radio is significant, with the percentage value increasing yearly. This situation indicates that there is progress in the field of da'wah in science. This situation is due to several factors, two of which are the most prominent. First, scientific research is becoming more data-driven and dealing with large amounts of complex data, posing challenges for researchers in analysis, storage, and many other areas. Second, there is a new policy where funding agencies require researchers to organize and preserve research data and large publishers to prepare research containing their data and results so that the public can access them to increase transparency in research and reproducibility.

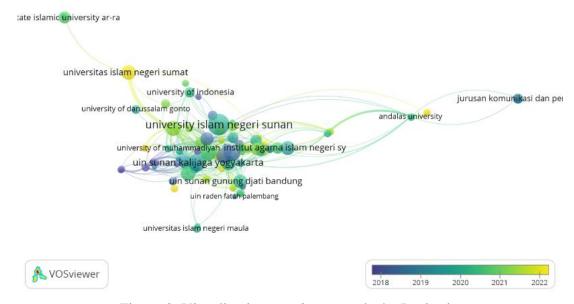


Figure 2. Visualization *overlay* towards the Institution

Figure 2 above shows several colors, from blue and green to yellow, where yellow shows the latest publications. Universitas Islam Negeri Sumatera Utara (State Islamic University of North Sumatera), Universitas Islam Negeri Syarif Hidayatullah Jakarta (Syarif Hidayatullah State the Islamic University of Jakarta), Universitas Islam Negeri Sultan Syarif Kasim Riau (The State Islamic University of Sultan Syarif Kasim of Riau), Universitas Islam Negeri Sunan Gunung Djati Bandung (State Islamic University of Sunan Gunung Djati Bandung), Universitas Islam Negeri Raden Intan Lampung (Raden Intan State Islamic University of Lampung) are universities with the latest publications and play a role in research on da'wah radio. From the visualization, it can be seen that university institutions with Islamic nuances are dominant in research on radio da'wah.

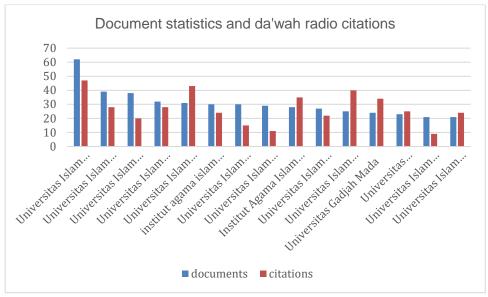


Figure 3. Statistics of documents and radio citations for da'wah

Figure 3 shows Universitas Islam Negeri Sunan Ampel Surabaya (Sunan Ampel State Islamic University Surabaya) number of documents (62) and citations (47), Universitas Islam Negeri Sunan Kalijaga Yogyakarta (Sunan Kalijaga State Islamic University Yogyakarta) documents (39) and citations (28), Universitas Islam Negeri Syarif Hidayatullah Jakarta (Syarif Hidayatullah State Islamic University of Jakarta) documents (38) and citations (20), Universitas Islam Negeri Syarif Hidayatullah (State Islamic University Syarif Hidayatullah) documents (32) and citations (28), Universitas Islam Negeri Wali Songo (Wali Songo State Islamic University) documents (31) and citations (43), Institut Agama Islam Negeri Surakarta (State Islamic Institute Of Surakarta) documents (30) and citations (24), Universitas Islam Negeri Sultan Syarif Kasim Riau (State Islamic University of Sultan Syarif Kasim of Riau), documents (30) and citations (15), Universitas Islam Negeri Sumatera Utara (State Islamic University of North Sumatera) documents (29) and citations (11), Institut Agama Islam Negeri Syekh Nurjati Cirebon (State Islamic Institute of Syekh Nurjati Cirebon) documents (28) and citations (35), Universitas Islam Negeri Sunan Gunung Djati Bandung (State Islamic University of Sunan Gunung Djati Bandung) documents (27) and citations (22), Universitas Islam Negeri Sayyid Ali Rahmatullah Tulungagung (Sayyid Ali Rahmatullah State Islamic University Tulungagung) documents (25) and citations (40), Universitas Gadjah Mada (Gadjah Mada University) documents (24) and citations (34), Universitas Muhammadiyah Yogyakarta (Yogyakarta Muhammadiyah University) documents (23) and citations (25), Universitas Islam Negeri Ar-Raniry (State Islamic University of AR - Raniry) documents (21) and citations (9), and Universitas Islam Negeri Mataram (Mataram State Islamic University) documents (21) and citations (24).

Citation is essential in writing scientific work, with the author's citation showing the reader that there is writing in our scientific work that originates from other people's scientific work. By citing, we respect other people's scientific work and avoid plagiarism. Citation provides information to readers about the author of the cited scientific work, the title of the cited scientific work, the name and location of publication, the date and year of publication, and the page of the cited scientific work.

Citation is taking one or more sentences from another written work to illustrate or strengthen the argument in one's writing. Citation is essential in writing scientific work, with the author's citation showing the reader that there is writing in our scientific work that originates from other people's scientific work. By citing, we respect other people's scientific work and avoid plagiarism. Citation provides information to readers about the author of the cited scientific work, the title of the cited scientific work, the name and location of publication, the date and year of publication, and the page of the cited scientific work. Apart from appreciating other people's scientific work, citations also have the following aims: (1) To convey to the reader where the sentences, ideas, and facts contained in the scientific work come from; (2) Not all references are by the desired research idea, it could be that the research carried out is a better idea, by conducting citations it provides a comparison of the research ideas outlined with research ideas that have been carried out previously; (3) Carrying out citations can help strengthen the ideas of the research being carried out and (4) Citations provide an overview of the quality of the scientific work we produce, relevant and up-to-date sources show the quality and ideas of the research.

The development of research into da'wah radio is a form of communication that focuses specifically on efforts to convey Islamic messages. Da'wah also needs to develop new strategies and methods to anticipate changes in existing communication patterns because developments in automatic communication technology also change communication patterns. The da'wah method carried out via radio needs to be adapted to the characteristics of existing mass media so that it can adapt to the communication patterns of audiences from mass media about developments in media technology (Wulandari & Yusuf, 2022).

Next, visualize the article data regarding authors, citations, and documents. The first visualization is co-authorship, which aims to find out the number of author notes in writing da'wah radio articles, where each author has several article documents, as in Figure 3 below:

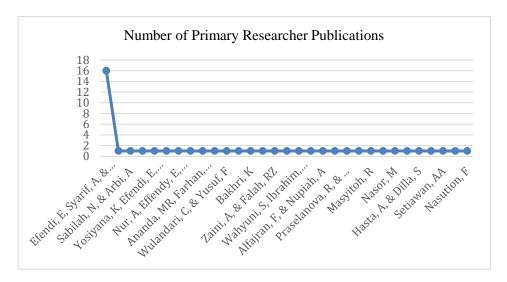


Figure 4. Number of Publications by Principal Researchers of Da'wah Radio

Based on Figure 4 shows that the top document of author articles related to da'wah radio is the author Anugrah, I, Sara., Sabilah, N., Nasution, Yosiyana, K., Alfiansyah, A., Nur, A., Harahap., Ananda, MR., Hilmi, M., Wulandari., Faidah, U., Bakhri, K., Talalu, TR., Zaini, A., Syafii, I., Wahyuni, S., Achmad, ZA., Alfajran, F., Avisena, A., Rozin, MS., Masyitoh, R., Burhani, AR., Nasor, M., Surianor, S., Hasta, A., Zaini, A., Setiawan, AA., Surianor, S., Nasution, F. Each (1). Then followed by another writer, Erwan Efendi, with the most (16). Erwan Efendi is a Universitas Islam Negeri Sumatera Utara lecturer and an expert in Islamic Education Management.

The ability of lecturers to publish scientific papers shows the role of lecturers in developing knowledge in specific fields of science nationally and internationally. A lecturer's publication ability is essential for students to summarize the development of their intellectual abilities in a scientific paper (Firmansyah, 2022). The publication of quality research results can continuously improve the quality of teaching materials and can be applied in community service. The low level of research publications by lecturers in an educational institution can hinder the achievement of the tri dharma of education both individually and as an educational institution. Here is the graphic in picture 18, the number of publications based on journal publications on research on vulnerable radio da'wah during 2013-2023 based on Google Scholar data.

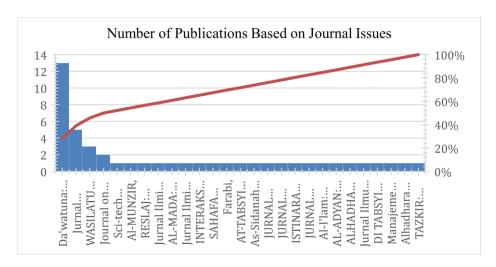


Figure 5. Publications based on journal publications on da'wah radio research

Based on the graph above, it explains that the most publications were in the Da'watuna: Jurnal Komunikasi dan Penyiaran Islam (13) Jurnal Pendidikan dan Konseling (5), Journal Wasilatuna: Jurnal Komunikasi dan Penyiaran Islam (3) and Jurnal Sci-tech Journal (STJ), Al-MUNZIR, Jurnal on Education, RESLAJ: Jurnal Sosial Pendidikan Agama Laa Roiba, Jurnal Ilmiah Wahana Pendidikan, Al-Mada: Jurnal Agama, Sosial, dan Budaya, Journal On Education, Jurnal Ilmiah Wahana, Interaksi Peradaban, Sahafa Journal of Islamic Communication, Farabi, At-Tabsyir: Jurnal Komunikasi, As-Sidanah: Jurnal Pengabdian Masyarakat, Jurnal Insypro, Jurnal Komunikasi Islam, Istinarah: Riset Keagamaan, Sosial dan Budaya, Jurnal Darussalam: Jurnal Pendidikan, Komunikasi dan Pemikiran Hukum Islam, Al-I'lam: Jurnal Komunikasi dan Penyiaran Islam, Al-Adyan: Jurnal Studi Lintas Agama, Alhadharah: Jurnal Ilmu Dakwah, Jurnal Ilmu Komunikasi Uho, Di Tabsyir Jurnal Komunikasi dan Penyuaran Islam, Manajemen Bisnis, Alhadharah: Jurnal Ilmu Dakwah, Tazkir: Jurnal Penelitian Ilmu-Ilmu Sosial dan Keislaman, each (1) publication.

Journal accreditation has been regulated by the rules of the Ministry of Research and Technology of the Republic of Indonesia, Number 9 of 2018 concerning Accreditation of Scientific Journals. Sinta has six categories to emphasize how good the quality of a successful journal is recorded, consisting of S1, S2, S3, S4, S5, and S6. Sinta 1 (S1) accreditation is the highest level in the Sinta journal accreditation category; the higher the level of the Sinta journal, the better the quality of the journal it has (Kementerian Riset Teknologi dan Pendidikan Tinggi, 2018).

Then, in research on radio da'wah published on Scopus, namely five studies (Abdelfattah, 2021; Achmad et al., 2021; Humaizi, 2018; Masduki et al., 2022; Nawawi et al., 2023; Shah et al., 2020; Sunarwoto, 2016). Most of these authors are affiliated with several institutions that have published communications and radio technology research.

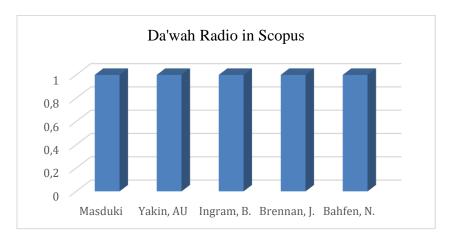


Figure 6. Da'wah Radio Authors in Scopus

Scopus-indexed publications only have five documents. The growth of da'wah radio publications is relatively low. publications in 2020, 2018, 2015, and 2011, each 1 publication. This explains the low development of publications in Scopus, but research publications in Indonesia are still a topic of interest and continue to grow from year to year.

Scopus is an indexation international journal. Scopus is included in the category of international journals with high reputation and impact. For this indexation, Scopus assesses journals using a journal quality clustering system known as Quartile (Q). SCImago Journal & Country Rank is a portal that analyzes and assesses the scientific domain, which includes journals and scientific indicators for countries in the world that were developed from information contained in the Scopus® database. Furthermore, the authors Masduki, Lövheim, M., Yakin, AU, Ingram, B., Brennan, J., Bahfen, N.

Research in the field of da'wah radio by country, from 5 publications in Indonesia (2), England (1), United States (1) and New Zealand (1). This means that Indonesia has the most publications, even though judging from the volume, the number of publications on Scopus could be much higher. This is different from publications in national journals where publications are increasing or high.



Figure 7. Quartile Scopus Radio da'wah

Writing scientific publications, especially those indexed by Scopus, has many benefits, including the following: (1) Track record as an academic; apart from being the primary evidence of research originality, scientific publications can be used as capital for your research track record as an academic. (2) Increasing the reputation and existence of research. The more scientific journals are cited, the better the reputation of the researchers. This is especially important for researchers who work as lecturers. (3) Contribute to the development of science. It is hoped that publishing in scientific journals can increase the development of science in specific scientific fields. (4) Proving competence and portfolio Apart from being valuable as a track record of competence, scientific publications can be used as a portfolio if you want to apply for a scholarship or continue your studies to a higher level. Figure 7 shows Scopus Quartile 1 publications (3), Quartile Q3 (1), and Quartile Q4 (1).

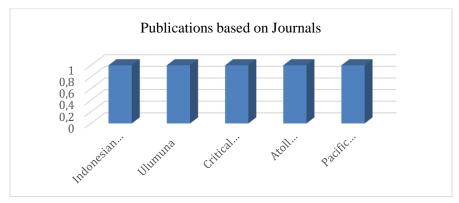


Figure 8. Publications in the Scopus journal

Figure 8 shows the publication of the da'wah radio journal, *Indonesian Journal of Islam and Muslim Societies, Contesting Religion: The Media Dynamics of Cultural Conflicts in Scandinavia, Ulumuna, Critical Research on Religion, New Media and Religious Transformations in Africa,* and *Pacific Journalism Review.* A total of 2 journals were published in the Indonesian journal.

The development of scientific journals with an open system (open access) in Indonesia is relatively rapid, especially since the implementation of government regulations, in this case, the Directorate General of Higher Education, which requires undergraduate, postgraduate, and doctoral students to write articles in scientific journals as one of the prerequisites for graduation. Apart from that, publishers' awareness regarding the low number of citations of scientific journal articles in Indonesia has contributed to the increasing interest of publishers in publishing their scientific articles electronically. Most of the applications used in Indonesia's electronic open scientific journal publishing system use the Open Journal System (OJS) developed by the Public Knowledge Project. One of the advantages of OJS is that it has interoperability facilities, which make it easier to harvest data by portals that carry out harvesting so that the visibility and accessibility of journals can be easier and wider, which has an impact

on increasing citations, impact factors, and highlighting research results outlined in journals. (Lukman, Ekawati. Marlina, Keumalasari. Ratih, Siagian. Al Hafidz, 2012)

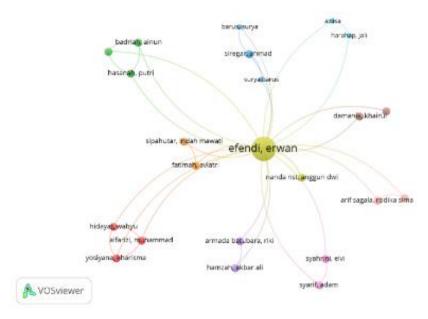


Figure 9. Network visualization in co-authorship

Figure 9 shows a network visualization of co-authorship, marked by nodes (circles) representing authors or researchers. The collection of nodes equipped with edges explains a correlation or relationship between researchers in research in da'wah radio. Bibliometric analysis based on researchers or authors focuses on Efendi Erwan, a lecturer at the North Sumatra State Islamic University, Medan, who is active in conducting research in the field of radio. The network shows the author's relationship or collaboration with other authors.

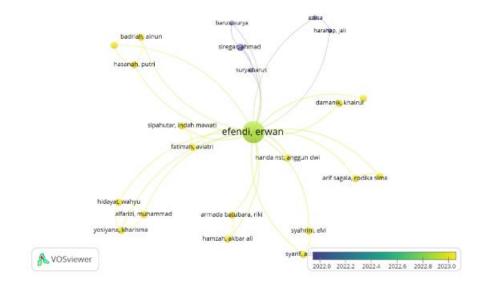


Figure 10. Overlay visualization of co-authorship

Authors of da'wah radio research are characterized by nodes with varying colors and edges connecting one researcher to another. The yellow node color indicates research that has been carried out or is the latest (2022-2023). The darkest node color represents previous research.

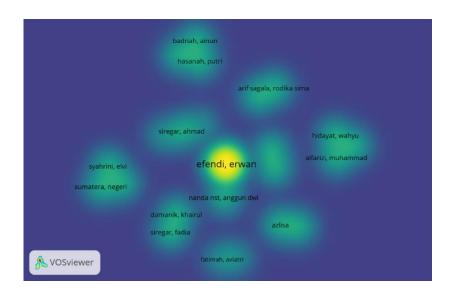


Figure 11. Visualization of density in co-authorship

It is clear from the density visualization results in Figure 11 that there is a density or emphasis on nodes, indicating a relationship between the research groups studying da'wah radio. Furthermore, the number of publications referring to the author in other research indicates the degree of node saturation in density visualization. In order to collaborate, the author did research by referring to many studies beside it. Using this mapping, one can obtain a comprehensive image of a bibliometric network's structure. (van Eck & Waltman, 2014). Perspectives regarding the future of journalism state that society needs journalism (Wahl-Jorgensen, 2016). The importance of journalism can be seen in its role as an informant, interpreter, and driver for sustainable development. (Van Der Haak et al., 2012).

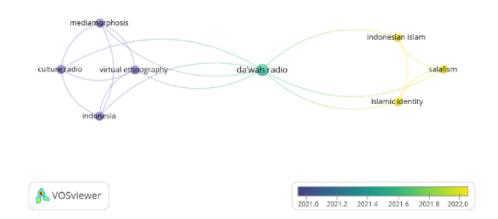


Figure 12. Overlay visualization of co-occurrence

After identifying the mapping and clustering of da'wah radio using network visualization, the next step is to map and cluster information architecture research trends based on historical traces or the year the research was published. With bibliometric analysis on density visualization, which shows the presence of strain and low intensity, research on radio da'wah is relatively increasing. However, the topic of radio research is still vast and needs to be researched. The last published map is density visualization. This section shows areas formed from nodes without any edges connecting the nodes, as in network and overlay visualization. The darkest colors are yellow, green, and blue. If the color in this visualization gets darker, more of the topic appears, and vice versa. The number of keywords marked with a solid yellow color indicates the density level. Meanwhile, the green color indicates that the keyword is widely used or researched, so the opportunities for researching this topic are still vast.

In the image above, the data is displayed with a visualization overlay; there are several colors, such as blue, green, and yellow. The color indicates when the article with the associated author was published. The yellow indicates new articles published in 2022, the latest publications with the keywords Salafism, Islamic identity, and Islamic Indonesia. Based on these keywords, it shows the publication written by Masduki with the title *Islam on the Air: The Struggle for Salafism through Radio in Indonesia* in the Indonesian Journal of Islam and Muslim Societies. Furthermore, the green color indicates the article was published sometime in 2021, and so on. Then, research about *preaching radio* was detected using the words Indonesia, metamorphosis, culture radio, and virtual ethnography. From the visualization of da'wah radio, other variables, such as digitalization and radio content, have yet to appear. This means that there is a gap that can enable writers, readers, and researchers in this field to carry out further research. With bibliometric analysis on density

visualization, which shows the presence of strain and low intensity, research on radio da'wah is relatively tiny. However, the topic of radio research is still vast and needs to be researched.

Conclusion

Based on the results of bibliometric mapping using Vosviewer and network visualization, overlay, and density, it can be concluded that within a decade, the field of radio da'wah science has experienced fluctuating developments in research publications. From a total of 151 publications, the number of publications in Scopus is relatively low (5) research. Meanwhile, 46 publications are indexed by accredited national journals. The highest growth in da'wah radio publications occurred in 2023, reaching 36 publications (24%), while the lowest publications occurred in 2013 and 2017 with the number of publications (2%).

Then, the implications of this research are related to the emphasis on radio aspects in technology and communication. Furthermore, this research still has limitations because it only analyzes published documents regarding da'wah radio in the 2013–2023 database. Therefore, we suggest that further research be carried out with a broader scope to emphasize the need for increased attention to the field of radio, especially in religious countries. Even though there is still little research in the field of da'wah radio indexed by Scopus, the level of national publications in Indonesia has experienced a significant increase.

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