

## Developments and Trends in Indonesian Tourism Technology Using Bibliometric Analysis

Agisti Mutiara Ayulya\*<sup>1</sup>, Syaifullah \*<sup>2</sup>, Muhammad Lutfi Hamzah<sup>3</sup>, Tengku Khairil  
Ahsyar<sup>4</sup>, Eki Saputra<sup>5</sup>

<sup>1,2,3,4,5</sup> Information Systems Study Program, Faculty of Science and Technology, Sultan Syarif  
Kasim State Islamic University, Pekanbaru-Riau, Indonesia.

e - mail: \*<sup>1</sup> 12050322046@students.uin-suska.ac.id, \*<sup>2</sup> syaifullah@uin-suska.ac.id,<sup>3</sup>  
muhammad.luthfi@uin-suska.c.id,<sup>4</sup> tengkukhairil@uin-suska. ac.id,<sup>5</sup>  
eki.saputra@uinsuska.ac.id

### Abstract

*Teknologi informasi telah mengubah masyarakat, layanan, juga sektor pariwisata telah menarik banyak penelitian dan publikasi. Meskipun penelitian terdahulu bertujuan menunjukkan pemahaman faktor teknologi pariwisata, tetapi masih kurang yang membahas faktor teknologi pariwisata Indonesia. Membahas publikasi ilmiah tentang teknologi pariwisata di Indonesia dapat memberikan pemahaman lebih dalam tentang pengembangan teknologi informasi dalam sektor pariwisata Indonesia dengan memberikan solusi. penelitian ini bertujuan menganalisis perkembangan dan tren faktor teknologi pariwisata di Indonesia dari tahun 2014 hingga 2023 dengan analisis bibliometric dari R studio serta menggunakan 113 artikel terindeks scopus. Metodologi meliputi perencanaan, identifikasi kata kunci, pencarian data scopus, bibliometric, perkembangan, dan tren teknologi pariwisata Indonesia. Hasil penelitian ini didapatkan peningkatan publikasi dari tahun ke tahun, pada kutipan pertahun terjadi fluktuasi, Jumlah artikel terpublikasi bervariasi dengan Sustainability (switzerland) menjadi peringkat pertama,, indonesia berkolaborasi dengan Malaysia, United Kingdom, Belgium, Indonesia juga menjadi top keywords serta tren topik, dan pada tren teknologi pariwisata terdapat dua klaster yang berada di dalam tematik basic themes yaitu tourism dan west java yang menjadi arah untuk penelitian selanjutnya.*

**Keywords** — Bibliometric, Pariwisata, Publikasi, Teknologi

### Abstract

*Information technology has changed society, services, and the tourism sector has attracted a lot of research and publications. Even though previous research aims to show an understanding of tourism technology factors, there is still little to discuss the technology factors of Indonesian tourism. Discussing scientific publications about tourism technology in Indonesia can provide a deeper understanding of the development of information technology in the Indonesian tourism sector by providing solutions. This research aims to analyze developments and trends in tourism technology factors in Indonesia from 2014 to 2023 with bibliometric analysis from R Studio and using 113 Scopus indexed articles. The methodology includes planning, keyword identification, Scopus data searches, bibliometrics, developments and trends in Indonesian tourism technology. The results of this research showed an increase in publications from year to year, in annual citations there were fluctuations, the number of published articles varied with Sustainability (Switzerland) being ranked first, Indonesia collaborated with Malaysia, the United Kingdom, Belgium, Indonesia also became the top keywords and trending topic. and in tourism technology trends, there are two clusters within the basic themes, namely tourism and West Java, which are the direction for further research.*

**Keywords**— *Bibliometrics, Tourism, Publications, Technology*

## 1. INTRODUCTION

Information technology and Information and Communication Technology (ICT) have changed society, services, as well as the tourism and hospitality sectors [1][2]. The emergence of the internet in the 1990s was followed by the development of websites, social networks and smartphones [3]. Technology has changed the way visitors think, plan, book and experience their tourism trips [4]. In the tourism industry, technology is now an important part of distribution, competition and marketing [5]. COVID-19 has also accelerated technology adoption recently. On the other hand, information technology is considered essential for restarting the tourism and hospitality industry [3]. It is true that the importance of technology in the tourism and hospitality industry has attracted a lot of research and publications.

According to Chiang, 2020 [6] research entitled Developing an e Marketing model for tourism and hospitality discusses 24 papers regarding technology and tourism factors to quantitatively review how technology changes tourism. The results of this research discuss tourism and hospitality knowledge maps identified and visualized to present complex relationships, various correlations, domain knowledge structures and trends in the impact of information technology on tourism and hospitality. Research by Ndou et al., 2022 [7] with the title Exploiting Technology to Deal with the COVID-19 Challenges in Travel & Tourism: A Bibliometric Analysis which discusses how COVID-19 has accelerated the adoption and diffusion of various technologies by various stakeholders in tourism. This research aims to determine developments and trends in tourism technology in the future. Apart from technological and tourism factors, Emilda K & Tomy K., 2020 [8] also said that the perceptions of government officials influence the values, beliefs and success of destinations. Their perception of the impact of tourism is also considered an important aspect in planning and policy making.

Although several previous studies have been conducted to demonstrate an understanding of tourism technological factors, there is still a lack of research that discusses technological factors tourism in Indonesia [9]. There are only 113 papers indexed by Scopus that discuss Indonesian tourism technology. So knowledge about thematic developments and expansion patterns of tourism technology trends in Indonesia is still lacking. Some researchers have difficulty reassessing developments and trends in Indonesian tourism technology, popular topics, methods, variables, destinations, countries, authors and affiliations that are important in the future during a certain period [10]. Discussing scientific publications about tourism technology in Indonesia is important because it can provide deeper insight and understanding about the development of information technology in the Indonesian tourism sector. Scientific publications can discuss the benefits and challenges in implementing information technology in the tourism sector, as well as provide solutions and recommendations for developing better information technology. Apart from that, scientific publications can also increase the competitiveness of Indonesian tourism in the global market and strengthen relationships between study programs and the academic community and tourism practitioners. Therefore, this research aims to analyze developments and trends in tourism technology factors in Indonesia from 2014 to 2023 using bibliometric analysis of the R Package from R studio. This research outlines related questions:

RQ1: How will Indonesian tourism technology develop in 2014-2023?

RQ2: What are the trends in Indonesian tourism technology in the future?

## 2. MET HODS

### 2.1 Planning

The planning stage begins with determining the theme to be discussed, where the theme used in this research is related to tourism technology. This research uses data from 2014-2023. Next, the researcher collected data using literature studies with a bibliometric approach from R Studio software [11]. The data obtained is article data obtained from the SCOPUS database which contains various quotes regarding the search keywords used. In this case, the search produced a data document containing 113 articles. Metadata is then extracted in bib style format.

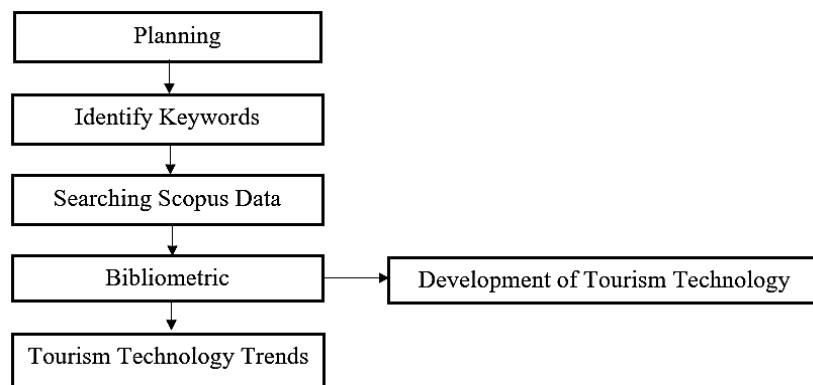


Figure 1 Methodology

## 2.2 Identify Keywords

The process of identifying keywords, which is also known as the initial stage of research. After identifying data sources, researchers will search for keywords or main keywords to find articles that best suit the research topic [12]. Researchers use Boolean logical operators such as AND/OR to create effective search queries that produce complete results [13]. After identifying articles and keywords that are most relevant to the research topic, researchers use search keywords. “Tourism”, “Technology”, “Indonesia” with search syntax: TITLE -ABS-KEY (tourism OR hospitality OR travel AND technology OR it OR is OR ict AND Indonesia) AND PUBYEAR > 2013 AND PUBYEAR < 2022 AND (LIMIT-TO ( DOCTYPE, “ar” )) AND ( LIMIT – TO ( PUBSTAGE, “final” )) AND ( LIMIT-TO ( SRCTYPE “j” )) AND ( LIMIT-TO ( LANGUAGE, “English” )) AND ( LIMIT- TO (SUBJAREA, “COMP” )) AND (LIMIT-TO (AFFILCOUNTRY, “Indonesia” )).

ID	Name	Query	Documents	Date last run	Actions
#22	tourism hospitality travel tec2	TITLE-ABS-KEY ( tourism OR hospitality OR travel AND technology OR it OR is OR ict AND indonesia ) AND PUBYEAR > 2013 AND PUBYEAR < 2024 AND ( LIMIT-TO ( DOCTYPE , “ar” )) AND ( LIMIT-TO ( PUBSTAGE , “final” )) AND ( LIMIT-TO ( SRCTYPE , “j” )) AND ( LIMIT-TO ( LANGUAGE , “English” )) AND ( LIMIT-TO ( SUBJAREA , “COMP” )) AND ( LIMIT-TO ( AFFILCOUNTRY , “Indonesia” ))	113	09 Oct 2023	View Less ^ Edit query

Figure 2Keywords

## 2.3 Searching Scopus Data

Research discussing technology can be found in various scientific publication media, whether journals, conference proceedings, or books. These media have different qualities. One thing that determines quality is the peer review process. Therefore, this research chose Scopus as a data source because scientific articles indexed by Scopus go through a peer review process. Scopus is a citation and abstract database supervised by experts in the field [14]. Based on information from the Scopus website ([www.scopus.com](http://www.scopus.com)) which was accessed on October 9 2023, data was generated for 113 journals that were in accordance with the research theme. According to Saleh & Sumarni, 2023 Scopus is the largest data center in the world which includes millions of scientific literature published decades ago by Elsevier [15]. Scopus helps researchers to search, analyze and visualize research effectively [16].

## 2.4 Bibliometrics

In 2017 Professor Massimo Aria released Bibliometrics [17]. Bibliometrics is a package used in R software. In R software there is also biblioshiny which is an application that provides a web interface for bibliometrics [11]. To use bibliometric and biblioshiny techniques, make sure you have R and RStudio installed we can download from <https://cran.r-project.org/> and <https://rstudio.com/products/rstudio/download/#download>. After that, open RStudio then on the "Tools" tab select "Install Packages," then enter "bibliometrix" and press "Install." Once finished, then "library(bibliometrix)" where this command is to load the bibliometrix package. The final step is to enter the command "biblioshiny()", this command opens the interface. Next you can import the Bib Tex file that was obtained from Searching Scopus Data. The biblioshiny interface will display the analysis results and display several menus on Biblioshiny.

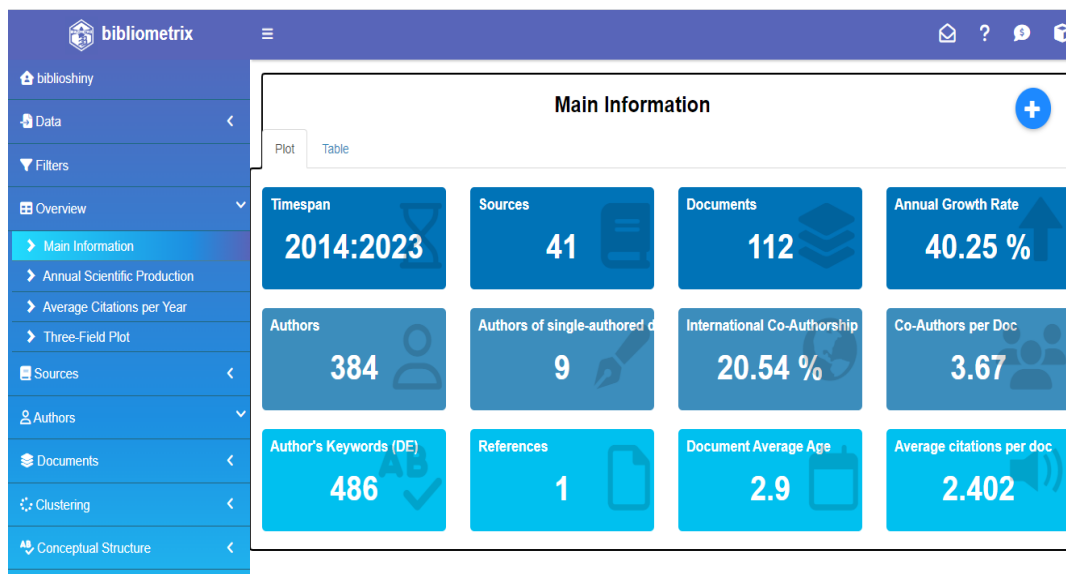


Figure 3 Main Information Bibliometrix

## 2.5 Development of Tourism Technology

Bibliometrics is useful because it provides structured analysis of large amounts of information, to summarize the development of article publications per year, researched themes, identify shifting disciplinary boundaries, display wordclouds, country collaborations to detect the most productive scientists and institutions, and present the big picture of research [18].

## 2.6 Tourism Technology Trends

Indonesian technology tourism trends continue to develop along with technological developments throughout the world. Trend analysis can be performed after importing Scopus data in bibliometrics [19]. Bibliometrically, Indonesian tourism technology trends can be seen on thematic maps grouped into several clusters. Thematic Map Analysis of tourism technology is linked to two dimensions, namely *density* and *centrality*. These themes emphasize a 2-dimensional map and are further categorized into 4 different categories, namely *motor themes*, *basic themes*, *emerging or declining themes*, and *niche themes*. *Motor Themes* are located in the first quadrant, top right with a cluster network that has high *centrality* and *density*, indicating that the themes have been well developed and are important for structuring research subjects [20]. *Niche Themes* or special themes are located in the second, top left quadrant with high theme *density* and low *centrality* which indicates that their relevance is limited [21]. *Emerging or declining themes* is located in the third quadrant, bottom left with low *centrality* and *density* themes and indicates that they are both minimally advanced and marginal [22]. Lastly, *Basic Themes* which are located in the fourth quadrant, bottom right with high *centrality* and low *density*, these themes are very important for transdisciplinary research issues [23].

### 3. RESULTS AND DISCUSSION

#### 3.1 Identification of Developments in Indonesian Tourism Technology Research

The data used in this research amounted to 113 articles originating from the Scopus database taken in 2014-2023 which were identified based on the type of journal source, year of research, country/territory boundaries "Indonesia", search through to "Article title, Abstract, Keywords" and type of language. Next, the data was processed using a bibliometric approach with R Studio software based on 113 existing article data. The results of data processing display statistical data graphs based on the data in the article.

##### 3.1.1 Development of Indonesian Tourism Technology Research Based on Publications

Based on the available publication results, it describes the total number of publications and article citations so that the volume of article publications can be measured. Figures 4 and 3 show the development of Indonesian tourism technology and the average number of article citations per year from 2014 to 2023.

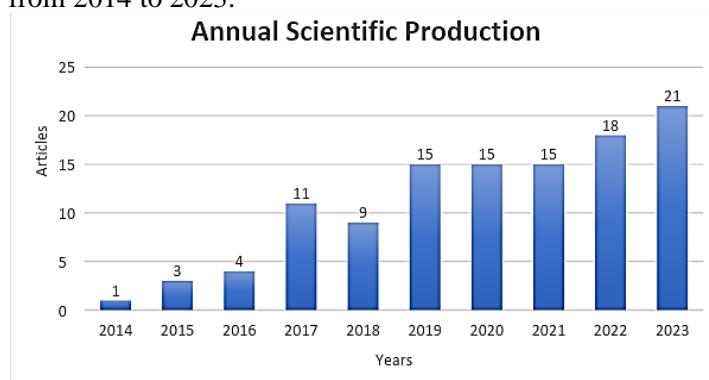


Figure 4 Number of articles produced per year

Figure 4 shows changes in Indonesian Tourism Technology publications from 2014 to 2023. During this period, 113 relevant scientific publications were presented, indicating an increase in article publications. The average number of publications from 2014 to 2017 continued to increase by 11 articles, however in 2018 article production decreased to 9 articles. Although the average increases every year with an increase observed in 2017, no increase was found from 2019 to 2021 regarding the number of articles, which was 15 articles. The increase in publications also increased again in 2022 by 18 articles and reached its peak in 2023 with a total of 21 articles.

##### 3.1.2 Development of Indonesian Tourism Technology Research Based on Average Annual Citations

From the data in Figure 5 it can be seen that the average annual quotations about Indonesian tourism technology have increased and decreased every year, which can be seen that there were 0.10 quotations in 2014 and 0.07 quotations in 2015. Then in In 2016 the average quotation about Indonesian tourism technology increased to 0.84 quotations per year. However, in 2017 the frequency of quotations per year decreased to 0.34 per year. Then in 2018 the average frequency of quotations increased by 0.37 per year. In 2019 the frequency increased again to 0.55 per year. However, in 2020 the average annual citations decreased again to 0.30 citations per year. In 2021 the frequency increases to 1.58 average citations per year and in 2022 to 1.50 average citations per year. Until 2023, the average frequency of citations will decrease to 0.43 per year.

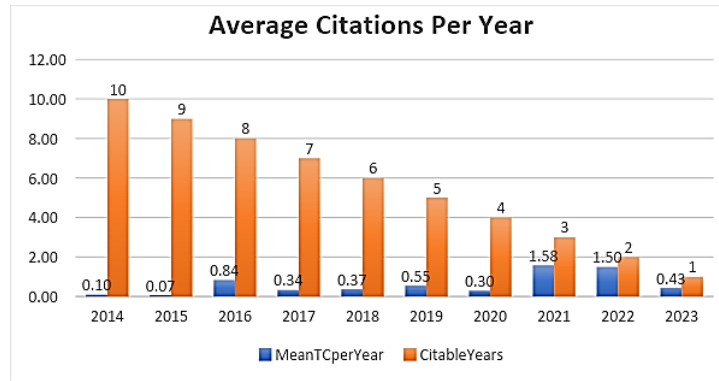


Figure 5 Average annual citations

### 3.1.3 Developments in Indonesian Tourism Technology Research Based on the Most Relevant Journals

Table 1 Most Relevant Journals

SOURCES	Articles
Sustainability (Switzerland)	25
Advanced Science Letters	11
International Journal of Supply Chain Management	8
Journal of Advanced Research in Dynamical and Control Systems	6
International Journal of Civil Engineering and Technology	5
International Journal of Data and Network Science	5
Journal of Theoretical and Applied Information Technology	5
International Journal on Advanced Science, Engineering and Information Technology	4
Bulletin of Electrical Engineering and Informatics	3
International Journal of Advanced Science and Technology	3

In the development of Indonesian tourism technology articles, the sources with the most publications are shown in Table 1. This shows that there are 11 top journals that have the highest number of publications. Sustainability Journal (Switzerland) and Advanced Science Letters were ranked first and second with 25 and 11 articles in each journal. The International Journal of Supply Chain Management and the Journal of Advanced Research in Dynamical and Control Systems were ranked third and fourth with 8 and 6 articles. In fifth position there are 5 articles each in the International Journal of Civil Engineering and Technology, International Journal of Data and Network Science and Journal of Theoretical and Applied Information Technology. The International Journal on Advanced Science, Engineering and Information Technology has 4 articles in sixth place and in the last position is the bulletin journal of electrical engineering and informatics and the international journal of advanced science and technology with 3 articles.

### 3.1.4 Most Relevant Keywords (Most Relevant Keywords)

Figure 6 shows the keywords that are most used in research. From this data we can see that Indonesia is the top keyword as the keywords that are most used in research with a total of 22 articles that use these keywords. Then in second place is sustainability with a total of 8 articles and in third position is the keyword tourism development which is usually used in conjunction with research that discusses tourism with a total of 8 articles. In the fourth and fifth positions using the keywords ecotourism, tourist destination each has 7 articles and in the sixth position there are 6 articles using the keywords tourism. The rest used the keywords questionnaire survey,

spatiotemporal analysis with 5 articles and in the last position the keywords covid-19, lesser sunda islands with 4 articles each.

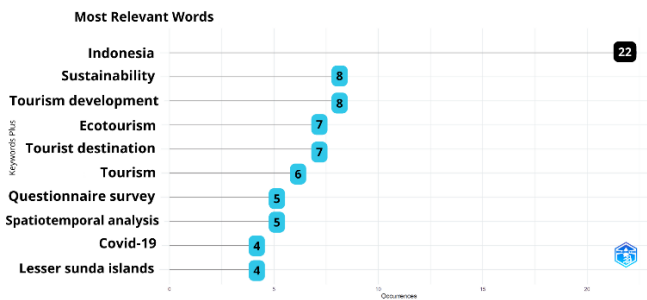


Figure 6 Research developments based on the most relevant keywords



Figure 7 WorldCloud

Figure 7 WordCloud is depicted for the author's keywords, with the font size of a term or phrase indicating its frequency level. This shows that Indonesia is often observed, accompanied by sustainability, tourism development, ecotourism, tourist destination, questionnaire survey, spatiotemporal analysis and covid-19. Even though Figure 6 and Figure 7 have different shapes, the content remains the same with a different presentation concept.

3.1.5 Development of Indonesian Tourism Technology research based on topic trends

In Figure 8 circles are used to indicate the frequency of occurrence of a particular topic trend with horizontal lines indicating the range between quartiles, indicating the period and extent to which the topic trend achieved popularity. Based on 113 documents, there are 6 trending topics that frequently appear in the period 2014 to 2023. It can be seen that Indonesia is a trending research topic starting from 2022-2023 with the highest frequency of 22. Then there is tourism development and sustainability with a frequency of 8 for each. each topic, in the next position there are the topics of tourist destination and ecotourism with each having 7 frequencies. The Questionnaire survey topic occupies the last position with a frequency of 5 in 2023.

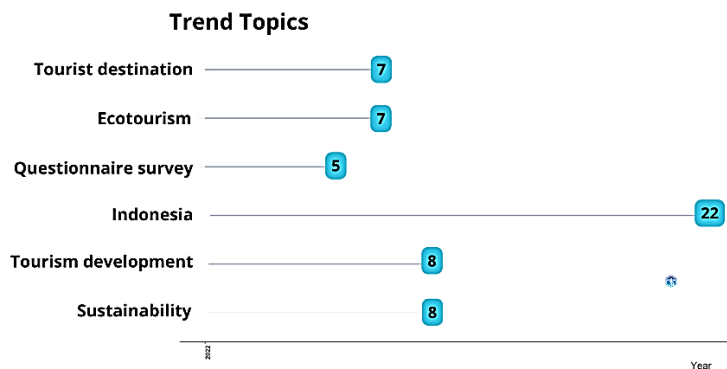


Figure 8 Trending topics

3.1.6 Development of Indonesian Tourism Technology research based on State Collaboration

Based on Scopus data processed by biblioshiny, in Figure 9 it can be seen that Indonesia is one of the countries that collaborates a lot in research discussing Indonesian tourism technology which is carried out together with Malaysia, the United Kingdom, Belgium and several other countries. From the collaboration data, the thickest line shows that the country has carried out a lot of collaboration. The data contained in the map explains that the frequency of publication of articles between Indonesia and Malaysia is 12, and the frequency of collaboration between Indonesia and the United Kingdom is 4. Collaboration between Indonesia and Belgium has a



frequency is 3 compared to Austria, the Czech Republic, Japan, Saudi Arabia, and the USA which only has 1 frequency each. This data can be seen in the country collaboration map menu in the table section in biblioshiny, it can show collaboration between countries and the number of frequencies of that collaboration.

Country Collaboration Map

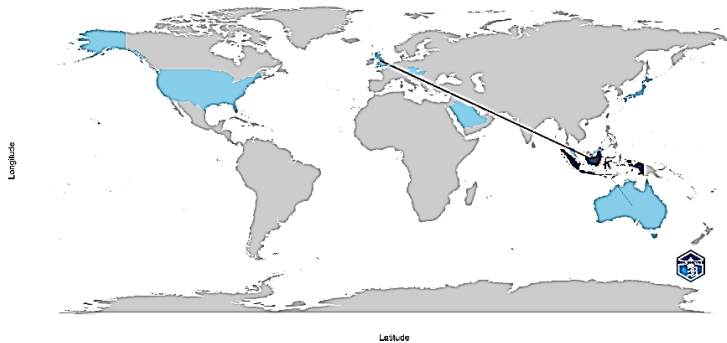


Table 2 Country Collaboration Frequency

From	To	Freq
Indonesia	MALAYSIA	12
Indonesia	United Kingdom	4
Indonesia	Belgium	3
Indonesia	Australia	2
Indonesia	Austria	1
Indonesia	Czech Republic	1
Indonesia	Hungary	1
Indonesia	Japan	1
Indonesia	Saudi Arabia	1
Indonesia	Usa	1

Figure 9 Collaboration of countries

3.1.7 Development of Indonesian Tourism Technology research based on the Co-occurrence Network

Figure 10 shows that the relationships between terms and key entities of Indonesian tourism technology are prioritized based on their tendency to relate to each other. This shows that the central node or network hub is designated as a key entity that appears simultaneously, which shows its importance in the analysis of Indonesian tourism technology. In accordance with the author's keywords, it was observed that there were 8 clusters that were grouped and interconnected, with each group represented by a dominant element. From these results, Indonesia, Tourist Behavior, Ecotourism, Covid-19, Tourism Management, UNESCO, Tourism Development and Governace Approach were dominant in first, second, third, fourth, fifth, sixth, seventh, eighth and ninth rankings.

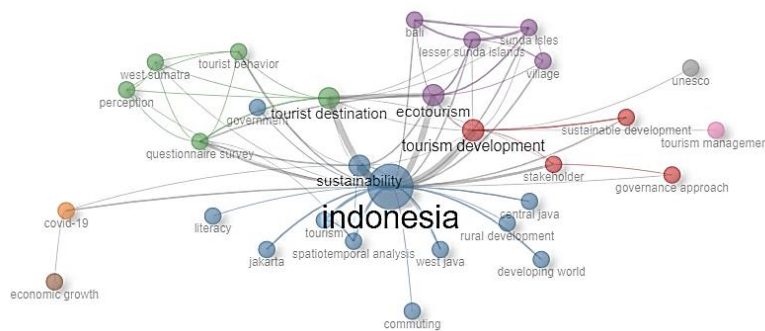


Figure 10 Co-occurrence network

3.2 Trends in Indonesian Tourism Technology Research

Analytical methods are useful for generating valuable knowledge from data and its representation through intuitive visualizations or maps, such as two-dimensional maps and social networks. Network analysis also allows researchers to determine statistical analysis on the resulting maps, to show differences in the relationships between the various detected clusters. a science map resulting from various analyzes is represented using visualization techniques. Networks are depicted through thematic maps, where the proximity between objects indicates their similarity [24] [25] . However, the purpose of the analysis is to determine the conceptual, intellectual, or social evolution of the field being analyzed, by identifying patterns, trends,



seasonality, and *outliers*. The purpose of the analysis is to identify features with high intensity in a certain time interval [26], [27] . In this context, data groupings and thematic areas are used to describe evolution over several periods [28] .

3.2.1 Thematic Map of Indonesian Tourism Technology

Thematic Map Analysis of Indonesian tourism technology is linked to 2 dimensions, namely *density* and *centrality*. These themes emphasize a 2-dimensional map and are further categorized into 4 different categories, namely *motor themes*, *basic themes*, *emerging or declining themes*, and *niche themes*.

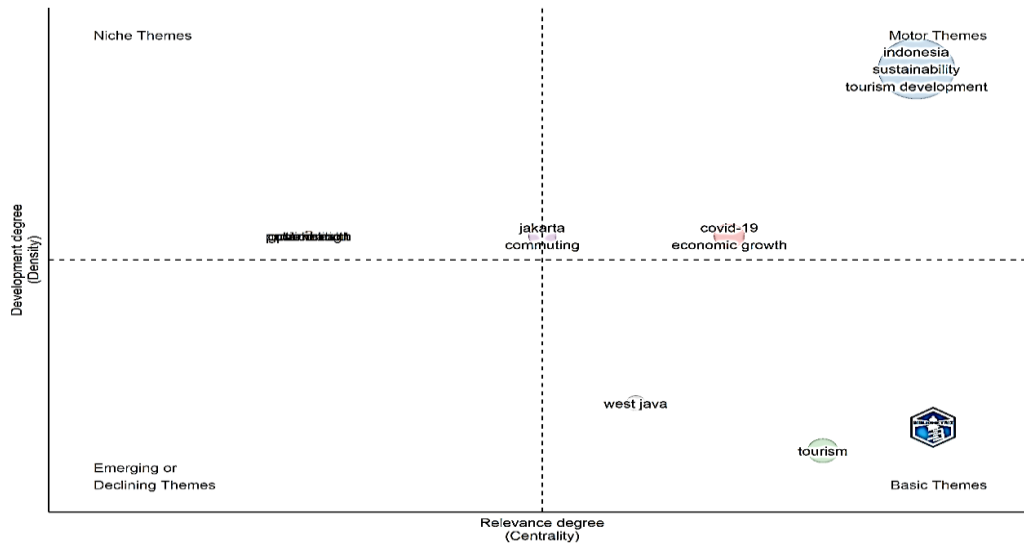


Figure 11 Thematic Map

Government is part of the niche themes, with motor themes represented by Indonesia, sustainability, tourism development, Covid-19, and economic growth. Meanwhile, Jakarta and commuting are between niche themes and motorbike themes. Apart from that, West Java and tourism are part of the basic themes [29] . Based on Table 3, tourism and West Java are important topics that are not developed optimally, as evidenced by the centrality and density values [30] of 8/1 and 6/2 respectively. This proves that these two themes have small centrality and density values because their development is less than optimal. Based on this data, researchers will discuss two clusters, namely West Java and Tourism, to identify trends in Indonesian tourism technology from 2014 to 2023.

Table 3 Thematic Culster Ranking

Clusters	Rank Centrality	Rank Density
Covid-19	7	5.5
Indonesia	9	9
Tourism	8	1
Jakarta	5	5.5
Marketing	2.5	5.5
Optimization	2.5	5.5
public health	2.5	5.5
West Java	6	2
Government	2.5	5.5

The theoretical implication based on these results is that tourism has been recognized as progressing in the industrial sector. This shows the large number of analyzes regarding technology in the tourism sector. Although this analysis is developing gradually, literature on “Indonesian Tourism Technology” is still lacking [9]. Moving forward, it is important to examine patterns of tourism technology formation to provide a comprehensive understanding of its development. In this study, the literature on tourism technology was synthesized from 2014 to 2023 using bibliometric analysis, facilitating the accumulation of knowledge and providing potential analytical directions. From this context, the results obtained contribute to the literature by analyzing the knowledge structure and evolution of Indonesian tourism technology analysis over the previous decade. Collaboration network analysis identified Malaysia, England, Belgium and several other countries connected with Indonesia in collaborating on tourism technology themed research. This research has several keywords such as Indonesia, sustainability, ecotourism, tourist destination questionnaire survey, and spatiotemporal. The results of the research show that there is an increase in publications from year to year, there are fluctuations in citations every year, the number of articles published varies with the position of Sustainability (Switzerland) in first place with 25 published articles, Indonesia is the country that publishes the most articles and the frequency increases from year to year.

Based on Practical Implications, this research is a synthesis of research published in Indonesia's leading tourism technology journal. In this case, various industry professionals have difficulty maintaining the large amount of academic research on Indonesian Tourism Technology. Although some papers provide theoretical and practical insights, these practitioners are still assessing the actual pragmatic implications [10]. By synthesizing analyzes of Indonesian tourism technology published in leading journals, this research serves as a resource for industry professionals seeking academic articles related to their situation. For example, the research summary suggests researching Indonesian tourism technology in the West Java region because the results of the thematic map show that this theme has low centrality and density values due to less than optimal development.

This investigation has several limitations, such as the use of Scopus as the sole data source. In this case, research should utilize multiple databases (WOS, Google Scholar, Dimensions) to analyze a wider selection of academic publications (books, conference proceedings, dissertations). Another limitation shows that the publication only uses the theme "Indonesian tourism technology" and does not contain other keywords even though there are other reports that contain a lot of relevant terminology. From this context, further research is encouraged to expand the search for data sources regarding tourism trend output, Technology Acceptance Models, Mobile Applications, Recommendation Systems, Social and Economic, especially those with high centrality and diversity values ("tourism" and "West Java").

#### 4. CONCLUSIONS

RQ1: The development of Indonesian tourism technology in the period 2014-2023 found that there was an increase in publications from year to year, the highest publication occurred in 2023, in annual citations there were fluctuations, the number of articles published varied with the position of Sustainability (Switzerland) being ranked first with 25 articles published, Indonesia is the country that publishes the most articles and the frequency has increased from year to year, Indonesia is also the top keyword in this research, and Indonesia is one one country that collaborates a lot in research discussing Indonesian tourism technology which is carried out together with Malaysia, the United Kingdom, Belgium and several other countries.

RQ2: Indonesian tourism technology trends for future research are in the Basic Themes which are located in the fourth quadrant, bottom right with high centrality and low density, these themes are very important for transdisciplinary research issues. Based on Table 3, tourism and West Java are important topics that are not developed optimally, as evidenced by the centrality and density values of 8/1 and 6/2 respectively. This proves that these two themes have low

centrality and density values because their development is less than optimal, so tourism and West Java become clusters that can be discussed for future research.

#### REFERENCES

- [1] S. Gössling, "Tourism, technology and ICT: a critical review of affordances and concessions," *J. Sustain. Tour.*, vol. 29, no. 5, pp. 733–750, May 2021, doi: 10.1080/09669582.2021.1873353.
- [2] L. Charfeddine and M. Umlai, "ICT sector, digitization and environmental sustainability: A systematic review of the literature from 2000 to 2022," *Renew. Sustain. Energy Rev.*, vol. 184, p. 113482, Sept. 2023, doi: 10.1016/j.rser.2023.113482.
- [3] A. Molina-Collado, M. Gómez-Rico, M. Sigala, MV Molina, E. Aranda, and Y. Salinero, "Mapping tourism and hospitality research on information and communication technology: a bibliometric and scientific approach," *Inf. Technol. Tour.*, vol. 24, no. 2, pp. 299–340, Jun. 2022, doi: 10.1007/s40558-022-00227-8.
- [4] D. Foris, AS Tecau, M. Hartescu, and T. Foris, "Relevance of the features regarding the performance of booking websites," *Tour. Econ.*, vol. 26, no. 6, pp. 1021–1041, Sept. 2020, doi: 10.1177/1354816619845790.
- [5] Z. Xiang, DR Fesenmaier, and H. Werthner, "Knowledge Creation in Information Technology and Tourism: A Critical Reflection and an Outlook for the Future," *J. Travel Res.*, vol. 60, no. 6, pp. 1371–1376, Jul. 2021, doi: 10.1177/0047287520933669.
- [6] C.-T. Chiang, "Developing an eMarketing model for tourism and hospitality: a keyword analysis," *Int. J. Contemp. Hosp. Manag.*, vol. 32, no. 10, pp. 3091–3114, Aug. 2020, doi: 10.1108/IJCHM-03-2020-0230.
- [7] V. Ndou, G. Mele, E. Hysa, and O. Manta, "Exploiting Technology to Deal with the COVID-19 Challenges in Travel & Tourism: A Bibliometric Analysis," *Sustainability*, vol. 14, no. 10, p. 5917, May 2022, doi: 10.3390/su14105917.
- [8] J. Emilda K and K. Tomy K., "SUSTAINABLE TOURISM DEVELOPMENT IN THE BACKWATERS OF SOUTH KERALA, INDIA: THE LOCAL GOVERNMENT PERSPECTIVE," *Geoj. Tour. Geosites*, vol. 33, no. 4, pp. 1532–1537, Dec. 2020, doi: 10.30892/gtg.334spl13-604.
- [9] A. Roziqin, AS Kurniawan, YS Hijri, and K. Kismartini, "Research trends of digital tourism: a bibliometric analysis," *Tour. Crit. Pract. Theory*, May 2023, doi: 10.1108/TRC-11-2022-0028.
- [10] C. Rafael and AL Pires, "Analysis of scientific production on Technological Innovation in Tourism," *Eur. J. Tour. Hosp. Recreation.*, vol. 11, no. 1, pp. 22–33, Dec. 2021, doi: 10.2478/ejthr-2021-0003.
- [11] M. Aria and C. Cuccurullo, "bibliometrix : An R-tool for comprehensive science mapping analysis," *J. Informetr.*, vol. 11, no. 4, pp. 959–975, Nov. 2017, doi: 10.1016/j.joi.2017.08.007.
- [12] X. Zhang, "A BIBLIOMETRIC ANALYSIS OF SECOND LANGUAGE ACQUISITION BETWEEN 1997 AND 2018," *Stud. Second Lang. Acquis.*, vol. 42, no. 1, pp. 199–222, March. 2020, doi: 10.1017/S0272263119000573.
- [13] A. Syahid and N. Mukminatien, "THIRTY YEARS OF TEFLIN Journal - A publication on the teaching and learning of English: A BIBLIOMETRIC PORTRAIT THROUGH THE LENS OF MICROSOFT ACADEMIC," *TEFLIN J. - Publ. Teach. Learn. Engl.*, vol. 32, no. 1, p. 134, May 2021, doi: 10.15639/teflinjournal.v32i1/134-166.
- [14] A. Maalej and I. Kallel, "Does Keystroke Dynamics tell us about Emotions? A Systematic Literature Review and Dataset Construction," in *2020 16th International Conference on Intelligent Environments (IE)*, Madrid, Spain: IEEE, Jul. 2020, pp. 60–67. doi: 10.1109/IE49459.2020.9155004.
- [15] AR Saleh and E. Sumarni, "Bibliometric Study of Post-Accredited Standardization Journals," *ResearchGate*, 2023.

- [16] W. Chiu, TCM Fan, S.-B. Nam, and P.-H. Sun, "Knowledge Mapping and Sustainable Development of eSports Research: A Bibliometric and Visualized Analysis," *Sustainability*, vol. 13, no. 18, p. 10354, Sept. 2021, doi: 10.3390/su131810354.
- [17] C. Cuccurullo and M. Aria, "A brief introduction to bibliometrix." [On line]. Available: [https://www.bibliometrix.org/vignettes/Introduction\\_to\\_bibliometrix.html](https://www.bibliometrix.org/vignettes/Introduction_to_bibliometrix.html)
- [18] AT Guler, CJF Waaijer, Y. Mohammed, and M. Palmblad, "Automating bibliometric analyzes using Taverna scientific workflows: A tutorial on integrating Web Services," *J. Informetr.*, vol. 10, no. 3, pp. 830–841, Aug. 2016, doi: 10.1016/j.joi.2016.05.002.
- [19] P. Thadathibesra, A. Pongpun, C. Achara, and P. Krerak, "MAPPING RESERCH TRENDS IN MOBILE TECHNOLOGY IN WELLNESS TOURISM DESTINATINATION: A BIBLIOMETRIC AND VISUALIZED ANALYSIS," *Geoj. Tour. Geosites*, vol. 45, no. 4 supplements, pp. 1693–1705, Dec. 2022, doi: 10.30892/gtg.454spl19-990.
- [20] R. Alkhamash, "Bibliometric, network, and thematic mapping analyzes of metaphor and discourse in COVID-19 publications from 2020 to 2022," *Front. Psychol.*, vol. 13, p. 1062943, Jan. 2023, doi: 10.3389/fpsyg.2022.1062943.
- [21] A. Parlina, K. Ramli, and H. Murfi, "Theme Mapping and Bibliometrics Analysis of One Decade of Big Data Research in the Scopus Database," *Information*, vol. 11, no. 2, p. 69, Jan. 2020, doi: 10.3390/info11020069.
- [22] D.D. Mühl and L. De Oliveira, "A bibliometric and thematic approach to agriculture 4.0," *Heliyon*, vol. 8, no. 5, p. e09369, May 2022, doi: 10.1016/j.heliyon.2022.e09369.
- [23] A. Rejeb, K. Rejeb, and H. Treiblmaier, "Mapping Metaverse Research: Identifying Future Research Areas Based on Bibliometric and Topic Modeling Techniques," *Information*, vol. 14, no. 7, p. 356, Jun. 2023, doi: 10.3390/info14070356.
- [24] N.J. Van Eck and L. Waltman, "Software survey: VOSviewer, a computer program for bibliometric mapping," *Scientometrics*, vol. 84, no. 2, pp. 523–538, Aug. 2010, doi: 10.1007/s11192-009-0146-3.
- [25] G. Gonzalez-Alcaide, S. Palacios-Fernandez, and J.-M. Ramos-Rincon, "Thematic research clusters in very old populations ( $\geq 80$  years): a bibliometric approach," *BMC Geriatr.*, vol. 21, no. 1, p. 266, Dec. 2021, doi: 10.1186/s12877-021-02209-7.
- [26] H. Small, "Tracking and predicting growth areas in science," *Scientometrics*, vol. 68, no. 3, pp. 595–610, Sept. 2006, doi: 10.1007/s11192-006-0132-y.
- [27] S. P. Upham and H. Small, "Emerging research fronts in science and technology: patterns of new knowledge development," *Scientometrics*, vol. 83, no. 1, pp. 15–38, Apr. 2010, doi: 10.1007/s11192-009-0051-9.
- [28] MJ Cobo, AG López-Herrera, E. Herrera-Viedma, and F. Herrera, "An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field," *J. Informetr.*, vol. 5, no. 1, pp. 146–166, Jan. 2011, doi: 10.1016/j.joi.2010.10.002.
- [29] C. Gibson, "Critical tourism studies: new directions for volatile times," *Tour. Geogr.*, vol. 23, no. 4, pp. 659–677, Jul. 2021, doi: 10.1080/14616688.2019.1647453.
- [30] Y. Huo, T. Fan, S. Chen, Q. Liu, Y. Fang, and F. Yao, "Thematic trends and knowledge structure map of sentinel lymph node biopsy for breast cancer: a bibliometric analysis from 2010 to 2019," *Transl. Cancer Res.*, vol. 11, no. 9, pp. 3092–3107, Sept. 2022, doi: 10.21037/tcr-21-2841.