

The Emergence of Robotics in Tourism and Hospitality: A Bibliometric Analysis from 2017 to 2023

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Abstract. We present an analysis of the emergence of robotic technology researches in tourism and hospitality from 2017 to 2023. Bibliometric analysis was used to analyze 47 articles published from 2017 to 2023 based on source, document type, journal name, publisher name, topic trends, and author collaborations. We use the combination of `Robotics+ Tourism+ Hospitality` as our main keywords in searching related article titles, abstracts, and keywords to get metadata, where the Scopus database is the main source. The tools used in this bibliometric analysis are Harzing's Publish or Perish for importing source data from Scopus database. Furthermore, we employ VoS Viewer for data visualization and further used for citation and metrics analysis. The results indicate that most related articles to are published in scientific journals, compared to other publication outlets e.g., book chapter, conference proceedings and book. Related articles published in scientific journals have received the highest citations compared to others. Based on network and overlay visualization, the most dominant terms (often appearing) are "AI", "services robots", "human robot interaction", "autonomy".

Keywords: Bibliometric analysis · Robotics · Tourism · Hospitality · Publish or Perish · VoS Viewer

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1 Introduction

Robotics technology has presently served tourism and hospitality sectors. Although the establishment of robot technology is already used in industries since long time ago, however the incorporation of robot technology came relatively late to the tourism and hospitality industries. Especially those involved in travel, food and beverage services, hotel service, entertainment, etc. Today, robotics has been used frequently since many of the tourism and hospitality services required sophisticated responses to the needs of the customers. While many automotive industries were largely employed by robots since 1990s, it was started by 2017 that tourism and hospitality researchers entered to the field i.e., added tourism and hospitality fields to robotics-based research. Joshi [1] initiated the used of robotics in Hospitality Industry. He took a case study at Henna Hotel, Huis Ten BoSch, Japan. Ivanov, *et al*. [2] adopted robots for service automation by tourism and hospitality companies. Ivanov & Webster [3] designed robot-base facilities for further friendly hospitality service. Bowen and Whalen [4] presented several trends that are changing travel and tourism, including robot technology. Ivanov & Webster [5] adopted AI, service automation and robots for travel, tourism and hospitality companies using a cost-benefit analysis. Kuo, *et al*. [6] investigated an innovative service with hospitality robots. Murphy, *et al*. [7]. Initiated a study of the age of robots in hospitality and tourism. Further they presented some challenges for teaching and research. Murphy, *et al*. [8] presented a research agenda involving robots in hospitality and tourism. Alexis [9] introduced the Potential Impact of Robotics and Service Automation in Tourism. Tung & Law [10] presented the potential for tourism and hospitality experience research in human-robot interactions.

In 2018, there are many researches in the filed done. Tussyadiah & Park [11] studied consumer evaluation of hotel service robots. Korstanje & Seraphin [12] presented a critical discussion of the role of robots in the rite of hospitality. Ukpabi, *et al*. [13] presented dual perspectives on the role of artificially intelligent robotic virtual agents in the tourism, travel and hospitality industries. Ivanov, *et al*. [14] studied consumers' attitudes towards the introduction of robots in accommodation establishments. Tung & Au [15] explored customer experiences with robotics in hospitality. Ivanov, *et al*. [16] presented a study on young Russian adults' attitudes towards the potential use of robots in hotels. Bowen & Morosan [17] studied the emergence of robot technology in hospitality industry. Primawati [18] studied the role of AI-based robot as an innovation in the hotel service.

In year 2019, Ivanov, *et al*. [19] reviewed the progress on robotics in hospitality and tourism. Gretzel & Murphy [20] studied consumer discourse on robots in tourism and hospitality service settings. Ivanov & Webster [21] proposed a conceptual framework of the use of AI, service automation, and robots in travel, tourism, and hospitality companies. Murphy, *et al*. [22] studied the role of anthropomorphism on marketing robot services in hospitality and tourism. Ivanov, [23] studied the ultimate transformation on how automation technologies disrupt the travel, tourism, and hospitality industries. Cain, *et al*. [24] presented the state of robotics and AI in the hospitality industry. Ivanov & Webster [25] compiled many studies on robots, artificial intelligence and service automation

in travel, tourism, and hospitality. Popesku [26] presented current applications of artificial intelligence in tourism and hospitality. Ivanov & Webster [27] studied on perceived appropriateness and intention to use service robots in tourism.

In 2020, Christou, *et al*. [28] presented tourists' perceptions regarding the use of anthropomorphic robots in tourism and hospitality. Go, *et al*. [29] presented on machine learning of robots using interactive technology acceptance model in tourism and hospitality. McCartney & McCartney [30] proposed a conceptual service-robot research framework for the hospitality and tourism industry. Samala, *et al*. [31] presented a critical insight on the impact of AI and robotics in the tourism sector. Kilichan & Yilmaz [32] studied AI and robotic technologies in tourism and hospitality industry. de Kervenoael, *et al*. [33] presented a study on human-robot interaction in hospitality services. They incorporated the role of perceived value, empathy, and information sharing into visitors' intentions to use social robots. Reis, *et al*. [34] studied service robots in the hospitality industry, where the case study took place at Henn-na hotel, Japan.

In 2021, Belanche, *et al*. [35] presented both service enhancement or cost reduction studies involving robots in tourism and hospitality. Manthiou, *et al*. [36] examined the three themes of service robotics in tourism and hospitality. Abou-Shouk, *et al*. [37] explored customers' attitudes to the adoption of robots in tourism and hospitality. Fusté-Forné & Jamal [38] proposed new directions for service robots in hospitality and tourism. Koo, *et al*. [39] incorporated AI and robotics technologies in travel, hospitality, and leisure. Mingotto, *et al*. [40] presented several challenges in re-designing operations and jobs to embody AI and robotics in services. Findings from a case in the hospitality industry. Choi, *et al*. [41] Exploring the influence of culture on tourist experiences with robots in service delivery environment.

Since the starting interest in robotics in tourism and hospitality raises from above explanation, then the need for an analysis study on the development on the topic and an identification of future research avenues in the field is emerged. Therefore, this paper investigates the academic literature on robots and its relevance to the travel, tourism and hospitality industries, where a bibliometric analysis approach is used. I this work, we use the Scopus database from 2017 to 2023. We present both the publication source, document type, journal name and rank, publisher name and rank, topic trends, and author collaborations, and visualize them. Finally, we discuss some of the research highlights to be explore in future.

The rest of the paper is organized as follows. Section 2 describes the proposed stages of this work. Section 3 presents the results and following discussion. Finally, we draw conclusion and highlight future recommendations in Sect. 4.

2 Proposed Method

We present bibliometrics analysis which consists of five stages, namely: Determining the keywords, initial searching and repair searching results; Compiling preliminary data statistics (before and after repairing) and saving in RIS format; Enter RIS data into Publish or Perish; Analysis of publications sources and citations; and finally visualize the results using VoS Viewer. Figure 1 below depicts the flow chart of our proposed method.

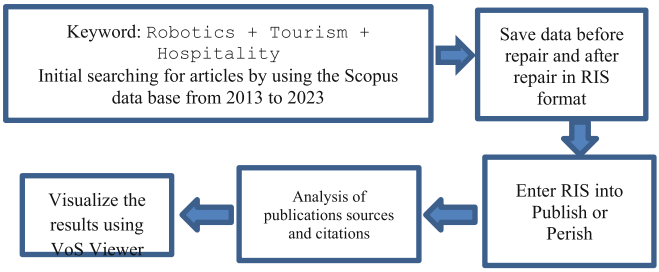

Fig. 1. Flow chart of the proposed method

3 Results and Discussion

This section explains the obtained results of this work, which includes publications and citations, visualizations, authors and networks, research locations and research domains.

3.1 Publications and Citations

For knowing comparison of the citation matrix on the data taken via Scopus, then researcher make the table in which containing number article, number citation, number citations per year, number authors per year, H index, G index, normal hI, and hI yearly at the beginning search and on results repair. Comparison data matrix in result search start and result search after repair could be seen in Table 1.

Table 1. Comparison Matrix

Data	Initial Search Results	Search Results Repair
Database	Scopus	Scopus
Year publishing	2017–2023	2017–2023
Year citation	6	6
Number of Articles	64	47
Number citation	2149	1719
Number Citation per Year	358.17	286.50
Number Authors per Year	3.13	3.11
H index	22	19
G index	46	41
hI Normal	14	13
hI Annual	2.33	2.17

Based on Table 1, there is a comparison matrix of data before and after comparison over a period of 6 years (2017–2023). In the Table 1, it can be seen several quantitative decreases, starting with the number of existing articles, it is presented that before the improvement there were 64 articles, but after the improvement to 47. The same is true of the number of citations, which were originally 2149 before the repair to 1719 after the repair. The number of citations per year also decreased because before the improvement amounted to 358.17 and after the improvement to 286.50. In relation to the author, there was a decrease, which was originally 3.13 before the improvement to 3.11. The H index also changed, from 22 to 19, the G index from 46 to 41. Normal hI which was originally 14 dropped to 13 and annual hI which was originally 2.33 to 2.17.

Table 2. The statistics descriptive of publication

Year	TP	% (N = 47)	NCP	TC	C/P	C/CP
2017	3	0.06	3	315	105.00	105.00
2018	3	0.06	3	285	95.00	95.00
2019	6	0.13	6	533	88.83	88.83
2020	5	0.11	5	243	48.60	48.60
2021	12	0.26	9	36	3.00	4.00
2022	14	0.30	12	107	7.64	8.92
2023	4	0.09	0	0	0.00	0.00
	47	100%				

Note: TP = total number of publications; NCP = number cited publications; TC = total quotes; C/P = average citations per publication; C/CP = average citation per cited publication.

From Table 2 above, in the first year, namely 2017, there were 3 publications where all three were cited 315 times. In 2018 with the publication of 3 journals and as many as 285 times citation from the three articles. In 2019, he succeeded in contributing 6 articles with 583 times the three articles were cited. In 2020 he succeeded in contributing to publishing 5 articles with 243 citations using the five articles. 2021 became the year with the most publications and was able to double the number from the previous few years with a total of 12 articles, of which 9 were cited 36 times in a percentage of 0.26%. Year 2022 is the year with the most publications, amounting to 14 publications with 12 of them quoted as many as 107 times and managed to contribute 0.30%. In 2023, so far it has succeeded in publishing as many as 4 articles and there is no data related to the number of publication citations and the number of citations. Figure 1 as follow depicts the bar chart of publication and citations.

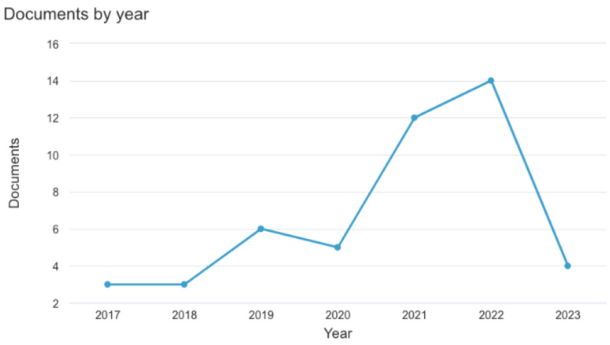

Fig. 2. Publication from 2017–2023

In Fig. 2 above, there is a graph that shows the number of documents in each year with the interval 2017 to 2023. It can be seen that 2021 is the year that outperforms the previous few years until 2022 becomes the peak point in journal publishing by publishing as many as 14 articles which is equivalent to a percentage of around 18%. 2017 and 2018 were the years with the least number of publications with 3 articles. Figure 3 as follow depicts the documents by subject area.

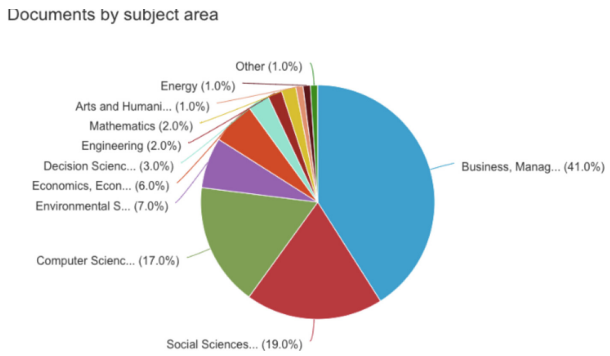

Fig. 3. Documents by subject area from 2017–2023

Figure 3 above displays data based on the subject area presented in the form of a pie diagram. Each portion and percentage on the chart are the search result on the Scopus page for further use in this article. The subject area of Business, Management, and Accounting became the most dominant with a contribution of 41 articles or in a percentage of 41% represented with a blue portion. Social Sciences occupies the second position with a contribution of 19 articles in a percentage of 19% represented by the portion of the red chart. The third largest portion is occupied by the subject of Computer Science with a contribution of 17 articles in a percentage of 17% represented by green. The next subject in a row is Environmental Science which succeeded in publishing 7 articles or 7%, Economics, Econometrics and Finance with 6 articles or 6%, next the subject of Decision Sciences with 3 articles or 3% followed by the subject of Engineering

and Mathematics area with both publishing 2 articles in percentage 2%. Then the bottom 2 are occupied by the subject areas Art and Humanities and Energy who each publish 1 article in a percentage of 1%. Figure 4 and Table 3 as follow describes the type of documents.

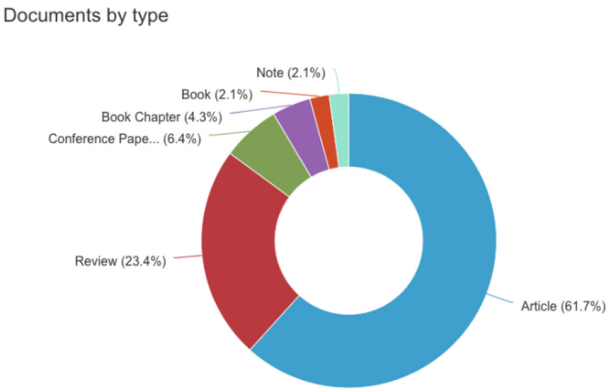

Fig. 4. The type of documents

Table 3. The type of documents

Type	Number	Percentage
Article	29	0.62
Review	11	0.23
Conference Paper	3	0.06
Book Chapter	2	0.04
Book	1	0.02
Note	1	0.02
	47	100%

Figure 4 and Table 3 above respectively depicts and describes document types that show the 6 types of documents used in the preparation of this article, namely Article, Review, Conference Paper, Book Chapter, Book and Note from Scopus datavase. The type of document with the type of Article is the most dominant with a total of 29 articles in a percentage of 62%, followed by the Review document type with 11 articles or in a percentage of 23%. Conference Paper ranked 3rd with 3 articles in a percentage of 6%, Book Chapters with 2 articles or 4%, and the last 2 types of documents occupied by Book and Note as much as 1 piece with a percentage of 2%. Figure 5 as follow depicts the documents per year by source.

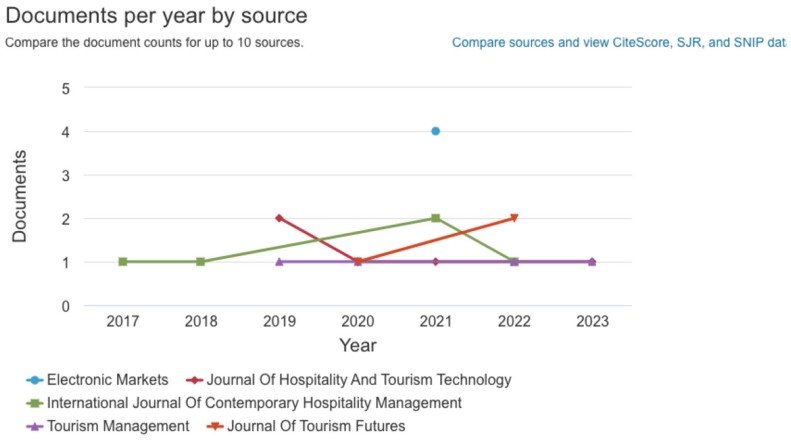

Fig. 5. Documents by source area from 2017–2023

From Fig. 7 above, sources from the International Journal of Contemporary Hospitality Management were published in 2014 and increased from 2018 to 2021 before declining in 2022. Sources from Tourism Management have successfully published from 2019 to 2023. Furthermore, the source of the Journal of Hospitality and Tourism Technology began publication in 2019 and experienced a decrease in 2020 in contrast to the source of the Journal of Tourism Features which increased from its inception in 2020 to 2022. Table 4 as follow describes the type sources of publication.

Table 4. Document source type

Type	Number	Percentage
Journal	41	0.87
Conference Proceeding	3	0.06
Book Series	2	0.04
Book	1	0.02
	47	100%

In Table 4 above, data is presented of document analysis or data based on the type of source. The data displayed is entirely derived from the Scopus database. In the first place comes from the Journal with a contribution of 41 articles which is equivalent to a percentage of 87%, which is then followed by Conference Proceedings which contributes 3 articles or equivalent to a percentage of 6%, then the third position is the Book Series with a contribution of 2 articles with a percentage of 4%. The last position is occupied by the Source Book type with a contribution of 1 book which is equivalent to a percentage of 2%. Figure 6 as follow depicts the documents by affiliation.

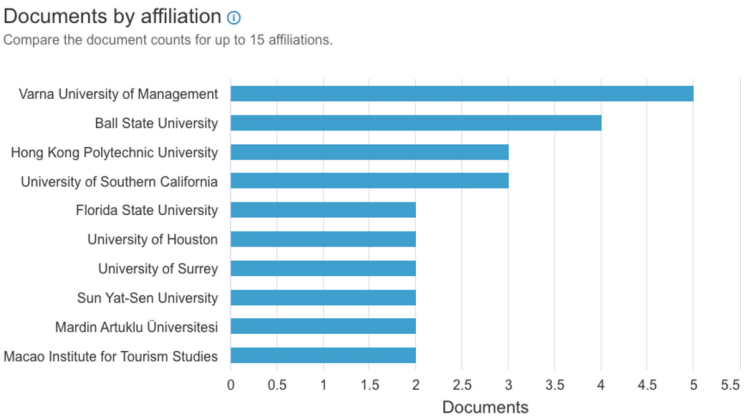

Fig. 6. Documents by affiliation area from 2017–2023

Figure 6 above displays documents based on their affiliation. Using the Scopus database, it was found that Vama University of Management was the most in contributing affiliates with a total of 5 articles. Bali State University occupies the second most positions with 4 articles, then followed by Hong Kong Polytechnic University and the University of Southern California as many as 3 articles. For other affiliates each donated 2 articles such as Florida State University, University of Houston, University of Surrey, Sun Yat-Sen University, Mardin Artuklu Universitesi, Macao Institute for Tourism Studies.

Table 5. Top 20 cited articles

Cites	Authors	Title	Year	Journal Name	Publisher
180	Tung & Au	Exploring customer experiences with robotics in hospitality	2018	International Journal of Contemporary Hospitality Management	Emerald
164	Li, *et al*	Hotel employee's artificial intelligence and robotics awareness and its impact on turnover intention: The moderating roles of perceived organizational support and competitive psychological climate	2019	Tourism Management	Elsevier

(*continued*)

Table 5. (*continued*)

Cites	Authors	Title	Year	Journal Name	Publisher
150	de Kervenoael, *et al*	Leveraging human-robot interaction in hospitality services: Incorporating the role of perceived value, empathy, and information sharing into visitorsâ€™ intentions to use social robots	2020	Tourism Management	Elsevier
149	Tung & Law	The potential for tourism and hospitality experience research in human-robot interactions	2017	International Journal of Contemporary Hospitality Management	Emerald
147	Murphy, *et al*	Marketing robot services in hospitality and tourism: the role of anthropomorphism	2019	Journal of Travel and Tourism Marketing	Routledge
146	Ivanov, *et al*	Progress on robotics in hospitality and tourism: a review of the literature	2019	Journal of Hospitality and Tourism Technology	Emerald
132	Murphy, *et al*	Dawning of the age of robots in hospitality and tourism: Challenges for teaching and research	2017	European Journal of Tourism Research	Varna University of Management
86	Bowen & Morosan	Beware hospitality industry: the robots are coming	2018	Worldwide Hospitality and Tourism Themes	Emerald
64	Belanche, *et al*	Frontline robots in tourism and hospitality: service enhancement or cost reduction?	2021	Electronic Markets	Springer
48	Ivanov & Webster	Robots in tourism: A research agenda for tourism economics	2020	Tourism Economics	SAGE
43	Samala, *et al*	Impact of AI and robotics in the tourism sector: a critical insight	2022	Journal of Tourism Futures	Emerald

(*continued*)

Table 5. (*continued*)

Cites	Authors	Title	Year	Journal Name	Publisher
41	Choi, *et al*	Exploring the influence of culture on tourist experiences with robots in service delivery environment	2021	Current Issues in Tourism	Routledge
38	Cain, *et al*	From sci-fi to sci-fact: the state of robotics and AI in the hospitality industry	2019	Journal of Hospitality and Tourism Technology	Emerald
34	Bowen & Whalen	Trends that are changing travel and tourism	2017	Worldwide Hospitality and Tourism Themes	Emerald
33	Nam, *et al*	The adoption of artificial intelligence and robotics in the hotel industry: prospects and challenges	2021	Electronic Markets	Springer
29	Ivanov & Webster	Robots, artificial intelligence and service automation in travel, tourism and hospitality	2019	Robots, Artificial Intelligence and Service Automation in Travel, Tourism and Hospitality	Emerald
26	Tuomi, *et al*	Spicing up hospitality service encounters: the case of Pepper™	2021	International Journal of Contemporary Hospitality Management	Emerald
24	Ivanov & Webster	Willingness-to-pay for robot-delivered tourism and hospitality services–an exploratory study	2021	International Journal of Contemporary Hospitality Management	Emerald
19	Blöcher & Alt	AI and robotics in the European restaurant sector: Assessing potentials for process innovation in a high-contact service industry	2021	Electronic Markets	Springer
19	Yu	Humanlike robot and human staff in service: Age and gender differences in perceiving smiling behaviors	2018	2018 7th International Conference on Industrial Technology and Management	IEEE

Table 5 above present 20 articles cited from various related fields. Based on the table above, an article by Tung & Au entitled "Exploring customer experiences with robotics in hospitality" in the International Journal of Contemporary Hospitality Management in 2018 occupies the first position that is most quoted, which is 180 times using the publisher Emerald The second position is occupied by a journal by Li, *et al*. in Tourism Management with the title "Hotel employee's artificial intelligence and robotics awareness and its impact on turnover intention: The moderating roles of perceived organizational support and competitive psychological climate" published by Elsevier. in 2019. In the last place occupied by the journal works Yu published in 2018 under the title "Humanlike robot and human staff in service: Age and gender differences in perceiving smiling behaviors" pada 2018 7th International Conference on Industrial Technology and Management published by oleh IEEE. Table 6 as follow describes the top five publisher on the related field.

Table 6. Top five publishers

No	Publisher	Number of Articles	Percentage
1	Emerald	19	0.46
2	Elsevier	11	0.27
3	Springer	6	0.15
4	Routledge	3	0.07
5	IEEE	2	0.05
		41	100%

Table 6 above displays the top 5 publishers used out of a total of 41 articles used. The first rank is occupied by Emerald publisher with 19 articles equivalent to a percentage of 46%, then followed by Elsevier with a contribution of 11 articles with a percentage of 27%. The third position is occupied by Springer publisher with a contribution of 6 articles with a percentage of 15%, followed by Routledge with a contribution of 3 articles with a percentage of 7% and the last position by the Institute of Electrical and Electronics Engineers Inc. With a contribution of 2 articles with a percentage of 5%. Table 7 as follow describes the top five journal on the related field.

Table 7. Top five journals ranking

No	Journal Name	Number of Articles	Percentage
1	Journal of Hospitality and Tourism Technology	5	0.28
2	Electronic Markets	4	0.22
3	International Journal of Contemporary Hospitality Management	4	0.22
4	Journal of Tourism Futures	3	0.17
5	Tourism Management	2	0.11
		18	100%

Table 7 displays a list of the top 5 journals that contributed to the publication of documents related to Smart Tourism from a total of 18 articles. Data shows that the Journal of Hospitality and Tourism Technology has a share of 5 articles in a percentage of 28%, then Electronic Markets and the International Journal of Contemporary Hospitality Management with a contribution of 4 articles in a percentage of 22%. The fourth position is occupied by the Journal of Tourism Futures with 3 articles equivalent to a percentage of 17% and closed by Tourism Management journal with a contribution of 2 articles in a percentage of 11%.

3.2 Visualization Topics Use VoS Viewer

Figure 7 below this show visualization of topic areas using network visualization from VoS Viewer.

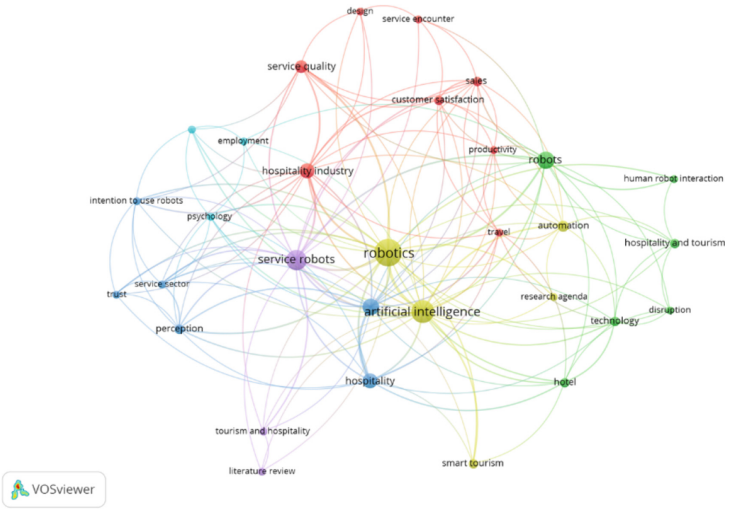

Fig. 7. Visualization topic area using network visualization

Table 8 as follow describes the item number in clusters obtained from VoS Viewer.

Table 8. Item number in clusters

Cluster	Color	Number of Items
1	Red	8
2	Green	6
3	Blue	6
4	Yellow	5
5	Purple	3
6	Light Blue	3

From Table 8 above, there are 6 clusters presented by 6 different colors. Several items obtained from mapping images with visualization of the Smart Tourism topic. Those colors are given follows by:

a. Red (8 items) consist of Hospitality Industry, Service Quality, Customer Satisfaction, Sales, Productivity, Service encounter, design and travel.
b. Green (6 items) consist of Robotics, Hospitality and Tourism, Technology, Disruption, Hotel, and Human robot interaction.
c. Blue (6 items) consist of Service robots, Artificial Intelligence, Hospitality, Perception, Service sector, and Trust.
d. Yellow (5 items) consist of Robotics, Artificial Intelligence, Smart Tourism, Automation, and Research Agenda.
e. Purple (3 items) consist of Service robots, tourism and hospitality, and Literature Review.
f. Light Blue (3 items) consist of Psychology, Intention to use robots, and employment.

Figure 8 as follow describes the visualization topic area using overlay visualization from VoS Viewer.

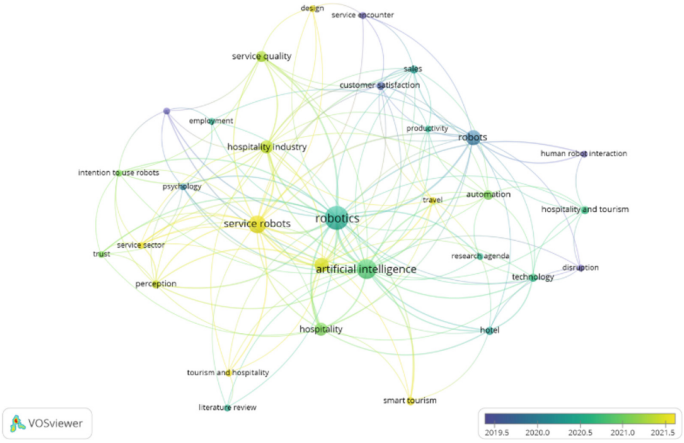

Fig. 8. Visualization topic area using overlay visualization

Figure 8 above shows the topic mapping with overlay visualization based on the color of the item. The color itself based on the longer a document produced which can be known that 2019 to 2020 is the darkest one than the other. That dark colors in 2019 include "Disruption", "Human robot interaction", "Customer satisfaction", "Service encounter". On 2020 there are "Robotics", "Psychology". Meanwhile, in 2021 there are "Service robots", "Artificial Intelligence", "Hospitality Industry", "Hospitality". Figure 9 as follow describes the visualization topic area using density visualization from VoS Viewer.

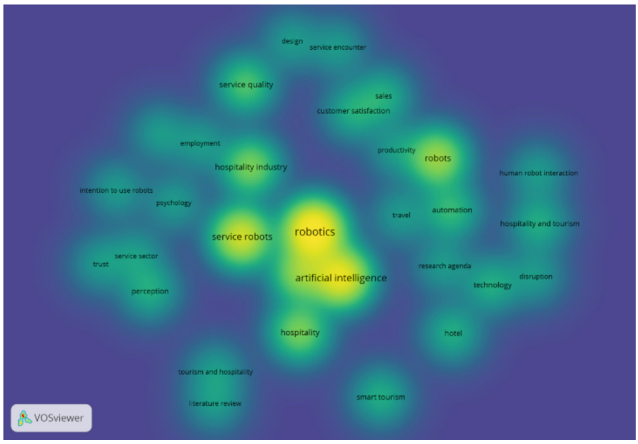

Fig. 9. Visualization topic area using density visualization

Figure 9 above depicts the density visualization. With this, the brighter color represents the presented the keywords. Brightly colored objects are meant to stand out and be more easily understood by the number of themes that are employed as study material. In terms of density, a symbol that is provided with color but has a relatively low level of density tends to be darker. The popular keywords are "Artificial Intelligence", "Robotics', "Service Robots", "Hospitality". Rare topics are "Intention to use robots", "tourism and hospitality", "Smart Tourism".

3.3 Author and Relationship Between Writer

Figure 10 below depicts overlay visualization of the author and co-author using VoS Viewer.

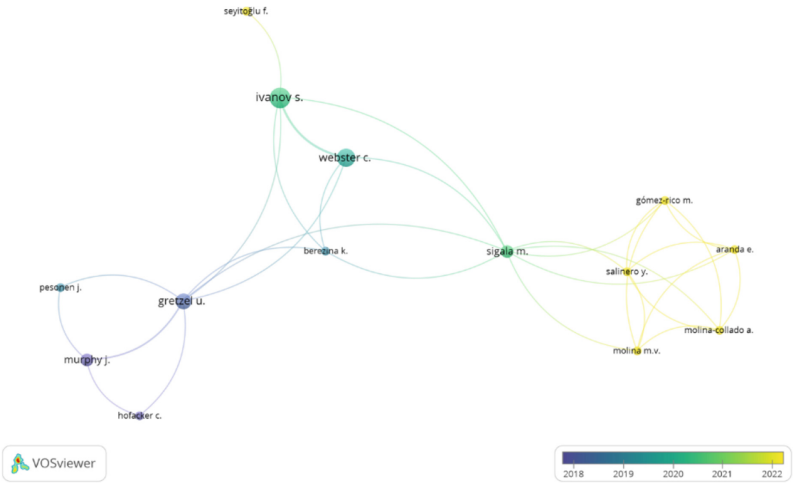

Fig. 10. Visualization of the author and co-author overlay

In Fig. 10 above, it is a mapping of the author visualization and co-author overlay which is analyzed using VoS viewer to get the relation between both author and co-author. Each author's nodes are colored according to the year they were published in the journal, and the number of nodes shows how many papers have been uploaded and how large the author network is. Based on the results, every author has share same connections on average. Gretzel who has connected to 6 authors and wrote article on average by 2018, secondly Webster, who has connections to 4 authors and wrote an article on average by 2020. Furthermore, Ivanov has connected to 4 authors who wrote on average year by 2021, likewise with Sigala. The last one Salinero who has 4 connections who wrote an article on the average year by 2022.

3.4 Research Locations and Research Domains

Table 9 below describes top 10 country of research location and research domain.

Table 9. Top 10 Country of research location and research domain

No	Country	Number of Articles	Research domain
1	United States	12	Robotics, robots, artificial intelligence, services robots, human robot interaction, AI awareness, autonomy, anthropomorphism
2	China	6	Robotics, service quality, service robots, AI awareness, ARMA model, acceptance of robots, air transportation
3	India	6	Artificial intelligence, automation, tourism, antecedent outcome framework, automation techniques
4	Turkey	5	Artificial intelligence, robotics, business process, collaborative spaces, contactless hosting, chatbots
5	United Kingdom	5	Artificial intelligence, hospitality industry, hospitality services, robotics, robots
6	Bulgaria	4	Robotics, robots, service robots, tourism, competitiveness, discrimination, hospitality
7	Hong Kong	4	Artificial intelligence, hospitality, perceived discrimination, robots
8	Australia	3	Robotics, autonomy, bibliometrics, hospitality, hotel, human robot interaction
9	Finland	3	Robotics, robots, artificial intelligence, hospitality, tourism,
10	France	3	Artificial intelligence, acceptance, biosensors, conceptual framework, contactless hosting

Table 9 above provides a more thorough explanation of the number of articles produced based on research domains from different nations. Similar to the preceding image, the United States has the -highest number of publications in the field of research, with 12 articles which include terms like "Robotics", "robots", "artificial intelligence", "services robots", "human robot interaction", "AI awareness", "autonomy", "anthropomorphism" as research domain keywords. Then came neighboring nations, like China and India with 6 shared articles, Turkey, United Kingdom, Bulgaria Hong Kong grouped by produced the similar amount which is 4 articles. Australia, Finland, and France all produced by 3 articles.

4 Conclusion and Suggestions

We have presented a bibliometric analysis on robotics technology researches in tourism and hospitality from 2017 to 2023. Our bibliometric study has shown in helping researchers to determine the characteristics of scientific production, including what, who, how, how, and where, it was published. Our bibliometric study contributes theoretically in determining the characteristics and evolution of scientific publication in the related field. Therefore, the results of this work can be a guideline for future researchers who are researching new topics in robotics technology in tourism and hospitality. Finally, the most found topics "AI", "services robots", "human robot interaction", "autonomy", and "anthropomorphism" can help the researchers to come up with alternative ideas of researches.

Since the coverage of Scopus database is smaller than that Google Scholar, thus it is recommended for future work to explore the Google Scholar which contain more published articles.

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