

Review

Evolution of sustainable development goals research in tourism sector. A bibliometric review

Paula Isabel Rodríguez-Castro¹, María Vanessa Rodríguez-Cornejo^{2,*}, Miguel Ángel Montañés-Del Río², Jesús Herrera-Madueño¹

¹ Accounting and Finance, University of Cadiz, 11405 Jerez de la Frontera, Spain

² Business Organization, University of Cadiz, 11405 Jerez de la Frontera, Spain

* **Corresponding authors:** María Vanessa Rodríguez-Cornejo, vanesa.rodriguez@uca.es

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Abstract: Since the United Nations' approval of the Sustainable Development Goals (SDGs), the tourism industry has been identified as one that causes the greatest environmental deterioration. This has led companies to devise strategies for the management of sustainable practices, which have become one of the main subjects that must be addressed in the literature, making it necessary to open lines of study. The objective of this work, is to identify the intellectual structure of the research field of the SDGs in the tourism sector, using a bibliometric analysis that allows the identification and analysis of the relationships between the topics that have had the greatest impact on the construction of the knowledge base of this discipline. This analysis started with a search on the theme of sustainable development goals and tourism on the Web of Science (WoS) platform between 2013 and 2022. The resulting data was processed with Bibliometrix, allowing for an analysis of indicators, number of articles, and also productivity by country, author and journal. In addition, the nodes (different themes) and clusters (trends) of the field of study were identified, highlighting the main research topics. In recent decades, SDGs has expanded into various sectors especially in the tourism sector, recognizing the importance of sustainable development when developing business activity, using available resources in an economically but also environmentally efficient way. In this sense, the topics stand out: framework, economic-grow, gender and ecotourism.

Keywords: sustainable; development goals; SDGs; tourism; bibliometric; co-word; Web of Science (WoS)

1. Introduction

Social issues, including fair trade and the reduction of poverty, have come to the forefront of the debate on sustainable tourism, with a universal call to put an end to poverty, protect the planet and guarantee that all people can enjoy peace and prosperity by 2030, according to the Sustainable Development Goals (SDGs) (Tepelus, 2008).

Additionally, there is a growing number of people who point at the tourism industry and its development as the root cause of much environmental damage (Wang et al., 2020). For this reason, the development of sustainable products is becoming more important than ever in today's tourism and accommodation industry, making environmental sustainability the main issue that needs to be addressed (Han, 2021).

This justifies why companies in the sector are implementing strategies for the management of sustainable practices (Madanaguli et al., 2022). Similarly, many organizations recognize the importance of developing sustainable behavior based on the premise that society and businesses should use available resources at a rate that does not compromise the wellbeing of future generations (Nave et al., 2021).

But even though the impact of tourism activities on the environment has been recognized, the literature that studies the relationship between them and the SDGs is imprecise and, in many cases, limited to merely mentioning the responsibility of tourism. Rarely does it cite the importance of promoting and achieving the SDGs (Nguyen et al., 2019; Wood, 2017). This brings about the need to carry out research in the field of the SDGs, to construct new, inclusive and competitive business models that can reduce negative impacts and providing positive effects for companies in general and for the natural, external environment in particular (MacKenzie and Gannon, 2019).

In this context, the realization of a bibliometric analysis could play an important part in research on the ODS in the tourism sector, and in the growth and development of the scientific research and production that has taken place in recent years and that has generated the need to create indicators which analyses this concept. Due to this increased academic interest and the lack of focused reviews, we believe it is time to examine the overall picture to suggest suitable lines of future research. Bibliometric analysis is a methodology which enables the analysis of scientific production to orient the scientific community as regards the focus points and progress in a certain area of knowledge. It also analyses various elements such as collaboration between authors, scientific activity by country or region, citations, and the impact factor of publications and journals (Donthu, Kumar et al., 2021; Donthu et al., 2020; Duque et al., 2019; Rocio et al., 2023).

Based on the above, our paper aims to study the main patterns and trends within the academic literature of the SDGs in the tourism industry using bibliometric tools. Essentially, we seek to answer five research questions (RQs) as follows:

RQ1. Which is the historical evolution of the literature about SDGs in the tourism industry?

RQ2. Which are the main journals around which the research topic is organized?

RQ3. Which are the main documents that have influenced the intellectual structure of the topic?

RQ4. Which are the more productive authors and the top publishing countries and universities?

RQ5. Which is the conceptual structure of this area or research?

The bibliometric analysis that was carried out to achieve this objective started with a search on the theme of SDGs in the tourism sector on the Web of Science (WoS) platform between 2013–2022. The references were exported from the database and then processed using the Bibliometrix software, which allows the realization of an analysis of indicators such as the number of articles, the authors with the biggest presence in the field, productivity by country and by journal, and the journals with the highest number of articles and greatest impact by number of citations. Furthermore, it aids the identification of nodes (different topics) and clusters (trends) in the field of study, highlighting the main research themes, their evolution and emerging trends which may provide future lines of research in the field.

2. Review of literature

The SDGs and tourism

The activity of the tourism industry is characterized by the fact that it is part of the service industry and by being dependent on the resources and commitment of all parties involved (Çiki and Tanriverdi, 2023; Klarin et al., 2023; Zhang et al., 2022). This is why businesses in the industry must attempt to fulfil their social and environmental responsibilities, whilst generating profits at the same time (Shin et al., 2021). Tourism has the potential to contribute, directly and indirectly, to each of the seventeen SDGs. Furthermore, the SDGs are considered to be a framework for the promotion and development of sustainable tourism (UNWTO and UNDP, 2017).

In recent years, there has been a marked increase in bibliometric studies which focus on the relationships between sustainability and tourism; sustainability as the new paradigm within tourism; tourism sustainability as a single topic, and; sustainable tourism (Mihalic et al., 2021; Pahrudin et al., 2022; Soh et al., 2023;). There have been other bibliometric studies which analyses corporate social responsibility activities, applied as an organizational management model that helps businesses to carry out their activity by aligning the interests and needs of their customers, suppliers, the public administrations and the community with their business strategy in the tourism industry (Lechuga et al., 2020; Sánchez-Camacho, 2022).

However, there are no studies which use a bibliometric analysis to analyses the trend of the research into the SDGS in the tourism industry, despite, research into the SDGs has increased since 2015 and the existing body of knowledge on them allows the field to be analyzed from different perspectives, thereby helping researchers to better understand the state of the field and future trends within it (Bautista et al., 2021).

Various authors have used bibliometric analyses to evaluate the literature on the SDGs. Yamaguchi et al. (2023) concluded that the field of the SDGs is growing rapidly with a trend towards the diversification of the areas of research, such as the business sector, education and poverty (Prieto-Jiménez et al., 2021; Yu and Huang, 2021). However, there is little bibliometric research which addresses the general aspects of the SDGs and their evolution.

Using a bibliometric analysis, Mishra et al. (2023) analyzed the progress, challenges, opportunities, trends and perspectives of the SDGs, analyzing the co-occurrence of keywords and productivity. The results showed the most frequently evaluated SDGs. Other studies, including those by Londono-Pineda and Cano (2022) and Sweileh (2020), identified the recurring types of evaluations related to the 2030 Agenda for Sustainable Development.

Yamaguchi et al. (2022) realized a descriptive bibliometric analysis by growth rate, area of research, source, citation and geographic region. They also applied the analysis of clusters using the co-occurrence of keywords, co-authorship and bibliographic coupling. The results revealed that the SDGs constitute an area of rapid growth, the areas of research are tending to diversify, and most of the reviewed documents were categorized into general aspects of sustainability. Meschede et al. (2020) used a bibliometric analysis to carry out a more comprehensive assessment of the SDGs by performing more than one individual evaluation and recognizing the interdependence and compensations between the various dimensions, which can be achieved by identifying the thresholds of each SDG.

Rather, the works which perform a bibliometric analysis and trend analysis in the field via an analysis of keywords in sustainable tourism include the SDGs as a related

concept that should be analyzed or as a keyword in the field of sustainable tourism. They do not focus on analyzing how its implementation or application in the tourism industry has evolved (Yamaguchi et al., 2023).

Therefore, none of the bibliometric analyzes the relation the SDGs with the tourism sector provide an overview which allows the identification and analysis of the relationships between the topics which have had the greatest impact on the construction of this discipline's knowledge base.

3. Bibliometric analysis

Bibliometrics is one of the most popular quantitative methods used as a technique to comprehensively explain the mobility and interaction of knowledge (Aman, 2018; Zhang et al., 2022). Its main objective is to identify, organize and analyze the main components within a specific field of research (de la Hoz-Correa et al., 2018; Muñoz-Leiva et al., 2020), via the gathering of relevant information from databases of journals, citations, authors, institutions, countries and keywords (Van Raan, 2005).

The primary objective of this work is to analyze the trend of co-occurrence (Callon et al., 1983), i.e., content analysis which allows, using a map, the analysis of the simultaneous presence of terms in academic documents, as well as the identification of patterns and relationships between them. The objective of this technique is to interconnect the most significant concepts (Muñoz-Leiva et al., 2011) to “reduce the distance between descriptors (or keywords) to a set of network diagrams which effectively illustrate the strongest association between said descriptors” (Viedma-del-Jesús et al., 2011).

This analysis may refer to various aspects, including the co-occurrence of keywords in the articles of a certain area of research, to identify common themes or emerging trends; or the co-authorship to identify frequent collaborations or research networks in the academic community (Baker et al., 2020; Cardador et al., 2023; Kumar et al., 2021). In this case, the focus is on the former, to produce an overview of the most relevant keywords, their interconnection and their evolution over time, thereby identifying the areas which have gained or lost importance.

Secondly, a performance analysis will be realized to discover, quantitatively and qualitatively, the relative contribution of a theme to the field of research, detecting the most noteworthy, productive and impactful sub-fields. The most noteworthy measurements are the number of publications, citations per year or per publication, h-index, institution and area of knowledge, among others (Donthu et al., 2020).

However, this type of analysis does have certain disadvantages, as indicated by Donthu, Reinartz, et al. (2021). Firstly, some words are used in multiple contexts and therefore the works need to be checked to find out which exact field they belong to, and secondly, some words can be very general, making it difficult to fit them into a specific field of research.

4. Methodology

Gathering data

The methodology chosen in this paper is bibliometric (Moreno-Guerrero et al.,

2020a; Moreno-Guerrero et al., 2020b). For this bibliometric study, data was collected in March 2023 from the WoS database. The WoS database has been used, since it has a high number of articles, authors and journals (more than 14,000) and is the database with the greatest academic impact (Mongeon and Paul-Hus, 2016) and the condition of peer review for scientific quality (Hodge and Lacasse, 2011). Therefore, it is the most used in the field of bibliometrics in general (González-Serrano et al., 2019) and, in particular, in tourism research (Merigó et al., 2015; Yu et al., 2019). Also, the concepts to be analyzed were established by creating a search equation with all of the terms associated with the selected concept for the study (Montero-Díaz et al., 2018). This meant first defining the search equation [Theme (“Sustainable Development Goals”) and Theme (touris*)] in the Social Sciences Citation Index (SSCI) category.

A total of 327 documents were obtained from the first filter and, having removed any works published in 2023, those not related to the subject and those which were not articles in journals, the final number of works analyzed was 267. Eliminating all those works that were not articles published in magazines, as well as those works that, even though accepted, had a publication date in future years. The described procedure is summarised in the six steps shown in **Figure 1** below:

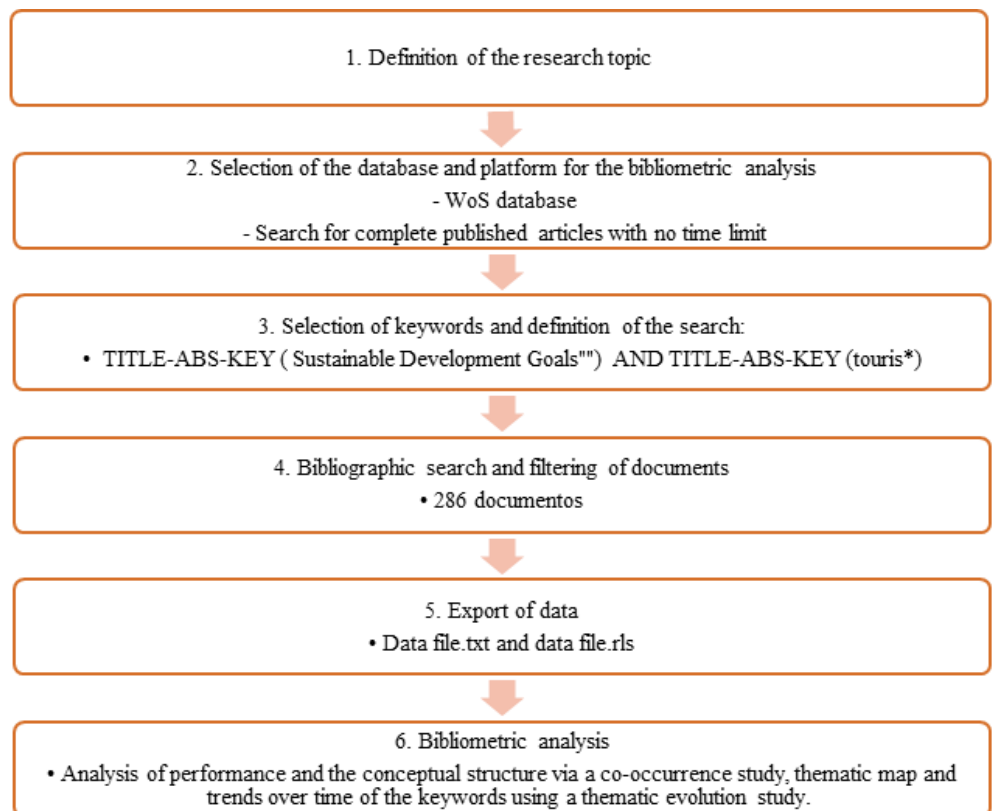


Figure 1. Steps for a bibliometric analysis (León-Castro et al., 2021).

5. Results

5.1. Productivity analysis

It is a prior step which allows the observation of the evolution of the research into a field of study (Carmona-Serrano et al., 2020a; Carmona-Serrano et al., 2020b),

which in this case is the SDGs in the tourism industry. It analyses productivity and impact, measuring them by studying the frequency and indicators of the number of article and journals, the names of the authors who published a significant number of articles in the field, the average number of citations for each author, the h-index, and the fifteen articles with the highest average number of citations per year.

The quantitative processing of the data used the R package from Bibliometrix which is commonly used in the field of social sciences (Lechuga et al., 2020; Ramos et al., 2021). The R package is an open-source tool which features bibliometric methods that can analyze quantitative research in scient metrics and bibliometrics (Prabhat and Suresh, 2020). It is widely accepted as one of the most useful and complete tools for this type of analysis (Janik et al., 2020) and for obtaining the co-occurrence. The units of the co-occurrence analysis were the keywords assigned by the document authors on WoS.

Figure 2 shows the production of scientific articles published in the WoS database and associated with the theme of the SDGs in tourism between 2013 and 2022, and the total is 250. Having analyzed the last nine years, the number of works published for the tourism industry did not exceed a dozen until 2019 (39), with the 2013 to 2018 period being the least productive. After that, and up to 2022, the number of publications slowly increased. The trend line shows that the biggest increase in scientific production was in the 2019–2022 period, which accounts for 93.35% of the total number of publications, demonstrating the scientific community’s increased interest in this area of knowledge. Production peaked in 2022 with 84 articles, representing 36.01% of the total.

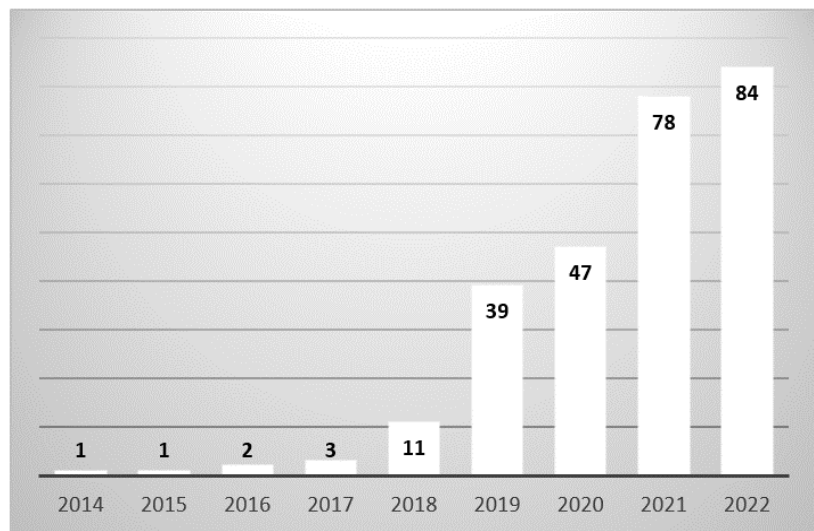


Figure 2. Annual scientific production of articles related to SDG in tourism.

Analyzing the scientific production by country (see **Figure 3**) produces the list of the 16 countries which lead the world’s academic production of articles on the SDGs in tourism on WoS. In first place is China with 151 publications, followed by Australia with 75 publications. Spain is in fourth place with 66. However, in the number of citations per country (see **Figure 4**), China moves to fifth place with 476 citations, behind the United Kingdom (955 citations), which is followed by Canada (624 citations) and New Zealand (565 citations). Spain is in seventh position (350 citations).

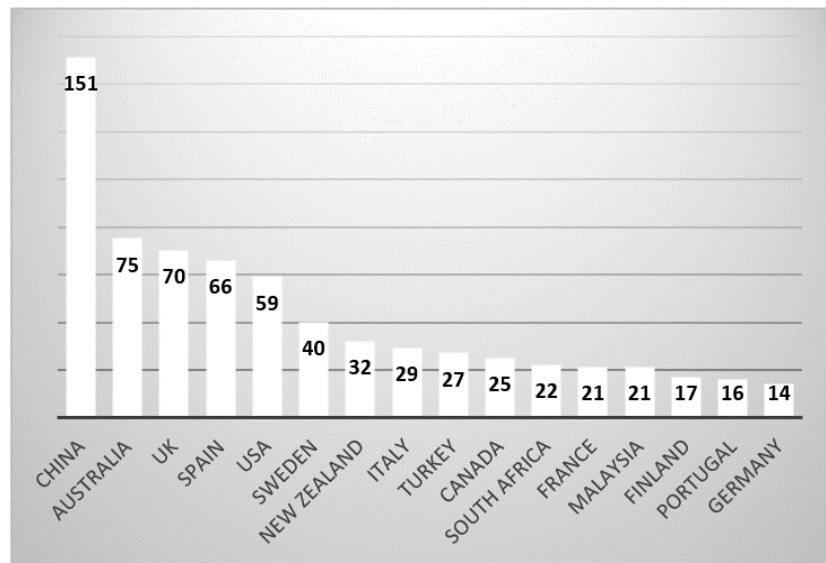


Figure 3. Annual scientific production of articles on the SDGs in tourism, per country.

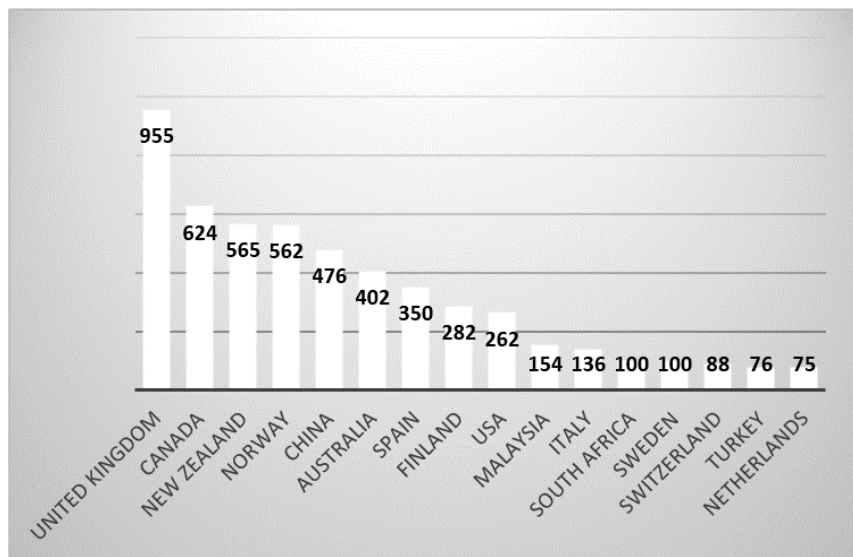


Figure 4. Number of citations per country.

As regards the analysis of the number of authors, there was participation from 1039 researchers, of whom 92.6% published a single work only. **Table 1** lists the most relevant authors, classifying them by the number of documents they published and their h-index. One author, Hall, C.M., leads the production with 13 published articles, and then there are 4 authors with 5 works each: Gossling, S.; Higgins-Desbiolles, F.; Scheyvens, R.; and Seyfi, S. These authors also have the best h-index, with Hall, C. M. having an h-index of 9; the next three having an h-index of 5; and Seyfi, S. with an h-index of 4. As regards the highest number of citations, Hall, C. M. has the most with 753, but only one of the other most productive authors has a high citation index: Scheyvens, R. It is worth noting that, although they are not among the authors with the highest number of articles and therefore not shown in **Table 2**, Sarkodie, S. A. has 413 citations and an h-index of 1.

Table 1. The most relevant documents based on production.

Author	Paper	TC
Alola, A. A., Bekun, F. V., & Sarkodie, S. A.	Dynamic impact of trade policy, economic growth, fertility rate, renewable and non-renewable energy consumption on ecological footprint in Europe. <i>Science of the Total Environment</i> , 685 (2019)	413
Scheyvens, R., Banks, G., & Hughes, E.	The private sector and the SDGs: The need to move beyond 'business as usual'. <i>Sustainable Development</i> , 24(6) (2016)	315
Hall, C. M.	Constructing sustainable tourism development: The 2030 agenda and the managerial ecology of sustainable tourism. <i>Journal of Sustainable Tourism</i> , 27(7) (2019)	247
Scott, D., Hall, C. M., & Gossling, S.	A Global Climate Change Vulnerability Index for the tourism sector. <i>Annals of Tourism Research</i> (2019)	165
Pizzi, S., Caputo, A., Corvino, A., & Venturelli, A.	Management research and the UN sustainable development goals (SDGs): A bibliometric investigation and systematic review. <i>Journal of cleaner production</i> , 276(2020)	146
Boluk, K. A., Cavaliere, C. T., & Higgins-Desbiolles, F.	A critical framework for interrogating the United Nations Sustainable Development Goals 2030 Agenda in tourism. <i>Journal of Sustainable Tourism</i> (2019)	136
Landrigan, P. J., Stegeman, J. J., Fleming, L. E., Allemand, D., Anderson, D. M., Backer, L. C., ..., & Rampal, P.	Human health and ocean pollution. <i>Annals of global health</i> , 86(1) (2020)	135
Rasoolimanesh, S. M., Sundari, R., Michael Hall, K., Esfandiari, K., & Seyfi, S.	Systematic review of indicators of sustainable tourism in relation to the goals of sustainable development. <i>J. Sustain. Tour</i> (2020)	129
Scheyvens, R., & Biddulph, R.	Inclusive tourism development. <i>Tourism Geographies</i> , 20(4) (2018)	121
Gössling, S., & Michael Hall, C.	Sharing versus collaborative economy: how to align ICT developments and the SDGs in tourism? <i>Journal of Sustainable Tourism</i> , 27(1) (2019)	107
Baum, T., Cheung, C., Kong, H., Kralj, A., & Mooney, S. Nguyễn Thị Thanh, H., Ramachandran, S., Dropulić Ružić, M., & Siow, M.	Sustainability and the tourism and hospitality workforce: A thematic analysis. <i>Sustainability</i> , 8(8) (2016)	90
Alarcón, D. M., & Cole, S.	No sustainability for tourism without gender equality. <i>Journal of Sustainable Tourism</i> , 27(7) (2019)	84
Haywood, K. M.	A post COVID-19 future-tourism re-imagined and re-enabled. <i>Tourism Geographies</i> , 22(3) (2020)	79
Grilli, G., Tyllianakis, E., Luisetti, T., Ferrini, S., & Turner, R. K.	Prospective tourist preferences for sustainable tourism development in Small Island Developing States. <i>Tourism Management</i> , 82(2021)	74
Padilla-Rivera, A., do Carmo, B. B. T., Arcese, G., & Merveille, N.	Social circular economy indicators: Selection through fuzzy delphi method. <i>Sustainable Production and Consumption</i> , 26(2021)	74
Danish, A. S. Iqbal Godil Bingjie Xu Avik Sinha Syed Abdul Rehman Khan Kittisak Jernsittiparsert	Revisiting the role of tourism and globalization in environmental degradation in China: Fresh insights from the quantile ARDL approach. <i>Journal of Cleaner Production</i> , 272(2020)	74

Table 2. The most relevant authors based on production.

Authors	Institution	Articles	H_Index	TC
Hall CM	University of Canterbury	13	9	753
Gossling S	Linnaeus University	5	5	347
Higginsdesbiolles F	University of South Australia	5	5	223
Scheyvens R	Massey University	5	5	489
Seyfi S	University of Oulu	5	4	164
Alola AA	CREDS-Centre for Research on Digitalization and Sustainability	4	3	441
Cavaliere CT	Colorado State University	4	3	197
Kim MJ	College of Hotel & Tourism Management	4	4	63

Table 2. (Continued).

Authors	Institution	Articles	H_Index	TC
Liu JG	North China University	4	3	61
Bekun FV	Istanbul Gelişim Üniversitesi	3	3	457
Boluk KA	University of Waterloo	3	3	168
Fleming LE	University of Exeter	3	2	183
Hughes E	Massey University	3	3	358

Table 1 analyses the documents with the greatest impact on WoS and the highlights are as follows: “Dynamic impact of trade policy, economic growth, fertility rate, renewable and non-renewable energy consumption on ecological footprint in Europe” (Alola et al., 2019) with 413 citations, and “The private sector and the SDGs: The need to move beyond ‘business as usual’” (Scheyvens et al., 2016), which is cited 285 times. This paper discusses the challenge being put forth to business actors by the SDGs, reflecting on both the potential for more sustainable and responsible practices and on the limits to change. In this case, the most cited works do not coincide with the most relevant authors and consequentially, the most relevant author from **Table 1** is not found until the third document. This implies that the number of citations is influenced by the number of works published and not their relevance.

Of the 15 most cited documents (**Figure 5**), 5 are published in the Journal of Sustainable Tourism, which has the greatest number of citations (1459), followed by Sustainability with 827 citations and Science of the Total Environment with 446 citations.

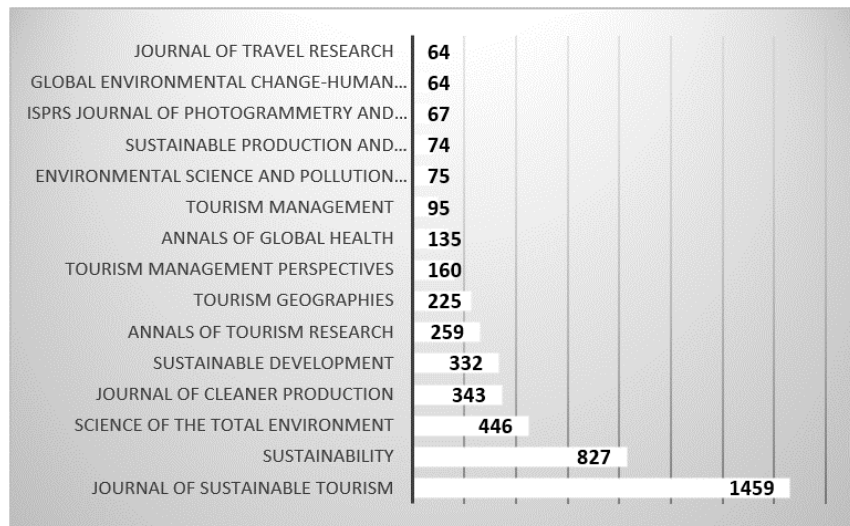


Figure 5. Number of citations by journal.

Shown in **Figure 6** is how the articles are distributed across the 88 journals, with Sustainability having the most (76 articles), followed by the Journal of Sustainable Tourism (52 articles) and Tourism Management Perspectives (10 articles), which is in eighth place in number of citations. It is worth noting that the third most cited journal only has two publications in the field in this study. 20% of the 88 journals published a single article only.

To analyse the constructs of the SDGs and tourism it was necessary to identify the fields of study in which the relationship between the two is the closest. This shows how the fields of science in which the relationship between the constructs is closest is Green Environmental Sciences (40.42%), followed by Hospitality Leisure Sport Tourism (37.98%) and Environmental Studies (33.10%).

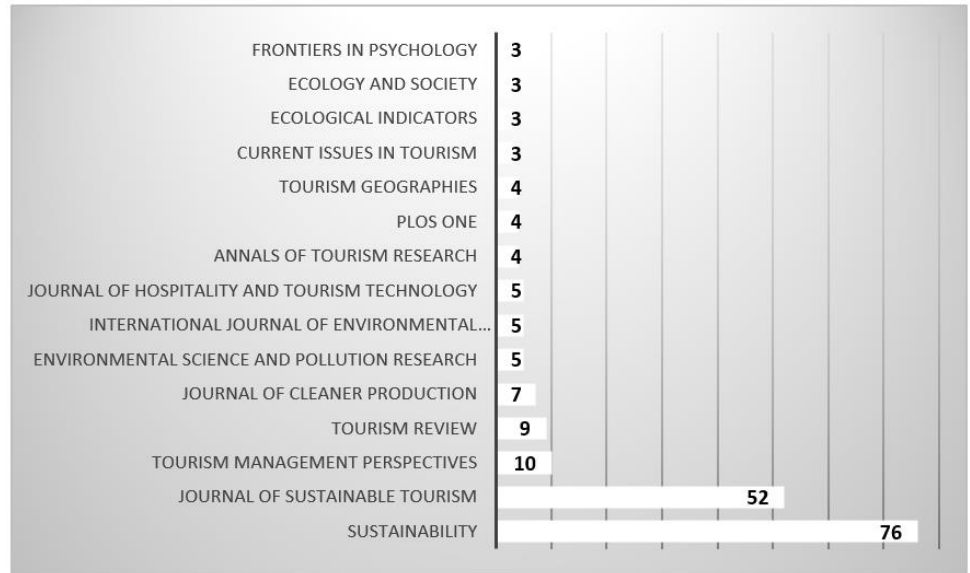


Figure 6. Number of publications by journal.

5.2. Conceptual structure

In the co-occurrence analysis, a set of words are obtained to reflect the central content of the research in the field of study (Naghizadeh et al., 2015). This type of analysis centers on the authors' keywords contained in the body of documents reported in the WoS and seeks to create a bibliometric map formed of various clusters, or significant thematic groupings, which can be studied simultaneously based on their size. In other words, the more central the cluster is on the map, the better the relationship with the theme, resulting in an analysis of trends in knowledge (Van Eck and Waltman, 2013).

Each cluster represents the trends in the research and is formed of circles or nodes which are linked together by lines that show the strength of the relationship (León-Castro et al., 2021). The analysis was carried out using Bibliometrix software and for the grouping of the 286 articles used 1139 authors' keywords, only mapping those which were used a minimum of 3 times.

Figure 7 shows that the keywords which have the highest occurrence in the 286 works are distributed into four clusters. The links show the co-occurrence relationships between each pair of keywords and the node color shows the group to which each keyword is semantically linked. The size of the labels and the diameter of each node are proportional to the frequency and the connections of the respective word. The four clusters are named after the word with the highest frequency. When interpreting the map, born in mind was the number of keywords within each thematic group, the number of occurrences of each one, their inter-relationship and their spatial location. The various clusters revealed the actual content and research themes of the documents,

whilst the conglomerations in the center of the maps indicated the thematic areas with greatest scientific activity.

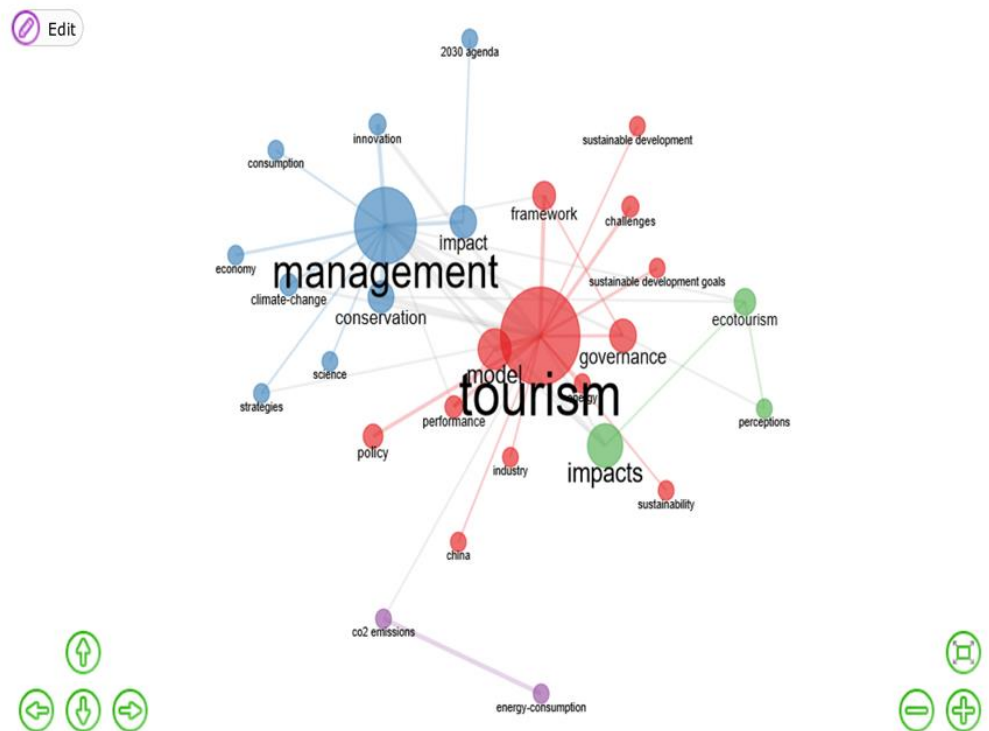


Figure 7. Co-word mapping.

- Cluster 1: Tourism. This term occurred in 61 articles and not only is it the central node of the cluster, it is also the node with the closest relationship to the others. Of the 13 keywords in this cluster, the following are noteworthy: model (24), governance (20), framework (17), challenges (14), policy (14), performance (13) and sustainable development goals (13). Upon observing the terms which form the cluster, it can be noted that they are related to the various management models and policies that need to be applied in the tourism industry to achieve the necessary changes to attain the SDGs and their benefits.
- Cluster 2: Management. This cluster is formed of 10 terms and has a higher number of articles on management (42), followed by the terms impact (24), conservation (17), climate change (13) and 2030 Agenda (12). These terms are related to the fields of business management and strategic management to achieve objectives such as impact, conservation and innovation, as listed in the 2030 Agenda.
- Cluster 3: Impacts. The highest frequency keyword in this cluster is impacts (24), along with ecotourism (16) and perceptions (9). Analysing the impacts of the policies applied to the tourism industry. The main keyword is closely related to tourism (the main word of the first cluster and very close to it, thusly determining the close relationship between the two), as well as the second cluster via the relationship they have with the keyword ecotourism and the terms impact and management.

- Cluster 4: Energy consumption. This cluster is formed of 3 keyword terms: hotels (6), energy consumption (10), and CO₂ emissions (9). This cluster is directly related to the first cluster via the term tourism, with the research focusing on policies for attaining the optimisation of the terms which form the cluster and tourism industry.

5.3. Thematic map

Like Cobo et al. (2012), this article analyzes a thematic map. That is, analysis quantitative, that analyzes the network of co-occurrence of words, to define what the scientific world is talking about in a certain field, as well as the main themes and trends. More specifically, the thematic map shows various classifications of themes. Each topic is represented by a circle (group) in the image and the size of each group is proportional to the number of documents associated with it. This analysis therefore allows us to quantify the thematic evolution of the scientific literature on the SDGs in tourism, helping to understand the current state of research in this field and possible future lines of research.

Furthermore, the thematic map catalogs the main keywords based on two dimensions: 1) Relevance (centrality) or relative importance of each keyword in the research field; and 2) The development, advancement or expansion of the knowledge generated in the field of research (density). The interaction of these two dimensions' forms four quadrants, as shown in **Table 3** below:

Table 3. Steps for an analysis of thematic map (León-Castro et al., 2021)).

<p>Quadrant 3: Niche themes</p> <ul style="list-style-type: none"> Themes of a marginal nature (well centred internal links but external links of little importance) Themes of scant importance (low centrality) 	<p>Quadrant 1: Motor themes</p> <ul style="list-style-type: none"> Well-developed themes (strong centrality) Themes of great importance for research (high density)
<p>Quadrant 4: Emerging or declining themes</p> <ul style="list-style-type: none"> Themes with a very low development level (low density) Scant relevance due to being emerging or disappearing (low centrality) 	<p>Quadrant 2: Basic themes (bridge themes)</p> <ul style="list-style-type: none"> Themes with a low development level (low density) Themes relevant to research (high centrality)

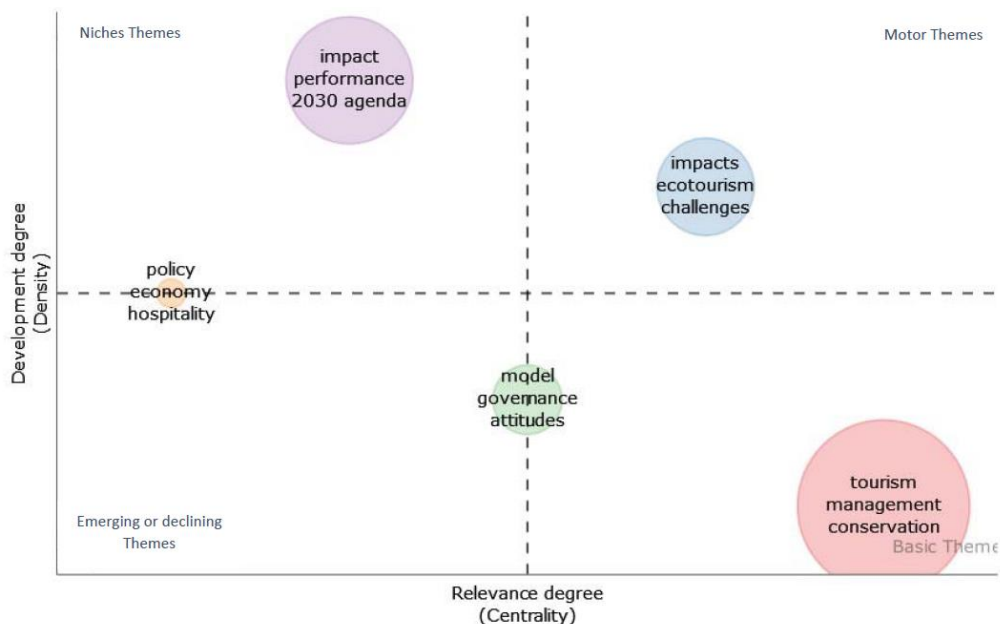


Figure 8. Thematic map of SDG in tourism topic distribution.

In this case, **Figure 8** shows the map of strategic issues, where the clusters appear in the four quadrants defined below:

- **Motor themes.** In this quadrant are themes which were niche but have started to gain momentum in the field of research. They are gathered in cluster 2 and include impacts, terms related to impacts and changes caused by the SDGs in the tourism industry, but the articles are focused on ecotourism. They are gathered into a single cluster, with a total of 10 keywords and the following top keywords: impacts (24 works), ecotourism (16), changes (14) and sustainable development goals (13), as featured in a total of 39 works published between 2017 and 2022. Within said period, many publications were in the last 3 years: 10 in 2020, 11 in 2021 and 15 in 2022, showing a rising trend in this theme. The 39 works were published in 19 journals. The journals with the highest number of publications were Sustainability (15) and the Journal of Sustainable Tourism (4). The journals with the greatest number of citations were Sustainability (93), the Journal of Sustainable Tourism (64), Water (57) and Frontiers in Marine Science (46), with the latter 2 journals having a single published work on the theme in this cluster.
- **Basic themes.** This quadrant is formed of 2 clusters: 1 and 3. The first is composed of 12 keywords, including tourism (in 61 works), management (42), conservation (17), framework (17), climate change (17) and innovation (12). They cover themes of strategic management related to how business decisions are made because of the SDGs in the tourism industry, with a total of 62 works in 33 journals. The journals with the highest number of publications were Sustainability (15) and the Journal of Sustainable Tourism (13), and the remaining journals had 1 or 2 works. Those with the greatest number of citations were: The Journal of Sustainable Tourism (285), Annals of Tourism Research (211 citations with only 2 works), Sustainability (209), and Annals of Global Health (135).

The second cluster is on the axis which separates the second quadrant from the fourth, emerging or declining themes, and it is formed of 7 keywords: governance (20), attitudes (11), perspective (8), satisfaction (8), resilience (7) and support (7). These are found in works which analyse policies for the implementation of the SDGs and how economic, social, cultural and environmental variables affect the tourism industry, especially as regards its human resources and customer satisfaction. A total of 23 works were featured in 13 different publications. The journals with the most works published in this field of research were Sustainability (10) and the Journal of Sustainable Tourism (2). In turn, the journals with the most citations were: Sustainability (175), the Journal of Sustainable Tourism (54), Tourism Management Perspectives (35) and Environmental Conservation (29). The articles with the highest number of citations were therefore found in the journals with the greatest number of works.

- **Niche themes.** These are important themes for the field of research but with a low level of development, combining transversal and basic themes, i.e., themes with some relevance but not yet a lot. The cluster is formed of terms such as impact (20), performance (13) and 2030 Agenda (12). They analyse the impact of implementing measures to achieve the SDGs and in various works, they are

related to the implementation of the SDGs with sustainability and corporate social responsibility measures that improve performance, efficiency or economic growth in the industry. They were found in 34 journals including the *Journal of Sustainable Tourism* (12), *Sustainability* (10) and *Tourism Management Perspectives* (4). Those with the most citations were: *Science of the Total Environment* (446) and *Sustainable Development* (332), both of which had only 2 published articles; the *Journal of Sustainable Tourism* (232), which had 12 published articles; and the *Journal of Cleaner Production* (228), which had 3 articles. Therefore, the number of article citations in this cluster does not depend on the number of publications but rather on the quality of the works, which would explain why they will move from a niche theme to a motor theme.

- Emerging or declining themes. This quadrant is unique in that it shares cluster 3 with quadrant 2. The second cluster within it is cluster 5, which in turn is shared with quadrant 3 (niche themes) and it can therefore be comprised of undeveloped themes which are becoming niche themes, with a greater relevance to the field of research. The keywords in this cluster with the highest number of repetitions are policy (14), along with economy (12), hospitality (12), consumption (8), gender (7) and benefits (6). They were published in 29 works in a total of 10 journals. The journals with the highest number of publications were the *Journal of Sustainable Tourism* (12), *Sustainability* (8) and the *Journal of Hospitality and Tourism Technology* (4), *Tourism Management and Perspective* (2) and *Tourism Review* (2). Those with the highest number of citations are the *Journal of Sustainable Tourism* (52), *Sustainability* (88), *Tourism Management and Perspective* (28) and the *Journal of Hospitality and Tourism Technology* (20). The journals with the highest number of citations are those with the greatest number of published works.

5.4. Thematic evolution

Thematic evolution is used to analyze the thematic and conceptual development of the research, in this case, the SDGs in the tourism industry. Using keywords, a co-occurrence analysis is carried out for each of the stages into which the 2013–2022 period was divided. This analysis provides a description of how the themes maintain a conceptual link throughout the selected subperiods and allows us to see the evolution of the themes (Gutiérrez-Salcedo et al., 2018). The superimposition of the different thematic maps allows us to analyze the evolution of the different themes and, therefore, shows how the different keywords have evolved (Cobo et al., 2011). In addition, it allows an analysis of the most predominant and emerging concepts and their connections over time.

Our study is divided into three time periods: the first from 2013 to 2016, the second from 2017 to 2019 and the third from 2020 to 2022 (see **Figure 9**).

As shown in **Figure 9**, the literature on the SDGs in the tourism industry has evolved over time: applying various keywords to describe the content of the studies, new themes emerging and others disappearing. Additionally, there is a set of keywords that have remained unchanged in consecutive subperiods.

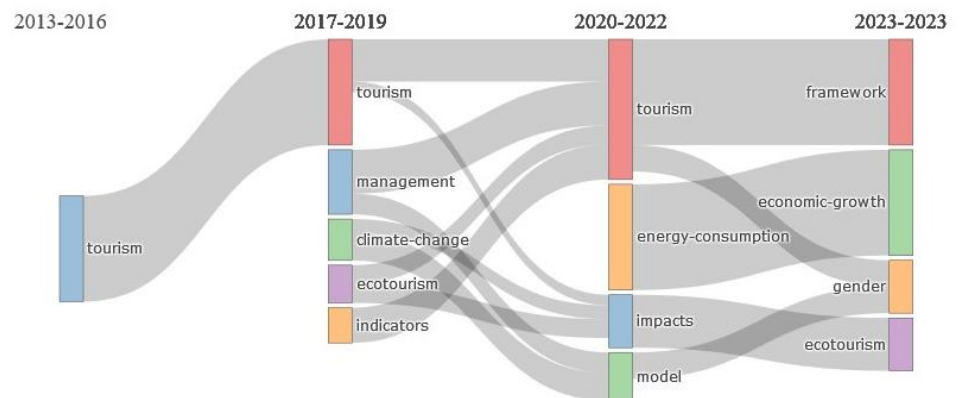


Figure 9. Thematic evolution of the SDGs in the tourism industry, 2013–2022.

Between 2013 and 2016: there was a single cluster, Tourism, with only 1 keyword with 2 occurrences, and only 5 articles were published analyzing the application of sustainability measures in the tourism industry and how ecotourism helps to achieve the SDGs. A total of 53 works were published in the next period, 2017 to 2019.

The Tourism cluster evolves in the following period to another cluster with the same name, which evolves to two clusters, Tourism and Impacts, with keywords such as behaviors (2 occurrences) and tourism (8 occurrences).

New keywords gathered into four new clusters appear in this period. The first, Management, evolves as shown in **Figure 9** towards the Tourism cluster in the following period, with keywords such as management, governance, sustainability, and innovation (each with 7 occurrences); and also towards the Model cluster with key words such as attitudes, model and perspective (with 3 occurrences); and less so, with an occurrence of 2, towards Energy consumption with energy as a keyword; towards the Impacts cluster with keywords such as perception; and towards the Performance cluster with keywords such as hospitality. The works are featured in the fields of strategic management and control, and they analyze the consequences that decisions made by businesses in the implementation of the SDGs have at a company and industry level.

The second cluster is compiled of works on climate change which evolve to the Impacts (keyword: impacts), Model (climate-change), Performance (policy) and Tourism (economy) clusters. The works analyze how the implementation and execution policies of the SDGs enable improvements in climate change that may be caused by activities in the industry, as well as the improvements they can bring about in said industry.

The third cluster, in the 2017–2019 period, features the ecotourism works and this gives rise to the appearance of works on energy consumption (with keywords such as industry), impacts (ecotourism), performance (consumption) and tourism (framework, conservation, strategies). The works analyze how the development of ecotourism activities allows the implementation of policies and strategies which help in the attainment of the SDGs.

Last is the indicators cluster which evolves towards works on tourism, which has keywords such as indicators and development goals. It contains works which analyze the various SDGs and the indicators of which they are composed, as well as the activities which the industry should begin to develop to achieve them.

In the 2020–2022 period: 228 articles were published and there was more diversity in themes related to the issues, including: tourism, impacts, governance, ecotourism, management and performance, words which come from the previous period. The works are centered on applying strategies that, via the directives of the SDGs, will make the tourism industry more sustainable and less polluting. They are gathered into the four clusters which have been analyzed previously: Tourism, Energy consumption, Impacts and Models. The keywords that form them are the same as those analyzed for the previous period, although they veer towards new themes such as economic growth, gender and ecotourism.

The analysis of the positions of the various themes in the strategic diagrams for each period (**Figure 10**) reveals that the first period (2013–2017) is formed of two overlapping clusters with the same shape and size and with a single keyword in each: the first contains 2 occurrences of sustainable development goals and the second has 2 occurrences of tourism. 5 works were published within this period, including the one with the second highest number of citations: Scheyvens et al. (2016). The works analyze the ways to make the tourism industry more sustainable and less polluting, and they agree on the need to apply the directives fixed in the SDGs.

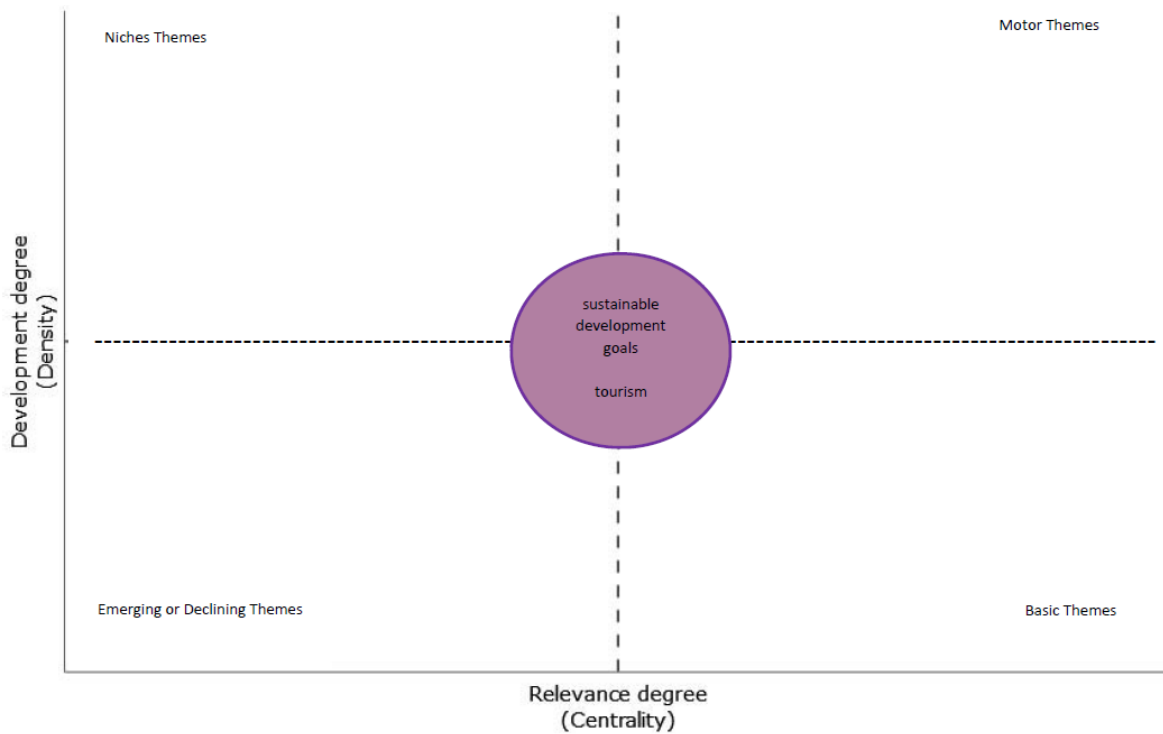


Figure 10. Time slice 1.

In the 2017–2019 period (**Figure 11**), there are five clusters. The first cluster, Climate Change, in quadrant 1, motor themes, is formed of the following keywords: climate-change (3 occurrences), impacts (3), policy (3), carbon (2), discourse (2), economy (2), ecosystem services (2), globalization (2) and millennium development goals (2). The works analyse the impact of the measures or indicators of the SDGs in the tourism sector. The second quadrant, basic themes, is formed of 14 keywords: management (7), governance (5), attitudes (3), energy (3), model (3), satisfaction (3), sustainability (3), culture (2), destination (2), hospitality (2), and human resource

management (2). The works are set in the fields of strategic business management and analyse how these management decisions lead to the achievement of the SDGs in the industry. Found within this cluster is another cluster which is on the axis separating the basic themes and the emerging or declining themes: Tourism, which is formed of 6 keywords: tourism (8), benefits (3), protected areas (3), behaviors (2), biodiversity conservation (2), and knowledge (2). The works analyse the benefits of the SDGs for protected areas and preserving an environment that has been seriously damaged by tourism activity.

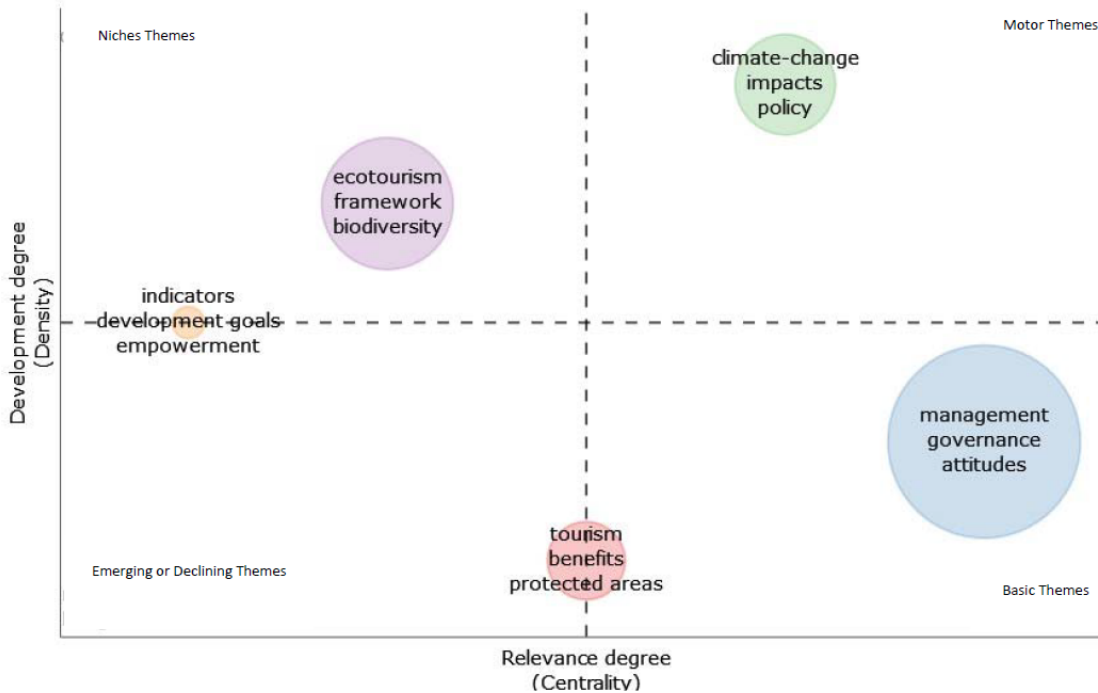


Figure 11. Time slice 2.

The next cluster, Indicators, is located between the axis separating the niche themes and emerging and declining themes. It is formed of 7 keywords: indicators (3), development goals (2), empowerments (2), perspectives (2), political-economy (2) and reflections (2). The works show the various indicators of the SDGs and which objectives are set up for the tourism industry. Last is the Ecotourism cluster within the niche themes and it is formed of 13 keywords: ecotourism (3), framework (3), biodiversity (2), conservation (2), consumption (2), corporate social responsibility (2), environment management (2), industry (2), map (2), science (2), strategies (2), technologies (2) and tool (2). Niche themes are those relevant to the research by not yet well developed, such as responsible tourism and social responsibility associated with the application of the SDGs to improve the industry. A total of 53 works were published in this period.

209 works were analyzed in this period and they are compiled into 6 clusters (**Figure 12**). The first of these, Models, is in the first quadrant, motor themes, and it contains 9 keywords: model (20 occurrences), climate change (9), attitudes (7), resilience (6), support (6), experience (5), perspective (5), travel (5) and values (5). The next cluster is on the axis separating motor themes and basic themes and is practically inside the second quadrant. The Tourism cluster, which in the previous

period was found between emerging and declining themes and motor themes, has also increased in size, becoming the most important cluster in this period, and it is formed of 15 terms: tourism (48), management (33), conservation (14), governance (13), framework (11), economy (10), innovation (9), sustainable development (8), strategies (7), development goals (6), future (5), indicators (5), sustainability (5), antecedents (4), and behavior (4). Therefore, there is an increase in the number of articles which establish a relationship between the strategic decisions made by business to achieve the SDGs and the subsequent improvement in the social, cultural, environmental and economic indicators in the tourism industry.

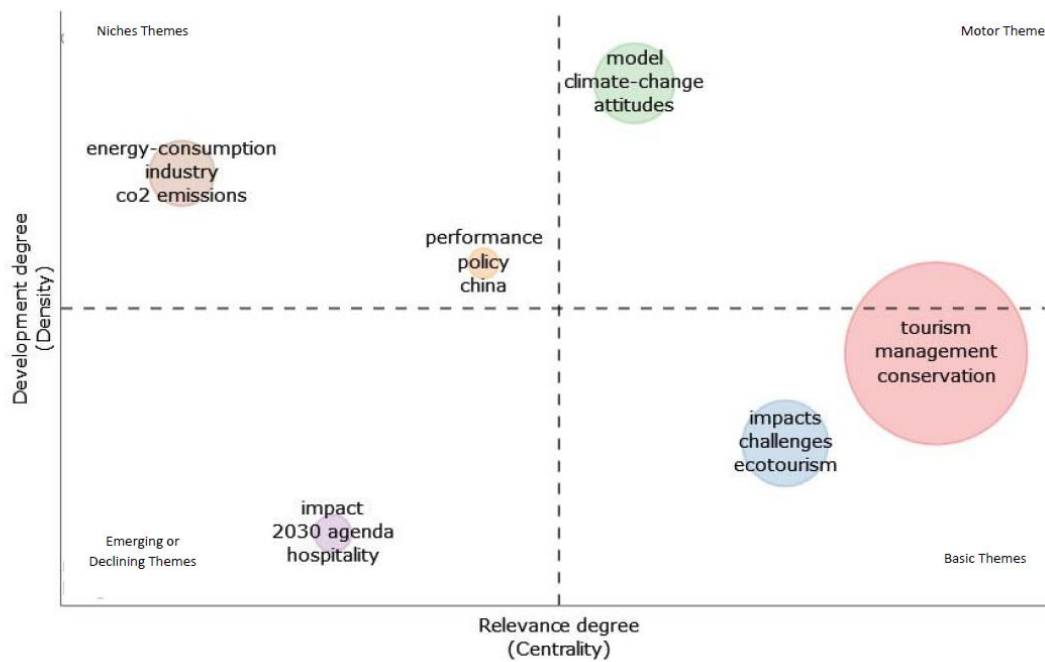


Figure 12. Time slice 3.

The next cluster, Impacts, is in the basic themes quadrant and is formed of impacts (20), challenges (12), ecotourism (11), sustainable development goals (11), employment (6), issues (6) and perception (6). The works analyze the impact of the SDGs and the benefits of changing to ecotourism within the industry. Found within the emerging or declining themes quadrant is the cluster called Impact and it is formed of 4 keywords: impact (18), 2030 agenda (12), hospitality (9) and education (6). The works analyze the impact of the SDGs that are required to comply with the 2030 Agenda in the industry. The next 2 clusters are found in the niche themes quadrant. The first, Performance, is formed of 6 keywords: performance (12), policy (8), China (7), consumption (5), efficiency (5) and sustainable tourism (5). The second cluster, Energy Consumption, is formed of 9 keywords: energy consumption (10), industry (9), CO₂ emissions (7), energy (7), growth (6), economic growth (5), greenhouse gas emissions (5), urbanization (5) and vulnerability (5). In both cases, the works allow the analysis of the benefits of applying the SDGs, such as increased performance and efficiency, or improving economic growth by trying to make a more sustainable tourism industry by applying the SDGs and reducing energy consumption and CO₂ emissions.

The main keywords of the last 19 documents published, in this period, are shown

in **Figure 13**. The first cluster is on the axis which separates motor themes and basic themes, and it has 2 keywords: framework (3) and management (2). The second quadrant, basic themes, contains the cluster called Tourism which in turn contains 2 keywords: tourism (3) and determinants (2).

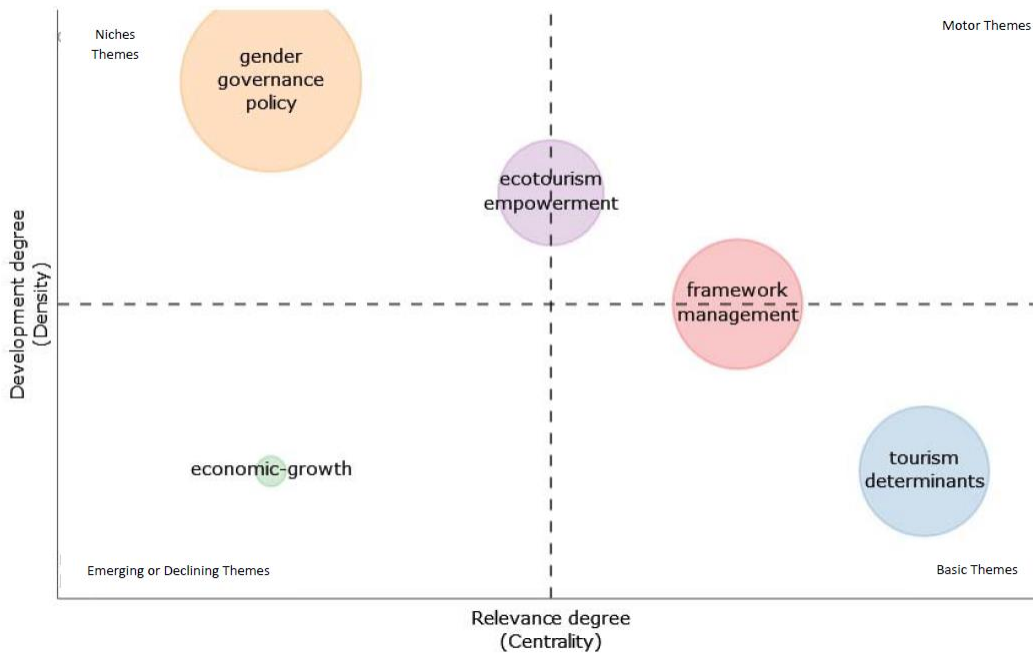


Figure 13. Time slice 4.

The cluster called Economic Growth is in the emerging or declining themes quadrant and it has a single keyword. Two clusters are found in the niche themes quadrant. The first, Gender, has 4 keywords: gender (2), governance (2), policy (2) and science (2). The second cluster is called Ecotourism and is on the axis between niche themes and motor themes.

The works analyze how to improve the tourism industry at a local and global level by attempting to achieve the SDGs, trying to improve the situation of women and supporting ecotourism.

6. Discussion

This study has analysed the evolution of the field of the SDGs and tourism in various periods between 2013 and 2022. After the initial analysis of the most relevant works, authors, countries and keywords, it went further into an analysis of the evolution of keywords and study themes in each period. This longitudinal analysis provided a bibliometric map and depicted how the focus points of the research have evolved over time in the field of study of the SDGs in the tourism sector.

We were guided by five research questions during this process, the conclusions for which we provide below. RQ1 sought to analyse the historical evolution of literature. Although the first paper was published in WOS in 2013, the results indicate that since 2019 there has been an increase in academic publications. Still, it has been in the last two years that this growth has taken an exponential form, indicating the importance and the interest of academics of this subject in recent years. RQ2 sought

to know the main journals that have published on the topics under analysis. In response to this question the journals that have published the highest number of articles are Sustainability, Journal of Sustainable Tourism and Tourism Management Perspective, this is more focused on tourism issues. The journal with the highest impact factor is Journal of Sustainable Tourism, followed by Sustainability and Science of the Total Environment. Of the five journals with the highest number of articles published, Sustainability is the journal with the most publications and the one that has seen the greatest increase in scientific production on these topics. We call on the other journals to call for special issues to increase the number of publications on this topic and, consequently, to broaden the sources where papers relating SDGs and tourism sector are published.

RQ3 focused on studying the most influential papers in the intellectual structure. Of all the papers analysed, only 10 obtained more than 100 citations. The paper written by Alola et al. (2019), is the most cited. Regarding RQ4, we observe that authors Hall is the one with the highest production with thirteen publications and an H-index of 9, followed by 4 authors with five works each.

Finally, RQ5 refers to the conceptual structure of the research topics, SDGs and tourism. In recent decades, SDGs has expanded into various sectors especially in the tourism sector, recognizing the importance of sustainable development when developing business activity, using available resources in an economically but also environmentally efficient way (Nave et al., 2021; Pahrudin et al., 2022; Shin et al., 2021; Soh et al., 2023).

In this regard, it has been shown how keywords in SDGs and tourism have followed a pattern over time. The works produced in the first years were primarily focused on the study of the achievement of the SDGs to mitigate the environmental, social, economic and cultural issues generated by tourism activities in a given area, with the most common keywords being tourism and SDGs (Baum et al., 2017; Scheyvens and Biddulph, 2018).

However, as time progressed, the keywords tourism and sustainable development began to be increasingly used in relation to the field under study. Furthermore, they started to equate attaining the SDGs, and therefore compliance with the 2030 Agenda, with achieving sustainability and economic growth in the tourism industry (Khizar et al., 2023).

The passage of time saw a diversification of the research themes addressed by researchers, with a greater variety of keywords related to performance, business management, strategic management, and management control in the tourism industry (Rubio et al., 2020; Ruiz-Fernandez et al., 2023; Yousaf et al., 2021). Importance was given to the search for ecotourism, in collaborating with the fight against climate change, reducing energy consumption and CO₂ emissions, and making the industry efficient and sustainable (Baloch et al., 2023; Shasha et al., 2020). The keyword term sustainable development goal does not appear many times but increasing importance is conferred to the keywords related to each of the existing goals and their impact on and benefits for the industry.

So, although bibliometric works that analyse the implementation of the SDGs in the tourism sector have proliferated (Soh et al., 2023; Taraniuk et al., 2023; Yamaguchi et al., 2023), there are no studies analysing the evolution and trends of the

research field on said sustainable development goals in this sector.

7. Conclusion

The evolution of keywords reflects the growing comprehension of the importance of the SDGs and sustainability in the tourism industry, as well as of the importance of expanding research topics to address broader aspects of social, economic, environmental and cultural development in the tourism industry. Also, the evolution of the SDGs and tourism themes show a progression from the centrality of the SDGs to a greater diversification of themes that have a more specific focus on analysing the impact and benefits of each SDG, as applied to the tourism industry. These changes reflect the evolution of research in the field in response to the changing preoccupations of researchers and stakeholders over time.

This work provides relevant information on the status quo of the SDGs in the tourism sector research field and establishes a roadmap for researchers who want to publish in this field. Furthermore, this study can help researchers compare and evaluate the different terms used. This allows us to suggest different paths for future research, as well as show progress in scientific progress.

Furthermore, for future researchers, it is useful to have an overview of the main authors and institutions to consider within the discipline, and the topics of interest for review. For current and potential authors, it can serve as a guiding guide in relation to the content, topics of interest and, in general, provide them with information that can help them in their intention to publish their research.

Limitations should be acknowledged. First, the data were retrieved solely from the Web of Science Core Collection, which may have biased the results of this study. Second, limiting the keyword search for topic (sustainable development goals and tourism sector) may be the major reason for the size of the final set and may also result in missing a portion of relevant studies. Third, due to language preference, some keywords may not be included in the search formula and thus may also lead to compromised integrity of the search results.

Conflict of interest: The authors declare no conflict of interest.

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