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## New advances in science mapping and performance analysis of the open innovation and tourism relationship

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## ABSTRACT

The number of scientific publications studying open innovation (OI) and tourism has increased since the first concept appeared. Nevertheless, there is still a gap regarding the science mapping and performance analysis of these two concepts. Although there are studies that focus on open innovation and tourism, few are studying the relationship between themes. We aimed to address this gap by reviewing the literature and searching the Scopus database using R. Bibliometrix. We identified 45 published articles between 2010 and 2022, covering 23 sources and 130 authors. The results indicate a strong collaboration network among authors. Open Innovation, Tourism, and Sustainability are the trend topics, as well as the three main keywords. The emerging topics are “open innovation in tourism”, “service innovation” and “overtourism”. Keywords, trend topics, and emerging topics can be valuable guides for researchers and help them decide which path to take in their studies in this field. This paper is a starting point for carrying out further research that relates OI to other areas of tourism, such as smart tourism or smart tourism destinations, which are highlighted in some of the most recent articles that were under this study.

### 1. Introduction

Nowadays, the word “innovation” is present in most diverse areas and it is usual to find this term, for example, in the description of an organization’s mission and strategy (Bessant and Tidd, 2007). Innovation is an economic and social term that consists of the change in value and satisfaction obtained from resources by the consumer (Drucker, 2014). One of the questions that emerge in the literature is “How to innovate?” (Elmquist et al., 2009), with the term “open innovation” appearing for the first time by Chesbrough (2003), whose definition is based on the premise that companies need to open their innovation processes and combine technologies, ideas, and resources, internal and external, to create value for the business (Chesbrough, 2003).

Open innovation has been widely studied in recent years, being one of the most researched concepts in the innovation management area (Huizingh, 2011) and it is present in several studies in the current literature (Abulrub and Lee, 2012; Bigliardi et al., 2021; Del Vecchio et al., 2018; Drucker, 2014). Studies on OI are reflected in different areas of work (Elmquist et al., 2009), from engineering, science, and psychology, to business, management, and tourism (Bigliardi et al., 2021;

Chesbrough and Chen, 2015; Del Vecchio et al., 2018; Gretzel et al., 2015b; c; Gusakov et al., 2020; Pikkemaat and Peters, 2016). Despite this, the themes of these studies are mostly applied to companies and manufacturing industries (Abulrub and Lee, 2012; Almeida, 2021; Chesbrough and Brunswicker, 2013; Inês et al., 2021; Laursen and Salter, 2006; Leitão et al., 2020) and only a few bibliometric studies were found (Dahlender and Gann, 2010; Elmquist et al., 2009; Natalicchio et al., 2017). Van de Vrande et al. (2009) claim that OI is relevant not only for large companies and manufacturing industries but also for other types of smaller companies and services, which studies should be expanded on.

Tourism is a sector made up of products and services in which companies of different sizes operate and it is constantly expanding, making it an economic sector with great weight worldwide (Della Corte et al., 2019). This sector is exposed to challenges (economic, technological, social, ecological, and so on) that must be faced to prosper. One of the main global challenges with economic repercussions has been the Covid-19 pandemic (El-Said and Aziz, 2022; Higgins-Desbiolles, 2020; Lampoltshammer et al., 2023; Ntounis et al., 2022; Zuccoli and Korstanje, 2023a; b), in which one of the sectors hardest hit has been

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tourism, which was considered by UWNTO (2020) to be the most affected sector. Another economic challenge that has cut over the years is the lack of skilled labour (Chand, 2016), as well as the difficulty in training new workers in this area (Zuccoli et al., 2022).

A major technological challenge is the dependence on the internet and energy to be connected, both for companies in the tourism sector that provide technological systems and applications and for tourists who use these systems and applications (Gretzel et al., 2015a). On the other hand, for these scholars, the constant demand for energy triggers sustainability challenges.

In the social sphere, issues such as gentrification and the disaffection of the local population are also a challenge for tourism (Alpestana, 2020). Climate change is another challenge in this sector (Lampolts-hammer et al., 2023), namely global warming, which is manifesting itself in various tourist regions, having an impact on business (e.g., tourism aimed at winter sports (Steiger et al., 2021).

One of the main elements that help to face these challenges is innovation (Carlsen et al., 2008; Egger et al., 2016) which has been highlighted for several decades within this sector (Hjalager, 2010). Innovation can arise in tourism from different sources – through changing customer needs, demographics, the emergence of new technologies, government policies, environmental and social changes, etc. – and can manifest itself in the form of products, services, processes, types of management or logistics (Hjalager, 1996, 2010).

Until about a decade ago little evidence would exist in the literature of studies linking innovation with tourism (Hjalager, 2010) particularly with open innovation (Ramayah et al., 2011). This scenario has changed over the years and studies on innovation in the sphere of tourism have grown (Doctor et al., 2011; Egger et al., 2016; Del Vecchio et al., 2018; Della Corte et al., 2019). Such an event was because tourism is an expanding and competitive sector where innovation is seen as an ally to face constant changes and as a source of competitive advantage (Gomezelj, 2016). The importance given to innovation and particularly to open innovation has captured the attention of researchers and academics, motivating the development of further studies in this area (Lalicic, 2018; Ngeoywijit et al., 2022; Stare and Krizaj, 2018; Szromek et al., 2022).

Despite this, some gaps were identified to which this study aims to respond or to contribute.

- (1) One literature gap that can be identified is the lack of comprehensive mapping and interconnections between the concepts of open innovation (OI) and tourism (Kim et al., 2021). Although the number of scientific publications studying the relationship between OI and tourism has increased significantly, there is still a need to systematically identify and analyze the existing literature on this topic (Liu and Chen, 2020).
- (2) On the other hand, studies relating to OI and tourism are scattered and have different focuses, such as sustainability (Cigir, 2018; Del Vecchio et al., 2018; Della Corte et al., 2021; Jernsand, 2019), business models (Foroughi et al., 2015; Ingrassia et al., 2022; Szromek, 2022; Szromek and Polok, 2022) and smart tourism (Ferràs et al., 2020; Gusakov et al., 2020; Nick et al., 2018; Gretzel et al., 2015b; c). For this reason, it would be important to have a compilation of scientific works – in the form of bibliometric analysis – that study OI and tourism, which was not found in the literature (we found bibliometric analyses about tourism and innovation, but not exactly of OI).
- (3) Another gap identified is the fact that open innovation is little used in the tourism area at the local administration level (Szromek et al., 2022). This gap will be a starting point for the possible realization of a future study related to the theme of this bibliometric analysis.
- (4) Finally, another possible literature gap is the need for more empirical research on the implementation of open innovation in the tourism industry (Pikkemaat and Peters, 2016). While the

abstract mentions the identification of trend topics, such as Open Innovation, Tourism, and Sustainability, it does not explicitly discuss how these concepts are being applied in practice (Goncalves and Sousa, 2019). Therefore, further research may be needed to investigate how open innovation practices can be implemented effectively in the tourism sector, and what factors are crucial for their success.

Since OI is a growing term, this analysis is useful for academics and professionals in the area as it brings together the most relevant information and the main gaps, in a given period, on these two themes, helping to develop more relevant works about them. Simultaneously, this study will help to gather and quantify the themes on which the work on OI and tourism focuses, identifying the less studied areas and, thus, boosting the realization of more studies that deal with the less developed themes.

Having counted the suggestions of the previously mentioned authors and the lack found in the previous literature, the following research questions (RQs):

RQ1: Which are the most relevant authors, journals, countries, institutions, and documents in the OI and tourism literature?

RQ2: What are the main keywords, trends keywords, and emerging topics in the discussion associated with the study on OI and tourism?

Based on those RQs, the following objectives (O) were defined:

O1: To point out the research evolution about the theme, stating: the main journals, authors, affiliations, countries, and documents;

O2: To classify and identify the main content of research through citations and keywords;

O3: To identify the main conceptual and thematic evolution/structure.

## 2. Theoretical framework: Linking open innovation and tourism

According to the definition of UNWTO (DESA, 2008), tourism is “a social, cultural and economic phenomenon involving the movement of people to countries or places outside their usual place, for personal or professional reasons”. Tourism has been expanding dynamically over the last few years, becoming one of the most globally representative economic activities (Della Corte et al., 2019; Egger et al., 2016). This sector faces challenges arising from the fast and various changes that take place, such as changes in processes and products, the social conjuncture, competitiveness, values, and customer requirements, among others (Egger et al., 2016; Witt et al., 2013).

Digital and technological development, namely the emergence of ICT, is another factor that contributes to the dynamism and changes in the tourism sector (Nick et al., 2018). This digital transformation is considered by many a driver of innovation in tourism (Law et al., 2014; Romero Dexeus, 2019), acting as an important means of introducing innovation in organizations and professionals in this field (Chiao et al., 2018). The Internet allows the share of knowledge, information, and innovation, involving users and giving rise to a global community for innovation. This approach of interaction and knowledge sharing has grown into the tourism sphere (Liburd and Hjalager, 2010). To face the challenges and respond to the needs arising from rapid changes and developments it is important for the tourism industry to adopt an innovative approach (Carlsen et al., 2008; Egger et al., 2016).

During the Covid19 and post-Covid19 era, there have been studies on the use of innovative technologies for businesses - particularly tourism - to recover from the damage caused by the pandemic. Examples of such technologies are virtual tours (El-Said and Aziz, 2022), augmented reality (AR) (Alam et al., 2021; Loureiro et al., 2020; Mohanty et al., 2020), virtual reality (VR) (Loureiro et al., 2020; Wibisono et al., 2023) and machine learning, which is a form of artificial intelligence (De Las Heras et al., 2020). These solutions may have come to stay even outside the context of the pandemic (Mohanty et al., 2020), so there will be a great demand for this type of technology. At the same time, the

development of more innovative procedures and strategies makes it possible to rethink technologies to promote sustainability (De Las Heras et al., 2020; Ioannides and Gyimóthy, 2020). AR and VR provide virtual experiences of a place without having to be there physically, which can prevent unnecessary travelling and thus contribute to increasing sustainability in tourism (Loureiro et al., 2020).

There is little consensus about the definition of innovation applied to tourism, however, in one of the studies analyzed in this work (Işık et al., 2022), two of the most used are by Schumpeter (1934) and OECD (2005), which define the term as the introduction of a new product, service, process, market, raw material or organizational structure that has something different from the previous one and substantially improved.

Before delving into the open innovation concept, it is important to make a brief reference to the commonalities and differences between the concepts of innovation and creativity (Anderson et al., 2014). Both innovation and creativity are part of the process and results of trying to create, develop or introduce something new and/or improved (Anderson et al., 2014).

According to Drucker and Maciariello (2014), innovation analyses needs in a given context and, being a conceptual term, it is also perceptive, as it presupposes observing, asking and listening. Successful innovators analyse what the innovation has to consist of to become an opportunity. In this sense, they look at customers, users and other stakeholders to understand their values, expectations and needs. A more contemporary definition of innovation is based on two main characteristics: (1) the degree of novelty and (2) the degree of usefulness or success in applying something new (which may be new for a particular company, market, country or world) (Granstrand & Holgersson, 2020).

Creativity, in turn, is understood as a key ability of individuals, which presupposes an intentional activity (a creative process) that takes place in a specific environment and generates products (tangible or nontangible) that are new, original, unconventional, valuable and useful (Kampylis and Valtanen, 2010). According to Wohl (2022), creativity is an intentional combination of ideas, symbols or objects in an unexpected way in a given context.

Based on the definitions presented, the commonalities between innovation and creativity, in addition to what was mentioned earlier, are novelty and usefulness. More than commonalities, innovation can in itself be a form of creativity, since creativity is multifaceted and can take on various dimensions - economic, artistic, cultural - one of which is technological, or innovation (Florida, 2003). Despite the differences found between innovation and creativity, there is a point of confluence between the two since, to innovate, it is necessary to be creative: creativity refers to the generation of ideas that will later be implemented in certain processes, products or services, to innovate them (Anderson et al., 2014). Innovation is the result of the creative process (Wohl, 2022).

Open innovation is one of the most researched and discussed topics since its introduction by Chesbrough (2003, p. 24) who defined it as “a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology. Open Innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model.”. According to Chesbrough (2003) and Von Hippel (2005), innovation resources are not limited to a single organization and should not be restricted to closer networks, that is, innovation must be open.

Open innovation refers to the process of generating, developing, and implementing new ideas and technologies by leveraging internal and external resources and knowledge. It involves collaboration and co-creation with partners, customers, and other stakeholders, and is often characterized by a more decentralized and networked approach to innovation (Chesbrough, 2003; Laursen and Salter, 2006; Vanhaverbeke et al., 2017).

In the tourism sector, OI is seen as a challenge (Iglesias-Sánchez

et al., 2019). One of the pioneers in OI research in this sector, namely in the hotel industry, was Menzel (2011), followed by studies on innovative users in tourism (Doctor et al., 2011; Faullant et al., 2012; Hjalager and Nordin, 2011). Liburd and Hjalager (2010) present paradigms of OI and knowledge exchange in tourism and the role of universities in this field. The study by Della Corte et al. (2019) conducts a bibliometric study of sustainable tourism within the field of open innovation, showing that sustainability issues are nowadays a cross-cutting concern in several areas. The study by Szromek et al. (2022) showed that solutions to face the obstacles that may arise in the tourism sector require the cooperation of stakeholders. However, it is not just traditional cooperation, but cooperation in the form of open innovation, with innovative solutions developed and made available by others (companies, destinations, and public entities).

There are several practical examples of open innovation in the tourism sector: information sharing between tourists, for example, on social networks or digital platforms (Del Vecchio et al., 2018), partnerships between companies (Enkel and Gassmann, 2007; Moretti and Biancardi, 2020), OI's contribution to making tourism smart (Gretzel et al., 2015b), the search for potential customers by hotels through accommodation platforms (Gusakov et al., 2020), among others.

Still, within this field of study, open innovation and, consequently, innovation, were associated with the term “smart tourism” (Gretzel et al., 2015b) and later with “smart tourism destination” (Del Vecchio et al., 2018; Gusakov et al., 2020) which is a smart city kind of extension, terms that have been highlighted in the recent years. Taking into account the evolution of the study field that relates OI and tourism it was perceived that carrying out a bibliometric study on these two topics would be an added value as long as it would help to gather the most relevant information on the subject, the trend topics, the countries where the relationship between these two themes is most studied, among other important outputs that will be presented and discussed throughout the work.

### 3. Methodology

#### 3.1. Methodological approach

This study follows a methodology based on a systematic literature review, whose purpose is to explain and discuss a subject, theme, or problem from references published in journals, magazines, books, and other documents (Martins and Theóphilo, 2009). Our research follows a bibliometric analysis, a research method that uses quantitative and statistical analyses to describe patterns of publications about a particular field of study and analyzes cooperation between different research profiles (Shanmugam, 2010). This methodology is commonly used in business and management areas, such as tourism (Cuccurullo et al., 2016; Della Corte et al., 2019; García-Lillo et al., 2016; Ramos-Rodríguez and Ruíz-Navarro, 2004), as it allows to explore the cutting-edge of the topic. Also, it is a systematic, straightforward, and reproducible process, as well as it avoids subjectivity (Della Corte et al., 2019). According to Vanti (2002), the goals of bibliometrics consist of identifying (1) the trends and growth of knowledge in a field, (2) the core journals of a discipline, (3) Measure the coverage of secondary journals, (4) the users of a discipline, (5) to predict publication trends, (6) to study the dispersion and obsolescence of scientific literature, (7) to predict the productivity of individual authors, organizations, and countries, (8) to measure the degree and patterns of collaboration among authors, (9) to analyze citation and co-citation processes, (10) to determine the performance of information retrieval systems, (11) to evaluate the statistical aspects of language, words, and phrases, (12) to assess the circulation and use of documents in a documentation centre, and finally, (13) to measure the growth of certain areas and the emergence of new themes.

It also has the particularity of extracting data that can be measured from a statistical analysis of the publications (Agarwal et al., 2016). The

bibliometric study gives more quantitative rigour to the subjective evaluation of the literature; it provides evidence of categories resulting from the theory of a review article and relating two or more authors/-works (Zupic and Čater, 2015).

### 3.2. Method

The applied methodology follows a bibliometric analysis through the use of R software. Bibliometrix is based on co-citation networks and content analysis of scientific articles (Aria and Cuccurullo, 2017). Guedes and Borschiver (2005) refer to bibliometrics as a statistical and quantitative technique whose purpose is to present indices of the production and dissemination of scientific knowledge.

R. Bibliometrix is a statistical package written in the open-source R language, encompassing statistical algorithms, mathematical functionality, and visualization features. It runs in a Windows and Linux operating system environment, with R Studio's graphical interface (Derwiş, 2019). It can be updated and integrated quickly, providing several routines to import bibliographic data from Scopus, Web of Science, ClarMate Analytics, PubMed, and Cochrane databases, preparing the bibliometric analyses and data matrices for co-citation, coupling, scientific collaboration analysis, and co-word analysis (Aria and Cuccurullo, 2017).

### 3.3. Methodological process stages

The methodology focused on three steps. In step one, we selected the Scopus database for being recognized worldwide as one of the most complete and reliable (Pacheco et al., 2020), in addition to indexing highly prestigious journals in such diverse areas, identifying the citations of documents, references used and analysis of scientific production with the calculation of bibliometric indices (Ceretta et al., 2016). We searched for the term "Big Data" and, throughout the data collection process, we identified the definitive database whose analysis was elaborated from the exportation to BIBText of the bibliographic data, identifying the types of documents, number of citations, distribution by year of publication, the authors, research areas and titles of sources; subsequently, through the software R. Bibliometrix, we processed the data of the various series of publications under analysis (Ekundayo and Okoh, 2018) and which culminated in obtaining 4019 documents in the period between 2008 and February 2022. Records obtained in duplicate were excluded from the study. In step two, we interrelate the authors, affiliations, countries, and documents that have most addressed the topic. In step three, we performed bibliometric analyses of co-occurrence, co-citation, and bibliographic, document, and author coupling, which are the most commonly used to map the topic and introduce a more objective component to the study, increasing the precision and rigour that this type of study requires (Zupic and Čater, 2015). We also applied the VOSviewer software for the network and the RStudio analysis in the graphical interface.

## 4. Bibliometric analysis and results

The search focused on the Scopus database conducted on January 3rd, 2023, covering the period between 2010 and 2022, on OI and Tourism scientific production. A total of 45 published were consulted from 23 sources. These articles were published with an average of 3.63 publications per year, an annual average citation of 44.45 per article, and a mean of 6.605 citations per year per article.

In Table 1 we summarize the information about the articles collected.

We present the results obtained and the respective interpretation based on the bibliometric analysis throughout this section.

**Table 1**  
Information about articles collected.

Timespan	2010–2022
Sources (Journals, Books, etc)	23
Documents	45
Average years from publication	3.42
Average citations per document	34.47
Average citations per year per doc	4.971
References	3253
DOCUMENT TYPES	
Article	45
DOCUMENT CONTENTS	
Keywords Plus (ID)	46
Author's Keywords (DE)	187
AUTHORS	
Authors	130
Author Appearances	153
Authors of single-authored documents	4
Authors of multi-authored documents	126
AUTHORS COLLABORATION	
Single-authored documents	6
Documents by Author	0.346
Authors per Document	2.89
Co-Authors per Documents	3.4
Collaboration Index	3.23

Source: Authors' elaboration.

### 4.1. Annual scientific production

We see an increase in knowledge production on the relationship between open innovation and tourism starting in 2010, despite the lack of publications from 2011 to 2013 and in the years 2016 and 2017. There was a substantial growth from 2014 (1 article) to 2022 (12 articles) (Fig. 1). The years 2020, 2021, and 2022 represent the highest scientific production in the period under review, 7, 9, and 9 articles, respectively, revealing the growing interest of researchers in this area of knowledge.

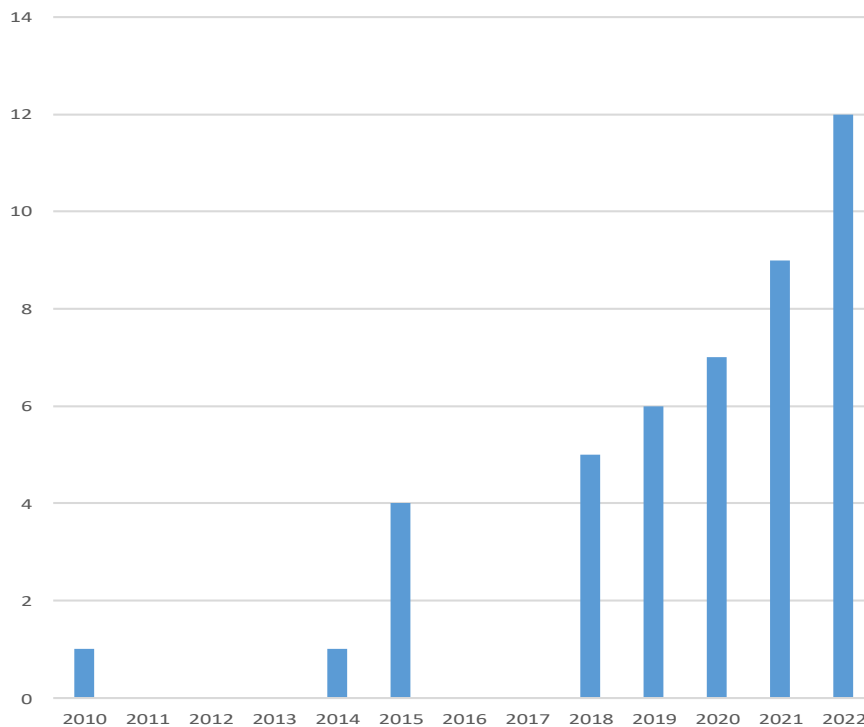
The keywords most found in the articles are "open Innovation" with 22 occurrences, "tourism" with 9, "sustainability" with 5, "innovation" with 4, "business models", "management", "overtourism" and "social media" with 3 and "co-creation" and "collaboration" with 2 (Fig. 2).

Fig. 3 shows the main trends topics over the years and we can see that (1) in 2020, the research trend was towards the "open innovation" theme, and (2) in 2021, the most worked-on theme was related to "tourism" and "sustainability".

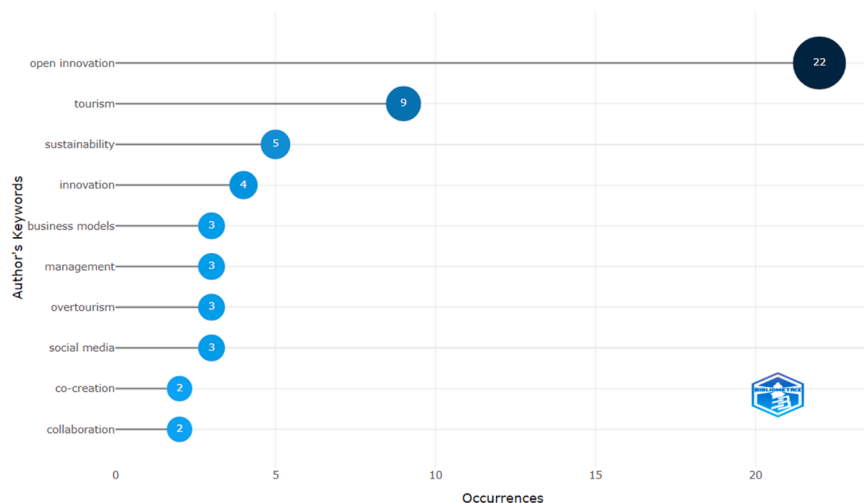
Co-word analysis reveals the density and centrality of the words considered as themes; it allows us to classify and map the themes into four dimensions or quadrants according to research trends through a two-dimensional diagram (Cobo et al., 2011).

Callon et al. (1991) refer that (1) the size of the spheres represents the number of documents associated with each theme or keyword, (2) centrality measures the intensity of connections with other clusters for a given cluster; the stronger these links are, the more this cluster represents a set of research problems considered crucial by the scientific community and (3) there are following positions: (a) upper right quadrant, (b) lower right quadrant, (c) lower left quadrant and (d) upper left quadrant.

The upper right quadrant shows the motor themes, as they present strong centrality and high density; their position is strategic, and they are likely to be treated systematically and over a long time by a well-defined group of researchers; The themes appearing in this quadrant are "open innovation", "tourism" and "sustainability". The lower right quadrant points out that the basic themes are central, but the density of internal links is relatively low; they can also signal the emergence of a series of research problems that are becoming central; The theme with the most centrality here is "social media communication", followed by "collaboration" and "innovation". The lower left quadrant shows the emerging or endangered themes, which have low density and low



**Fig. 1.** Scientific production evolution between 2010 and 2022  
Source: Authors' elaboration.



**Fig. 2.** Most relevant keywords  
Source: Authors' elaboration.

centrality, and are peripheral themes; here the theme that stands out are “open innovation in tourism”, “service innovation” and “overtourism”. The upper left quadrant is peripheral and poorly developed themes, representing the most peripheral part of the network; we can conclude that the most central quadrants are essentially made up of themes like “coupling coordination”, “the tourism industry”, “co-creation” and “sustainable tourism” (see Fig. 4).

**4.2. Journals with the most published and cited articles**

For Ardito et al. (2019), a journal analysis is vital in that it identifies the various research streams on the topic and encourages cross-production between different streams.

We have obtained the journals that published the most papers over this period. We highlight the (1) Journal of Open Innovation: Technology, Market, and Complexity with 18 articles, (2) Sustainability with 4, and (3) International Journal of Contemporary Hospitality and Journal of Hospitality and Tourism Management with 2 (Fig. 5).

As for the most-cited journals in the area we identified, in the first place, (1) Tourism Management Perspectives with 126 citations, (2) Sustainability with 81 citations, (3) the Annals of Tourism Research with 49 citations, followed by (4) the International Journal of Hospitality Management with 47, (5) the Tourism Management with 46 and (6) the International Journal of Contemporary Hospitality Management with 45 (Fig. 6).

One of the metrics used to measure journals' productivity and

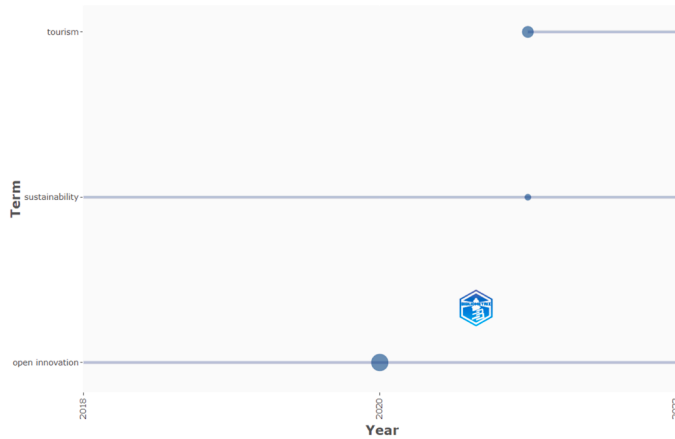


Fig. 3. Trend topics in terms used in the survey between 2010 and 2022. Source: Authors' elaboration.

scientific impact is the *h-index*, also called the *Hirsch index*. Once again, we confirm that the journals with the highest H-index are precisely those that have published the most documents, namely (1) Journal of Open Innovation: Technology, Market, and Complexity (H index: 7), (2) Sustainability (Switzerland) (H index: 4), and (3) International Journal of Contemporary Hospitality Management and Journal of Hospitality and Tourism Management (both with H index: 2) (Fig. 7).

4.3. Countries with the highest scientific production

In terms of scientific production, Spain, Italy, Poland, Austria, and Thailand occupy the top five places, with 31, 19, 17, 12, and 10 documents, respectively (Table 2).

On the map, we see the darker blue tone, with the highest production, Spain, Italy, Poland, Austria, and Thailand are marked, followed by South Korea, the United States of America, China, Portugal, and Malaysia, marked with a less intense tone (less production) (Fig. 8).

The countries whose scientific output is the most cited are South Korea with 1154 citations, Italy with 127, Portugal with 36, Denmark with 35, Spain with 33, Austria with 29, Poland with 28, and the United States with 21 (Fig. 9).

From the comparison between Table 3 and Fig. 10, although is not in the top five countries with the highest scientific production, South Korea

is the country with the most citations. Italy is the second most cited country and it is also the second country with more scientific production.

4.4. Documents

The document with the highest number of citations in the area is the article “Smart Tourism: Foundations and Developments” by Gretzel et al. (2015b), published in the Journal of Electronic Markets, with 799 citations (3 local citations; 796 global citations), whose study “defines smart tourism, sheds light on current smart tourism trends, and then lays out its technological and business foundations” (p. 179). The second paper, with 344 citations (3 local citations; 341 global citations), is entitled “Conceptual foundations for understanding smart tourism ecosystems” by Gretzel et al. (2015b), from Computers in Human Behavior, whose study “defines, describes and illustrates the idea of a smart tourism ecosystem (STE)” (p. 558). The paper also “draws on conceptualizations of smart technologies, smart cities, and smart tourism to envision new ways in which value is created, exchanged, and consumed in the STE” (p. 558). The third document, with 75 citations (2 local citations; 73 global citations), is entitled “Sustainable Tourism in the Open Innovation Realm: A Bibliometric Analysis”, by Della Corte et al. (2019), from Sustainability and “evaluates bibliometric analysis of sustainable tourism in the open innovation realm, depicts emerging themes, and offers critical discussion for theory development and further research” (p. 1). Table 3 presents the most cited documents.

4.5. Authors

Between 2010 and 2022, we found that 130 authors published articles about the relationship between open innovation and tourism, of which 4 are single-authored (3.1%), while 126 are coauthored (96.9%) (Table 1). The authors with the most scientific production on OI and tourism are A. R. Szromek with 8 articles, P. P. Iglesias-Sánchez with 3, and C. Jambrino-Maldonado also with 3 (Fig. 10).

Fig. 11 presents a time dimension of scientific production open innovation and tourism. A. R. Szromek, P. P. Iglesias-Sánchez, C. Jambrino-Maldonado, M. B. Correia, G. Del Gaudio, V. Della Corte, D. J. King, F. Sepe, and Z. Zhoue were the most regular authors on the last four years.

The most locally cited authors were those mentioned in Fig. 12, all of them with 3 citations.

In terms of affiliations, the Silesian University of Technology (a

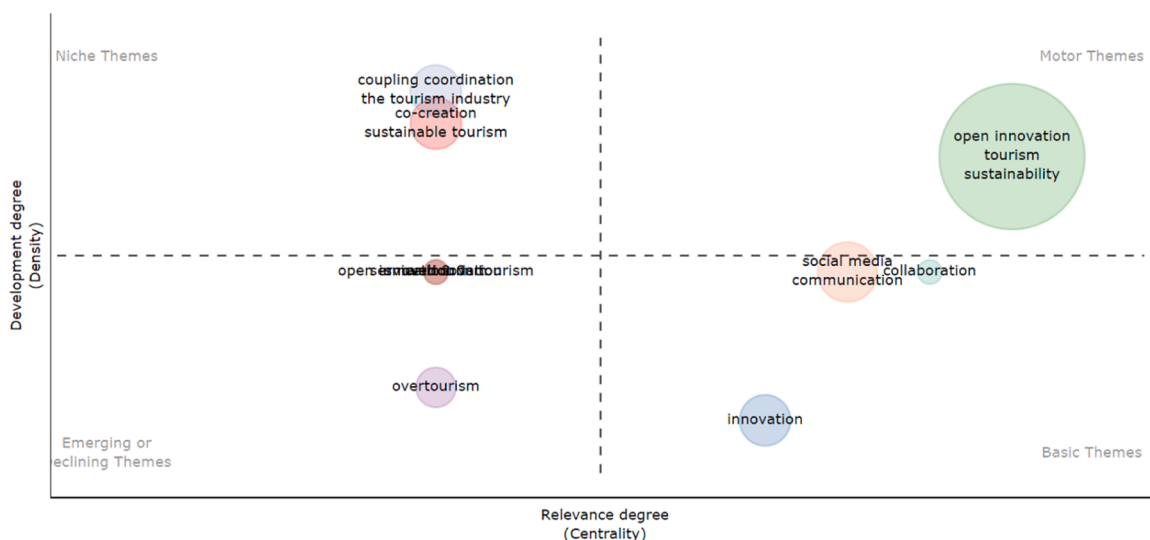


Fig. 4. Thematic map of the most relevant words. Source: Authors' elaboration.

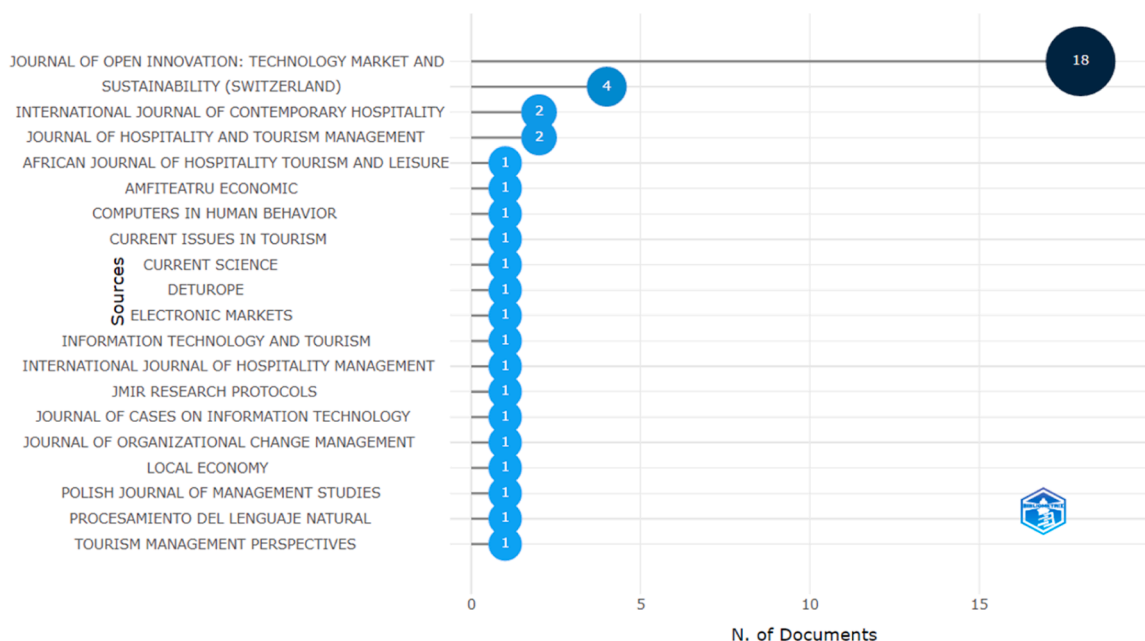


Fig. 5. Journals with the most relevant sources  
Source: Authors' elaboration.

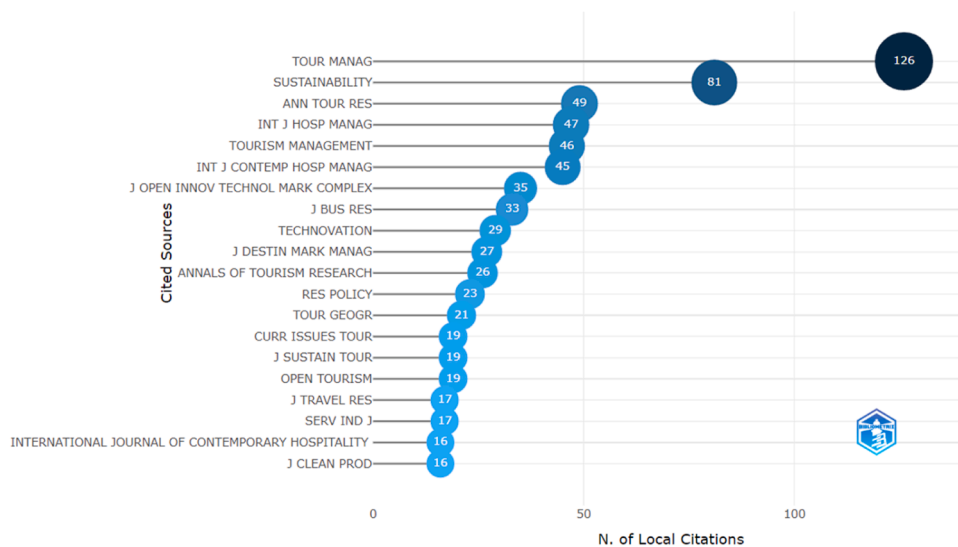


Fig. 6. Most local cited sources  
Source: Authors' elaboration.

Polish university) has the most publications (12 articles). The University of Naples Federico II, an Italian university, is in second place with 7 articles, followed by a Thai university, Ubon Ratchathani University (6 articles), the Spanish Universidad de Málaga-Andalucía Tech (5 articles), two Italian universities – Università Degli Studi di Palermo and the University of Salento – with 4 articles, University of Malaga (Spanish as well) and the South Korean Wooduk University, also with 4 articles. Lastly, there's Chinhoyi University of Technology (a Zimbabwean university) and the Austrian Modul University Vienna, both with 3 articles. The results are displayed in Table 4.

To analyze authors, words, and themes of more outstanding research and most cited references, we use the Sankey Diagram (Fig. 13). This diagram streamlines and clarifies the interactions between the three elements. The larger the size of the coloured rectangles, the greater the importance of keywords, references, and authors. The lines, or links,

connecting publications to authors and keywords are thicker or thinner depending on the number of links. The most relevant themes are “open innovation” and “tourism”, followed by “management”, “open innovation with the digital transformation” and “social media”, as mentioned by all authors. A. R. Szromek and G. Polok are the most cited authors in the area.

#### 4.6. Network analysis

##### 4.6.1. Collaboration networks

Scientific collaboration between authors strengthens knowledge production and is vital for disseminating science. The interaction between authors and countries is fundamental to understanding how they transmit information and knowledge and how they relate. We found a network of collaboration between authors that amounted to 45 articles,

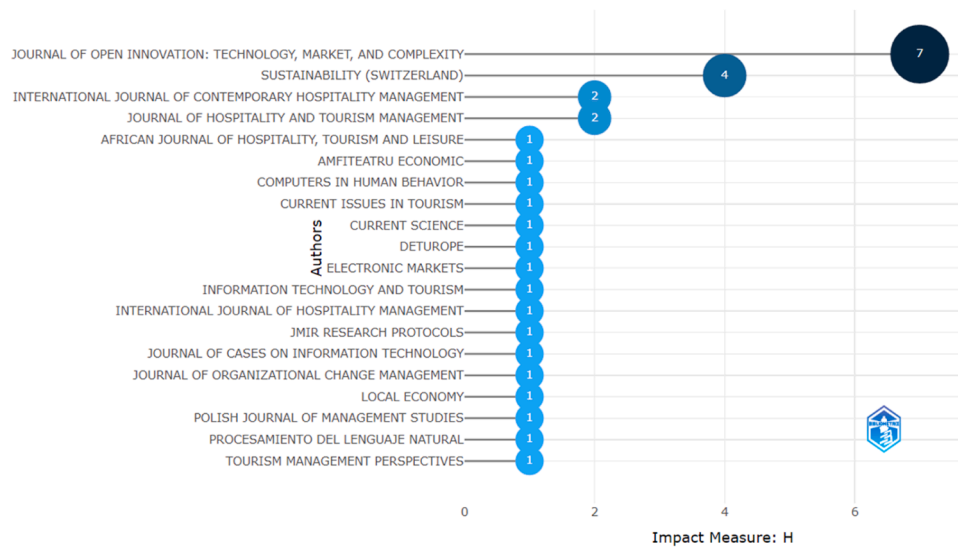


Fig. 7. Source local impact by H index  
Source: Authors' elaboration.

Table 2  
Top-ten number of publications by country.

Country	No. of articles
SPAIN	31
ITALY	19
POLAND	17
AUSTRIA	12
THAILAND	10
SOUTH KOREA	7
USA	7
CHINA	6
PORTUGAL	6
MALAYSIA	5

Source: Authors' elaboration.

an average of 3.4 co-authors per document, and 2.89 authors per document found (Table 1). Fig. 14 shows the collaboration between countries: in blue, the articles published only in a single country, and in

pink, the articles published with the collaboration in several countries, published by authors from more than one country. This type of collaboration is essential as it allows us to know the themes that brought the authors and their respective institutions together and the research networks. Spain and South Korea stand out in the area of collaboration between authors.

4.6.2. Author networks

Fig. 15 shows three clusters of authors whose names are identified by circles. The variation in size of the circles corresponding to each author is proportional to the number of articles each author has in the selected sample. The authors with a larger font are those with the highest number of co-authorships. We can enhance A. R. Szromek, M. Naramski, K. Herman, and G. Polok in the red cluster and P. P. Iglesias-Sánchez, C. Jambrino-Maldonado, and M. B. Correia in the blue cluster and V. Della Corte, G. Del Gaudio and F. Sepe in the green cluster, forming strong cooperation networks between them visualized by the degree of closeness between them and the position occupied in the graph.

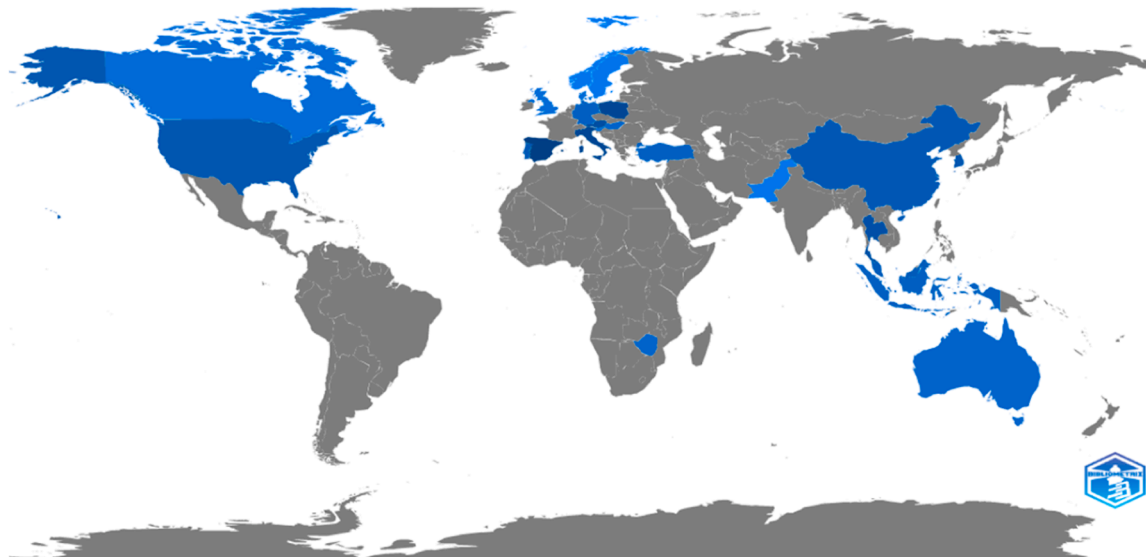


Fig. 8. Scientific production by countries  
Source: Authors' elaboration.

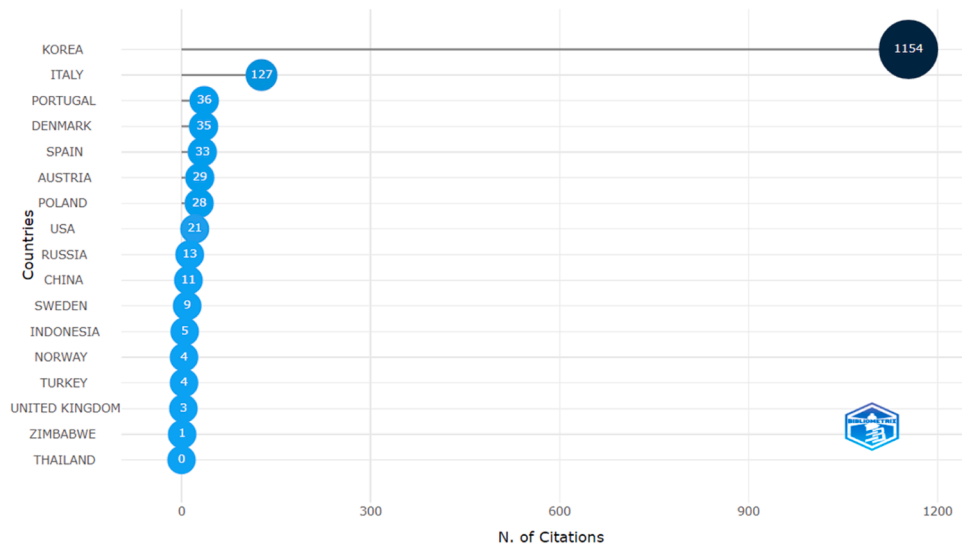


Fig. 9. Most cited countries  
Source: Authors' elaboration.

Table 3  
Top-ten most cited documents.

Document	DOI	Year	Local Citations	Global Citations	LC/GC Rati (%)
GRETZEL U. 2015, ELECTRON MARK	10.1007/812525-015-0196-8	2015	3	796	0.38
GRETZEL U. 2015, COMPUT HUM BEHAV	10.1016/j.chb.2015.03.043	2015	3	341	0.88
DELLA CORTE V, 2019, SUSTAINABILITY	10.3390/sul 1216114	2019	2	73	2.74
DEL VECCHIO P, 2018, SUSTAINABILITY	10.3390/Sul 0093215	2018	1	38	2.63
CASAIS 8.2020, J HOSPTOUR MANAGE	10.1016/j.jhtm.2019.11.010	2020	0	36	0.00
LIBURD J.2010. J HOSP TOUR MANAGE	10.1375/jhtm.17.1.12	2010	1	35	2.86
LALICIC L, 2018, INT J CONTEMP HOSP MANAGE	10.1108/1JCHM-04-2016-0233	2018	1	25	4.00
LELO DE LARREA G. 2021. TOUR MANAGE PERSPECT	10.1016/j.tmp.2021.100789	2021	1	21	4.76
NICK G, 2018, DETUROPE		2018	0	14	0.00

Source: Authors' elaboration.

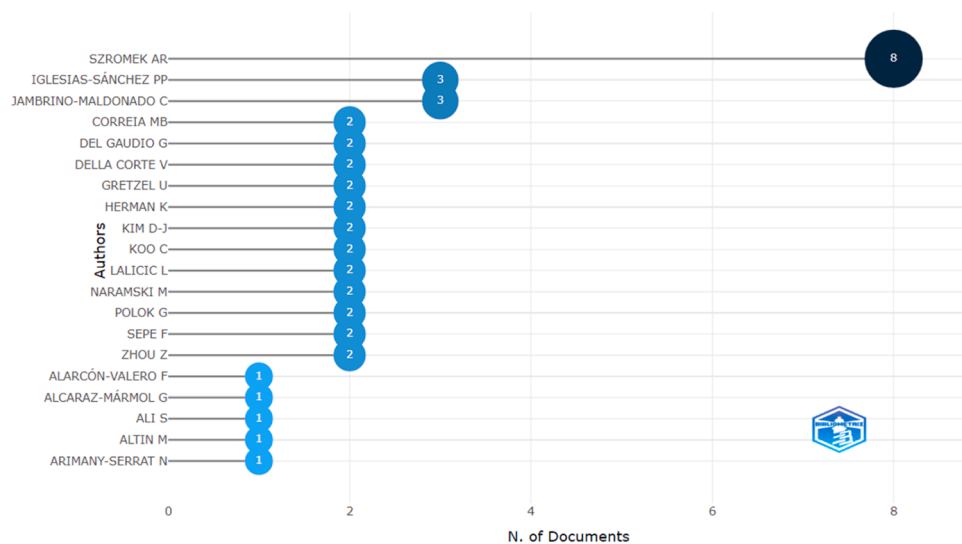


Fig. 10. Most relevant authors  
Source: Authors' elaboration.

4.6.3. Co-citation analysis

Fig. 16 presents the mapping of documents based on bibliographic coupling. We identify five clusters relating to distinct clusters of

publications. Each cluster has a different colour and is marked as a set of articles co-cited together. Each circle corresponds to an article and the lines establish the connection between them through co-citations. The

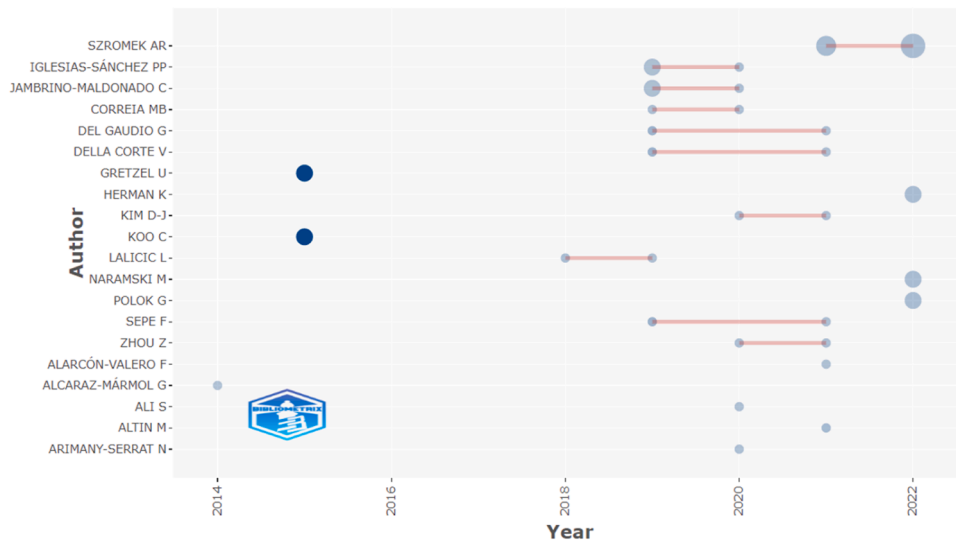


Fig. 11. Top authors' scientific production over time  
Source: Authors' elaboration.

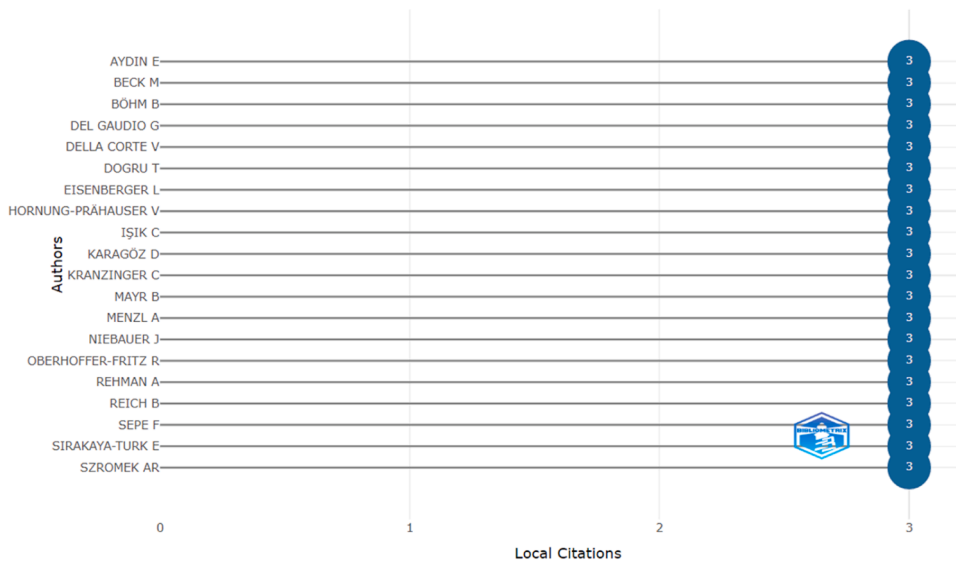


Fig. 12. Most locally cited authors  
Source: Authors' elaboration.

Table 4  
Top-ten affiliations.

Affiliations	Articles
SILESIAN UNIVERSITY OF TECHNOLOGY	12
UNIVERSITY OF NAPLES FEDERICO 11	7
UBON RATCHATHANI UNIVERSITY	6
UNIVERSIDAD DE MALAGA-ANDALUCIA TECH	5
UNIVERSITA DEGLISTUDI DI PALERMO	4
UNIVERSITY OF MALAGA	4
UNIVERSITY OF SALENTO	4
WOOSUK UNIVERSITY	4
CHINHOYI UNIVERSITY OF TECHNOLOGY	3
MOGUL UNIVERSITY VIENNA	3

Source: Authors' elaboration.

size of the circles is determined by the number of times it was co-cited in the publications. The network graph based on the bibliographic coupling of the documents highlights the most significant ones in the set,

many of which are from recent years, expressing the proximity between publications according to the references used. The greater the proximity between publications, the greater the number of documents they share, whether or not they belong to the same country and institution. The blue cluster represents the cluster with the largest number of papers, followed by the green and red clusters. The red cluster is composed of the lower number of articles. For articles to be categorized in the same cluster there must be a high degree of similarity between them.

### 5. Discussion

Our study makes a bibliometric analysis of open innovation and tourism scientific production evolution between 2010 and 2022. This research contributes with a quantitative and statistical analysis of articles on OI and tourism.

The results reveal the production of 45 articles in 23 journals between 2010 and 2022. Regarding the evolution of scientific production, there is an evident growth from 2018 until 2022, after a period of low

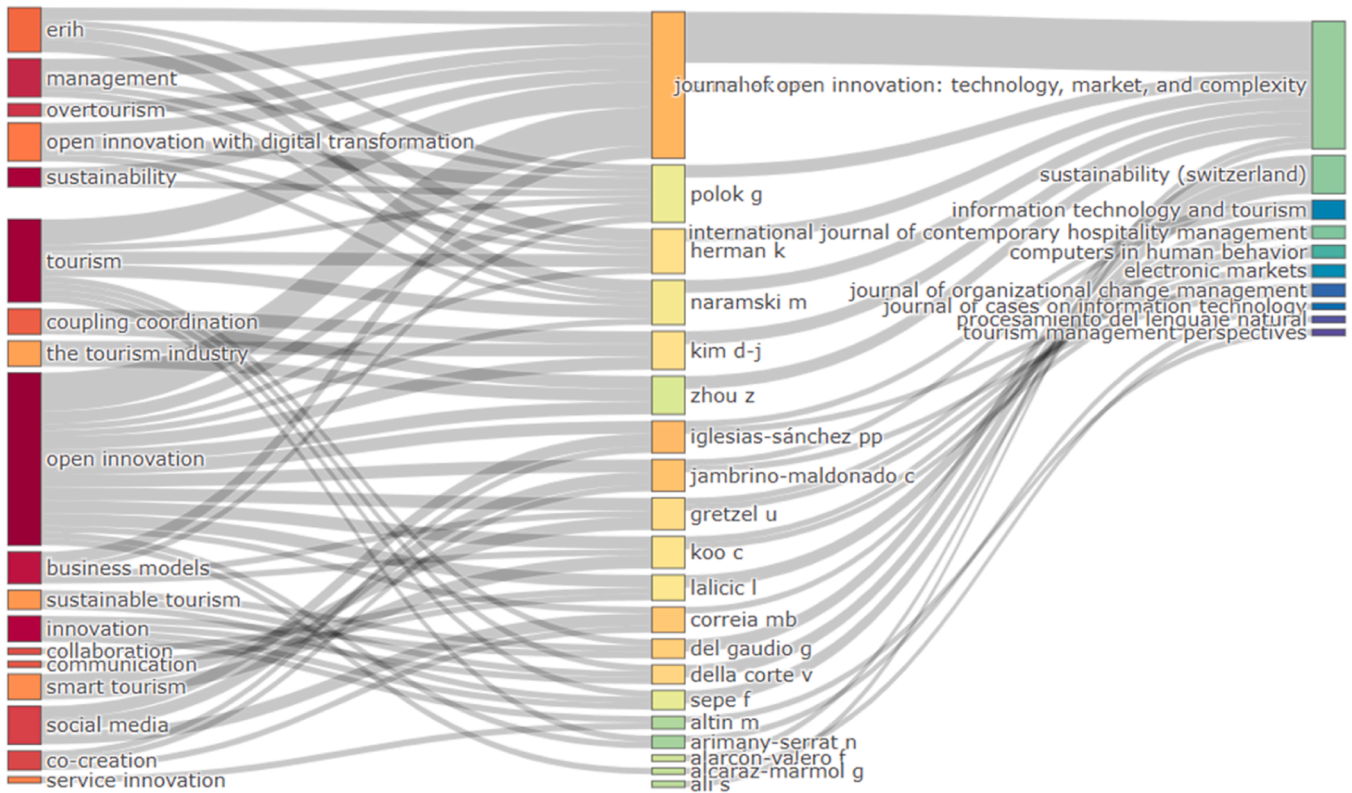


Fig. 13. Sankey's diagram: relation between authors, words, and documents  
Source: Authors' elaboration.

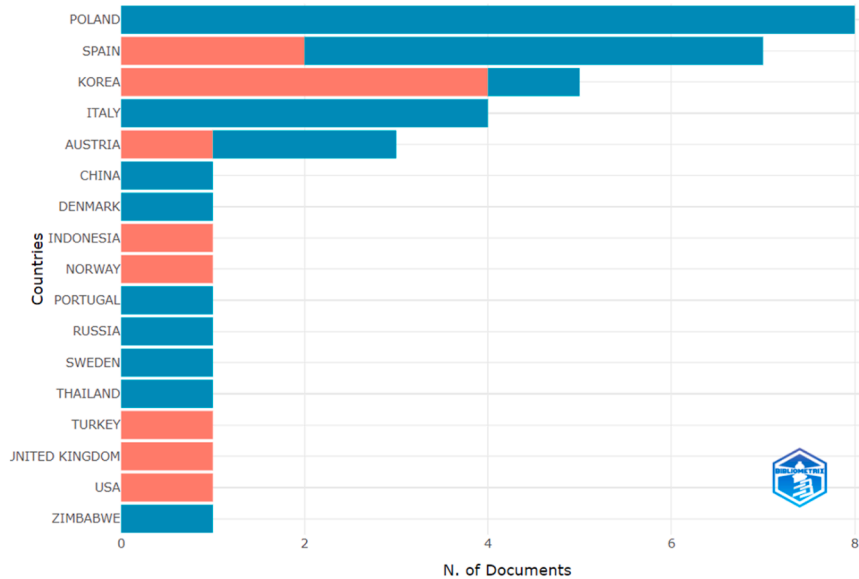


Fig. 14. Corresponding author's country Key: MCP = Multiple Country Publications; SCP = Single Country Publications.  
Source: Authors' elaboration.

scientific production and which had a few years without publications. The evolution of recent years demonstrates that these are trending themes and that there is a current interest in studying them together (Della Corte et al., 2019; Iglesias-Sánchez et al., 2019, 2020; Szromek, 2022; Szromek and Polok, 2022; Szromek et al., 2022).

We proceed to answer the research questions enounced in the introduction:

RQ1: Which are the most relevant authors, journals, countries,

institutions, and documents in the open innovation and tourism literature?

Concerning the authors, those with the greatest production, according to this analysis, are A. R. Szromek, who has produced articles in the last two years; P. P. Iglesias-Sánchez and C. Jambrino-Maldonado, both produced in the last four years. Despite these results, the authors whose scientific production spread over more years were G. Del Gaudio, Valentina Della Corte, and F. Sepe, all of them Italian.



Markets. This is followed by the “Conceptual Foundations for Understanding Smart Tourism Ecosystems” written by Gretzel et al. (2015c) and published in the journal *Computers in Human Behaviour*. The third document with the highest number of citations is entitled “Sustainable Tourism in the Open Innovation Realm: A Bibliometric Analysis”, by Della Corte, V. et al. (2019), published in the journal *Sustainability*. Considering the titles and keywords of these publications, these articles are central to the development of the study focused on open innovation and tourism, specifically smart tourism.

RQ2: What are the main keywords, trends keywords, and emerging topics in the discussion associated with the study on open innovation and tourism?

Regarding the keywords, the most found were open innovation, tourism, sustainability, innovation, business models, management, overtourism, social media, co-creation, and collaboration. This shows an interest in studying OI associated with the tourism sector in the field of sustainability (Del Vecchio et al., 2018; Della Corte et al., 2019; Della Corte et al., 2021; Jernsand, 2019) as well as management and business fields (Cruz-Ruiz et al., 2022; Foroughi et al., 2015; Gusakov et al., 2020; Iglesias-Sánchez et al., 2020; Ingrassia et al., 2022).

The trend topics were open innovation, in 2020, and tourism and sustainability in 2021, which are in line with three of the keywords most present in the literature.

## 6. Conclusions

Carrying out this bibliometric analysis using the R. Bibliometrix software allowed us to obtain a deeper knowledge of the existing literature on the relationship between OI and tourism, namely, the trend topics, the main newspapers, the countries with the greatest scientific production, and the most cited ones, the most relevant studies, and the main authors.

Through this research, it was possible to conclude that the interest in the study of these two themes is recent and there has been a strong impulse in recent years because open innovation is also a recent topic (it first appeared with Chesbrough, 2003). Similarly, studies linking OI with tourism are also recent (Della Corte et al., 2019; Gusakov et al., 2020; Lalicic, 2018; Szromek et al., 2022).

The term “smart tourism” is also the subject of some more recent studies (Ferrás et al., 2020; Gusakov et al., 2020) and the two documents with the highest number of citations are about this topic (Gretzel et al., 2015b, 2015c), which seems to be the field that future studies will focus on.

The methodology used proved to be very useful, as it made it possible to identify the state of scientific production for these two concepts and future research trends.

Based on the articles covered in this bibliometric analysis, scientific production on the themes “open innovation” and “tourism” has been related to areas such as sustainability, innovation, business models, and management, four of the most found keywords, after OI and tourism. It seems that future studies will be developed following these lines since several of the most recent articles (from 2021 and 2022) relate these terms and present proposals for future lines of research in these areas (Del Vecchio et al., 2018; Szromek, 2021b; Szromek and Polok, 2022).

It can be concluded that there has been an increase in scientific publications focusing on the concepts of open innovation and tourism. However, there is still a gap in the literature regarding the mapping and interconnections of these two concepts.

### 6.1. Theoretical and practical implications

One of the main general contributions of this article is the gathering of relevant information for academics who carry out studies in this area, as it makes clear which terms are currently in trend, the level of scientific production, and the main existing collaborations.

This work also contributes to getting to know what other emerging

themes are related to OI and tourism, the existing gaps, and the newspapers with the most publications, among others.

The study’s findings have several implications for theory. Firstly, the study highlights the need for more research on the intersection of open innovation and tourism, particularly in the context of sustainable tourism practices. This would help to advance the theoretical understanding of open innovation in the tourism industry and its potential to address the industry’s challenges.

Secondly, the study shows that open innovation is a collaborative and networked process that involves multiple stakeholders and resources. Therefore, the traditional linear and closed innovation models are no longer adequate for the tourism industry. This highlights the need to develop new theoretical frameworks that incorporate the principles of open innovation and networked innovation.

Thirdly, the study suggests that open innovation can be applied to various aspects of the tourism industry, such as product development, service design, marketing, and sustainability. Therefore, future research should explore the different contexts and applications of open innovation in the tourism industry and its impact on organizational performance and competitiveness.

Overall, the study’s implications for theory suggest that open innovation is a promising approach for the tourism industry and that further research is needed to explore its potential to address the industry’s challenges and opportunities. On the one hand, we have the themes of smart tourism and smart tourism destinations, which have been recent research targets. On the other hand, sustainability in the tourism sector is one of the trending topics.

The outputs of this bibliometric analysis allow us to update knowledge on the two themes under study and constitute a valuable source of information for companies in the tourism sector, but also in other business areas where innovation is present. The implications for practitioners and policymakers in the tourism industry from the reviewed literature on open innovation and tourism are:

- (1) Embrace open innovation: Tourism businesses should embrace open innovation and collaborate with external partners, such as customers, local communities, and other stakeholders, to generate new ideas and solutions that can enhance their competitiveness and sustainability.
- (2) Foster a culture of innovation: Tourism organizations should foster a culture of innovation and creativity within their organization by encouraging employees to think outside the box and experiment with new ideas and technologies.
- (3) Engage in sustainable tourism practices: Open innovation can help tourism businesses and organizations develop more sustainable tourism practices by collaborating with environmental organizations, policymakers, and other stakeholders.
- (4) Leverage technology: Tourism businesses can leverage technology and digital platforms to facilitate open innovation and collaboration with external partners.
- (5) Monitor trends: Practitioners and policymakers in the tourism industry should monitor trends and emerging topics in open innovation, tourism, and sustainability to stay up-to-date with the latest developments and opportunities.

### 6.2. Limitations

Bibliometric analyses have some strengths, but also some weaknesses. Strengths include, for example, the fact that they are a tool for DMOs (Destination Management Organisation) and policy-makers, helping with decision-making, while also providing useful quantitative indicators of collaboration (Ismail et al., 2012). This method makes it possible to analyse a wide range of data and scientific articles and has gained popularity in the field of business in recent years, although it can also be used in other areas of scientific research (Donthu et al., 2021). These advantages translate into various theoretical and practical

implications. On the other hand, it is a weakness that bibliometric analyses only provide a short-term forecast of the research field (Wallin, 2005). Other weaknesses lie with bibliometric databases, which may not include all existing articles on a given topic in a given period, as well as correctly identifying authors' affiliations (Ismail et al., 2012).

The main limitation of this study is that it only covers articles published between 2010 and 2022, which may not provide a comprehensive view of the entire body of literature on open innovation and tourism. In the future, a bibliometric analysis may be carried out in a different range of years or over a longer period, allowing a better perception of the evolution of themes and trends. Additionally, the study only searched the Scopus database, which may have excluded relevant articles published in other databases or sources. Therefore, another database (e.g., Web of Science) or a combination of several ones (e.g., Scopus and Web of Science) may be used, to study these two concepts more widely and compare the information obtained. Furthermore, the study only focuses on the quantitative analysis of author collaboration and topic trends, and may not provide an in-depth analysis of the content and quality of the identified articles.

### 6.3. Future research lines

Regarding this subject, some research lines can be carried out in the future:

- (1) A bibliometric analysis that links OI to smart tourism or smart tourism destinations. These analyses did not fit within the scope of this study but that would be interesting taking into account the notoriety that has been given to these themes.
- (2) Further exploration of the specific mechanisms and processes through which open innovation can be effectively implemented in the tourism industry, taking into account the unique characteristics of the sector and the diverse range of stakeholders involved;
- (3) Investigation of the potential barriers and challenges that may hinder the adoption and successful implementation of open innovation in the tourism industry, including issues related to organisational culture, intellectual property rights, and trust among partners;
- (4) Examination of the impact of open innovation on various aspects of the tourism industry, such as customer satisfaction, business performance, and sustainability outcomes;
- (5) Exploration of the role of technology and digital platforms in enabling and facilitating open innovation in the tourism industry, and the potential implications of these developments for traditional tourism businesses and organisations;
- (6) Investigation of the potential role of open innovation in addressing emerging issues and challenges in the tourism industry, such as the impact of climate change and the rise of alternative tourism models.

The study of the relationship between the topics of open innovation and tourism is an emerging theme whose future research seems to be particularly linked to the use of new technologies in business (Bigliardi et al., 2021; El-Said and Aziz, 2022; Mohanty et al., 2020). Another foreseeable avenue for the future study of these topics is IO linked to sustainable tourism (Della Corte et al., 2019; Della Corte et al., 2021), a relationship that has gained even more prominence with Covid-19 (De Las Heras et al., 2020; Ioannides and Gyimóthy, 2020). The OI associated with smart tourism, and specifically with smart tourism destinations, is another topic resulting from the relationship between IO and tourism that has been studied in the latest literature (Gretzel & Scarpino-Johns, 2018); Gusakov et al. (2020)). It can therefore be concluded that the study of the relationship between these two topics is something current and with prospects for growth in the academic field, with various practical and theoretical applications.

### Author contributions

Authors participated in the drafting of this manuscript as individual experts in their fields, and are solely responsible for the contents. All authors have read and agreed to the published version of the manuscript.

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### Ethical statement

Option 3, No applicable because the paper is not under the Bioethics Act.

### Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Orlando Lima Rua reports financial support was provided by Center for Organisational and Social Studies.

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