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# Bibliometric analysis of trends in COVID-19 and tourism

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The aim of the research is the bibliometric analysis of research on COVID-19 and tourism in order to detect research lines and gaps, the main authors, the countries with the highest number of publications, the most analysed study areas, the journals with the most number of publications and the articles with the highest number of citations. The Web of Science (WOS) database was used to extract the publications and the VOSviewer software was used to represent the data analysed. The keywords used resulted in 1792 publications that were subjected to a filtering process to avoid introducing articles that did not meet the inclusion criteria. Finally, the analysis was composed by 921 publications. The analysis locates a new line of research that visualizes the crisis as an opportunity to propel a new, more sustainable tourism. Tourist perception and the risk of transmission, together with the analysis of measures and policies are other of the most researched topics. China is the country with the most articles on COVID-19 and tourism according to the author's main affiliation, as well as being the most analysed area of study. To the best of our knowledge, this is the first article to carry out a bibliometric analysis of COVID-19 and tourism publications.

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## Introduction

Tourism is an economic driver and a major sector in many countries (Archer et al., 2005), but the arrival of the new coronavirus, SARS-CoV-2 or COVID-19, has changed the tourism scenario. This disease was first reported on 31 December 2019 in Wuhan city, China, by the World Health Organization (Gössling et al., 2020). The severity of the virus, considered the deadliest in history (Fotiadis et al., 2021), leads to a paralysis of tourism in China on 27 January 2020 with the cancellation of all group travel (Mao et al., 2020). Mobility restrictions and border closures spread to the rest of the world, bringing tourism to a standstill due to the dependent relationship between the tourism industry and mobility (Sharma et al., 2021).

The World Tourism Organisation (UNWTO) (2021) highlighted a drop in foreign investment in the tourism sector of 74%, USD 35.9 billion, by 2020, causing losses ranging from USD 910 billion to USD 1.2 trillion and a decrease of 100–120 million direct tourism jobs.

Some tourism destinations have been opening up but the sector has not yet recovered (Akhtar et al., 2021). Tourism is facing a new situation that requires innovative and creative change to succeed (Bodolica et al., 2021; Aldao et al., 2021). Governments must promote strategies to save the sector (Florido-Benitez, 2021; Salem et al., 2021), while businesses will manage the crisis with actions that seek to decrease losses (Liu et al., 2021a) and increase their competitiveness, such as the commitment to hygiene (Suk and Kim, 2021), the design of specific itineraries and activities adapted to the current situation (Wang et al., 2021a) or the creation of tourism campaigns that consider the most important topics of discussion for tourists today (Cavache-Franco et al., 2021).

In this pandemic, important changes in travel patterns and tourist behaviour have been detected, which could endure in the long term (Ioannides and Gyimothy, 2020). Tourist preferences are aligned with the search for greenery and protected areas (McGinlay et al., 2020), while at the same time there is a move away from mass tourism (Higgins-Desbiolles, 2020; Renaud, 2020; Arora and Sharma, 2021). This is leading to an increased interest in other forms of accommodation such as Glamping (Craig and Karabas, 2021) and other tourism typologies such as wellness tourism (Pinos-Navarrete and Shaw, 2021). A change in the way of transport used has also been observed due to the fear of infection, with tourists now generally avoiding public transport (Li et al., 2020; Jiricka-Pürner et al., 2020).

This pandemic is an opportunity to transform the tourism industry with actions such as strategic innovation (Hemington and Neill, 2021). But there is a lack of research to rethink and establish the changes needed in the industry to adapt to a new post-pandemic situation (Sigala, 2020; Kock et al., 2020). We are living an important transition, which can be seen as an opportunity to reinvent tourism taking into account aspects such as social variables, responsible development (Higgins-Desbiolles, 2020; Ioannides and Gyimothy, 2020), environmental impacts (Iaquinto, 2020), looking for a new model of sustainable tourism (Sheller, 2021; Ioannides, Gyimothy (2020); Gössling et al., 2020; Mackenzie and Goodnow, 2020; Zielinski and Botero, 2020; Wen et al., 2020). Planning will be the key to driving tourism economic recovery (Li et al., 2021b).

Research on COVID-19 has been developed in all fields of study, but this article focuses specifically on the tourism industry. It aims at a bibliometric analysis of research on COVID-19 and tourism in order to extract the research lines and gaps, the main authors, the countries with the highest number of publications, the most analysed study areas, the journals with the most publications and the articles with the highest number of citations. To this end, the article is structured as follows: the method section

explains the process undertaken in the bibliometric analysis, the results section identifies the most relevant areas of the analysis, the discussion section brings these results together and highlights areas for future research, and finally, the conclusion section highlights the main findings of the study.

## Methods

The method used consists of a bibliometric analysis of the scientific production on tourism and COVID-19. The use of this type of analysis is motivated by the need to evaluate scientific production (Ellegaard and Wallin, 2015). Its use makes it possible to present the most relevant results of a set of bibliographic documents in a summarised way (Martínez-López et al., 2018), to detect new research trends and to increase the possibilities of cooperation between researchers (Ellegaard and Wallin, 2015). It is a way of organising information within a specific field of study (Albort-Morant and Ribeiro-Soriano, 2016). Bibliometric analysis has been used in tourism research (Leong et al., 2020; Li et al., 2021a) and to study the current pandemic situation of COVID-19 (Chahrour et al., 2020; Sa'ed and Al-Jabi, 2020; Fan et al., 2020), but to the authors' knowledge this is the first study to assess both topics together.

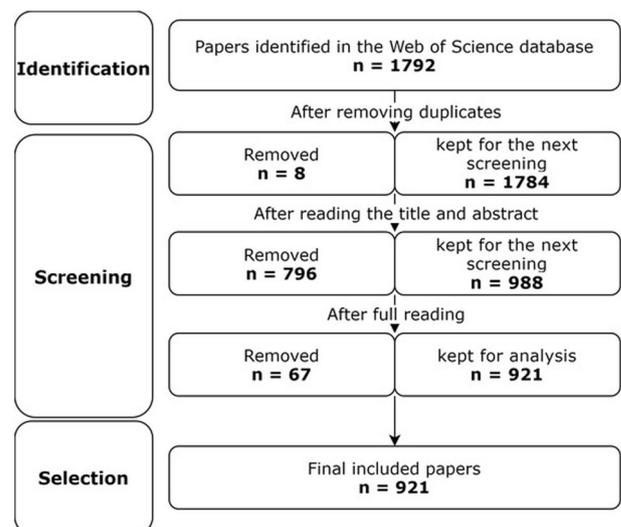
The database used to extract the information was the Web of Science (WOS). This database allows access to publications from all fields of knowledge with a high quality index (Ellegaard and Wallin, 2015; Shah et al., 2019). Its structure allows for targeted, well-structured searches with a high value of thoroughness (Chavarro et al., 2018).

The inclusion criteria focused the search on articles published in 2020 and 2021, which were written in English and whose object of research was tourism in the COVID-19 era. For this purpose, the following search algorithm was used, which includes any publication on COVID-19 and tourism or tourists:

((“sars2”) OR (“sars-2”) OR (“SARS-CoV-2”) OR (“novel corona virus pneumonia”) OR (“coronavirus”) OR (“COVID-19”) OR (“COVID19”)) AND touris\*.

WOS allows results to be filtered according to the year of publication and language of the article, so the keyword search and filters applied resulted in 1792 publications as of 15 September 2021 (Fig. 1).

The search results, 1792 publications, are exported to an Excel sheet to proceed with the filtering process. First, duplicate



**Fig. 1 Stages of implementation.** Identification, screening and selection of publications. \*n = number.

publications are eliminated, resulting in 1784 articles. Secondly, a filtering process is carried out in which the authors, by reading the title and the abstract, analyse the content to include the publications that aim to study tourism and COVID-19, 988 publications continue in the process. Thirdly, the content of the full text is analysed to eliminate articles which do not meet the inclusion criteria, as a result 921 publications are selected.

A content analysis is carried out on the 921 selected publications to provide information on the most researched topics, the authors with the most publications, the geographical distribution of the articles, the journals with the highest number of articles, the most cited articles and the most analysed areas in the case studies. VOSviewer software is used as a tool to build and visualise the bibliometric maps. Its advanced technique allows the creation of author, journal or keyword maps based on co-occurrence data (Van Eck and Waltman, 2010). This tool has its own technique for separating data into clusters, assigning a colour to each cluster (Van Eck and Waltman, 2017). Its ease of use and the possibility of working with a large number of publications have been the reason for its choice. The results of the analysis are presented in the following section.

## Results

The publications on COVID-19 and tourism analysed in this study were 921, of which 304 were published in 2020 and 617 were published in 2021. There is a high trend in the publication of these types of articles and this study can redirect these researches towards possible research gaps. This article identified the lines of research, the main authors, the countries with the highest number of publications, the most analysed study areas, the journals with the most publications and the articles with the highest number of citations. The results of the analysis are shown below.

**Keyword analysis.** The first part of the study consists of analysing the most relevant keywords with the aim of highlighting hot topics and possible future research topics. For this purpose, a keyword co-occurrence analysis is carried out using VOSviewer. Applying a minimum occurrence of 10 times per word as a filter, 343 words were found, classified into 6 clusters. The mapping of these keywords is shown in Fig. 2, which shows the most used words “covid” 1605 times, “tourism” 747 times, “pandemic” 645 times, and “study” 510 times.

The analysis of these groups allows us to define the specific topics of study. In group 1, represented in the image by the green colour, the topics that stand out are those that relate COVID-19 infection to the measures carried out, such as quarantine and travel restrictions. In cluster 2, blue, there is a more latent emergence of studies on perception, risk and travel intention. Cluster 3, red, includes topics related to sustainability, resilience, opportunity, transformation and crisis management in the tourism industry. Cluster 4, yellow, analyses case studies and implementation of tools. Cluster 5, light blue, focuses on the tourism sector and the pandemic from an economic point of view. Group 6, in purple, focuses on the hospitality industry, its employees and customer satisfaction.

**Authorship analysis.** The publications were analysed to extract author data. The 921 publications belong to 2633 authors. The average number of authors per article was 2.85. The highest percentage of articles, 25.95%, are written by two authors, a total of 239 articles. This is followed by 228 articles with 3 authors, 24.75%, and articles written by a single author with 137 publications, 14.87% of the total. The number of articles authored by four or more authors accounted for 34.43%, 317 articles, with 25 of them having 10 or more authors.

The VOSviewer tool was used to analyse and map the information. Figure 3 shows the total number of authors and shows how the 4 most relevant authors stand out; Michael C. Hall with 9 articles and Rob Law, Jun Wen and Hugues Seraphin with a total of 8 publications each. Establishing at least 2 publications as a determinant we obtain 250 authors and with a minimum of 3 publications 72 authors appear. Figure 4 shows the co-authorship relationships of these 72 authors.

**Analysis of the main affiliation of the authors.** To do this, each publication has been linked to the countries with which each author is affiliated, so that a publication can be part of several countries, but if there are two authors from the same country in a publication, it is only taken into consideration once, to avoid duplicating the same article several times in one country.

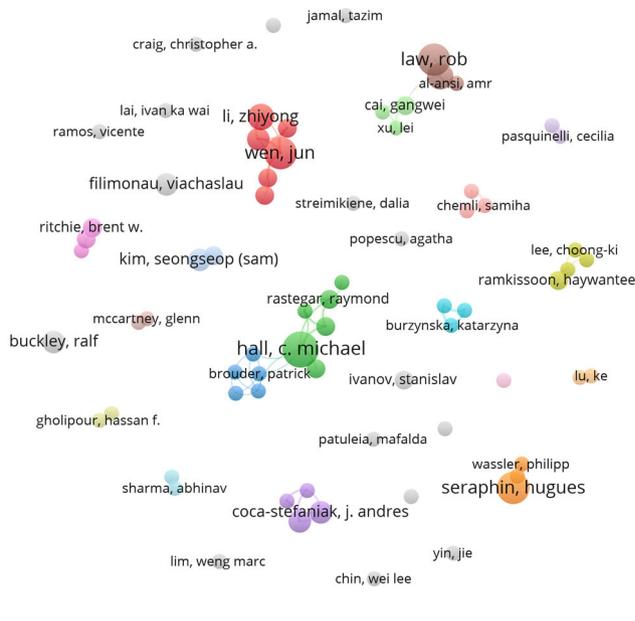
The analysis showed that 311 articles (33.77%) were international collaborations and 610 (66.23%) were publications in which only one country is linked as affiliation of the authors. The 921 publications on COVID-19 and tourism are linked to a total of 102 countries, it should be noted that the 311 international collaborative publications will be linked to more than one country per article. The geographical representation shown in Fig. 5 indicates a higher presence of articles in China (147), the United States (111), the United Kingdom (90), Spain (86) and Australia (73). The interest of these countries in publishing on the subject may be motivated by the importance of tourism in these areas; these countries are in the top 10 tourist destinations by revenue for 2019 according to the UNWTO.

**Study area analysis.** This analysis found that most publications on COVID-19 and tourism are theoretical or conceptual. A total of 509 publications, 55.27%, have no area of study, addressing the research globally. Then, we found 48 publications, 5.21%, which analyse areas globally or make comparisons of several countries or regions. Finally, we analysed the publications with case studies in a specific area. These 364 publications account for 39.52% of the total. The main location of these publications is in China, 69 articles, 18.96%. This is due to the origin of the disease, the first occurrence of which was reported in Wuhan (China) in December 2019 (Gössling et al., 2020). Since then, articles that seek to analyse the transmission of the virus, evaluate containment measures and search for a meaning to the origin of the pandemic have been published.

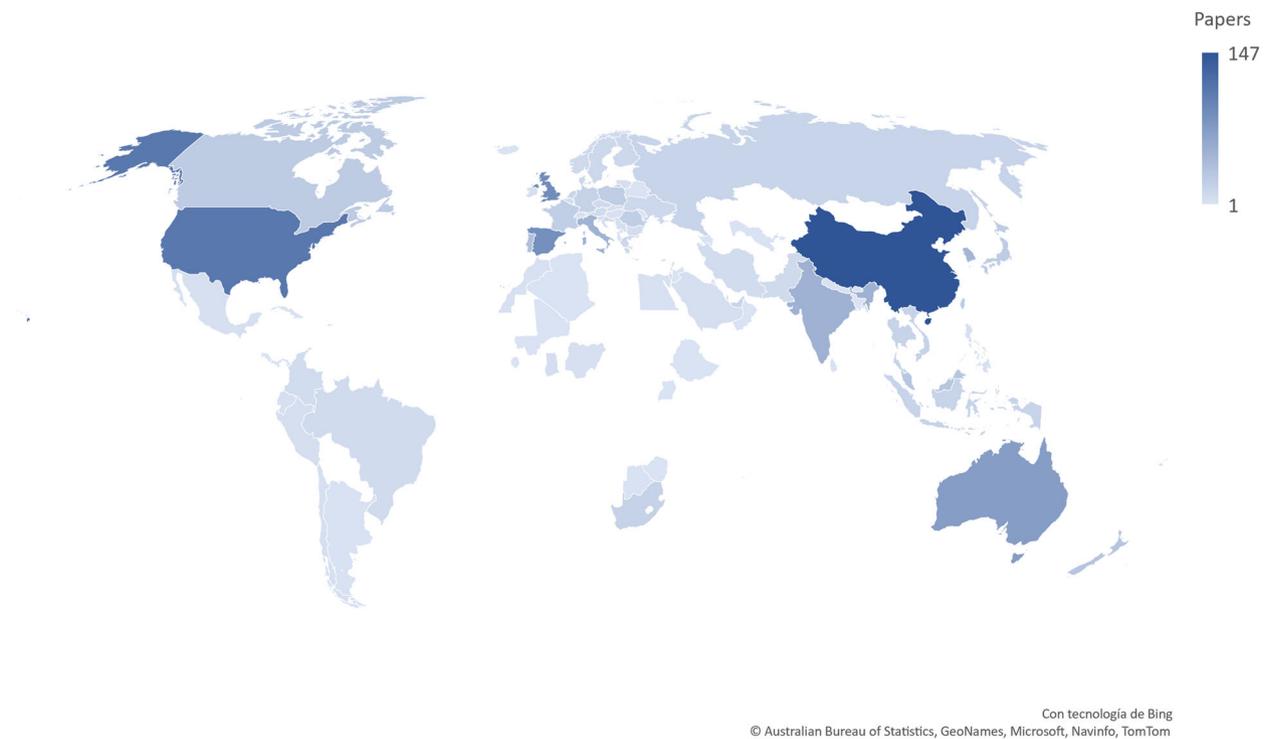
The next countries with the most case studies are Spain and the United States, with 26 and 21 publications, respectively. In the case of Spain, the slump in tourism has led to significant losses, with total Spanish travel indicators falling by around 70%. The 12 months of pandemic between April 2020 and March 2021 have meant a loss of 116 billion euros compared to 2019, 63 billion coming from foreign tourism revenues (EXCELTUR, 2021). For this reason, research is urgently looking for a solution to ensure the development of tourism, according to four of the publications from a more sustainable point of view. The United States is the country with the highest losses in the tourism industry, losing USD 147,245 million in 2020 compared to the previous year (ESTA, 2021). Their research is mainly concerned with assessing the risk of contagion in the tourism industry and developing strategies to recover the activity.

**Analysis of journals.** The 921 articles on COVID-19 and tourism were published in 276 journals from different fields of study. There were 181 journals (65.58%) with only 1 article, followed by 39 journals (14.13%) with 2 articles published. There are 18 journals with at least 10 publications, with Current Issues in Tourism with 90 articles (9.77%), Sustainability with 85 articles





**Fig. 4 Co-authorship.** Map for authors with more than three publications on COVID-19 and tourism.



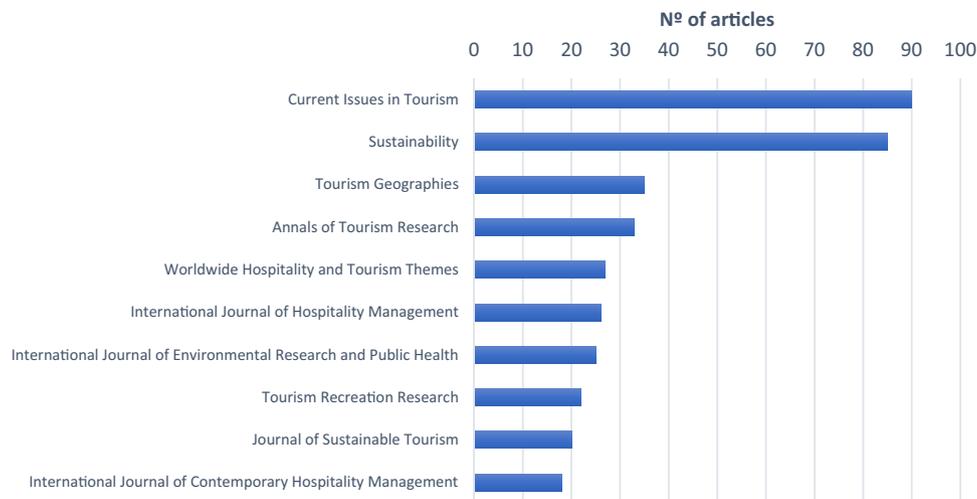
**Fig. 5 Geographical distribution.** Representation of articles about Covid-19 and tourism.

**Discussion**

The COVID-19 crisis has had a significant impact on tourism, with the restrictive measures implemented by governments making it impossible to develop this activity. Research on the subject has been increasing since the start of the pandemic, motivated by uncertainty about the future of tourism and the need to respond to the new challenges facing the industry.

The analysis of the keywords has enabled us to detect a new trend that views this crisis as an opportunity to promote a new, more sustainable model of tourism (Cardoso, 2020; Ioannides and Gyimothy, 2020; Romagosa, 2020; Chang et al., 2020;

Higgins-Desbiolles, 2020; Sheller, 2021; Sobaih et al., 2021; Polukhina et al., 2021; Duxbury et al., 2021). This model challenges the pollution caused by the activity and the unsustainability of mass tourism. This proposition is gaining momentum in a world increasingly concerned about climate change (Gossling et al., 2020). However, the expected recovery of tourism may lead to a lack of planning of tourist activity resulting in uncontrolled mass consumption. For this reason, it is important to support strategic planning, evaluation and monitoring of tourism. (Subadra and Hughes, 2021). Tourist perception and the risk of virus transmission has been a hotly



**Fig. 6 Journals.** Top 10 most published journals.

debated topic among tourism scientists. Researchers analyse factors influencing travel intention such as destination characteristics, available information or safety (Godovykh et al., 2021; Rahmafirtria et al., 2021; Abraham et al., 2020; Teer-oovengadum et al., 2021; Chua et al., 2021; Liu et al., 2021b; Hao et al., 2021; Liu et al., 2021c). Another line of research has sought to analyse the measures and policies carried out during the pandemic, such as social distancing (Shin and Kang, 2020; Gunay and Kurtulmuş, 2021; Hidalgo et al., 2021; Moreno-Casasola et al., 2021), the use of masks (Thiel et al., 2021), temperature control (Bielecki et al., 2020), disinfection (Rueda-López et al., 2021), ventilation (Khatib et al., 2020), quarantine (Goh and Baum, 2021; Altuntas and Gok, 2021; Wang et al., 2021b), vaccines (Adongo et al., 2021; Williams et al., 2021; Gursoy et al., 2021) or the COVID-19 passport (Chen et al., 2020; Oliveira-Santos, 2020; Liew and Flaherty, 2021).

The analysis of the clusters allows us to locate the lines of research that exist within the publications on the subject, while at the same time detecting the gaps in this research. This article contributes to the thematic by identifying and naming the following future research: 1. Research addressing mobility restriction measures can move forward to address issues related to control/freedom policies in destinations or the possibility of triggering an increase in racial prejudice with possible effects on the immigrant labour force in tourist destinations. 2. Studies that cover the perception of risk in travel intentions are based on detecting this risk, but do not provide measures or tools for tourism destination managers to address this issue. These tools could be the subject of future research. 3. Research proposing a more sustainable tourism after COVID-19 should analyse the situation of tourism businesses currently considered to be polluting, such as cruise tourism; the reduction of this type of tourism has an economic impact that should be studied. 4. Studies proposing technological tools to address the COVID-19 crisis, such as robotisation of the tourism service, should address issues such as technical and security failures arising from data management. 5. Future research on the economic impact of COVID-19 can address future issues such as the social return on public investment in the recovery of the tourism industry, for example through job creation. 6. Hotel buffet service has changed from self-service to personalised service to avoid COVID-19 contagion, the influence of this change on guest satisfaction could be analysed. This change of model could be positive for customer loyalty and could be here to stay.

This analysis has found that most of the research is conceptual or theoretical, and there is a need to apply this knowledge in empirical studies to test the validity of the frameworks developed.

This study highlights China as the country with the most articles according to the author's primary affiliation, coinciding with the most analysed area of study. This is due to the origin of the virus, but it is characteristic that countries such as India are not highlighted, having been, after the United States, the country most affected by COVID-19 and whose tourism activity represents 6.9% of the country's GDP before the pandemic (WTTC, 2021). The United States and Spain are, after China, the countries with the most case studies, and also show a high representation of articles according to the author's primary affiliation. Both countries are at the forefront of tourism worldwide and the recovery of the sector plays a very important role.

The articles analysed are mostly published in prestigious journals of high scientific quality. The results of the journal analysis show, on the one hand, a concentration of more than half of the journals with only one article, and, on the other hand, the two journals with the most articles account for about 20% of the total. The majority classification in tourism categories is due to their link to the topic. The study of citations reflects a greater interest in articles published in 2020, obviously because they have a longer time horizon and are more likely to be cited. Articles with one or no citations account for the majority of publications and 21.8% of citations are concentrated in two specific articles.

## Conclusion

The aim of this article is the bibliometric analysis of the scientific production on COVID-19 and tourism. Bibliometric analysis has been found to be a valuable method for assessing scientific output (Ellegaard and Wallin, 2015). We have used organised and transparent procedures that allow for the replicability of the study (Littell et al., 2008). This analysis has allowed us to provide a perspective on the documents dealing with the subject and to identify the main lines and gaps in research, the main authors, the countries with the most publications and the most analysed countries, the most prominent journals and the most cited articles. However, we would like to highlight the limitations of the study. The WOS database does not capture the total number of publications on the subject. This study focused on publications in English, so articles in other languages were not analysed, but we hope that more scholars in other linguistic fields will replicate the study. The increase in the number of publications on the subject

makes it necessary to assess the quality of the papers presented in order to obtain the most relevant information.

This study concludes by highlighting the positive attitude of researchers in the recovery of the tourism industry (Ioannides and Gyimothy, 2020; Gössling et al., 2020). However, this recovery needs to be supported by a process of adaptation and innovation in the tourism sector (Dias et al., 2021). There is no doubt that there is still a long way to go and that scientific progress is needed to address the problems arising from the pandemic. But so far research is mainly theoretical and the process of applying that theory, empirical research that refutes the benefits of the application of science, is lacking. We want to express the need for collaboration between tourism researchers and other affected areas, such as public health or human rights. Research is the tool to plan for post-pandemic tourism and to develop recovery strategies that reshape the sector to adapt to the current social and environmental context.

Finally, we want this research to contribute to enhancing knowledge transfer from research to the tourism industry to help overcome the aftermath of the pandemic. Knowledge transfer in the field of tourism is virtually non-existent and we see the COVID-19 pandemic as an opportunity to change this.

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### Competing interests

The authors declare no competing interests.

### Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

### Informed consent

This article does not contain any studies with human participants performed by any of the authors.

### Additional information

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