

# Bibliometric analysis and literature review of ecotourism: Toward sustainable development

Sayantana Khanra<sup>a,b</sup>, Amandeep Dhir<sup>c,d,e,\*</sup>, Puneet Kaur<sup>e,f</sup>, Matti Mäntymäki<sup>a</sup>

<sup>a</sup> *Turku School of Economics, University of Turku, Turku, Finland*

<sup>b</sup> *School of Business, Woxsen University, Hyderabad, India*

<sup>c</sup> *Department of Management, School of Business & Law, University of Agder, Kristiansand, Norway*

<sup>d</sup> *The Norwegian School of Hotel Management, Faculty of Social Sciences, Stavanger, Norway*

<sup>e</sup> *Optentia Research Focus Area, North-West University, Vanderbijlpark, South Africa*

<sup>f</sup> *Department of Psychosocial Science, University of Bergen, Bergen, Norway*

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## ABSTRACT

In recent decades, rising consumer interest in visiting relatively less commercialized natural destinations has facilitated the growth of ecotourism. Yet the research on ecotourism is fragmented, presenting gaps in the current understanding of this topic. This study performs a bibliometric analysis to assimilate the present knowledge from a total of 878 articles published in six reputable outlets between 1990 and 2019. The study analyzed citation chains and coauthorship networks to acknowledge contributions from select authors, organizations, and countries. Next, a cocitation analysis of the prior literature identified four major thematic areas: ecological preservation, residents' interests, the carbon footprint, and tourists' behaviors. Further, a dynamic cocitation analysis technique mapped the development of these thematic areas. Subsequently, a content analysis of the four thematic areas delivered significant insights about prior research in the domain and indicated future avenues of research.

## 1. Introduction

Ecotourism is the practice of traveling to relatively less exploited natural destinations to appreciate the natural settings, acquire knowledge about wildlife, and enjoy local cultures in authentic settings while conserving the environments of the destinations (Lee & Jan, 2019). Ecotourism has been widely facilitated by the authorities of protected areas in many countries that promote the sustainable development of tourism (Buckley, Cater, Linsheng, & Chen, 2008). Therefore, support from the local community is integral for balanced ecotourism (Nunkoo & Gursoy, 2012). When well planned, ecotourism may deliver substantial economic benefits to local residents (Deery, Jago, & Fredline, 2012). For example, fishermen living in an ecotourism destination may explore related occupations, such as boatmen, scuba drivers, and seafood stall owners, to boost their earnings (Plummer & Fennell, 2009). However, residents have often protested against poorly planned ecotourism businesses that have left negative impacts on the environment and the livelihoods of those living at the destination (Kousis, 2000).

A comprehensive model of ecotourism includes sustainable characteristics that are supportive of environmental enhancement, global in scope, and inclusive of both environmental and sociocultural dimensions (Weaver, 2005). Conceptually, a fine line exists between ecotourism and sustainable tourism. Ecotourism is a concept driven by demand from tourists, while sustainable tourism incorporates measures to conserve the environment from the supply side, meaning by tourism service providers (Dolnicar & Leisch, 2007). However, the tourism industry has blurred the line by popularizing the term "ecotourism" to label their offerings as explorations of environmentally sensitive areas (Collins, 1999). Therefore, ecotourism is often viewed as a part of the tourism industry's efforts to foster sustainable tourism (Collins, 1999; Weaver, 2005). In general, ecotourists seek a deep understanding and transformational outcomes from visiting an attraction (Weaver, 2005), and hence, they are expected to be concerned about protecting the environment around the attraction (Dolnicar & Leisch, 2007). However, prior research has documented that many tourists resist the required changes in hospitality consumption behavior that can protect the environment (Juvan & Dolnicar, 2014). For instance, a tourist concerned

\* Corresponding author.

E-mail addresses: [sayantana.khanra@woxsen.edu.in](mailto:sayantana.khanra@woxsen.edu.in) (S. Khanra), [amandeep.dhir@uia.no](mailto:amandeep.dhir@uia.no) (A. Dhir), [puneet.kaur@uib.no](mailto:puneet.kaur@uib.no) (P. Kaur), [matti.mantymaki@utu.fi](mailto:matti.mantymaki@utu.fi) (M. Mäntymäki).

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about excessive holiday flying may continue to fly frequently (Cohen, Higham, & Cavaliere, 2011).

In recent decades, the growth of research on ecotourism has necessitated a review of what is currently known about this subject. For instance, one group of researchers reviewed the prior literature to outline the uncertainties and research needs regarding ecotourists' behavior toward climate change (Gössling, Scott, Hall, Ceron, & Dubois, 2012). Deery et al. (2012) summarized the social impacts of tourism. Additionally, another group of scholars reviewed the ecotourism literature in the Chinese language to provide a global perspective on ecotourism, confirming that the term "shengtai luyou" conveys a similar meaning as ecotourism (Buckley et al., 2008). However, such attempts to review the literature on ecotourism are narrowly focused and fragmented, presenting a lack of comprehensive understanding of this topic, which is particularly important in the present context because concepts such as ecotourism are endogenously multidisciplinary (Boley, Maruyama, & Woosnam, 2015). Furthermore, a paucity of research is available that documents the evolution and current status of the research on ecotourism. Therefore, the present study addresses these research gaps by answering three research questions (RQs): **RQ1**. Who are the key contributors in shaping the research on ecotourism? **RQ2**. What are the important thematic areas in ecotourism research? **RQ3**. What are the important future research scopes that may be recommended to the researchers studying this topic?

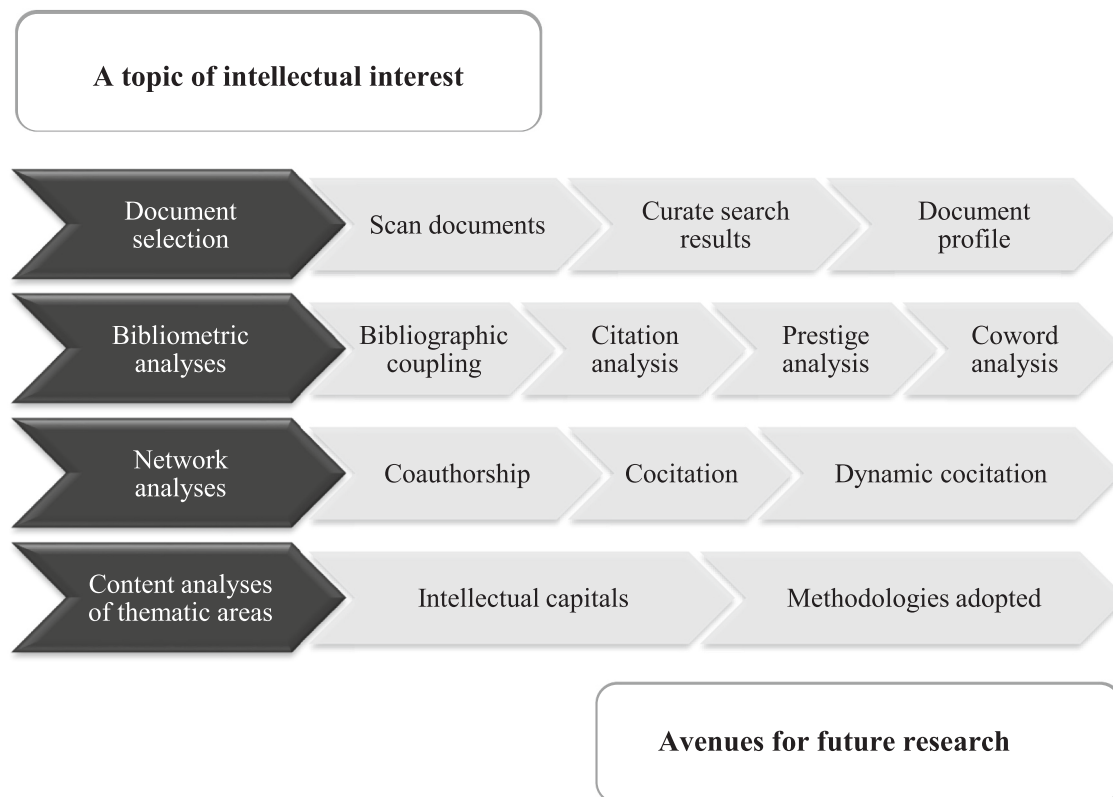
These RQs are answered by selecting a sample of the literature on ecotourism that has been published in six journals of high repute and analyzing these articles following a rigorous bibliometric approach (Fahimnia, Sarkis, & Davarzani, 2015; Xu et al., 2018). A bibliometric analysis is well recognized for its ability to summarize the knowledge available on a research topic (Bhatt, Ghuman, & Dhir, 2020; Racherla &

Hu, 2010). **RQ1** is addressed following a standard protocol for bibliometric studies developed by Khanra, Dhir, and Mäntymäki (2020). Then, the findings from a cocitation analysis technique answer **RQ2** by identifying important thematic areas in ecotourism literature (Koseoglu, Mehraliyev, & Xiao, 2019; Shin & Perdue, 2019). These thematic areas include the ecological preservation of tourist destinations, the protection of residents' interests in tourist destinations, the carbon footprint from tourist mobility, and tourists' attitudes and behaviors toward sustainability. Consequently, the development of those thematic areas can be traced with the help of a dynamic cocitation analysis (Cavaggioli & Ughetto, 2019; Xu et al., 2018). Next, future scopes to extend the knowledge of ecotourism are subjected to a discourse analysis, as required by **RQ3**. The current study organizes the ecotourism literature, which is fragmented and lacks well-defined boundaries, in the process of answering the RQs.

## 2. Methodology

Prior studies have adopted bibliometric analysis to structure existing knowledge about research topics across management domains, such as additive manufacturing (Cavaggioli & Ughetto, 2019), sustainability (Bhatt et al., 2020), and tourism (Koseoglu et al., 2019). From a methodological standpoint, bibliographic coupling, citation and cocitation analysis, and cword and coauthorship analysis techniques have been commonly adopted in prior research that has been based on bibliometric analyses (Cavaggioli & Ughetto, 2019; Xu et al., 2018). A collection of these techniques is included in a bibliometric protocol developed by Khanra, Dhir, Islam, and Mäntymäki (2020) (Fig. 1).

The current study conducted bibliographic coupling, a citation and cword analysis, and a coauthorship analysis using the VOSviewer



\*This protocol is prepared by Khanra et al. (2020a)

Fig. 1. Protocol\* for a bibliometric study.

\*This protocol is prepared by Khanra et al. (2020a).

software package. VOSviewer is reliable software that can analyze bibliometric data and visualize the results using sophisticated options (Van Eck & Waltman, 2014). The fractional counting of bibliometric links on VOSviewer is followed in the current study to adjust for the bias from the number of coauthors in publications (Van Eck & Waltman, 2014). A prestige analysis, cocitation analysis, and dynamic cocitation analysis were conducted using Gephi because of its ability to adopt a specialized ranking algorithm and capability to perform sophisticated dynamic analyses (Khanra, Dhir, Islam, & Mäntymäki, 2020).

### 3. Literature selection

The literature selection for this bibliometric study involves three stages: scanning, curating, and reporting the sample (Khanra, Dhir, Islam, & Mäntymäki, 2020). The academic community recognizes the Scopus database because of its ability to provide comprehensive coverage of available resources (Caviggioli & Ughetto, 2019; Xu et al., 2018). Therefore, the resources suitable for the current study were identified by conducting a search through the title, keyword, and abstract of publications listed on the Scopus database following prior research (Fahimnia et al., 2015; Xu et al., 2018).

#### 3.1. Scanning phase

A preliminary exploration of Scopus revealed that prior studies often used several terms, such as “nature-based tourism,” “wildlife tourism,”

and “responsible tourism,” to represent concepts of “ecotourism.” However, the term “sustainable tourism” stood for the term “ecotourism” much more frequently than other terms. Following prior studies (Khanra, Dhir, Islam, & Mäntymäki, 2020; Ruparel, Dhir, Tandon, Kaur, & Islam, 2020; Tandon, Dhir, Islam, & Mäntymäki, 2020; Tandon, Kaur, Dhir, & Mäntymäki, 2020), the search string “ecotourism OR sustainable tourism” was finalized. A search with this string resulted in 5981 published documents (on August 15, 2019) from books, journals, and conference proceedings in business management and related subject areas.

#### 3.2. Curating phase

The results obtained from the previous phase were then refined in this phase (Khanra, Dhir, Islam, & Mäntymäki, 2020). Selecting articles published in journals of higher academic rigor improves the quality of insights obtained from bibliometric analyses (Xu et al., 2018). Thus, the search criteria for the current paper were refined to focus on the research published in journals of high repute in the domain of hospitality and tourism. A total of six journals in hospitality and tourism are rated three or above in the Academic Journal Guide prepared by the Association of Business Schools (ABS) (ABS, 2015). These journals are the *Annals of Tourism Research (ATR)* (ABS rating – 4), the *Journal of Travel Research (JTR)* (ABS 4), *Tourism Management (TM)* (ABS 4), the *International Journal of Contemporary Hospitality Management (IJCHM)* (ABS 3), the *International Journal of Hospitality Management (IJHM)* (ABS

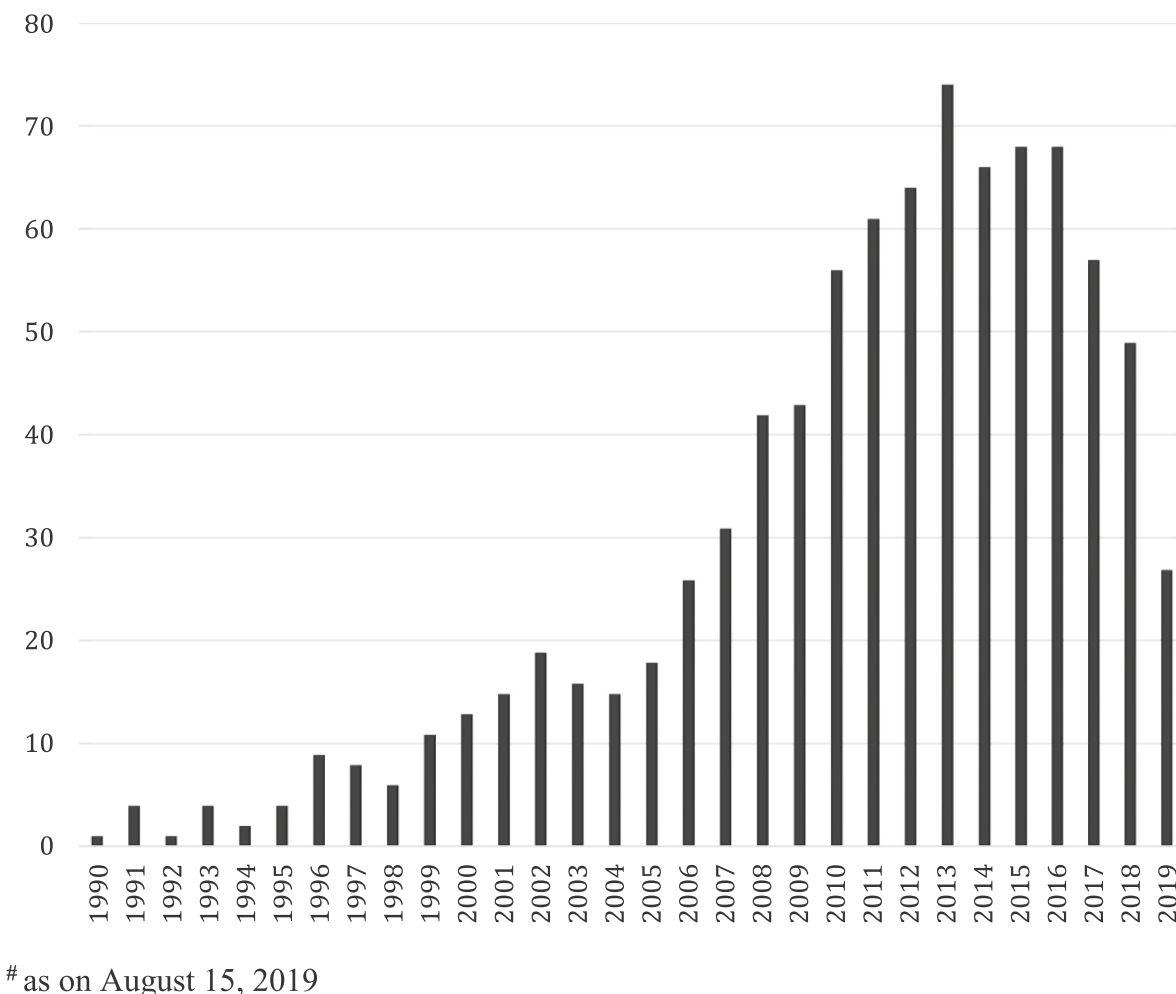


Fig. 2. Articles published<sup>#</sup> per year.  
<sup>#</sup> as on August 15, 2019.

3), and the *Journal of Sustainable Tourism (JSM)* (ABS 3). A total of 878 articles published in journals with three and above ratings in the journal guide constituted the sample for the current study. Bibliometric data corresponding to the sample were saved as both .ris and .csv files.

### 3.3. Analyzing phase

The inclusion of an article published in 1990 indicates that ecotourism is a fairly mature research topic in management and related study areas. The trend in the number of publications on the topic, as revealed by Fig. 2, suggests that interest in ecotourism research is increasing in management and related study areas. The present study's sample is composed of contributions from 1590 authors affiliated with 1295 organizations from 76 countries. All six journals, namely *JSM* (537 articles), *TM* (176 articles), *ATR* (83 articles), *JTR* (63 articles), *IJHM* (14 articles), and *IJCHM* (5 articles), published research on ecotourism. Table 1 presents the top 10 authors, organizations, and countries according to the number of publications.

## 4. Bibliometric analyses

### 4.1. Bibliographic coupling

Two publications referring to a document are matched in bibliographic coupling because high instances of shared references indicate common intellectual capital of the coupled publications (Shin & Perdue, 2019). Table 2 shows the influential authors, organizations, and countries contributing important articles to the sample for the current study. Stefan Gössling was found to be the most influential author in the

**Table 1**  
Top 10 contributors based on number of publications.

Author	Number of articles	Organization	Number of articles	Country	Number of articles
Weaver, D.	26	Griffith University, Australia	59	Australia	224
Gössling, S.	17	University of Queensland, Australia	38	United States	198
Higham, J.	14	University of Waterloo, Canada	24	United Kingdom	157
Dolnicar, S.	12	James Cook University, Australia	24	Canada	78
Boley, B.	10	University of Otago, New Zealand	22	New Zealand	66
Peeters, P.	10	University of Surrey, United Kingdom	21	Sweden	49
Coghlan, A.	9	Southern Cross University, Australia	20	China	39
Hall, C.	9	Linnaeus University, Kalmar, Sweden	18	Spain	32
Nyaupane, G.	9	Breda University of Applied Sciences, Netherlands	14	Netherlands	30
Weiler, B.	8	Lunds Universitet, Sweden	13	Norway	29

**Table 2**  
Top 10 contributors from bibliographic coupling.

Author	Total link strength	Organization	Total link strength	Country	Total link strength
Gössling, S.	1096.16	Linnaeus University, Kalmar, Sweden	705.82	Australia	7512.88
Weaver, D.	1003.25	University of Otago, New Zealand	686.31	United States	6637.56
Higham, J.	996.54	Western Norway Research Institute, Sogndal, Norway	653.18	United Kingdom	6395.17
Peeters, P.	768.37	University of Canterbury, New Zealand	521.86	New Zealand	3359.04
Ruhanen, L.	723.81	University of Oulu, Finland	426.61	Canada	2976.98
Hall, C.	691.66	University of Johannesburg, South Africa	393.91	Sweden	2162.03
Dolnicar, S.	682.16	James Cook University, Australia	312.65	Norway	1992.83
Boley, B.	678.14	Breda University of Applied Sciences, Netherlands	304.23	China	1683.24
Weiler, B.	657.01	Griffith University, Australia	301.12	Spain	1392.19
Lawton, L.	646.08	University of Surrey, United Kingdom	297.46	Netherlands	1107.41

ecotourism literature, followed by David Weaver and James Higham. Among the organizations, Linnaeus University, Kalmar (Sweden), the University of Otago (New Zealand), and the Western Norway Research Institute, Sogndal (Norway), are found to be the most influential in the literature. Among the countries, Australia exhibits the highest influence on ecotourism literature, followed by the United States and the United Kingdom. However, the bibliographic coupling technique, which is grounded in backward citation chaining, attracts criticism for its inefficiency in analyzing older publications (Van Eck & Waltman, 2014).

### 4.2. Citation analysis

This technique seeks to measure the degree of recognition a published document has gained in academia by looking at the citation count of the document (Caviggioli & Ughetto, 2019; Xu et al., 2018). Table 3 acknowledges the top 10 authors, organizations, and countries contributing popular articles, as revealed by a citation analysis. David Weaver was found to be the most popular author in ecotourism literature, followed by Sara Dolnicar and Laura Jane Lawton. The universities of Otago (New Zealand), Wollongong (Australia), and South Carolina (United States) are among the most popular institutes. Furthermore, studies from Australia, the United States, and the United Kingdom are found to be very popular in ecotourism literature. However, this technique only takes into consideration a publication's popularity, not its importance in a research domain (Khanra, Dhir, Islam, & Mäntymäki, 2020).

### 4.3. Prestige analysis

This technique identifies articles important in shaping a research

**Table 3**  
Top 10 contributors from citation analysis.

Author	Total link strength	Organization	Total link strength	Country	Total link strength
Weaver, D.	661	University of Otago, New Zealand	151	Australia	1498
Dolnicar, S.	430	University of Wllongong, Australia	101	United States	1233
Lawton, L.	319	University of South Carolina, United States	99	United Kingdom	1054
Boley, B.	226	University of Canterbury, New Zealand	93	Canada	684
Peeters, P.	183	University of Oulu, Finland	86	New Zealand	653
Gössling, S.	164	University of Waterloo, Canada	83	Sweden	381
Higham, J.	161	University of Surrey, United Kingdom	79	Netherlands	358
Nyaupane, G.	156	Griffith University, Australia	78	Norway	307
Ballantyne, R.	148	Monash University, Australia	76	Taiwan	294
Packer, J.	148	University of Idaho, Moscow, Russia	75	China	293

domain using an augmented version of the PageRank algorithm (Fahimnia et al., 2015). This algorithm prioritizes publications that are cocited with well-regarded publications (Xu et al., 2018). Given publication  $\rho_i$  (positive integer  $i \in [1, \eta]$ , where  $\eta$  is the number of publications within a cluster) cited publication  $\rho_0$ , and  $\rho_i$  is cited  $\lambda(\rho_i)$  times, PageRank of  $\rho_0$ ,

$$\mathfrak{R}(\rho_0) = \frac{(1 - \varepsilon)}{\eta} + \varepsilon \left[ \frac{\mathfrak{R}(\rho_1)}{\lambda(\rho_1)} + \frac{\mathfrak{R}(\rho_2)}{\lambda(\rho_2)} + \dots + \frac{\mathfrak{R}(\rho_\eta)}{\lambda(\rho_\eta)} \right]$$

where  $\varepsilon$  ( $\varepsilon \in [0, 1]$ ) represents a damping factor (Brin & Page, 1998). Table 3 acknowledges the top 10 prestigious articles among the 878 articles under review. Scott, Peeters, and Gössling (2010), Dolnicar and Leisch (2007), and Deery et al. (2012) authored the three most prestigious articles.

#### 4.4. Coword analysis

The keywords used by the authors and journal indexers of the articles under review provide a snapshot of literature on a research topic (Khanra, Dhir, Islam, & Mäntymäki, 2020). The authors of the articles in the current study's sample provided 2333 keywords, whereas the publishers indexed the articles with 1439 keywords. VOSviewer connects the keywords that co-occurred in articles, and the density of a keyword represents the frequency of occurrences for the keyword. Table 5 reports the identified keywords that co-occur frequently. Sustainable tourism and ecotourism are the most frequently used keywords by authors and indexers, respectively. A study of keywords in Table 5 reveals that authors focus on the relationship between ecological thinking and tourism in ecotourism. However, the indexers view the research topic from a broader perspective, taking into account tourist behavior, the tourism market, tourist economics, and government approaches, along with the

requirement to manage the crucial relationships.

Fig. 3 presents the density diagram of the author keywords, while Fig. 4 presents the density diagram of the index keywords. Both network diagrams cover the following concepts: (a) nature protection (author keywords: protected areas, nature-based tourism, and community participation; index keywords: protected area, nature conservation, and biodiversity), (b) climate conservation (author keywords: climate change, tourism impacts, and tourism policy; index keywords: climate change, emission control, and environmental policy), and (c) economic development (author keywords: sustainable development, stakeholders, and World Heritage Site; index keywords: tourism economics, heritage tourism, and indigenous population). Additionally, the index keywords also encompass the behavioral aspects of tourists (index keywords: tourist behavior, perception, and recreational activities).

### 5. Network analyses

#### 5.1. Coauthorship analysis

The tendency within a network of coauthors to refer to certain publications may influence the literature on a research topic (Cavaggioli & Ughetto, 2019; Racherla & Hu, 2010). Articles with at least 10 citations in the Scopus database were selected for this analysis to emphasize the more important collaborations. Thus, only 33 authors appear in the coauthorship network, as presented in Fig. 5. The network is divided into four groups. Dianne Drege (four links), Betty Weiler (four links), and Kate Rodger (two links) are prominent among the 10 authors in the first group. The authors in the second group of eight authors include Stefan Gössling, Colin Michael Hall, and Paul Peeters, who are respectively linked with eight, six, and five authors. The third group of seven authors is led by Lisa Ruhaneen with four links, followed by Michelle Whitford and Sara Dolnicar with three links each. Bernard Lane (six links), Susanne Becken (3), and David Weaver (2) are prominent among the seven authors in the fourth group.

From the network, a total of 59 organizations contributed articles to the sample of the current study, as highlighted in Fig. 6. From these connections, four groups emerge with 18, 16, 13, and 12 organizations, respectively. The present study also identified collaborative networks among 45 countries that contributed at least 10 articles to the sample from the coauthorship analysis (see Fig. 7).

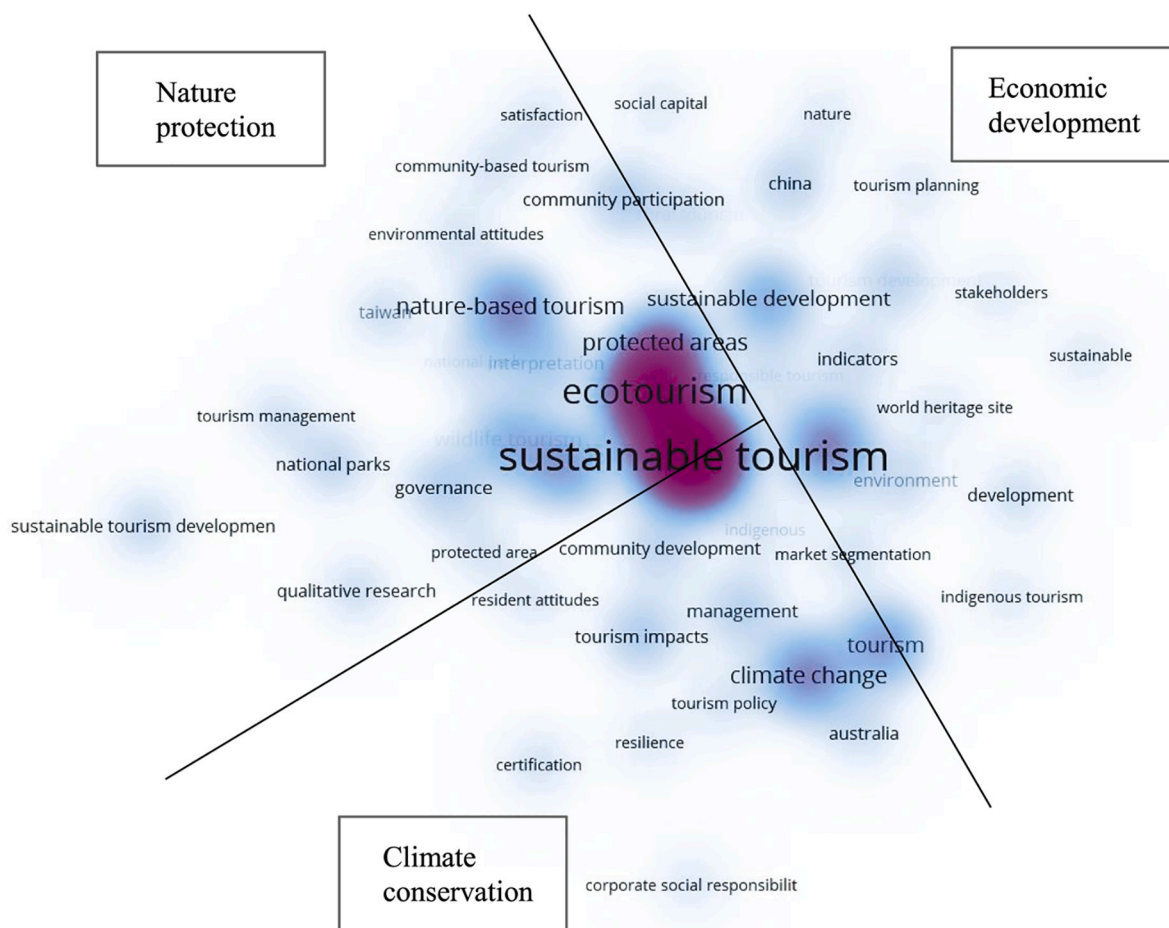
#### 5.2. Cocitation analysis

When two publications cite a pair of publications, then the pair of publications is considered as cocited (Shin & Perdue, 2019; Xu et al., 2018). The relatedness of the topics among cocited publications form a cluster of literature networks (Koseoglu et al., 2019; Shin & Perdue, 2019). The semantic similarities are measured by the density of intra-cluster links compared with intercluster links, here following a modularity index of the Louvain algorithm for a weighted network (Cavaggioli & Ughetto, 2019). The modularity index ( $\Lambda$ ) is formulated as follows:

$$\Lambda = \frac{1}{\sigma} \sum_{ij} \left[ \Psi_{ij} \frac{\omega_i \omega_j}{\sigma} \right] \phi(\alpha_i, \alpha_j); \text{ where } \omega_i = \sum_j \Psi_{ij}, \omega_j = \sum_i \Psi_{ij}, \text{ and } \sigma = 2 \sum_{ij} \Psi_{ij}.$$

Here,  $\Psi_{ij}$  represents the weight of the edge connecting the  $i^{\text{th}}$  article and  $j^{\text{th}}$  article,  $\alpha_i$  represents the cluster that the  $i^{\text{th}}$  article is assigned, and  $\phi(\alpha_i, \alpha_j)$  represents a binary function which equals one when both the  $i^{\text{th}}$  article and the  $j^{\text{th}}$  article are in the same cluster and is zero otherwise (Fahimnia et al., 2015).

The Gephi modularity tool visualized 3481 edges connecting 878 articles from our sample using the Louvain algorithm. Using the Louvain algorithm for modularity detection, four major clusters were identified, capturing 78.70% of articles in our sample (= 691 articles) and 86.06%



\* Minimum occurrences = 10

Fig. 3. Density diagram of author keywords\*.

\* Minimum occurrences = 10.

of the cocitation network (= 2996 edges). These clusters are chronologically arranged (Table 6), and the prestigious articles in each cluster are ranked according to their PageRank score (Table 7). Publications belonging to a cluster are connected by a thematic area (Koseoglu et al., 2019; Shin & Perdue, 2019). Thematic areas for four major clusters (see Table 6) were identified by analyzing the prestigious articles reported in Table 7.

### 5.3. Dynamic cocitation analysis

The findings from this technique deliver an understanding about the development of the thematic areas that are identified from the cocitation analysis (Xu et al., 2018). Fig. 8 presents the evolution of four major clusters that evolved following different paths. The annual accumulation of articles in each cluster is reported in Table 8. Here, Cluster 1 emerged in 1990 and tended toward saturation post 2004, whereas Cluster 2 underwent major growth from 2005 to 2012. This signifies that the research focus shifted from the ecological preservation of tourist destinations to the protection of residents' interests in those destinations between 2005 and 2012. However, both of these thematic areas may be considered sufficiently mature currently because no article has been added to these two clusters since 2016. Cluster 3, the largest among the four clusters, represents the magnitude of concerns regarding the carbon footprint from tourist mobility. Cluster 3 experienced strong growth between 2005 and 2016 and has been approaching maturity since 2017.

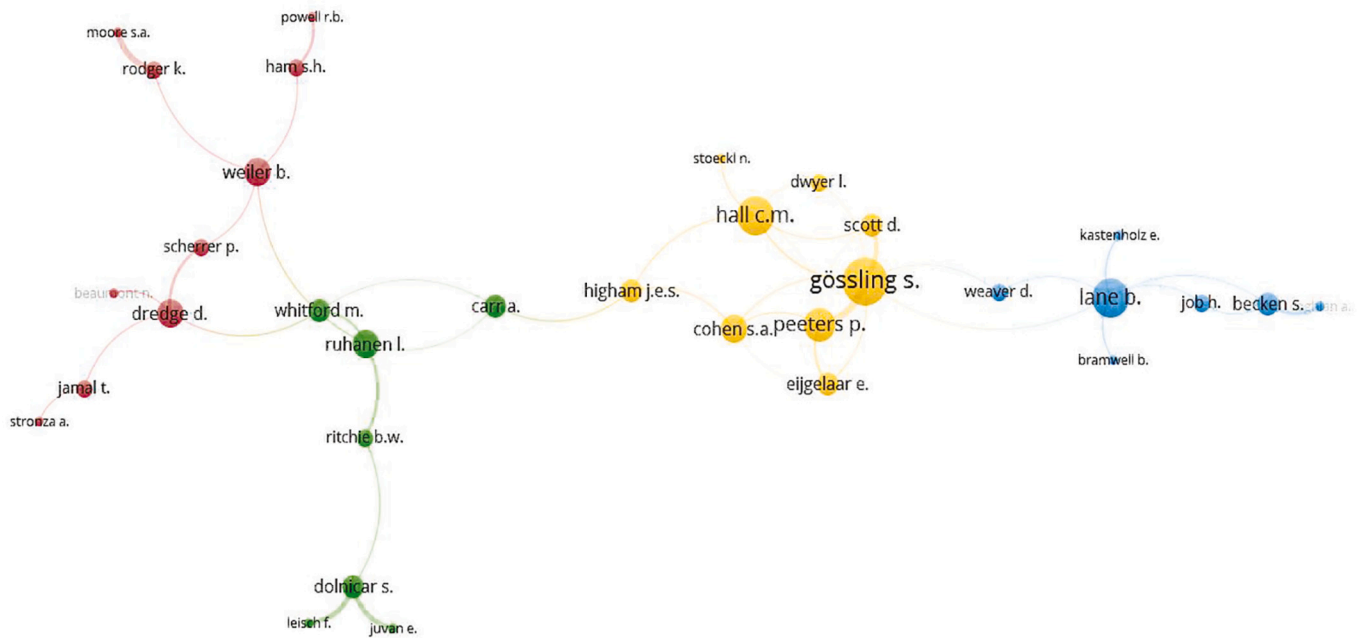
Cluster 4, the latest among the four clusters, captures the interest of contemporary research in studying tourists' attitudes and behaviors toward sustainability.

## 6. Thematic areas

### 6.1. Cluster 1: Ecological preservation of tourist destinations

Ecotourism aims to maintain a balance in the tradeoffs between the extensive commercialization of a tourist destination and the conservation of natural resources or the ecological status of the destination (Collins, 1999). An important aspect of such tradeoffs pertains to maintaining parity between the different destinations that promote ecotourism opportunities to alleviate the pressure created on the local ecosystems from hosting greater multitudes of tourists. One way to achieve this balance would be for destination countries to advertise comprehensive tourism opportunities to a global audience because travel agencies focus on and promote only a few popular destinations (Akama, 1996). Alternative activities related to ecotourism, such as sport fishing, camel riding, visiting rural areas, attending cultural events, and observing archaeological sites (Akama, 1996), may also be advertised to promote visits to less commercialized destinations. The concept of ecotourism may be argued as having similar connotations for local cultures across Eastern and Western nations. For instance, Buckley et al. (2008) discussed the Chinese concept of "shengtai luyou," which





\* minimum publications = 3; minimum citations = 10

Fig. 5. Network of authors from coauthorship analysis\*.  
\* minimum publications = 3; minimum citations = 10.

activities of the residents (Tao & Wall, 2009) and promotes equitably shared benefits emerging from ecotourism activities (Scheyvens, 1999). For instance, agritourism may educate tourists about agriculture (noneconomic benefits) and enhance the earnings of farmer families (economic benefits) (Tew & Barbieri, 2012). Yet, Fleischer and Tchetchik (2005) found that knowledge of farm activities is often of no interest to tourists. Therefore, tourism managers need valid tools and indicators that can track the progress of resident engagement efforts in conjunction with the management of tourist expectations (Boley et al., 2015).

### 6.3. Cluster 3: Carbon footprint from tourist mobility

This theme captures serious concerns about greenhouse gas emissions from tourist mobility, resultant climate change, the insufficiency of current regulations, and the need to encourage tourists' participation in the reduction of greenhouse gas emissions. Gössling et al. (2012) argued for the tourism industry's need to critically identify avenues to reduce their carbon footprint because climate change can negatively affect the attractiveness of ecotourism destinations and, eventually, their allied businesses. However, tourism businesses may be unlikely to adopt and may even resist environmentally friendly measures that do not offer financial gains in the short term (Bramwell & Lane, 2013). In fact, efforts made by the tourism industry to reduce such emissions were insufficient for meeting the policy objectives set by international communities to fight climate change (Scott et al., 2010). This may be attributed to their expectations toward earning a return on their investments in developing the required infrastructure (Bramwell & Lane, 2013).

As much as 90% of greenhouse gas emissions in the tourism industry can be attributed to the aviation sector (Higham & Cohen, 2011). Yet this sector is posited as providing inaccurate information to travelers, who subsequently exhibit denial for contributing to climate change (Gössling & Peeters, 2007). Cohen, Higham, and Reis (2013) reported

that tourists are less concerned about environmental sustainability during their holidays when compared with their regular daily lives. Furthermore, frequent fliers who are well aware of global warming may refuse to change their travel behavior (McKercher, Prideaux, Cheung, & Law, 2010). Contrarily, Higham and Cohen (2011) found that tourists involved in domestic travel may gradually overcome the psychological denial of human-induced climate change and demonstrate a willingness to reduce domestic flight travel.

Here, voluntary change in tourists' behaviors is unlikely without strong government regulations (Cohen et al., 2013; McKercher et al., 2010). Researchers have also proposed different measures to address this issue, such as reducing air travel (Cohen et al., 2011) and imposing a global tax on air travel (Becken, 2007). Reductions in air travel may lead to the avoidance of long-term consequences for climate change by sacrificing short-term personal benefits (Cohen et al., 2011). Becken (2007) proposed an air travel tax at the global level to counter the sector's adverse impact on the climate as a measure of compromise between restricting commercial air travel and reducing airlines' carbon footprint. Yet such high taxes in conjunction with rising fuel prices may severely affect low-cost carriers, consequently causing a breakdown in the hospitality industry (Yeoman et al., 2007).

### 6.4. Cluster 4: Tourist attitudes and behavior toward sustainability

For tourism to become part of a more sustainable consumer lifestyle, tourists would need to incorporate and accept changes in their innate behavioral patterns. Yet Miller, Rathouse, Scarles, Holmes, and Tribe (2010) posited that tourists are often unwilling to accept and perform changes in behavior because of insufficient awareness of the impact tourism leaves on the environment relative to behaviors exhibited during their daily lives. Furthermore, this may also be attributed to individuals' perceived differences in their moral obligations and attitudes toward proenvironmentalism while experiencing different situations



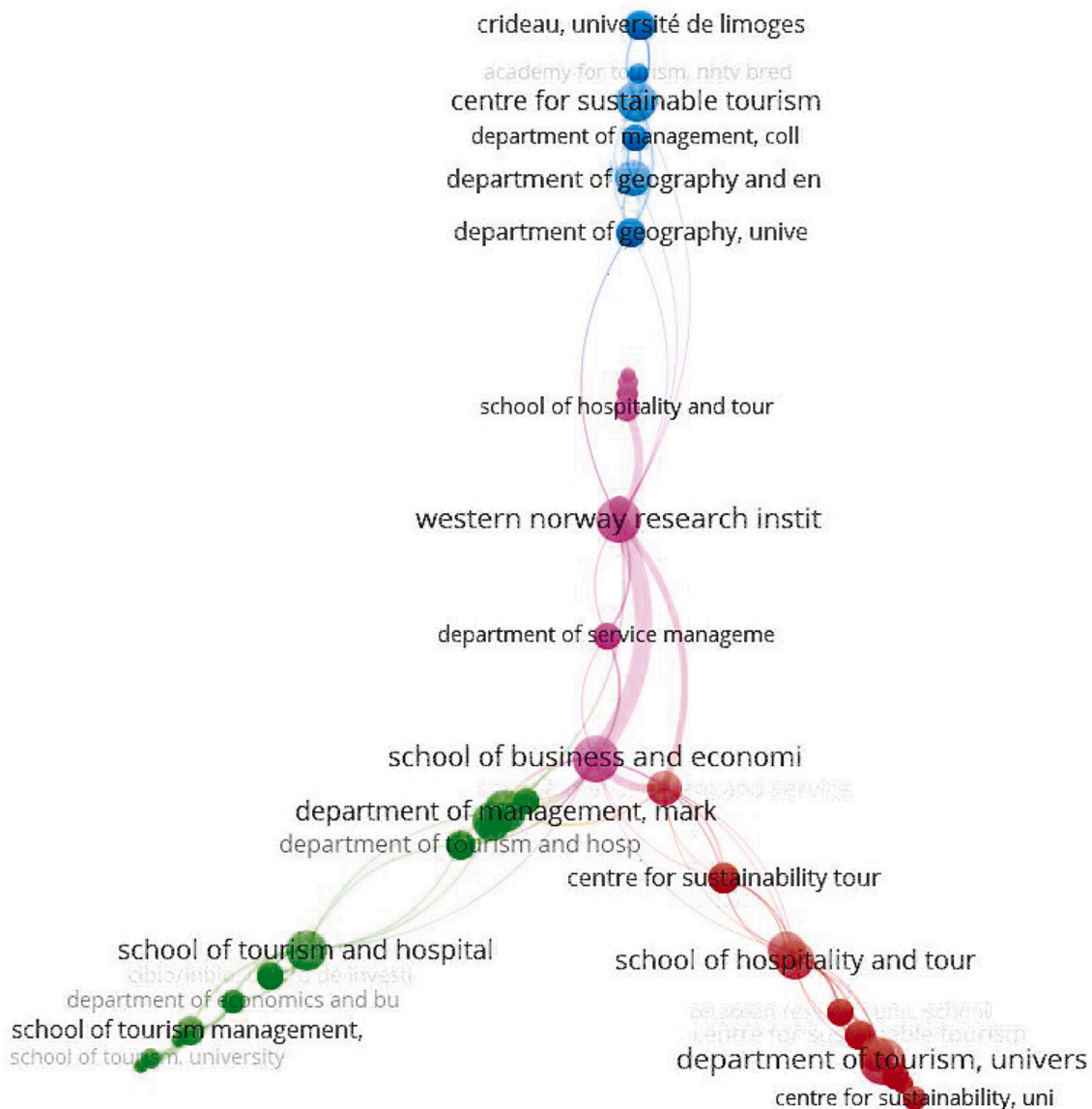


Fig. 6. Network of organizations from coauthorship analysis.

(Dolnicar & Leisch, 2007). For instance, individuals actively engaging in proenvironmental behavior in their regular lives often contribute to negative environmental consequences, albeit unintentionally, during vacation (Juvan & Dolnicar, 2014).

Prior research has applied many theories to explain tourists' proenvironmental behaviors. For instance, tourist intentions to visit "green hotels" have been studied through frameworks using the augmented application of theories, such as the value-belief-norm (VBN) theory (Choi, Jang, & Kandampully, 2015) and theory of planned behavior (TPB) (Chen & Tung, 2014). Han (2015) provided a detailed analysis of the development of proenvironmental intentions among travelers' green lodging through an integrated framework based on the VBN theory and the TPB. Similarly, Kiatkawsin and Han (2017) merged the VBN theory and expectancy theory to study the intention of young travelers to behave proenvironmentally. Lee (2011) argued that a tourist's commitment to an ecological conversation would be correlated to attachment to the destination, involvement in recreational activities, and responsible behavior toward the environment. However, such commitment and proenvironmental behavior may not always be different among individuals who actively participate in ecofriendly activities and those who do not (Han, & Hsu, L.-T. (Jane), & Sheu, C.,

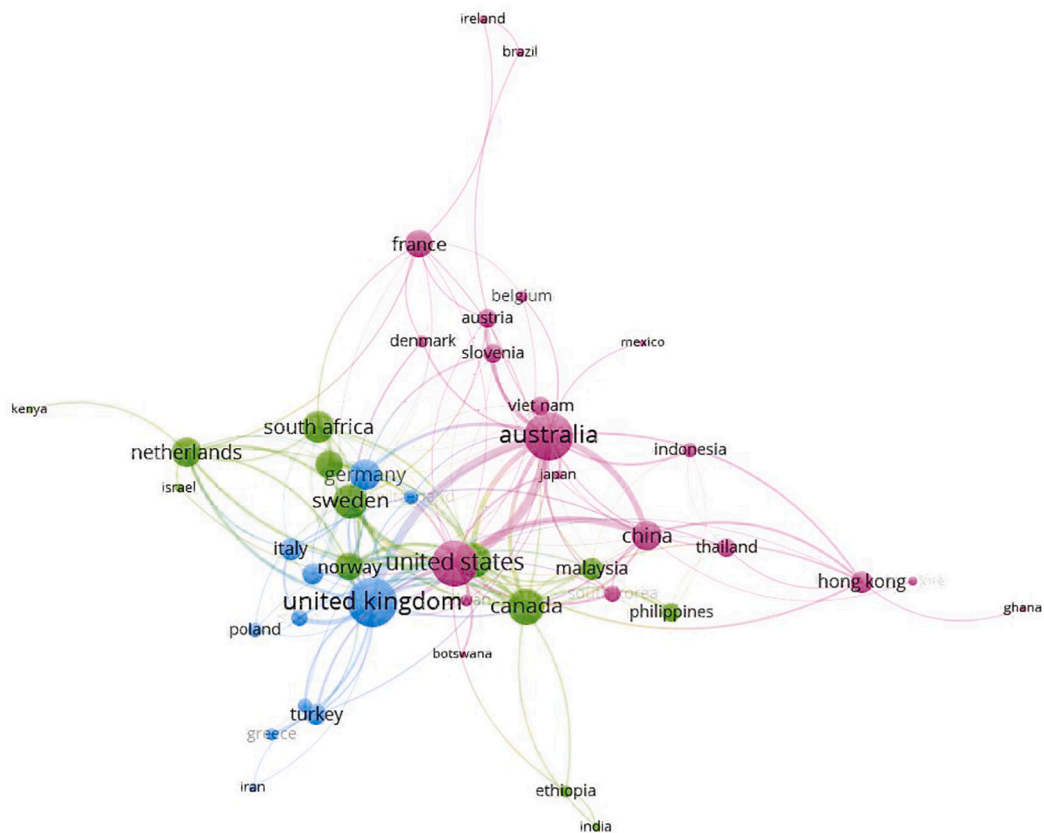
2010). Therefore, effective communication aimed at influencing tourists' behaviors may be the key to reducing negative environmental consequences for ecotourism destinations (Brown, Ham, & Hughes, 2010). Indeed, Brown et al. (2010) reported that well-designed campaigns encouraged one national park's visitors to reduce littering at the tourist destination.

## 7. Research gaps and recommendations

From analyzing the contents of major thematic areas and their development, three sets of research gaps have emerged. These scopes for future research are also recommended as a way to address the respective research gaps, as subsequently discussed.

### 7.1. Methodologies for advancing themes

The literature focusing on a certain research topic often starts with conceptual and qualitative articles and advances with quantitative studies (Fahimnia et al., 2015). The articles in Cluster 1 are mainly based on case studies (Kousis, 2000; Li, 2004), conceptual studies (Buckley et al., 2008; Plummer & Fennell, 2009), and descriptive studies (Akama,



\* minimum publications = 10; minimum citations = 100

**Fig. 7.** Network of countries from coauthorship analysis.  
\* minimum publications = 10; minimum citations = 100.

1996; Eagles, 2002). Half of the reviewed articles in Cluster 3 followed qualitative approaches, such as interview-based studies (Cohen et al., 2013; Higham & Cohen, 2011), a focused group discussion (Becken, 2007), and a scenario analysis (Yeoman et al., 2007). The other half in Cluster 3 deploy a conceptual approach (Bramwell & Lane, 2013), a cluster analysis (McKercher et al., 2010), descriptive analyses (Gössling & Peeters, 2007; Scott et al., 2010), and a literature review (Gössling et al., 2012) to meet their study objectives. Therefore, in the future, more quantitative studies based on the themes of Cluster 1 and Cluster 3 are required. We recommend that future researchers should develop new measures and empirically test issues in the ecological preservation of ecotourist destinations and in the carbon footprint reduction from tourist mobility.

Six out of the 10 prestigious articles in Cluster 2 (Boley et al., 2015; Choi & Murray, 2010; Draper et al., 2009; Nunkoo & Gursoy, 2012; Tew & Barbieri, 2012; Woosnam, 2011) and seven in Cluster 4 (Chen & Tung, 2014; Choi et al., 2015; Dolnicar & Leisch, 2007; Han, 2015; Han, & Hsu, L.-T. (Jane), & Sheu, C., 2010; Kiatkawsin & Han, 2017; Lee, 2011) followed an empirical methodology. The studies in Cluster 2 and Cluster 4 mostly followed empirical approaches. Therefore, scholars may aim to aggregate the current knowledge by performing a meta-analysis of the prior literature on ecotourism destinations and tourists' attitudes and behaviors toward sustainability.

## 7.2. New themes in ecotourism research

Ecotourism is an interdisciplinary domain of knowledge inherently connected with hospitality management, geography, and international business. Furthermore, the present study identified four major themes in ecotourism research connected to different fields of study. The first theme suggests that the ecological preservation of tourist destinations is focused on environment conservation (Cluster 1). The second theme of protecting residents' interests in tourist destinations is related to economics and public policy (Cluster 2). The third theme infers that the carbon footprint from tourist mobility is linked to sustainable logistics (Cluster 3). The fourth theme captures tourist attitudes and behavior toward sustainability and connects them to consumer behaviors (Cluster 4).

Exploring the connections between ecotourism and several disciplines, such as healthcare, financial services, and advanced technologies, are scarce. For instance, research is lacking on the requirement of medical assistance for ecotourists in need, the role of ecotourism in psychological well-being, and opportunities for medical tourism in ecotourism destinations. Furthermore, topics such as financing options for ecotourists, their purchasing behavior during trips, and travel insurance coverage for ecotourism are not well studied. These topics take on greater importance now because the COVID-19 pandemic adds serious uncertainties in the purchase behavior of consumers in various contexts, including retail (Laato, Islam, Farooq, & Dhir, 2020), the stock market (Talwar, Talwar, Kaur, Tripathy, & Dhir, 2020), and hospitality

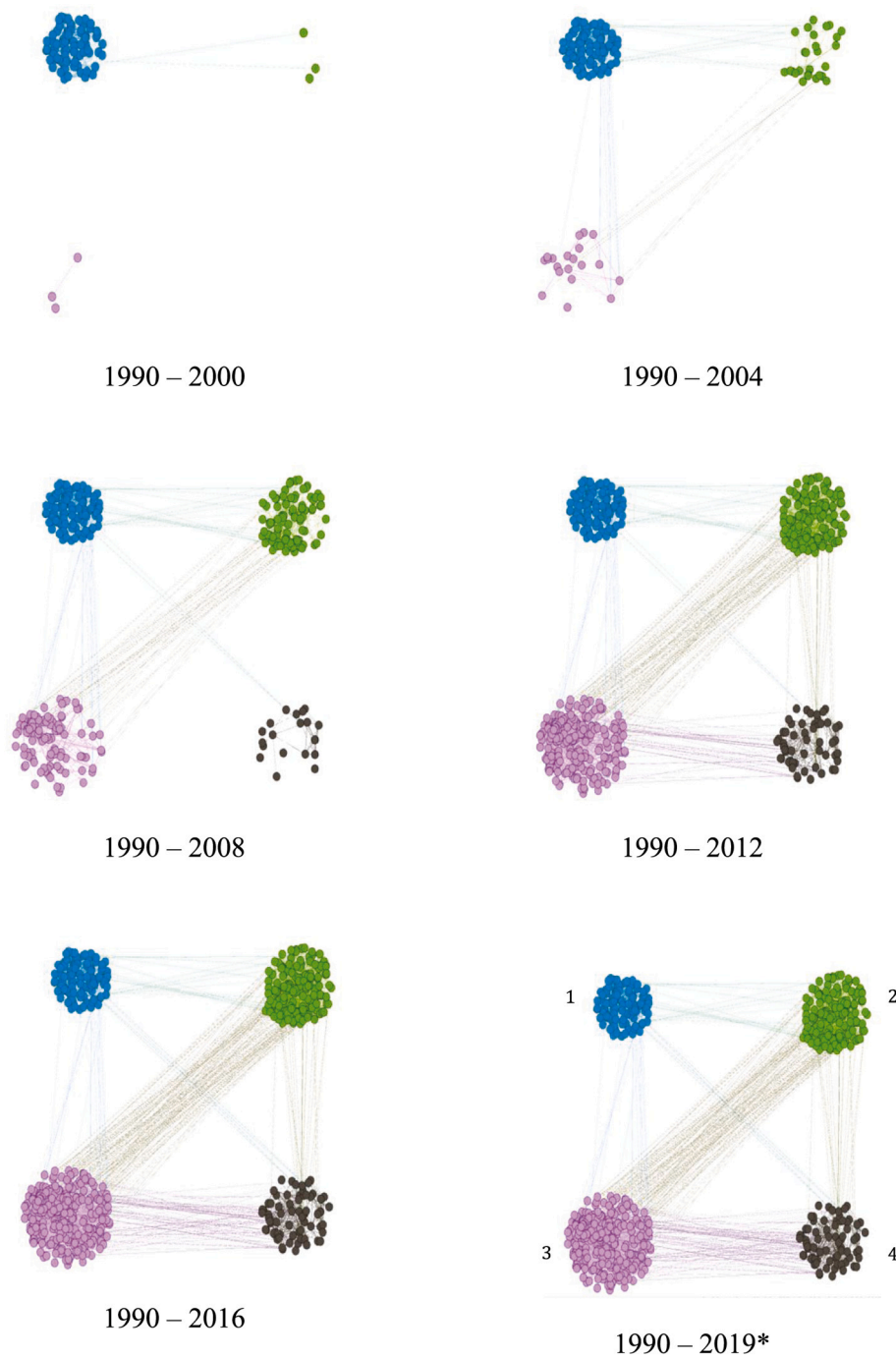


Fig. 8. Evolution of clusters from dynamic cocitation analysis.

services (Khanra, Dhir, Joseph, & Kaur, 2020).

### 7.3. New directions in ecotourism research

The articles listed in Table 4 are the 10 most prestigious among the articles on ecotourism that have been published in six important outlets. Two thematic areas that include three articles each from the 10 prestigious articles are the ecological preservation of the tourist destination (Collins, 1999; Li, 2004; Plummer & Fennell, 2009) and the carbon footprint from tourist mobility (Cohen et al., 2011; Gössling et al., 2012; Scott et al., 2010). The rest of the four prestigious articles are equally divided into thematic areas discussing protecting residents' interests in the tourist destination (Deery et al., 2012; Nunkoo & Gursoy, 2012) and

tourists' attitudes and behaviors toward sustainability (Dolnicar & Leisch, 2007; Miller et al., 2010). However, no article published after 2012 gained enough traction to be included in Table 4.

Future researchers may borrow the concepts from management domains to offer a thorough understanding of issues in ecotourism. For instance, the "dynamic capabilities" required to sustain the attractiveness of a nature-based destination in the wake of climate change may provide important insights for the responsible authorities in ecotourism management. Furthermore, the exploration of strategies to attract potential customers from the "bottom of the pyramid" to destinations facing a reduction in visitors, especially in the off-seasons, may benefit hospitality managers. Prestigious studies may emerge from the adoption of these concepts to provide new directions in ecotourism research.

**Table 4**  
Top 10 articles from prestige analysis.

Article	PageRank Score	Local citation count*	Global citation count#
Scott et al. (2010)	0.005291	23	313
Dolnicar and Leisch (2007)	0.005143	14	125
Deery et al. (2012)	0.005130	38	497
Nunkoo and Gursoy (2012)	0.004520	24	413
Plummer and Fennell (2009)	0.003929	13	203
Miller et al. (2010)	0.003656	22	339
Li (2004)	0.003619	15	148
Cohen et al. (2011)	0.003588	17	146
Collins (1999)	0.003417	21	233
Gössling et al. (2012)	0.003283	28	385

# Source: Google Scholar (August 31, 2019).

\* Source: Scopus (August 15, 2019).

**Table 5**  
Top 10 keywords from coword analysis.

Author keyword	Total link strength	Index keyword	Total link strength
Sustainable tourism	183	Ecotourism	862
Ecotourism	123	Tourism management	291
Climate change	41	Sustainability	210
Nature-based tourism	39	Sustainable development	131
Protected areas	38	Tourist behavior	118
Tourism	34	Tourism market	101
Sustainable development	29	Protected area	85
Wildlife tourism	25	Tourist economics	61
Community participation	17	Nature conservation	57
Responsible tourism	15	Government approach	55

**Table 6**  
Literature classification from cocitation analysis.

Cluster*	Publication period	Number of articles	Thematic area
Cluster 1 (Color code: Blue)	1990–2011	110	Ecological preservation of tourist destination
Cluster 2 (Color code: Green)	1999–2015	189	Protecting residents' interests in tourist destination
Cluster 3 (Color code: Pink)	2000–2017	315	Carbon footprint from tourist mobility
Cluster 4 (Color code: Black)	2005–2018	77	Tourists' attitude and behavior toward sustainability

\* The clusters are numbered based on their size, not the sequence of their emergence.

Besides this, the benefits and challenges for advanced technology applications, such as big data analytics (Khanra, Dhir, Islam, & Mäntymäki, 2020; Khanra, Dhir, Joseph, & Kaur, 2020), blockchain (Tandon et al., 2020a), and cognitive computing (Behera, Bala, & Dhir, 2019), by authorities managing ecotourism may be studied.

## 8. Discussion

The prior research on ecotourism is scattered across journals, and

**Table 7**  
Top 10 prestigious articles in each cluster.

Articles in cluster 1	PageRank score	Articles in cluster 2	PageRank score
Plummer and Fennell (2009)	0.005388	Deery et al. (2012)	0.004835
Li (2004)	0.005134	Nunkoo and Gursoy (2012)	0.004582
Akama (1996)	0.004721	Scheyvens (1999)	0.004376
Buckley et al. (2008)	0.004426	Draper et al. (2009)	0.003927
Kousis (2000)	0.004341	Choi and Murray (2010)	0.003842
Collins (1999)	0.004180	Woosnam (2011)	0.003783
Palacio (1997)	0.003996	Tao and Wall (2009)	0.003275
Eagles (2002)	0.003715	Tew and Barbieri (2012)	0.003194
Ballantyne et al. (2011)	0.003548	Fleischer and Tchetchik (2005)	0.003077
Uysal, Jurowski, Noe & McDonald, (1994)	0.003326	Boley et al. (2015)	0.002997
Articles in cluster 3	PageRank score	Articles in cluster 4	PageRank score
Scott et al. (2010)	0.005291	Dolnicar and Leisch (2007)	0.005801
Gössling and Peeters (2007)	0.005143	Miller et al. (2010)	0.005589
McKercher et al. (2010)	0.005134	Juvan and Dolnicar (2014)	0.005537
Higham and Cohen (2011)	0.004519	Brown et al. (2010)	0.005398
Becken (2007)	0.004392	Han, Hsu & Sheu (2010)	0.005146
Cohen et al. (2011)	0.003928	Chen and Tung (2014)	0.005016
Gössling et al. (2012)	0.003619	Han (2015)	0.004879
Cohen et al. (2013)	0.003501	Choi et al. (2015)	0.004607
Bramwell and Lane (2013)	0.003476	Kiatkawsin and Han (2017)	0.004586
Yeoman et al. (2007)	0.003421	Lee (2011)	0.004531

research demonstrating the present structure of the literature is insufficient. To this end, the current study has made the following contributions to the ecotourism literature:

### 8.1. Recognizing key contributors

**RQ1** of the present study aimed to identify the key contributors to ecotourism research. This question is addressed following different bibliometrics. The presence of six authors, namely David Weaver, Stefan Gössling, James Higham, Sara Dolnicar, Paul Peeters, and Bynum Boley, as shown in Tables 1–3, suggests that they are among the key authors on the research topic. Tables 1–3 suggest that the University of Otago, Griffith University, and the University of Surrey are the organizations leading the research in this area. The contributions of eight countries, namely, Australia, the United States, the United Kingdom, Canada, New Zealand, Norway, China, and the Netherlands, are acknowledged in Tables 1–3. Furthermore, the coauthorship analysis of the authors (Fig. 5), organizations (Fig. 6), and countries (Fig. 7) identified a collaborative network that is strongly associated with this research topic. Collaboration patterns suggest that the research on this topic is dispersed in several core groups within a large network of contributors.

### 8.2. Identifying prestigious articles

The articles listed in Table 4 are the most prestigious among the articles on ecotourism that have been published in six important outlets. These articles were published between 1999 and 2012. Two thematic areas are the ecological preservation of the tourist destination (Collins, 1999; Li, 2004; Plummer & Fennell, 2009) and the carbon footprint from tourist mobility (Cohen et al., 2011; Gössling et al., 2012; Scott et al., 2010). The rest of the four prestigious articles are equally divided into

**Table 8**  
Evolution of clusters from dynamic cocitation analysis.

Year	Number of articles published			
	Cluster 1	Cluster 2	Cluster 3	Cluster 4
1990	1	0	0	0
1991	3	0	0	0
1992	0	0	0	0
1993	5	0	0	0
1994	10	0	0	0
1995	7	0	0	0
1995	10	0	0	0
1996	9	0	0	0
1997	11	0	0	0
1998	15	0	0	0
1999	8	2	0	0
2000	7	1	3	0
2001	10	3	1	0
2002	2	9	6	0
2003	5	5	4	0
2004	2	7	6	0
2005	1	16	11	7
2006	2	20	21	1
2007	1	16	30	6
2008	0	18	26	6
2009	0	27	30	5
2010	1	22	31	17
2011	0	16	35	7
2012	0	9	33	8
2013	0	5	36	6
2014	0	8	36	3
2015	0	5	19	5
2016	0	0	7	0
2017	0	0	1	5
2018	0	0	0	1
2019*	0	0	0	0

thematic areas discussing the protection of residents' interests in the tourist destination (Deery et al., 2012; Nunkoo & Gursoy, 2012) and tourists' attitudes and behaviors toward sustainability (Dolnicar & Leisch, 2007; Miller et al., 2010). However, no article published after 2012 earned enough prestige to be featured in Table 4.

### 8.3. Identifying important thematic areas

RQ2 enquired about the important thematic areas in ecotourism literature. This question is answered by clustering the literature in a cocitation analysis (see Table 6). The identified thematic areas find strong relevance in the recent literature. For instance, Ruhanan's (2019) take on the prominence of ecological thinking in ecotourism experiences connects to the first important thematic area regarding the ecological preservation of tourist destinations. The second important thematic area on protecting residents' interests in tourist destinations relates to the conflict between tourists' and residents' interests (Lee, 2019), the problems residents face from overtourism (Seraphin, Ivanov, Dosquet, & Bourliataux-Lajoinie, 2019), and the need for sustainable community development (Aquino, Lück, & Schänzel, 2018). The third important thematic area (the carbon footprint from tourist mobility) is under investigation in both Eastern (Lee & Jan, 2019) and Western (Rico et al., 2019) parts of the world. Also, recent research (Holmes, Dodds, & Frochot, 2019; Passafaro, 2019) has paid extensive attention to tourists' attitudes and behaviors toward sustainability, which is the fourth important thematic area.

### 8.4. Evolution of important thematic areas

From the dynamic cocitation technique analysis, discussions on the ecological preservation of tourist destinations and the protection of residents' interests at those destinations achieved saturation. The technique also reveals that the thematic area on reducing the carbon footprint from tourist mobility had sustained interest from academia.

Studying tourists' attitudes and behaviors toward sustainability emerged as a recent thematic area, which is still in a growth phase. In-depth analyses of the contents of the four critical thematic areas may prove to be timely additions to the literature on ecotourism.

### 8.5. Future research scopes

RQ3 aimed to recommend future research scopes to researchers studying ecotourism. The first set of agendas is dedicated to advancing the existing themes in ecotourism research. The second set of agendas may aid in the emergence of new themes in ecotourism research. The third set of agendas intends to provide new directions in ecotourism research. In addition to three sets of agendas, the present study intends to shed light on the need to establish bridges across disciplines connected with ecotourism. For instance, the research domain of ecology may be connected with the research domain of ecotourism in the sub-domain of citizen science, where citizens (particularly ecotourists) are engaged in the collection of data pertaining to natural ecosystems (Hay Mele, Russo, & D'Alelio, 2019). Citizen science may also establish a bridge between the thematic areas relating to ecological preservation and tourists' behaviors. Furthermore, Hay Mele et al. (2019) advocated a roadmap to combine marine ecology and economy through integrated coastal management, which connects to the thematic area of protecting residents' interests in tourist destinations. The current study may guide future researchers in the domain of hospitality and tourism in the development of state-of-the-art conceptual foundations and advanced research on ecotourism.

## 9. Conclusion

The current study presents a comprehensive review of research on ecotourism. This conclusion is drawn from the findings from a set of techniques that constitute a protocol for bibliometric studies. A significant outcome of the present study was the identification of four critical thematic areas relating to the ecological preservation of tourist destinations, the protection of residents' interests in tourist destinations, the carbon footprint from tourist mobility, and tourists' attitudes and behavior toward sustainability, respectively. Consequently, the research gaps that emerged from the thematic areas have been identified, and future research scopes have been recommended to address those gaps. It may be recognized that the findings reported in the present study faced the inherent limitations of the analyzed sample; the sample consisted of articles published in quality journals that are ranked three and above in the ABS list (ABS, 2015). Future studies may address this inherent limitation by including documents from a larger database. For example, emerging and specialist journals such as the *Journal of Ecotourism* and *Journal of Tourism and Cultural Change*, where there are present up-to-date discussions on ecotourism. Hence, the inclusion of articles from such journals may enrich the current study's findings with insights specific to the advancements in ecotourism research. Nevertheless, the present study may guide future researchers to advance research on ecotourism.

### Contribution statement

SK and AD conceived the idea of the study. SK collected bibliometric data and performed requi suitableanalyses. AD, PK and MM verified all the process followed for data collection and analysis. SK wrote the first draft of the study and AD, PK and MM critically reviewed and edited the manuscript.

### CRediT authorship contribution statement

**Sayantana Khanra:** Conceptualization, Methodology, Data curation, Formal analysis, Writing - original draft, Writing - review & editing.  
**Amandeep Dhir:** Conceptualization, Methodology, Writing - review &

editing. **Puneet Kaur**: Project administration, Supervision, Validation, Writing - review & editing. **Matti Mäntymäki**: Project administration, Supervision, Validation, Writing - review & editing.

## Declaration of Competing Interest

None.

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None.

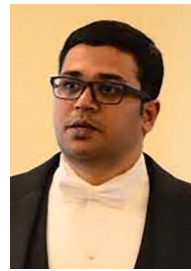
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**Sayantan Khanra (PhD)** is currently an Assistant Professor at Woxsen School of Business, India. He is also affiliated with Turku School of Economics, University of Turku, Finland. His research appear in the Enterprise Information systems, Journal of Hospitality and Tourism Management, Transforming Government: People, Process and Policy, amo among other leading academic journals. He is specialized in narrative, systematic and bibliometric reviews.



**Amandeep Dhir (DSc, PhD)** is a Professor of Research Methods at University of Agder, Norway. He is also a visiting professor at Norwegian School of Hotel Management, University of Stavanger, Norway. His research appears in the Journal of Retailing and Consumer Services, Journal of Destination Marketing & Management, International Journal of Contemporary Hospitality Management, International Journal of Hospitality Management, Technological Forecasting and Social Change, International Journal of Information Management, Computers in Human Behavior, Computers in Industry, Journal of Cleaner Production, Food quality and preferences, Appetite, Information Technology & People, Australasian Marketing Journal, Enterprise Information Systems among others.



**Puneet Kaur (DSc)** is currently a postdoctoral researcher at Department of Psychosocial Science, University of Bergen, Norway. Her research appears in Journal of Retailing and Consumer Services, International Journal of Contemporary Hospitality Management, International Journal of Hospitality Management, Technological Forecasting and Social Change, International Journal of Information Management, Computers in Human Behavior, Information Technology & People among others.



**Matti Mäntymäki (DSc)** holds a PhD in Information systems and currently he is an Associate Professor at Turku School of Economics, University of Turku, Finland. His work has published in Information Systems Journal, Computers in Human Behavior, International Journal of Hospitality Management, Technological Forecasting and Social Change, International Journal of Information Management, Electronic Markets, among others.