

Review

# Science Mapping the Knowledge Base on Sustainable Tourism Development, 1990–2018

Chanin Yoopetch \*  and Suthep Nimsai

Center for Research on Sustainable Development, College of Management, Mahidol University, 69 Vipavadee Rangsit Rd., Bangkok 10400, Thailand

\* Correspondence: chaninyoo@gmail.com; Tel.: +66-2200-2000

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**Abstract:** Robust literature on sustainable tourism development has emerged globally both in economically developed and emerging economies. Over the past several decades, policymakers and business practitioners increasingly acknowledge that the long-term development and sustainability of tourism destinations require clear guidelines and direction. The impetus for sustainable tourism development has become ever more urgent as a result of dual trends of climate change and massification of the global tourism industry. The current research review used science mapping techniques to examine 1596 Scopus-indexed documents published on sustainable tourism development. The objectives of the review were to document the size, growth, and global distribution of this literature, identify its key journals, authors, and documents, highlight emerging topics, and illuminate the underlying intellectual structure of this literature. The review also provides guidelines for scholars to develop research that can aid in future sustainable tourism development.

**Keywords:** sustainable tourism development; tourism sustainability; tourism development; science mapping; bibliometric review; systematic review of research

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## 1. Introduction

Tourism development has been a topic of interest among scholars for more than 100 years [1]. While the early literature aimed to develop conceptual models and document tourism trends, more recent research on tourism development has sought to integrate concepts associated with ‘sustainability’ [2–4]. Indeed, the establishment of the United Nation’s the sustainable development goals highlighted the need for research, policy, and practice on tourism development to incorporate economic, social, and environmental dimensions. This has resulted in the conceptualization of the tourism life cycles, as well as models of sustainable tourism development [5–8]. Notably, sustainable tourism development has received attention from public sector units (e.g., government ministries and departments), non-governmental organizations, and private enterprises [7–9].

Scholars have documented a wide range of problems that arise from ‘unsustainable tourism’. Recent examples include the negative effects of human waste polluting the bay and threatening coral reefs on Boracay Island in the Philippines, and the impact of mass tourism on the ancient pyramids at Giza in Egypt. These cases illustrate how unsustainable tourism can result in depletion of the very natural resources (e.g., coral beaches) and wonders of the world (e.g., pyramids) that attract tourists in the first place. In addition, scholars have documented how tourism initiatives often fail to develop sustainable income-producing enterprises for local populations. This leads to short-term exploitation of human and natural resources, and a failure to develop local capacity needed to sustain long-term success [2,5,10,11]. Common to these examples is the observation that unsustainable tourism invariably ‘kills the goose that lays the golden egg’.

The term, “sustainable tourism” was first coined by Bramwell and Lance [8,12,13] as a model for economic development designed to promote the quality of life of local communities, support tourist experiences at tourism destinations, and sustain the environment of the tourism destinations. In recent years, tourism scholars have highlighted the urgency of sustainable tourism development as an increasing number of tourism destinations are facing sustainability challenges. These include air pollution, inadequate water supply, uncontrollable and unmanageable waste, and the destruction of tourism sites due to over-crowding and overuse [14–18]. In some instances, unsustainable tourism threatens the extinction of flora and fauna in different parts of the world.

A growing literature has accumulated over time aimed at documenting the foundations of sustainable tourism. This paper contributes to this literature by using science mapping to document and synthesize research published on sustainable tourism between 1990 and 2018. Four research questions guided this bibliometric review of research on sustainable tourism.

RQ1: What are the characteristics of scholarly works on sustainable tourism development (STD) published from 1990 to 2018?

RQ2: Which journals, authors, and documents on sustainable tourism development have achieved the greatest scholarly impact?

RQ3: What is the intellectual structure of the knowledge base on sustainable tourism development?

RQ4: What are the high interest topics studied by scholars in the area of sustainable tourism development literature?

For simplicity, in this review the concepts of ‘sustainable tourism development’, ‘sustainability tourism development’, and ‘tourism development for sustainability’ will be referred to as ‘sustainable tourism development’ or STD. This review identified 1596 STD-related documents included in the Scopus index. Bibliographic data associated with these documents were exported from Scopus for bibliometric analysis. Scopus, Excel, and VOSviewer software programs were used to conduct a range of descriptive statistical tests, citation analyses, and social network analyses commonly used in science mapping studies [19–23].

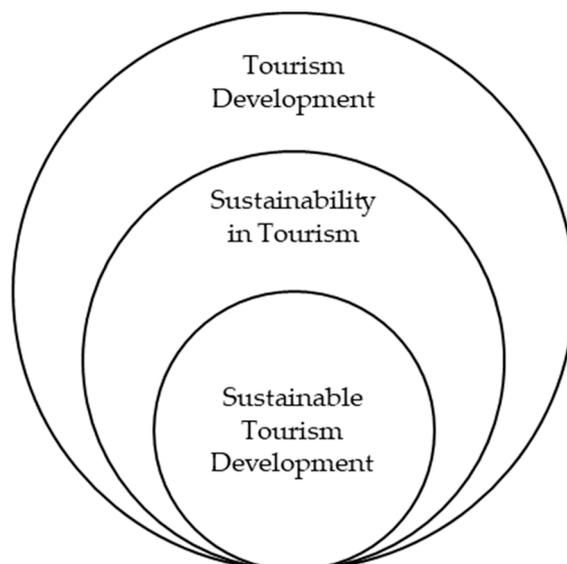
## 2. Conceptual Background

In order to set the stage for this review of research, the authors first present the study’s conceptualization of sustainable tourism development. Then several prior bibliometric reviews of the STD literature will be examined in order to identify the contributions of the current review.

### 2.1. Conceptualizing Sustainable Tourism Development

The concept of sustainable tourism was first developed in the 1990s [24–34]. The early literature on sustainable tourism was associated with the broader construct of ‘tourism development’. Early literature focused on the ‘economic sustainability’ of tourism development [35–38], as studies identified unanticipated negative outcomes of tourism development (e.g., pollution, resource depletion, habitat destruction) [39–41]. Tourism scholars responded by linking tourism with emerging conceptions of ‘environmental sustainability’ [42,43]. Consistent with broader international policy trends, the concept of ‘sustainability’ gradually broadened to include social, community, economic, and environmental concerns and criteria. During the ensuing decades STD came to subsume related constructs, such as green tourism, ecotourism, and responsible tourism [42–56]. This evolving conceptualization of sustainable tourism development is presented in Figure 1.

The model in Figure 1 represents the basic conceptual framework that guided this review. The review started from the broad concept of general tourism development [57–68]. Next, the concept of sustainability in tourism was refined in order to incorporate social, economic, and environmental outcomes of tourism development [69–78]. Finally, we focused on ‘Sustainable Tourism Development’ to further incorporate these dual foci [79–81].



**Figure 1.** Conceptualizing sustainable tourism development.

## 2.2. Prior Reviews of Research on Related Domains

Several bibliometric reviews of the sustainable tourism literature have been conducted. While their foci, objectives, and methods have varied, they overlap to different degrees with those of the current review. Thus, it is important to identify the value added by this current effort. Table 1 summarizes key features of prior reviews that were identified in related literatures (e.g., tourism development, sustainable tourism).

**Table 1.** Past bibliometric reviews of research on sustainable tourism.

Author	Ruhanen et al. 2015 [24]	Niñerola et al. 2019 [25]	Garrigos-Simon et al. 2018 [26]
<i>n</i>	492 articles	4647 articles	2279 articles
Source	Four tourism journals	Scopus	Web of Science
Objectives	theory and methods; subjects; perspectives/approaches; geography	Bibliometric analysis of sustainability and tourism	Bibliometric analysis of income and employment in STD
Time frame	1987—2012	1987—2018	1933—2017
Keywords	sustainable tourism sustainable development sustainability	tourism sustainability sustainable tourism tourism	sustainability, tourism, income, employment
Focus	Sustainable tourism	Sustainable tourism	Tourism sustainability income or employment
Software	Excel	VOSviewer	VOSviewer
Analysis	theories and methods subjects/contextual themes perspectives/approaches	Growth, geography journals, papers and authors topics	Topics, author impact; co-authorship patterns

The reviews are titled as (1) *Trends and patterns in sustainable tourism research: a 25-year bibliometric analysis* [24], (2) *Tourism Research on Sustainability: A Bibliometric Analysis*, [25] (3) *Tourism and Sustainability: A Bibliometric and Visualization Analysis* [26]. As indicated in Table 1, the reviews vary based on the different dimensions around which the reviews were organized (e.g., time frame, size of the database etc.).

This review differs from and extends these prior efforts to document and make sense of the evolution of research on sustainable development in several respects. First, in contrast to all three prior bibliometric reviews, the current review adopted a narrower focus on ‘sustainable tourism development’. This variation in focus influenced the search for documents and resulted in a different

database for analysis. Second, our research questions differ significantly from those addressed by Ruhannen et al. [24] and Garrigos-Simon et al. [26]. While our substantive focus and methodology bear similarities to the Niñerola et al. [25] review, as suggested above, our focus is more narrowly cast onto sustainable tourism development'. This is reflected in the smaller number of documents identified in the current review of research. In the final section of this review, the authors will compare the results of this review with those reported in the above-cited reviews of sustainable tourism research.

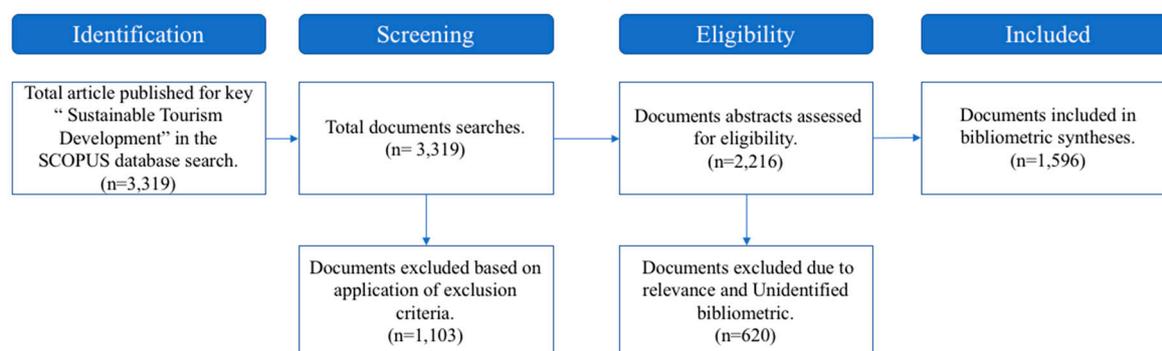
### 3. Method and Materials

The current review of research used science mapping, which relies on bibliometric analysis as a means of documenting and synthesizing features of the STD knowledge base [82–85]. In contrast with review methods, such as research synthesis and meta-analysis, science mapping does not focus on integrating substantive findings from a body of literature. Rather, science mapping seeks to reveal features to describe the evolution, composition, and intellectual structure of the knowledge base. The rationale behind science mapping lies in the need to understand the process of knowledge accumulation and how it informs the production of useful knowledge for policy and practice. Thus, the findings from science mapping reviews are used to chart new directions aimed at strengthening future knowledge production.

#### 3.1. Search Criteria and Identification of Sources

This review used Scopus, one of the largest databases on social science research [86–88], for the purpose of identifying high quality, relevant documents for the review. The review was limited to articles published in Scopus-indexed journals in the belief that this would produce a more consistent quality of documents. The time frame of the study was from 1990–2018. As indicated in the prior section of the paper, the topical focus was 'sustainable tourism development'. This was defined as the development orientation in tourism with the focus and goals of balanced sustainability, including economic, socio-cultural, and environmental dimensions.

The review followed PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) in the search and identification of relevant documents in Scopus (see Figure 2). [87]. The Scopus search began with the keywords (TITLE-ABS-KEY ("tourism development") OR TITLE-ABS-KEY ("sustainability in tourism")) AND TITLE-ABS-KEY (sustainable tourism development)), resulted in 3319 documents to be further analyzed. After final screening and checking for eligibility, including types of documents and duplications, 1596 documents remained in the Scopus list for use in the review.



**Figure 2.** Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram detailing steps in the identification and screening of sources [87].

#### 3.2. Data Extraction and Analysis

Bibliographic data, associated with the 1596 journal articles, were exported from Scopus. The data were saved in an Excel file for further analysis, as well as subsequent upload into bibliometric software.

The data extracted from Scopus included names of authors, author affiliations, year of publication, index keywords, abstract, and various citation information.

The authors used descriptive statistics to investigate the size, growth trajectory, and geographic distribution of documents in the review database [83]. Regarding bibliometric analysis, citation and co-citation analyses were applied to assess the impact and influence of the authors and documents in the field of study in sustainable tourism development. Citation analysis examines the direct impact of documents included in the review database by calculating the number of times each document or author had been cited by other documents located in the Scopus index. This citation analysis yields a certain number of ‘Scopus citations’ for authors and documents.

Co-citation analysis measures the number of times two authors or two documents in the ‘reference lists’ of documents in the review database have been cited by other scholars. When two authors or documents are frequently ‘co-cited’ by other scholars, it suggests that they share a kind of intellectual affinity or similarity. Co-citation has several noteworthy strengths that go beyond direct citation analysis. First, since co-citation analysis examines the ‘cited references’ in the review documents, it actually captures a much broader literature than citation analysis. Consequently, co-citation analysis often surfaces influential scholars in related fields (e.g., sustainability science, economics, general management) who may never have written on sustainable tourism. Finally, because co-citation analysis is able to identify similarities in the scholarship of different authors, it has been used to analyze the ‘intellectual structure’ or dominant research traditions within a discipline or a line inquiry [21,23,28]. In this review, co-citation analysis was applied to both authors and documents.

Finally, topical foci in the STD knowledge-base was examined through keyword co-occurrence analysis or co-word analysis. The main aim of this analysis is to determine the frequency of keywords that ‘co-occur’ in the title, abstract, or keywords of documents in the database extracted from Scopus. Temporal co-word analysis reanalyzes the results of co-word analysis using the date of publication information associated with all of the documents. It then analyzes the distribution of documents associated with a keyword over time in order to identify documents that have tended to be published in the most recent period covered in the review. Temporal co-word analysis is used to identify the research front [88] or hot topics in a field.

## 4. Results

The presentation of results are organized in the sequence of the four research questions that guided this review.

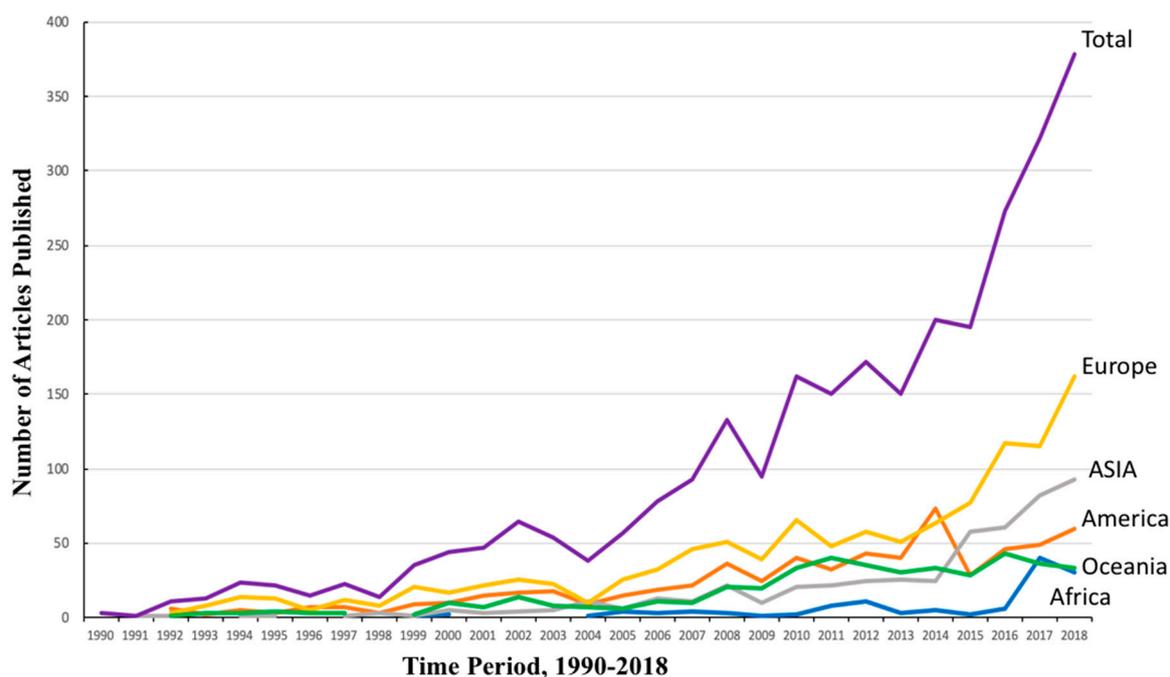
### 4.1. Size, Growth Trajectory, and Global Distribution of the STD Literature

The 1596 documents, published on the topic of sustainable tourism development since 1990, represent a substantial knowledge base. As shown in Figure 3, there was slow growth in the early 1990s and accelerating growth since 2005. This trend is confirmed by the publication of 723 documents representing 45% of the full literature between 2013 and 2018.

The geographical distribution found that authors from the United States (USA) have published the most STD documents (276). They were followed by documents authored by scholars from Australia (255), United Kingdom (238), Canada (99), Spain (78), New Zealand (65), China (65), Sweden (47), and South Africa (45). This distribution is not surprising in light of more general Anglo-American-European dominance in international journal publication.

At the same time, however, the production of STD scholarship has been rising across most regions of the world over the past decade (see Figure 3). While Europe, Asia, and America lead the way, the recent rise of Asian scholarship in this domain is especially notable. This reflects both the growth of tourism destinations Asia and the massification of tourism, especially from China. These trends have cohered into a greater awareness among policymakers and the public of threats associated with unsustainable tourism in this region. A spike in African scholarship in the past several years may

foretell a new trend, as tourism expands in Africa and threats to existing tourism destinations are documented and acknowledged.



**Figure 3.** Trajectory of the sustainable tourism development literature, 1990–2018 ( $n = 1596$ ) by regions.

#### 4.2. Analysis of Influential Journals, Authors, and Documents

This section presents the analysis on key journals, authors, and documents in the literature on sustainable tourism development. The first analyses focused on identifying journals that have been most active and influential in the dissemination of STD research. The top 20 journals in this field ranked by citation impact are listed in Table 2. These journals account for 68.7% of the publications in the review database. Using dual criteria of publication volume and citation impact, the most influential journals publishing STD research are the *Journal of Sustainable Tourism Management*, *Annals of Tourism Research*, *Tourism Geographies*, *Journal of Travel Research*, and the *Journal of Cleaner Production*. While *Sustainability* (Switz) has been the second most active publishers of STD topics, its citation impact is somewhat lower than the above-mentioned journals.

It is further observed that the citation statistics for these journals (e.g., citations per document) are quite strong, thereby suggesting a broad uptake of this literature by scholars around the world. This impression of strong citation impact is also buttressed by the fact that all 20 of the top ranked journals in this field fall into the first or second quartile of Scopus. Moreover, since these journals account for such a substantial portion of the review database (i.e., 68.7%), it is reasonable to suggest that the body of STD scholarship covered in this review meets a reasonable quality standard.

Data presented in Table 2 also affirm the conclusion that sustainable tourism development is a cross-disciplinary line of research. The subject domains of these journals cut across business and strategy, business and tourism, Energy and the Environment, Earth and Society, and Societies and Geography. Journal title further suggest interest from journals specializing in hospitality management and travel, as well as regional journals.

**Table 2.** Twenty journals publishing research on sustainable tourism development by total documents, 1990–2018.

Rank	Journal	Subject Domain	Docu-Ments	Scopus Citations	Scopus Quartile	Citations Per Document
1	<i>Journal of Sustainable Tourism</i>	Bus & Tour	416	14,420	Q1	34.7
2	<i>Tourism Management</i>	Bus & Strat	104	5856	Q1	56.3
3	<i>Annals of Tourism Research</i>	Bus & Tour	52	3711	Q1	71.4
4	<i>Tourism Geographies</i>	Bus & Tour	43	1238	Q1	28.8
5	<i>Journal of Travel Research</i>	Bus & Tour	26	1167	Q1	44.9
6	<i>Journal of Cleaner Production</i>	Bus & Strat	40	914	Q1	22.9
7	<i>Current Issues in Tourism</i>	Bus & Tour	37	892	Q1	24.1
8	<i>Sustainability (Switzerland)</i>	Ener & Env	104	480	Q2	4.6
9	<i>Tourism Recreation Research</i>	Bus & Tour	41	437	Q2	10.7
10	<i>Tourism and Hospitality Research</i>	Bus & Tour	33	431	Q1	13.1
11	<i>Journal of Ecotourism</i>	Bus & Tour	24	375	Q2	15.6
12	<i>Int Journal of Contemporary Hospitality Management</i>	Bus & Tour	17	373	Q1	21.9
13	<i>Tourism Management Perspectives</i>	Bus & Tour	37	329	Q1	8.9
14	<i>Asia Pacific Journal of Tourism Research</i>	Bus & Tour	29	273	Q2	9.4
15	<i>Tourism Review</i>	Bus & Tour	15	273	Q2	18.2
16	<i>Scandinavian Jnl of Hospitality &amp; Tourism</i>	Bus & Tour	13	248	Q2	19.1
17	<i>International Journal of Tourism Research</i>	Bus & Tour	18	245	Q2	13.6
18	<i>Anatolia</i>	Earth & Soc	24	229	Q2	9.5
19	<i>Development Southern Africa</i>	Soc & Geo	11	216	Q2	19.6
20	<i>Tourism and Hospitality Planning &amp; Dev</i>	Bus & Tour	13	196	Q1	15.1

The next analyses focused on identifying the key authors of STD scholarship. The top five authors contributing to this field, based on Scopus citation impact, have been Gössling (1207), Weaver (882), Lane(825), Bramwell (749), and Hunter (742), (see Table 3). As indicated in Table 3, topical foci studied by the most highly-cited scholars include tourism, sustainability sciences, geography, heritage, climate, and transport. These patterns again reinforce the inter-disciplinary make-up of this field.

**Table 3.** Highly cited authors on sustainable tourism development, 1990–2018 ( $n = 1596$ ).

Rank	Author	Nation	Focus	Scopus Citations
1	Gössling S.	SWE	Mobility & tourism	1207
2	Weaver D.B.	AUS	Tourism	882
3	Lane B.	AUS	Tourism	825
4	Bramwell B.	UK	Biology	749
5	Hunter C.	UK	Tourism	742
6	Dolnicar S.	AUT	Tourism	587
7	Hall C.M.	NZL	Geo. & tourism	520
8	Miller G.	UK	Sustainability & tourism	517
9	Moscardo G.	AUS	Tourism & heritage	517
10	Peeters P.	NLD	Tourism & transport	504
11	Saarinen J.	FIN	Tourism & nature conserv	430
12	Becken S.	AUS	Sustainable tourism	393
13	Font X.	UK	Sustainable tourism	378
14	Weiler B.	AUS	tourism	369
15	Wall G.	UK	Tourism & development plan	365
16	Jamal T.	USA	Sustainability & tourism	332
17	Boley B.B.	USA	Sust tourism/geo-tourism	287
18	Nepal S.K.	USA	Tourism	287
19	Ruhanen L.	AUS	Tourism	281
20	Scott D.	CAN	Tourism & climate	280

Note: Minimum number of documents of an author (5).

Author co-citation analysis was used to complement the results of citation analysis. Although the top-cited scholars reprise selected names identified in Table 3 (e.g., Hall, Gössling, Bramwell, and Weaver), the list also reveals highly co-cited scholars who either published outside of Scopus, or in fields associated with, but not centrally located in ‘sustainable tourism development’ (e.g., Butler, Buckley, Scott, Getz). The synthesis of the results presented in Tables 3 and 4 reveals the most influential authors in this: Gössling, Weaver, Bramwell, Hall, Hunter, Dolnicar, Peeters, Font, Waal, Jamal, and Butler.

**Table 4.** High impact scholars in the field of sustainable tourism development based on co-citations.

Rank	Author	Nation	Focus	Co-Citations	Link Strength
1	*Hall, C.M.	NZL	Geography, Tourism	1034	30,520
2	Butler, R.	CAN	Tourism development	768	19,750
3	*Gossling, S.	SWE	Mobility, Tourism	673	22,743
4	*Bramwell, B.	UK	Governance, Tourism	649	19,039
5	*Weaver, D.	AUS	Tourism	499	14,137
6	*Lane, B.	UK	Tourism	455	13,284
7	*Wall, g.	UK	Tourism, Development planning	403	10,090
8	*Jamal, T.	USA	Sustainability, tourism	361	11,074
9	Buckley, R.	AUS	Tourism, Ecology	345	10,575
10	Scott, D.	CAN	Tourism	339	11,979
11	Getz, D.	CAN	Tourism	325	8634
12	Sharpley, R.	UK	Tourism	299	8652
13	McCool, S.	USA	Natural resource planning	292	8545
14	*Peeters, P.	NLD	Tourism	285	9658
15	Becken, S.	AUS	Tourism	272	8462
16	*Hunter, C.	UK	Tourism	272	7249
17	*Dolnicar, S.	AUT	Tourism	254	7991
18	*Font, X.	UK	Sustainable tourism	253	5989
19	McKercher, B.	CAN	Tourism	245	6841
20	Sirakaya, E.	USA	Tourism policy	241	6883

\* Indicates that the scholar was also one of the top 20 cited scholars identified in Table 3.

The next set of analyses focused on identifying the most influential documents in this field (Table 5). Based on the abstract of these papers, the scope of these topics reflected the focus on sustainability, changing paradigm, finding indicators for sustainability, evolutionary theory in sustainable tourism, residents' attitudes, cultural and heritage tourism management, rural and pro-poor tourism, nature-based tourism, community-based tourism, the roles of public and private organizations and policy and governance systems. Not surprisingly, many of the highly cited authors are also associated with these documents (e.g., Butler, Bramwell, Buckley, Hunter, Saarinen).

**Table 5.** Order of the twenty most highly-cited sustainable tourism development documents based on Scopus citations, 1990–2018 ( $n = 1596$ ).

Rank	Documents	Type	Nation	Scopus Citations
1	Butler (1999). Sustainable tourism: A state-of-the-art review.	Rev	CAN	383
2	Hunter (1997). Sustainable tourism as an adaptive paradigm.	Con	UK	377
3	Choi & Sirakaya (2006). Sustainability indicators for managing community tourism.	Con	USA	353
4	Sharpley (2000). Tourism and sustainable development: Exploring the theoretical divide.	Con	UK	336
5	Saarinen (2006). Traditions of sustainability in tourism studies.	Con	FIN	322
6	Liu (2003). Sustainable tourism development: A critique.	Con	CHN	320
7	Sims (2009). Food, place and authenticity: Local food and the sustainable tourism experience	Emp	UK	303
8	Moscardo (1996). Mindful visitors: Heritage and tourism.	Con	AUS	300
9	Hassan (2000). Determinants of market competitiveness in an environmentally sustainable tourism industry.	Con	USA	296
10	Miller (2001). The development of indicators for sustainable tourism: Results of a Delphi survey of tourism researchers.	Emp	UK	274
11	Buckley (2012). Sustainable tourism: Research and reality.	Rev	AUS	249
12	Reynolds & Braithwaite (2000). Towards a conceptual framework for wildlife tourism.	Con	UK	222
13	Lane (1994). What is rural tourism?	Con	AUS	204
14	Choi & Sirakaya (2005). Measuring residents' attitude toward sustainable tourism.	Emp	KOR	203

Table 5. Cont.

Rank	Documents	Type	Nation	Scopus Citations
15	Ryan (2002). Equity, management, power sharing and sustainability-Issues of the 'new tourism'.	Con	NZL	193
16	Briassoulis (2002). Sustainable tourism and the question of the commons.	Con	GRC	190
17	Bramwell (2011). Governance, the state and sustainable tourism ...	Con	UK	188
18	Dwyer et al. (2009). Destination and enterprise management for a tourism future.	Con	AUS	187
19	Okazaki (2008). A community-based tourism model: Its conception and use.	Con	JPN	182
20	Bramwell & Lane (1993). Sustainable tourism: An evolving global approach.	Con	UK	181

Table 6 demonstrated document co-citation analysis, showing the degree to which these documents in the review database have been 'co-cited' with documents located in the reference lists of the other sustainable tourism development documents. These co-citation documents may not be included in the Scopus review database used in this study. However, the co-citation analysis showed that these documents are influential to the authors of the documents in this review. For example, the work of Brundtand [89] on Our Common Future, published in 1987, has been co-cited by other documents in this review, but this document (Our Common Future) was not included in this review. This co-citation analysis described the connections among the scholarly works in the area of sustainable tourism development, without the limit of the Scopus database used in this study. In addition, based on co-citation analysis, a number of journal indicated their impact on this field of STD with high level of co-citation, including *Annals of Tourism Research*, *Journal of Sustainable Tourism*, and *Tourism Management*.

Table 6. Order of the twenty most highly co-cited sustainable tourism development documents.

Rank	Cited Reference	Society	Type of Paper	Co-Citations
1	Hunter (1997). Sustainable tourism as an adaptive paradigm.	UK	Con	55
2	Liu (2003). Sustainable tourism development: A critique.	CHN	Con	53
3	Bramwell & Lane (1993). Sustainable tourism: An evolving global approach.	UK	Con	52
4	Sharpley (2000). Tourism and sustainable development: exploring the theoretical divide.	UK	Con	47
5	Jamal & Getz (1995). Collaboration theory and community tourism planning.	CAN	Con	37
6	Saarinen (2006). Traditions of sustainability in tourism studies.	FIN	Con	34
7	Buckley (2012). Sustainable tourism: Research and reality.	AUS	Rev	30
8	Choi & Sirakaya (2006). Sustainability indicators for managing community tourism.	USA	Con	27
9	Cole (2006). Information and empowerment: The keys to achieving sustainable tourism.	UK	Emp	27
10	Butler (1999). Sustainable tourism: A state-of-the-art review.	CAN	Rev	26
11	Cole (2006). Information and empowerment: The keys to achieving sustainable tourism.	UK	Con	25
12	Miller et al. (2010). Public understanding of sustainable tourism.	UK	Emp	25
13	Miller (2001). The development of indicators for sustainable tourism: results of a delphi survey of tourism researchers.	UK	Emp	25
14	Brundtand (1987). Our common future.	NOR	Con	24
15	Clarke (1997). A framework of approaches to sustainable tourism.	UK	Con	22
16	Tosun (2000). Limits to community participation in the tourism development process in developing countries.	TUR	Con	22
17	Inskip (1991). Tourism planning: An integrated and sustainable development approach.	USA	Con	21
18	Mowforth & Munt (1998). Tourism and sustainability: New tourism in the third world.	IRL	Con	21
19	Bramwell (2011). Governance the state and sustainable tourism: A political economy approach.	UK	Con	20
20	Scheyvens (1999). Ecotourism and the empowerment of local communities.	NZL	Con	20

#### 4.3. Intellectual Structure of the Sustainable Tourism Development Knowledge Base

The next research question inquired into the intellectual structure of the knowledge-base on sustainable tourism development. Science mapping offers a visual-spatial representation of the intellectual structure of fields of knowledge based on author co-citation analysis [23,25]. VOSviewer was used to generate a co-citation map in which similarities among frequently co-cited authors cohere into clusters that are interpreted as ‘Schools of Thought’ [23,28,90]. These Schools of Thought comprise a visual map of the intellectual structure of the field. Interpretation of the co-citation map begins with the author nodes where the size of the bubble reflects the relative volume of the author’s co-citations [21,23]. The proximity of nodes to one another represents the degree of intellectual affinity of authors based upon the number of their co-citations. The links between specific authors represent co-citations of the two authors by other scholars.

VOSviewer identified author co-citation networks comprised of 48,679 authors identified in the reference lists of the 1596 documents in the review database. A map was generated using a threshold of 75 author co-citations with the map set to display 135 authors. The largest nodes belong to the top co-cited scholars listed above in Table 4.

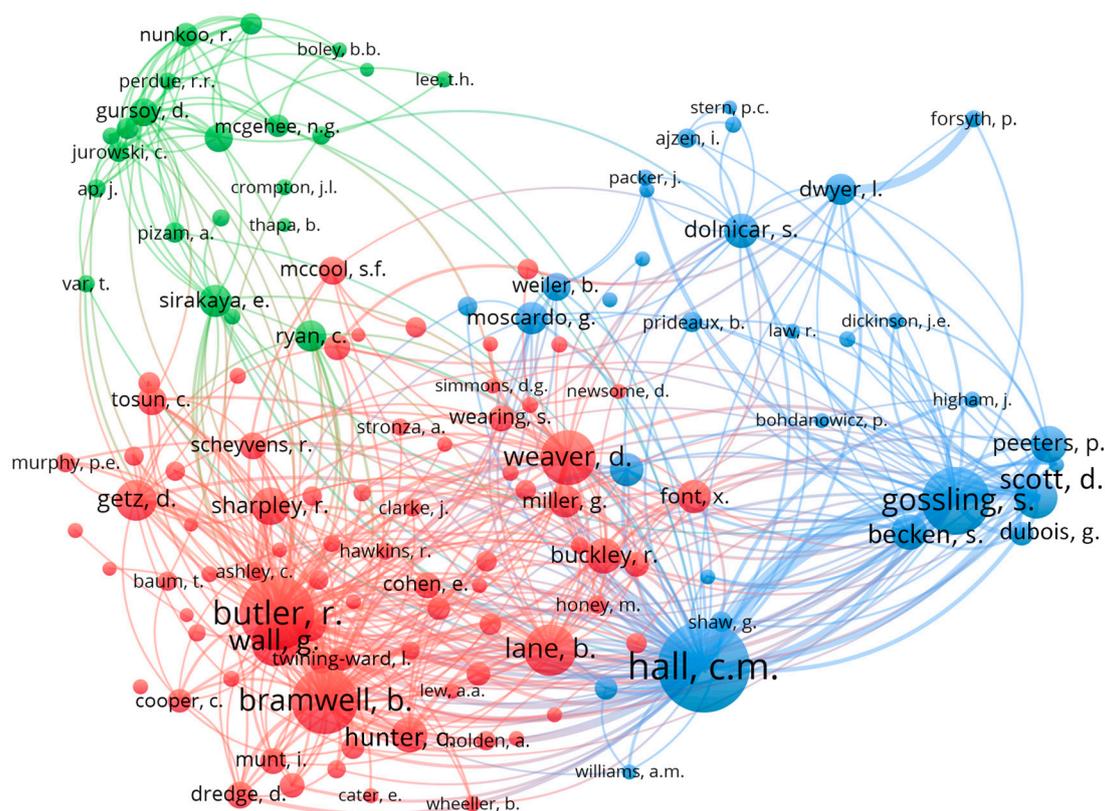
The map in Figure 4 shows three Schools of Thought of varying size, dispersion, and coherence. These Schools are: Sustainable Tourism Development, Sustainable Tourism and the Environment, Tourism and Sustainable Communities. The formation of these author clusters, based on co-citation analysis, reveals the evolution of distinctive lines of inquiry that have come to define the STD knowledge-base.

The largest School of Thought, indicated in red, suggests a theme of Sustainable Tourism Development. This School is led by Butler (768 co-citations), Bramwell (649), Wall (499), Lane (455), Jamal (361), Getz (325), Sharpley (299), and Hunter (272). This School emphasizes management processes associated with achieving tourism sustainability. Prominent topics in this school included tourism trends [2,8,12], stages of tourism process and development [2,3], and governance theory in tourism [13,37,38,65]. For this School of Thought, the majority of authors have focused on key factors and activities related to tourism development, tourism destination life cycle. They have also sought to define and describe key processes of tourism development, and indicators and measurements of sustainable tourism development goals [3,12,13,38].

The blue cluster is a School of Thought comprised of authors associated with Sustainable Tourism and the Environment. Key authors include Hall (1034), Gössling (673), Scott (339), Becken (272), Peeters (285), Dolnicar (254), and McKercher (245). The topics included tourism geography [71,78], tourist behavior [32,77], and tourism system and structure [32,78]. The body of works of the authors in this School of Thought reflected the sustainable tourism developments in the context of tourism impacts (positive and negatives) and the understanding the needs and desires of tourists and their behaviors [32,77].

The green cluster reflects a School of Thought comprised of scholars who have studied Tourism and Sustainable Communities. Key authors in this School include McCool (292 co-citations), Sirakaya (241), Ryan (230), McGehee (203), Gurosy (197), and Nunkoo (150). This School of Thought has focused on tourism stakeholder participation [48,54], residents’ attitudes [4,35], perceptions toward tourism development [4,47], and natural resource planning [9,48]. In addition, this School of Thought has highlighted the role of stakeholders, especially local communities or local residents, which in the 1990–2000, were not the key participants in the process of sustainable tourism development. In other words, this School of Thought has raised the importance of stakeholder participation for sustainable tourism development.

Consistent with data presented in Table 4, Hall, Butler, Gossling, and Bramwell have the largest nodes, indicating the most co-citations in this literature. Nonetheless, Colin Hall and Richard Butler hold the distinction of being the key ‘boundary-spanning’ scholars in this literature. This is reflected in the density of their ‘links’ to scholars in all three Schools of Thought. This means that their scholarship has, more than others, both integrated and influenced concepts across this literature.



**Figure 4.** Co-citation analysis map of the sustainable tourism development literature, 1990–2018 (threshold 75 citations, display 135 authors).

#### 4.4. Topical Foci of the Sustainable Tourism Development Knowledge Base

The last research question concerned the topical foci of the STD knowledge base. Here keyword co-occurrence analysis was used to identify topical trends [21]. Using all keywords for co-occurrence analysis, the ten words with the highest frequency of co-occurrence included, ecotourism (746), sustainable tourism (671), tourism development (465), sustainable development (378), sustainability (374), tourism management (331), tourism destination (240), tourism (195), stakeholder (130), and tourism market (108). Thus, this analysis highlights the emergence of ‘ecotourism’ as a particularly important topic within this literature.

Figure 5 also provides a temporal co-word analysis designed to highlight the most recent topics of interest. On the map, nodes with a brighter color are concentrated in the most recent years and can, therefore, be considered ‘hot topics’. With this in mind, the STD co-word map further highlights climate change, tourism impact, tourist behaviors, empowerment, policy-making, and cultural heritage/heritage tourism.

In addition, the heat map also provides the increasing prominence of research on sustainable tourism development in Asia, (e.g., China and Taiwan). Earlier analyses indicated that most researchers in the sustainable tourism development area were traditionally from Western economies. Yet, this map suggests a recent shift in the focus of the field towards Asia. Moreover, the research front of research in sustainable tourism development appears to be focusing more on understanding the needs, attitudes, and viewpoints of both tourists and stakeholders. This extends to examining the empowerment of local communities and indigenous populations. Figure 5 also highlights concerns regarding the negative impact of climate change, carrying capacity, and tourism growth on the sustainability of tourism. Finally, the temporal map also reveals the emergence of ecotourism and tourism that honors and shares cultural heritage as an emerging trend.



in Western, developed societies. This suggests an important gap in this literature. Fortunately, our data found that STD studies, authored in developing countries, have increased in recent years. The authors wish to encourage this trend and suggest that journals in this field address this gap through a series of special issues that target sustainable tourism in developing societies over the next several years.

Our results support and extend findings from prior bibliometric reviews, as highlighted earlier in Table 1. For example, our findings affirm the prior identification of the *Journal of Sustainable Tourism*, *Tourism Management*, and the *Annals of Tourism Research* as the premier journals publishing research on sustainable tourism development [24–26,78]. Scholars seeking high visibility outlets for their research may wish to look first to these journals. In addition, our citation analyses reinforce prior conclusions that Hall, Weaver, Bramwell, Hunter, and Gössling are the thought leaders in this domain of sustainability research [8,11–13,37,38,71,77,81].

This review also shed light on the conceptual-topical evolution of this field. Prior to the emergence of sustainable tourism development in the 1990s, development theories tended to focus primarily on the economic aspects of tourism development (e.g., modernization theory). However, over time, scholars began to document the negative effects of unsustainable tourism [49,81]. This led to a gradual shift in focus from ‘tourism development’ [50,56], to ‘sustainability in tourism’ [47,55] to the more specific area of ‘sustainable tourism development’ [37,45,51]. Consistent with broader trends in the global sustainability movement, ‘sustainable tourism development’ has grown to incorporate socio-cultural, economic and environmental goals and practices. Similarly, we observed in this literature a concurrent trend towards stakeholder involvement and empowerment (e.g., individuals, communities, and public organizations) in sustainable tourism development.

The findings from this review suggest that the timeliness of conducting research syntheses that elaborate on scholarship associated with the three schools of thought identified in this review. It can be said that the three schools of thought conceptualize the overall system of sustainable tourism development, from development initiatives, goal setting and measurement, implementation, and effects. Firstly, the School of Sustainable Tourism Development offers the basic foundation, guidelines, and theory for the development process of sustainable tourism [13,37,38,65]. Secondly, the School of Sustainable Tourism and the Environment highlights the effects of tourism and tourism activities on the environments both with respect to resource exploitation and depletion, as well as environmental impact [32,71,78]. Lastly, the School of Tourism and Sustainable Communities brings to light the importance of different stakeholders (e.g., business, communities, government, tourists) in sustainable tourism development [47,48,54]. Taken together these three schools offer an empirically derived, comprehensive conceptualization of sustainable tourism development.

Given their grounding in published literature, the authors suggest that the three schools of thought are appropriate targets for follow-up reviews of research. Given the state of this literature’s development, we believe that the most suitable review methodology will be research synthesis of substantive findings. Nonetheless, reviewers should also pay attention to documenting the predominant methods being used in this field of study. Although our impression from this review was that the literature is primarily descriptive and qualitative, this should be verified through more explicit analysis. The advancement of the knowledge-base on SE will require a broader set of research methodologies capable of documenting the effects of different SE strategies.

Co-word analyses, conducted in this review, also offer insight into trends that comprise important foci for STD research in this era. The first concerns ecotourism. This was the most significant topic identified in this literature. Influential authors (e.g., Scheyvens, Buckley, Weaver, Wall, Brandon) and documents [52,62,67,90] associated with this topic were identified in the review. Second, hot topics that have emerged in recent years include climate change, tourist behaviors and impact, empowerment, policymaking, and the role of cultural heritage in sustainable tourism development. Based on the related literature, these topics represented the crucial concerns regarding the direction of tourism development and its impacts on societies and the environment.

With the fast-growing expansion of tourism activities, tourists have continued to explore new destinations. Even though tourism can generate significant amounts of revenue for tourism destinations, especially in developing countries, there are several negative impacts of tourism, including over-carrying capacity, changes or abandonments of life styles of local people in many communities, carbon footprints from transportation, and over-investments in popular tourism destination. It is found that many research studies in these areas explored solutions for the real sustainable tourism development, including the need for a better and dynamic tourism development model and policy, and the need for action to cope with environmental challenges and at the same time allowing tourism destinations to achieve the sustainable tourism development goals.

Finally, several different findings from this review suggest that STD research located in emerging regions of the world (e.g., Asia, Africa, Latin America) has high growth potential [91–93]. While the review did not explicitly analyze contributing factors for this trend, we suggest that it could result from two sources. First, tourism represents an important contributor to the economies of many developing societies. In the current global context, challenges to the sustainability of tourism in these societies has also risen to the fore. Thus, sustainable tourism development represents an increasingly important policy issue for governments in developing societies. Concurrent with the emergence of this trend is the increased publication trajectory of scholars located in developing societies over the past decade [94]. We predict that these dual forces will drive the future of the STD literature over the next decade.

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