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Bibliometric Analysis and Trends: An Application in Senior Tourism

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Abstract

This study applies bibliometric analysis to senior tourism research from 1998 to 2017, identifies its intellectual structure, emerging trends, and future research opportunities, and through CiteSpace implements and analiyzes a detailed search of documents collated from Web-of-Science and Scopus. The results reveal a slowly increasing growth of research with six main areas of research. The network of journals shows a core peripheral structure with *Tourism Management* ranked first. Among countries' publications, the United States leads in volume. The identification of structural holes, keyword analysis, and development of emerging tendencies highlight priorities in senior tourism pointing to new opportunities for research. This study is different from others through its temporal and dynamic analysis of the last two decades, utilizing CiteSpace for co-citation and co-occurrence network analysis and equipping researchers and the hospitality sector with new exploration tools.

Key words: Bibliometrics; Web-of Science; Scopus; senior tourism; co-citation network; co-occurrence network; CiteSpace.

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1. Introduction

It is imperative that scholars monitor the developing literature in order to glean new insights in varied topic areas, thereby adding to the body of existing knowledge (Chen, 2006). Bibliometrics is critical for conducting periodic reviews of existing research fields, identifying contributions to knowledge, and constructing substantiated arguments about the development of a specific field (Denyer and Tranfield, 2006). A bibliometric study involves the statistical analysis of scientific publications and adopts quantitative performance indicators to get over the disadvantage of subjectivity in peer review and expert judgments (Van Raan, 2004).

Bibliometrics has become a critical tool for tourism studies via assessing research or scientific production in a specific area over time. The increasing number and complexity of research papers have created a need for visualization tools that can produce maps, graphs, and diagrams to illuminate patterns, trends, and processes. Despite such usefulness, the number of bibliometric studies using network visualization is small and only covers short time periods (Evren and Kosac, 2014). This method is under-utilized in tourism research and has the potential, if developed, to explore the structure of tourism networks in many different contexts (Scott et al., 2008). Thus, it offers applications in any research field.

The most popular bibliometric visualization tool CiteSpace (Chen et al., 2010), used in the current study, allows a researcher to take time series snapshots of the knowledge domain and merge these into a visual map. Moreover, different types of bibliometric networks can be constructed with CiteSpace: (i) co-citation networks of authors, documents, and journals; (ii) co-occurring author keywords and keywords plus; (iii) co-authorship networks of authors; (iv) co-authors' institutions; and (v) co-authors' country. Although several studies have been conducted through CiteSpace in the areas of medicine (e.g. Pestana and Sobral, 2019) and hospitality (e.g. Li et al., 2017), to the best of our knowledge this tool has only recently been used in tourism in the areas of sustainability (Fang et al., 2018) and tourism crisis (Jiang et al., 2017).

It is important to understand the interest of the current study in the bibliometric analysis of senior tourism research. As elderly populations grow, this changing demographic is increasingly afflicted by adverse economic and social conditions. Traveling in particular is one of many methods countering these effects and may have a positive impact on quality of life for the elderly (Alén et al., 2017). As their numbers grow, seniors will be an important segment for the tourism industry in coming decades (Alén et al., 2017). Senior travel reviews in the past have been dominated by cross-sectional designs that result in temporal gaps (Huber et al., 2017).

The aim of our study is to show the value of a bibliometric visualization by using CiteSpace in the field of senior tourism research from 1998 until 2017. We employ co-citation network analysis and co-occurrence network analysis of keywords and references to visualize and detect the intellectual structure as well as the evolution footprints of intellectual turning points in the senior tourism research during this period. This study claims originality on several grounds: (1) by focusing on the last twenty years, our dataset identifies several generations of seniors; (2) the use of citation index-based expansion allows a robust construction of our dataset

(Chen et al., 2010); (3) the two most comprehensive literature databases, Web-of-Science (WoS) and Scopus (Guz and Rushchitsky, 2009), are used to create our dataset, providing more representative results relating to the senior tourism field; and (4) using metrics computed by CiteSpace to visualize the merged network and to identify the dynamics of its development, we provide a better pattern and understanding of this field for subsequent scholars to repeat our efforts using other forms of data.

2. Methodology

2.1 Data Collection

WoS and Scopus databases generated global scientific outputs and were then analyzed by CiteSpace (http://cluster.cis.drexel.edu/~cchen/citespace/). The analysis reviews published works from 1998 to 2017 in keeping with the timeframe of other studies where a similar time horizon has been adopted (e.g. Ye et al., 2013). It is also necessary to divide the study period into intervals to better analyze changes in the development network. We identify four-time periods: first slice 1998-2002; second slice 2003-2007; third slice 2008-2012; fourth slice 2013-2017. Althoughinterest in the senior travel segment within tourism scholarship began in the 1980s (Sie et al., 2016), up until the 1990s, documents collected from Web-of-Science (WoS) and Scopus have been discontinued and are almost non-existent.

The present empirical study was carried out at the beginning of May 2018. The keywords *senior tourists*, *senior travel*, *mature tourists*, *elderly tourist*, *older tourists*, *elderly travel*, *elderly tourists*, *grey tourists*, *silver tourists*, and *motivation* were searched in WoS and Scopus. These two are considered the most widespread databases in different scientific fields used for searching literature (Guz and Rushchitsky, 2009).

The gross sample includes 1,524 articles from WoS and 1,944 articles from Scopus. All articles were analyzed to verify their relationship with the "senior tourism" research stream. This analysis led to the identification of outliers among articles. Additionally, papers that are not cited by other studies remain disconnected to others and thus were eliminated based on the assumption that they are not relevant to the topic. For further analysis with CiteSpace, we converted a total of 512 articles from Scopus to the WoS format (Chen, 2006). Duplicated articles were eliminated, resulting in a net sample of 700 connected articles (Table 1). There is an increase in the number of published articles on senior tourism, growing slowly by 0.21 per year in total research undertaken on senior tourism.

Table 1. Sample Size

					Gross sample					
Subnetwork	Documents		Articles		Outliers		Disconnected		Connected	
Years	N	%	N	%	N	%	N	%	N	%
Web-of-Science										
1998-2002	111	5.0	84	75.68	54	64.29	8	9.52	22	26.19
2003-2007	187	8.5	118	63.10	79	66.95	10	8.47	29	24.58
2008-2012	580	26.2	384	66.21	240	62.50	50	13.02	94	24.48
2013-2017	1333	60.3	938	70.37	728	77.61	83	8.85	127	13.54
Total	2211	100	1524	68.93	1101	72.24	151	9.91	272	17.85
Scopus										
1998-2002	236	9.35	156	66.10	79	50.64	4	2.56	73	46.79
2003-2007	404	16.00	377	93.32	274	72.68	7	1.86	96	25.46
2008-2012	763	30.22	563	73.79	388	68.92	19	3.37	156	27.71
2013-2017	1122	44.44	848	75.58	564	66.51	61	7.19	223	26.30
Total	2525	100	1944	76.99	1305	67.13	91	4.68	548	28.19
	Scopus		Scopus and WoS		Web-of-Science and Scopus					
	Converted to WoS		Connected		Duplications	Net sample of connected articles				
	N	%	N	%	N	N	% per articles	% per year		
1998-2002	73	46.79	95	39.58	7	88	36.67	12.57		
2003-2007	96	25.46	125	25.25	7	118	23.84	16.86		
2008-2012	145	25.75	239	25.24	32	207	21.86	29.57		
2013-2017	198	23.35	325	18.20	38	287	16.07	41.00		
Total	512	26.34	784	22.61	84	700	20.18	100		

Source: The authors from WoS and Scopus databases.

2.2 Data Analysis

CiteSpace includes structural, temporal, and semantic metrics. Structural metrics include *betweenness centrality*, *modularity*, and *silhouette*. Here, *betweenness centrality* indicates the important position of a node in bridging different stages of the development of a scientific field (Chen, Dubin, and Kim, 2014); *modularity* is the extent to which a network can be divided into independent clusters with clear boundaries; *silhouette* gives the quality of a clustering configuration.

Temporal metrics include *citation burst* and *sigma*. Here, *citation burst* is a specific duration in which the frequency of an entity increases abruptly with reference to its peers. It represents a statistically significant change in the number of citations about a specific phenomenon over a short time span within the overall time interval (Chen, 2006), irrespective of the frequency of the host entity; *sigma* is a combination of betweenness centrality and citation burst. It highlights those articles that herald new ideas (Chen, 2006).

Semantic metrics define cluster labels from phrases extracted from titles, abstracts, and keywords or from index terms of citing articles. They are done so through several algorithms, like the log-likelihood ratio (LLR), which usually gives the best result in terms of uniqueness and coverage (Chen, 2006).

This study employs the following analysis approaches: co-citation analysis of cited references and journals; co-authorship analysis of countries; and co-occurrence analysis of keywords. Co-citation is one of the most frequently used bibliometric techniques (Evren and Kosak, 2014) for dealing with a diverse and growing academic literature (Denyer and Tranfield, 2006). Co-citation describes the intellectual development of the overall domain and detects existing scientific schools and academic networks (de Solla Price, 1965). Co-authorship analysis identifies the underlying patterns of collaboration between researchers working in the field. Authors and countries are connected to each other when they share authorship of an article included in the sample of source articles. Co-occurrence analysis is based on the theory that research fields can be analyzed based on patterns of keyword usage in publications, which have been largely and successfully used for dynamic evolution of science. Content analysis is effective at mapping the strength of association between keywords in textual data (Jiang et al., 2017). CiteSpace includes co-occurring *author keywords* and *keywords plus* to evaluate the trend of senior tourism research. *Keywords plus* are generated independently of the title and author keywords, describing an article's contents with greater depth and variety (Wang et al., 2013). In recent years, the distribution change of keywords in different periods has been applied to evaluate research trends (e.g. Wang et al., 2013). Table 2 includes CiteSpace metrics for a dynamic analysis of the network of senior tourism research, discussed in the corresponding sections.

Table 2. CiteSpace Metrics by Node Type

Network	Node Type by Year	Modularity	Nodes	Links	Density	# Clusters	Mean Silhouette
Journal co-citation network	**Journals**						
	1998-2002	0.4929	51	153	0.1200	7	0.7143
	2003-2007	0.6272	64	192	0.0952	7	0.8571
	2008-2012	0.6920	120	360	0.0504	12	0.6667
	2013-2017	0.7015	210	630	0.0287	21	0.4286
Network of co-authors' country	**Countries**						
	1998-2002	0.5283	29	30	0.0739	13	0.3077
	2003-2007	0.4300	36	94	0.1492	7	0.4286
	2008-2012	0.4692	56	127	0.0825	9	0.5556
	2013-2017	0.4151	86	237	0.0648	14	0.6429
Document co-citation network	**Documents**						
	1998-2002	0.3445	18	36	0.235	7	0.4273
	2003-2007	0.5799	19	26	0.152	7	0.5703
	2008-2012	0.5002	27	46	0.131	8	0.4994
	2013-2017	0.4313	42	126	0.146	7	0.7131
Author co-citation network	**Cited Author**						
	1998-2002	0.4392	186	814	0.0473	30	0.2286
	2003-2007	0.4012	41	123	0.1500	8	0.6250
	2008-2012	0.4886	80	240	0.0759	15	0.4000
	2013-2017	0.4913	139	417	0.0435	38	0.3421
Co-occurring author keywords and keywords plus	**Keyword**						
	1998-2002	0.6397	26	40	0.1231	7	0.571
	2003-2007	0.5266	41	123	0.1500	4	1.000
	2008-2012	0.4714	68	68	0.0896	15	0.467
	2013-2017	0.5106	115	115	0.0526	7	1.000

Source: The authors.

3. Results and Discussion

3.1 Top Journals

A network of journals exhibits good modularity over time (Table 2), which indicates that the journals tend to have more connections inside the group within which they are located, exhibiting a good degree of collaboration. This network is centralized around the top journals, as can be seen by the great variation among the number of links each node possesses. Nevertheless, the density decreases with time while the number of clusters increases (from 7 to 21), suggesting the connection among the top journals turns more decentralized with the passage of time as more new journals become involved in senior tourism research. The top 10 journals account for 48.71% of total publications (TP) and 47.47% of total citations (TC). *Tourism Management* accounts for most of the senior tourism research with 91 articles; while *Journal of Travel and Tourism Marketing* and *Tourism Review* stand out among the other sources with the highest ratio of citations per publication.

A citation burst can be used to detect the most active research journals. A citation burst also provides evidence that a particular type of node is associated with a surge in citations, which means the node has attracted an extraordinary degree of attention from the scientific community (Chen et al., 2014). Table 3 shows the top 10 journals with the strongest citation bursts in the dataset. The first two detected are *International Journal of Tourism Review*, with the highest citation burst from 2011 until 2017, followed by *Tourism Management*, with a citation burst from 2008 until 2012. *Current Issues in Tourism* is the journal with the highest length of citation bursts (2010-2017).

Table 3. Citation Burst of the Top Journals

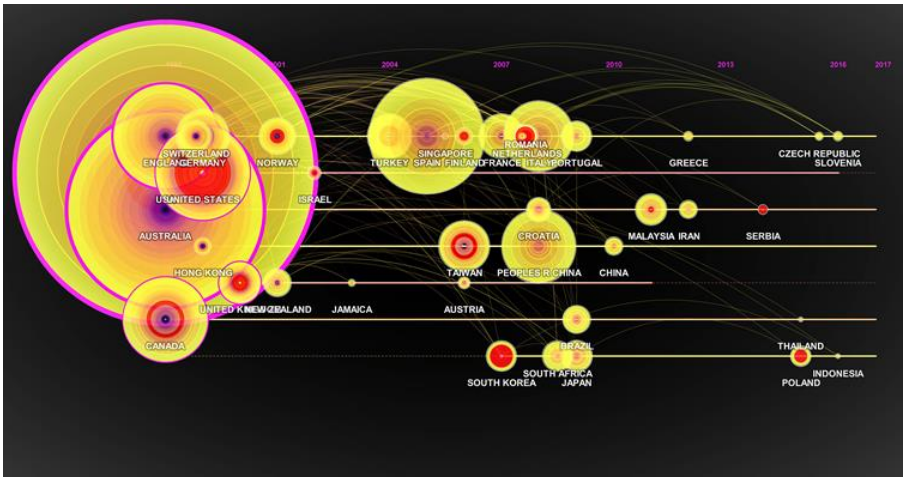
Cited Journals	Strength	Begin	End	1998 - 2017
International Journal of Tourism Review	10.6632	**2011**	2017	
Tourism Management	9.535	**2008**	2012	
Annals pf Tourism Research	8.6588	**2008**	2012	
International Journal of Contemporary Hospitality Management	7.7612	**2015**	2017	
Asia Pacific Journal of Tourism Research	6.2816	**2014**	2017	
Current Issues in Tourism	6.0601	**2010**	2017	
Journal of Travel & Tourism Marketing	5.4793	**2009**	2012	
Journal of Vacation Marketing	4.6176	**2008**	2012	
Journal of Travel Research	4.561	**2008**	2011	
Tourism Analysis	3.971	**2015**	2017	

Source: The authors.

3.2 Scholarly Communities and Collaboration by Country

The network of co-authors' country aims to demonstrate the collaborative relationship between authors' country and territory. All years present acceptable modularity (Table 2). The partitions of the network on the basis of its connectivity characteristics show some variation in the number of clusters (from 7 to 14) and indicate its dynamics. The development of senior tourism research collaboration in different countries is presented along a time axis in Figure 1. The U.S. and Australia have acted as the foundation for collaboration with other countries in later years. The density of the network has its highest value in the second slice, where the structure of the network is more concentrated in some countries. Nevertheless, the decreasing values of density and the increased number of nodes and links highlight that the foundation researchers are active collaborators with researchers across many countries.

Figure 1. Time-slice View of Co-authors' Country



3.3 Research Themes

Table 4 lists the evolution of key research-front terms between 1998 and 2017. The centrality of a keyword quantifies its importance in the network, and all the top keywords have significant centrality values, being relevant to the expansion of knowledge. It can be seen that the growth of research topics occurred mainly in 2013 under the following main central keywords: *tourism management*, *tourist perception*, *tourism behavior*, *motivation*, *tourist satisfaction*, *tourism attraction*, *ecotourism*, and *tourist attitude*. This indicates a growing focus on the management and development of tourism, specially tourist perception, motivation, and attitude. It illustrates that detailed issues related to senior tourism are being examined through a broader range of disciplinary backgrounds as the field matures.

Table 4. Keywords with High Frequencies and Centrality by Slices

Years	Keywords	Count	Centrality	Years	Keywords	Count	Centrality
1998-2002	tourist perception	35	0.34	2003-2007	tourism management	35	0.41
	USA	34	0.41		ecotourism	34	0.43
	tourism development	33	0.35		motivation	33	0.42
	tourism safety	30	0.34		Japan	29	0.23
	Australia	25	0.21		elderly population	28	0.21
	tourism destination	24	0.39		intentions	25	0.37
	heritage tourism	23	0.42		Australia	23	0.37
	tourist attraction	20	0.31		Canada	22	0.13
	tourist satisfaction	19	0.34		USA	19	0.36
	elderly population	14	0.28		tourist attraction	18	0.23
					landscape	15	0.18
2008-2012	tourism destination	43	0.42	2013-2017	tourist perceptions	57	0.44
	tourism development	42	0.44		tourist behavior	54	0.43
	tourism management	40	0.46		tourism management	53	0.44
	tourism attraction	39	0.38		tourism attraction	50	0.41
	China	36	0.36		ecotourism	48	0.34
	heritage tourism	29	0.35		motivation	43	0.41
	motivation	25	0.36		health tourism	36	0.27
	tourist perception	23	0.16		tourist satisfaction	35	0.41
	USA	20	0.41		tourist attitude	34	0.28
	UK	18	0.21		Spain	34	0.21
	tourism attitude	16	0.22		tourist experience	31	0.23
	tourism satisfaction	13	0.18		landscape	27	0.13
	ecotourism	11	0.23		experience	23	0.13
					information technology	23	0.36
					rural tourism	20	0.22
					authenticity	17	0.14
					service	16	0.13

Source: The authors.

Table 5 shows the top 15 keywords with strong citation burst from 1998-2017. *Burst* detection can identify bursts of keywords as indicators of emerging trends (Chen et al., 2014). Geographical keywords such as United States and Australia are evident in the results, because the tourism industry is largely based on physical location and resources, and thus keywords are likely to reflect research exploring this growing segment of seniors and case studies in specific locations. The United States has the strongest burst between 1999-2009. The hottest topics from 2008-2012 are tourism destination, tourism development, tourism management, destination attractiveness, and heritage tourism. The most recent burst of keywords is Spain, which reflects recent financial issues in that country. Tourism management and motivations are also hot topics from 2013-2017. This indicates that recent hot topics have attracted researchers with a management and psychological background.

Table 5. Top 15 keywords with the Strongest Citation Bursts

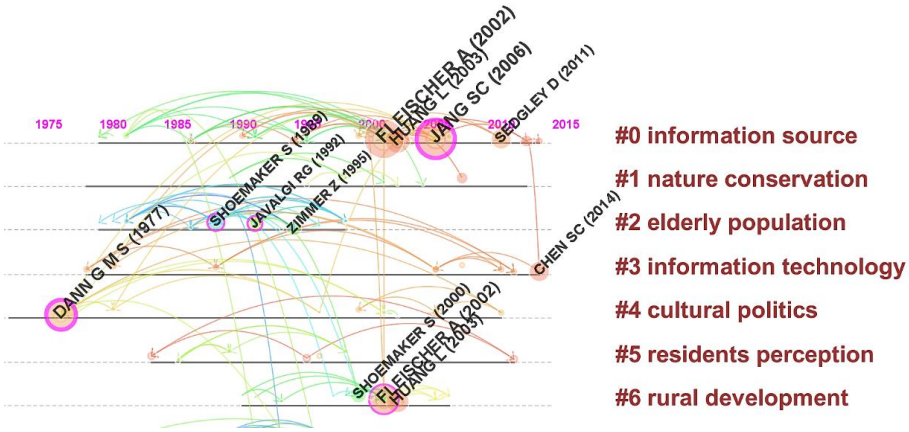
	Citation burst			
Keywords	Strength	Begin	End	Duration (1998 - 2017)
Unites States	186.993	**1999**	2009	
Australia	72.342	**2004**	2009	
Ecotourism	11.395	**2004**	2009	
Japan	67.619	**2005**	2012	
Tourism development	62.102	**2008**	2014	
Tourism destination	60.954	**2008**	2014	
Heritage tourism	64.261	**2010**	2012	
Destination attractiveness	35.602	**2010**	2014	
Spain	39.519	**2014**	2017	
Tourism management	42.992	**2011**	2017	
Tourist satisfaction	83.727	**2014**	2017	
Motivation	40.394	**2014**	2017	
Tourist experience	43.317	**2015**	2017	
Health tourism	50.791	**2015**	2017	
Service	44.676	**2015**	2017	

Source: The authors.

3.4 Co-citation Analysis by Thematic Clusters

Figure 2 shows some highly cited articles in a timeline visualization of the network, where red rings indicate citation bursts over time periods (Chen et al., 2014). The cited articles are represented by nodes in the network, and links between nodes represent the number of times that citations have appeared together in the source documents included in the dataset. The color of links denotes the time a particular connection is made, based on the publication year of the source article. Blue colors indicate older connections, whereas red colors indicate more recent connections. The figure shows some relevant articles (identified by the first author) distributed by thematic clusters.

Figure 2. Timelines of Co-citation Clusters.



CiteSpace divides the co-citation network into many clusters of co-cited references, so that references are tightly connected within the same cluster. The recentness of a cluster is measured by percentiles and the mean year of publication. The number of elements in each major homogenous cluster is listed in Table 6, all with 10 or more documents and with good silhouettes, meaning they can be labeled by noun phrases from titles of the cited articles in the cluster (Chen et al., 2010).

CiteSpace allows the identification of a core of thematic clusters, defined by clusters #0 up to cluster #6. All clusters have good silhouette (>= 0.70), which is an indicator not only of its homogeneity, but also of the quality of the cluster configuration.

Cluster #0 is labelled *information source*, because it includes articles focusing mainly on travel information sources as an input for their travel motivations, constraints, market segmentation, and well-being motivations.

Cluster #1 is labelled *nature conservation*, because it includes articles focusing mainly on nature-based motivations, psychological well-being, and tourists' environmental concerns.

Cluster #2 is labelled *elderly population*, because it includes articles focusing on seniors, including their heterogeneity, their motivations, and differences with non-seniors.

Cluster #3 is labelled *information technology*, because it includes articles focusing on use of the Internet, social media platforms, and mobile devices.

Cluster #4 is labelled *cultural politics*, because it includes articles focusing on seniors cultural, economic, and social diversities.

Cluster #5 is labelled *residents' perception*, because it includes articles focusing on residents' perception. As these articles go beyond describing senior tourism, this cluster is omitted from our research.

Finally, cluster #6 is labelled *rural development*, because it includes articles focusing on destination attractiveness in the rural area and on cultural tourism and mass tourism activities as ways to promote rural development.

Table 6. Major Clusters of Co-cited References

#	Size	Silhouette	Label (LLR)	Year Ave.	Std.	Min	P50	P75
0	23	0.705	Information source	1998	10.1	1980	2001	2006
1	15	0.863	Nature conservation	1998	9.83	1979	1999	2005
2	15	0.94	Elderly population	1991	6.49	1980	1992	1997
3	14	0.782	Information technology	1998	12.9	1979	2006	2010
4	13	0.695	Cultural politics	1991	13.6	1973	1997	2001
5	12	1	Residents' perception	1996	8.49	1997	1997	2002
6	12	0.874	Rural development	1999	4.9	2000	2000	2002

Source: The authors.

Most cited papers give a historical perspective on scientific progress and reveal recognition of scientific advancement (Chen, 2006). Our databases show the highest cited articles belong to cluster #2, labeled *elderly population* by LLR, with a median of publications between 1980 to 1992. As usual in the literature, older papers receive more citations than recent ones, given the time length of knowledge diffusion. This research stream is slowly increasing, and therefore very old papers represent the pillars of senior tourism research. Shoemaker (1989) and Javalgi et al. (1992) are the two most highly cited and central articles from both clusters #2 and #3. Shoemaker (1989) is one of the first articles to question homogeneity in the senior market and to use senior travel motivations to segment the market into clusters, while Javalgi et al. (1992) compare the behavior of senior versus non-senior tourists. Table 7 shows that these two highly cited articles provide conceptual frameworks in the early stages of the field and are central to the network.

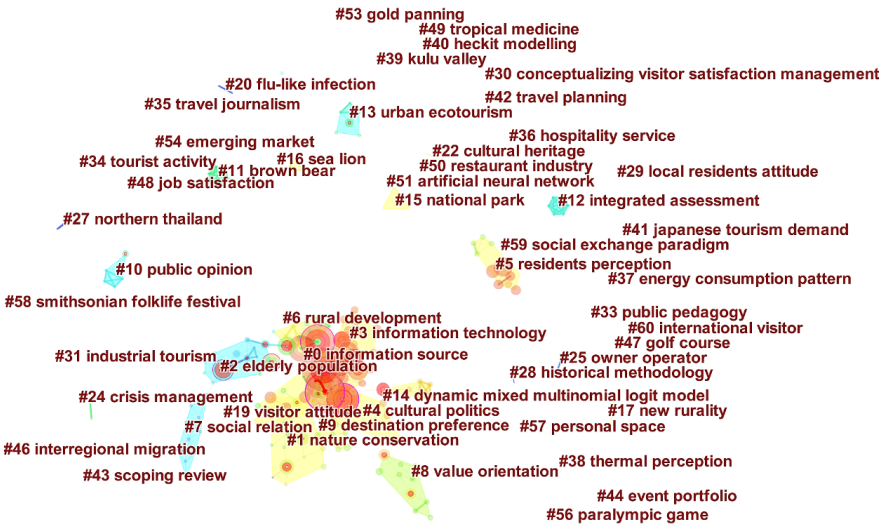
Table 7. Top Articles with the Most Citation Counts

Citations	Author(s)	Year	Source	Cluster #
167	Jang & Wu.	2006	*Tourism Management*	0
164	Fleischer & Pizam.	2002	*Annals of Tourism Research*	0
104	Hsu, Cai & Wong.	2007	*Tourism Management*	0
98	Horneman, Carter, Wei & Ruys.	2002	*Journal of Travel Research*	0
85	Huang & Tsai.	2003	*Tourism Management*	0
62	Kim, Wei & Ruys.	2003	*Tourism Management*	0
44	Sedgley, Pritchard & Morgan.	2011	*Annals of Tourism Research*	0
29	Chen, Liu & Chang.	2013	*International Journal of Hospitality Management*	0
7	Alén., Losada & de Carlos.	2017	*Current Issues in Tourism*	0
98	Sangpikul.	2008	*Tourism*	1
383	Shoemaker.	1989	*Journal of Travel Research*	2
232	Javalgi, Thomas & Rao.	1992	*Journal of Travel Research*	2
289	Zimmer, Brayley & Searle.	1995	*Journal of Travel Research*	2
177	Romsa & Blenman.	1989	*Annals of Tourism Research*	2
383	Shoemaker.	1989	*Journal of Travel Research*	3
232	Javalgi, Thomas & Rao.	1992	*Journal of Travel Research*	3
68	Chen & Shoemaker.	2014	*Annals of Tourism Research*	3
288	Dann.	1977	*Annals of Tourism Research*	4
172	Milman.	1998	*Journal of Travel Research*	6
167	Jang & Wu.	2006	*Tourism Management*	6
140	Shoemaker.	2000	*Journal of Travel Research*	6
98	Horneman, Carter, Wei & Ruys.	2002	*Journal of Travel Research*	6

Source: The authors.

There is an increase in the number of published articles on senior tourism, growing slowly by 0.21 per year in total research undertaken on senior tourism (Figure 3). Major foundation articles are likely to be located towards the center of the network, because they are often cited together in the same source documents. Articles that link two clusters together indicate an opportunity for researchers to fill an information gap (Haythornthwaite, 1996). Consequently, articles produced as a result of this kind of effort provide conceptual bridges, and it is probable in linking disparate fields of understanding that they will be cited by scholars engaged in researching different areas. These articles are measured in CiteSpace by betweenness centrality and are also defined as structural holes by Burt (1992). The most central articles belong to cluster #0, the major cluster in terms of size, with 23 references, and it is the second more recently-formed cluster, with a median of publications between 1980 to 2001. Fleischer and Pizam (2002) review senior travellers' motivations and constraints, forming an important bridge between the former cluster #0 and the secondary cluster #2 dominated by Shoemaker (1989). Jang and Wu (2006) study push and pull motivations and emotions and provide an important bridge between the former cluster #0 and cluster #6, dominated by Milman (1998). Huang and Tsai (2003) analyze destination selection attributes, focusing on direct travel suppliers and indirect travel motivator and providing an important bridge between the primary cluster and cluster #5. From an overview of the network of co-cited references and burst terms, other structural holes and disconnected clusters may indicate developing areas, such as the cluster of nodes connected to Vigolo et al. (2016) in hospitality services (cluster # 36) and connected to Vila et al. (2012) in the restaurant industry (cluster #50).

Figure 3. Overview of the Network of Co-cited References and Burst Terms



3.5 Temporal Analysis

Table 8 includes the articles that have significant values in structural and temporal metrics. The article with the highest strength of citation bursts (62.8) in all the co-citation network is Shoemaker (1989), which is a reference from clusters #2 and #3. Dann (1977) is the reference with the highest citation burst (strength 47.622) from cluster #4, being a relevant mark in senior tourism research, with a current citation burst from 2012 until 2017. Dann (1977) is the first researcher to analyze the connection between tourists' home situation and their leisure patterns, including factors stemming from "anomie" and "ego-enhancement" in the tourist himself. Dann (1997) is like a sleeping beauty, because there is a gap of 35 years between its publication and subsequent citation burst, in contrast with Shoemaker (2000), who exhibits a citation burst after only three years. Apart from these articles, Shoemaker (1998, 2000), Romsa and Blenman (1989), and Javalgi et al. (1992) have citation bursts before 2009. Shoemaker (2000) focuses on an analysis of the senior market over a ten-year period; Romsa and Blenman (1989) focus on differences in seniors' preferred activities versus non-seniors'; while Javalgi et al. (1992) focus on differences in the behavior of seniors with that of non-senior tourists.

All the following articles have citations burst near 2017. Huang and Tsai (2003) are also a sleeping beauty, because a gap of ten years exists between publication and citation burst. Sedglay et al. (2011) focus on the need for more individualized, subjective research that explores the intricacies of older people's lives. Finally, Kim et al. (2003) are another article of interest representing an investigation of seniors' perception of the relevant travel features.

Table 8. Top Articles in Centrality, Citation Burst, and Sigma

Authors	Year	Centrality	Sigma	Citation burst				To be Cited (years)	#
				Strength	Begin	End	Duration (1998-2017)		
Shoemaker.	1989	0.33	2.12	62.8	1999	2004		10	2; 3
Shoemaker	2000	0.26	1.36	51.4	2003	2009		3	6
Sedgley, Pritchard & Morgan.	2011	0.20	1.02	50.8	2015	2017		4	0
Dann.	1977	0.41	2.68	46.7	2012	2017		35	4
Huang & Tsai.	2003	0.25	1.08	37.4	2013	2017		10	0
Romsa & Blenman.	1989	0.22	1.06	31.9	2002	2003		13	2
Javalgi, Thomas & Rao.	1992	0.28	1.41	21.4	2002	2009		10	2
Fleischer & Pizam.	2002	0.37	1.47	20.5	2015	2017		13	0
Kim, Wei & Ruys.	2003	0.25	1.10	18.8	2014	2017		11	0
Jang & Wu.	2006	0.44	1.40	17.4	2013	2017		7	0

Source: The authors.

4. Conclusion

The competitiveness network of a company nowadays depends on the diversity and strategic value of specialized knowledge and its capacity to integrate this knowledge effectively (Tiwari and Gupta, 2012). Therefore, such knowledge is necessary to develop managerial capacities (Raffensperger, 2003) and to ensure that strategic decisions are translated into actions that are properly implemented and managed in the field (Lien and Quirk, 2002). It is evident that bibliometric analysis has helped to characterize, both qualitatively and quantitatively, the dynamics of the senior tourism research field, including its development, hotspots and trends of investigation, and collaboration. A systematic review of the literature aims to guide future research by proposing promising future research avenues structured around the thematic areas of theoretical perspectives, methodological approaches, and methods (Moosa, 2004). As a result, researchers and the hospitality sector are equipped with new tools of exploration.

Using bibliometric analysis through CiteSpace, this paper seeks to reveal its potential to analyze senior tourism's evolution over the past twenty years, its particular dynamics, and which areas are being pursued by scholars. The results extend past bibliometric studies of senior tourism research by combining co-citation analysis and co-occurrence of keywords to understand the development of this field from different perspectives. These techniques offer several advantages versus traditional approaches to analyze the literature, as noted below.

First, by measuring and visualizing along the period the relational analysis of different nodes (authors, articles, journals, and countries), this dynamic study provides insights into the knowledge domain (Chen, 2006). Second, the clustering techniques used in this research not only identify articles that serve as an important bridge between two clusters, but also suggest potential research directions. Third, the bibliometric visualization used herein provides important temporal data of country co-authorship, citation burst of articles, journals, and keywords co-occurrence, which add a new dimension to the analysis and provide intuitions into the flow of major trends and collaborations. Finally, co-occurrence analysis helps detect the most frequent keywords and identify trends and emergent research topics. When keywords are analyzed from a geographical viewpoint and after considering the whole period, it is apparent that research efforts on senior tourism are concentrated in two countries: U.S.A. and Australia. Nevertheless, in the last few years countries such as Spain and Japan have emerged. This makes sense if the severe problem of an aging population in these societies is taken into consideration, which has an evident impact on the growth of this market segment and the corresponding interest on it.

Keywords are also helpful for understanding research priorities and their evolution over time. The time span 2008-2012 presents a period of consolidation in terms of the analysis of some dimensions of senior tourism segments related to tourism destination and development, tourism management, tourism attraction, and heritage tourism. However, between 2013 and 2017, new topics have strongly burst onto the research scene: tourist satisfaction, tourist experience, health tourism, service, and motivations, attracting researchers with a management and

psychological background. The results show that research on senior tourism has moved from broader topics, like tourism management, to more specific topics, like satisfaction, motivation, and experience, as the field has matured. Therefore, this field of study is turning more multidisciplinary, being progressively analyzed from the new angles provided by diverse scientific approaches, which complement and enrich its content. The results of this study should help hospitality sectors to benefit from the knowledge within this segment, especially as senior tourists will soon constitute one of the largest prospective market segments for hotel, restaurant, and shopping industries (Chen et al., 2013).

This paper is also useful to anyone interested in engaging in senior tourism research - namely, the readers of *International Journal of Business and Economics* (IJBE). An innovative and scientifically rigorous method could also provide sound analysis as to the state of the art of senior tourism research if it incorporates insights into the major identified articles. As a final point, the methodological analysis used in the current study through CiteSpace can be a powerful way to help tourism research transition towards a less undisciplined array of theories and models (Tribe, 1997).

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