

REVIEW ARTICLE

Quantitative Research on the Sense of Place: Visualizing Literature Through Systematic Reviews and Bibliometric Analysis

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Abstract:

The concept of a sense of place, involving the emotional and cognitive connections between individuals and specific locations, has long been a focal point of research in the social sciences. To delve deeper into this topic, this study employed VOS viewer software to conduct PRISMA process screening of an initial pool of 675 articles from the Scopus database, eventually selecting 249 for in-depth systematic literature review and bibliometric analysis. co-authorship, co-occurrence, citation, bibliographic coupling, and term, to elucidate the core themes, key scholars, and development trends in this field. The findings indicate a shift in the sense of place research from traditional paradigms toward a new paradigm that integrates diverse perspectives and interdisciplinary approaches. Particularly in the last five years, "tourism" and "tourist" have emerged as core exploration themes, economic development imperatives and the demands of community or destination management. This suggests that sense of place research is actively adapting to new research paradigms, focusing on developing the tourism industry and community management needs in the face of globalization and economic development challenges. This study provides a comprehensive perspective through a systematic literature review and bibliometric analysis, offering valuable insights into this research field's current status and future developments.

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Introduction

Space is a concept used to describe the surrounding physical area and the place which is considered a specific location in space (Lefebvre, 1991; Tuan, 1977). The concept of a sense of place has interested social scientists for many years, but it remains an elusive and complex phenomenon. Eisenhauer et al. (2000) demonstrated that the meaning of the environment derives from people's experiences of society and culture while forming culturally shared meanings and providing a framework for constructing a sense of place. In other words, space becomes a place when it is given social and cultural meaning. Cresswell (2004) argued that place is a more concrete concept than space. Relph (1976) referred to space as amorphous and intangible, providing the context for a place. Mohammad

et al. (2013) emphasized that the sense of place is an essential aspect of the cultural context that integrates the user with the place. As Tuan (1979) stated, a place embodies the experiences and aspirations of a people. Moreover, it is not only a fact that needs to be interpreted within a broader spatial framework but also a reality that needs to be clarified and understood from the perspective of the people who give it meaning.

To our knowledge, a sense of place is a vague and confusing concept (Shamai, 1991; Shamai & Ilatov, 2005). Although the concept of sense of place has been defined in various ways, it is generally agreed that it involves a person's emotional and perceptual relationship with a specific place (Hashemnezhad et al., 2013; Nazar, 2017; Xu et al., 2022). For many years, researchers have shown great interest in research on the sense of place, as it can be used to explain how people relate to specific locations and how the physical and social environment influences their behavior. However, different disciplines have different views on the sense of place. For example, architects, planners, and urban designers thought it represented the physical characteristics of the built environment and the soul or spirit embedded in the place (Phuong & Groves, 2010). In Xu's (2022) view, a sense of place refers to people's perception of a particular environment as a dynamic process of emotional attachment and satisfaction between people and places and the relationship between people and places with cultural and social characteristics. Moreover, according to Jorgensen and Stedman (2006), a sense of place can be considered a multidimensional structure representing beliefs, emotions and behavioral commitments about a specific geographical environment. The sense of place is closely related to environmental factors such as landscape, architecture, and public art.

The importance of a sense of place has been widely recognized in academic and practice settings. For decades, researchers have worked to develop methods for measuring a sense of place, including both qualitative and quantitative approaches. For example, some scholars have used interviews, focus groups, and geographic mapping to explore a range of topics related to it (Kusumowidagdo et al., 2015; Lowery & Morse, 2013; Poe et al., 2016; Tan et al., 2018). In addition, some scholars use surveys to analyze the importance of place for understanding and addressing solutions to social problems (Gu & Ryan, 2008; Jorgensen & Stedman, 2001, 2006; Pretty et al., 2003).

On the one hand, when using a qualitative approach to analyze the sense of place, researchers prefer to capture the categories that influence the sense of place through the respondents' descriptions. For example, Kianicka et al. (2006) demonstrated the impact of landscape, social relations, culture, economy, and leisure activities on locals and visitors and their importance. In addition, Mazumdar et al. (2000) highlighted how the built environment interacts with the social, commercial, and ritual activities of migrants to create and sustain a sense of place. Muhammad et al. (2020) proposed understanding indigenous people's interaction with the physical environment through a sense of place. This type of research is more oriented towards empirical studies. On the other hand, in the quantitative analyzes of the sense of place, many studies have tried different methods of measuring the sense of place from various perspectives. Shamai (1991) identified three levels of sense of place: belonging, attachment, and commitment to a place. In the quantifying sense of place, Jorgensen and Stedman (2001, 2006), Christiaanse and Haartsen (2017) and Nanzer (2014) categorized it into place identity, place attachment and place dependence. Stedman (2003b) argued that the sense of place consists of place attachment and satisfaction. In addition, many scholars studied the sense of place from a single perspective. For example, Eisenhauer et al. (2000) argued that place attachment constitutes a unique sense of place and reveals the importance of the connection between people and places.

Shamsuddin and Ujang (2008) and Hashem et al. (2013) demonstrated that place attachment influences users' perceptions of place identity. Furthermore, Tan et al. (2018) presented a very different view, arguing that a sense of loss, justice, and mission are essential components that constitute a sense of place.

Quantitative methods cover a wide range and more comprehensive data than qualitative methods. In urban planning, a sense of place is critical to understanding the characteristics of a place and its development potential (Hu & Chen, 2018). It gives planners a holistic approach to understanding a location's environmental, social, economic, and cultural dynamics. By understanding the nature of a place, planners can better identify potential development opportunities, such as the potential for investment in infrastructure and public services (Dempsey et al., 2011; Qian & Zhu, 2014; Walker, 1999). In some cases, it can also help to identify any possible threats to a place, such as the potential for economic decline or social unrest (Dempsey et al., 2011; Massey, 1991), which can inform decisions about a place's future. Quantifying a sense of place also helps to identify and understand the value of a place (Grenni et al., 2020), which is essential for informing the design of a place. The importance of the quantifying sense of place is also recognized in tourism (Amsden et al., 2011; Kerstetter & Bricker, 2009; Smith, 2015). Quantifying a sense of place helps to identify the characteristics that attract visitors to a place, such as its landscape, historic buildings, cultural attractions and activities. It can also help identify areas that could benefit from investment or infrastructure improvements, such as visitor facilities (Abou-Shouk et al., 2018). In summary, measuring a sense of place is crucial for comprehending its features and potential for development. It also helps to identify potential opportunities and threats to a place, inform project design in a way sensitive to the local context, and enhance a sense of place.

Sense of place reflects individuals' attitudes and feelings formed through subjective experiences in specific objective environments. With globalization, the necessity of quantifying such attitudes becomes increasingly prominent in today's world. Understanding the sense of place and attitudes of people in different regions presents growing challenges on a global scale. Therefore, objectively quantifying the emotions and attitudes of people in the various areas helps to narrow the understanding gaps in an international perspective. This paper aims to provide valuable information on research hotspots in various fields of sense of place studies for future researchers, thereby revealing research dynamics within different domains.

Although bibliometric analysis has become an important method in systematic reviews, literature utilizing this method for in-depth study of the sense of place remains relatively scarce. Nelson et al. (2020) have explored the multidimensional concept of a sense of place through bibliometric means; however, their study primarily focuses on conceptual discussions. This study, aiming to expand the research perspective further, is committed to capturing the overall trends and evolutions of sense of place research from a macro perspective. Through this approach, the researchers also identify core themes, key scholars, and development trends within the field and reveal the evolution of the sense of place research over time, providing new perspectives and depth for understanding the field.

Methods

Systematic and bibliometric reviews examine, identify, organize and analyze metadata for a specific field of study over a period (Mayes-Ramírez et al., 2023). On the one hand, a systematic review can synthesize the state of knowledge in a field from which future research priorities can be identified (Page et al., 2021). Conversely, bibliometric analysis can help researchers to systematically analyze

trends in the scientific literature and compare the research efforts of different scholars, institutions, and countries, as well as the impact of research, to assess the performance of researchers in the field of academic research at the interface (Donthu et al., 2020).

First, the researchers screened the articles according to the PRISMA 2020 flowchart proposed by Page et al. (2021). Only those qualitative studies from the sense of place research articles were selected. The last search was done on February 20, 2023. Figure 1 shows the criteria and number of included and excluded articles in different stages. Using the systematic review method, after three stages of screening, identification, screening and eligibility, the final number of documents was 249 (Figure 1). Secondly, the researchers imported 249 documents into VOS viewer v. 1.6.18 for data analysis and visualization analysis. Finally, the researchers analyze and discuss the status of the sense of place.

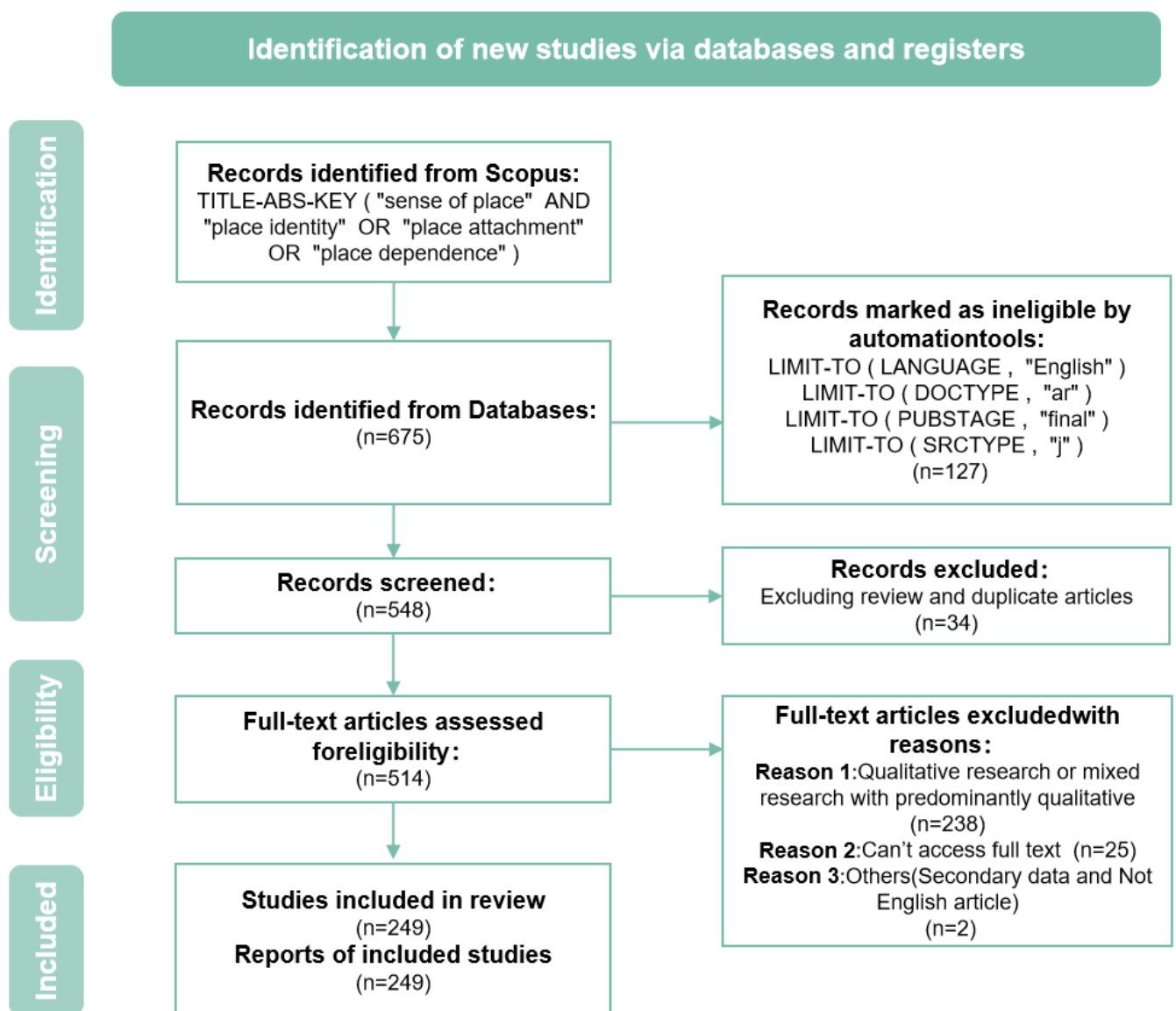


Figure 1: PRISMA chart for reporting systematic reviews

Collection and Filter

The concept of sense of place is vague, and its components vary across domains. However, as mentioned earlier, in most cases, place identity, place attachment, and place dependence are usually considered part of the sense of place. Therefore, the researchers set the search terms as “sense of place” AND “place identity” OR “place attachment” OR “place dependence”. In addition, to collect information more comprehensively, researchers enter the set search terms in TITLE-ABS-KEY in Scopus. This database has a wide range of subject coverage and sufficient quality (Ghani et al., 2022). For the researchers to effectively review the articles, the scope of the literature was focused on English-language journal articles only. Finally, the researchers excluded those studies that were qualitative or mixed methods studies that were predominantly qualitative, could not access the full text, and the data sources were secondary and non-English articles. A total of 249 articles were included in the review by the researchers after the above process (Figure 1).

Analysis

Donthu et al. (2021) noted that bibliometric analysis is a popular and rigorous method for exploring and analyzing large amounts of scientific data. To ensure the accuracy of the data, researchers exported the final data included in the review as a CVS format file, including details such as title, author, country, year, publication source, abstract, and index keywords. The CVS files were then imported into VOS viewer v. 1.6.18 to generate network and relationship diagrams for grouping and processing words and heat maps of keywords in the literature. Finally, the researchers used VOS viewer to generate visualization views.

First, in the network and overlay visualization, items are represented by circles, the size and color of which distinguish the weight of items and their stated clusters. The distance between circles indicates the correlation between two items. The closer the distance, the more significant the correlation (Van Eck & Waltman, 2022). The difference is that network visualization helps researchers to discover the structural distribution of research hotspots and research cliques through author collaboration, as well as similarities and differences among scholars on research topics through author coupling networks, etc. In contrast, overlay visualization is color mapped default to the average year of keyword occurrences.

Result and Discussion

Referring to the suggestion of Donthu et al. (2021), the researchers finally conducted a performance analysis and scientific mapping of the 249 articles. The researchers mainly performed a visual analysis of the quantitative research on the sense of place from five perspectives: co-Authorship, co-occurrence, citation, bibliographic coupling and term.

Results

The researchers created related visualization images after importing the CVS format files of the 249 literature into the VOS viewer software. The retrieved article network is analyzed and discussed from five perspectives: co-Authorship, co-occurrence, citation, bibliographic coupling and term.

Visualization of Co-Authorship

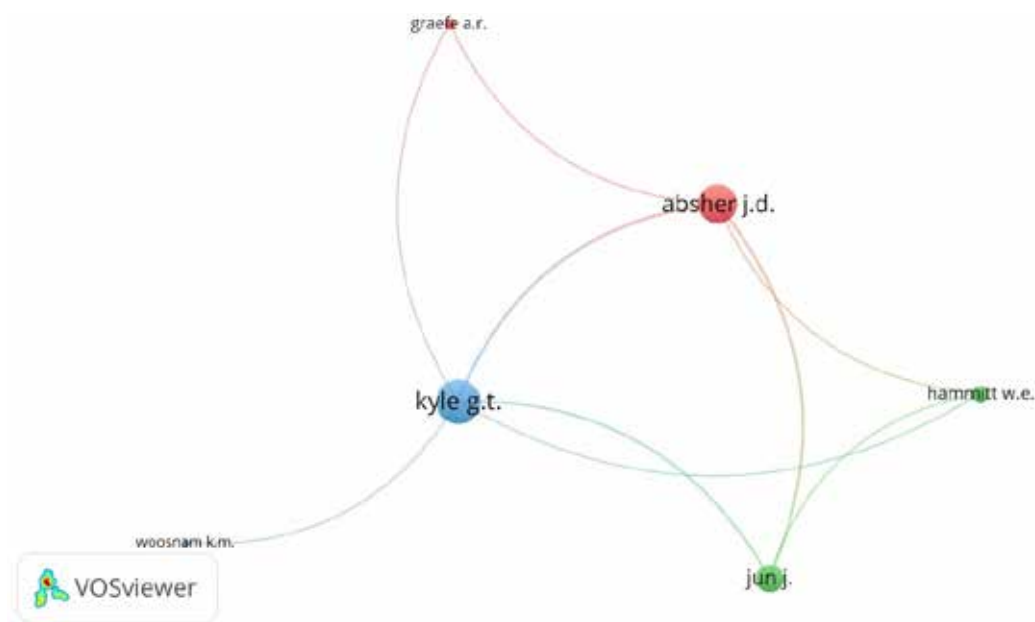


Figure 2: Network visualization of co-authorship

The researchers used a VOS viewer to visualize the relationship between these co-authors to discover their cooperative relationship. When the calculation method was set to full counting and articles with more than seven authors were ignored, we found that 639 authors met this criterion. When the researchers further set the minimum number of documents of an author to 2, 58 authors met this criterion. Among these 58 authors, only six authors were linked (as shown in Figure 2). Visualized by VOS viewer, it is possible to see the strength of connections between these authors through collaborative papers. From Figure 2, among the six authors, J. D. Absher, A. R. Graefe, W. E. Hammitt, J. Jun, G.T. Kyle and K. M. Woosnam, the circle represented by G. T. Kyle. was the largest. This shows that G. T. Kyle is the most closely related to the other authors in the quantitative research on the sense of place and has co-authored articles with the remaining five co-authors. The details of the co-author network are shown in Table 1.

Table 1: Details of co-authorship

No.	Authors	Documents	Citations	Avg. pub. year	Avg. citations	Avg. norm. citations
1	J. D. Absher	3	263	2008	87.6667	0.4668
2	A. R. Graefe	2	218	2008	109	0.5192
3	W. E. Hammitt	2	258	2009	129	0.8664
4	J. Jun	2	74	2011	37	0.4636
5	G. T. Kyle	4	280	2011	70	0.954
6	K. M. Woosnam	4	252	2019	63	3.2025

The co-authorship network visualization reveals the research productivity and influence of the six authors in the field of journal articles. The results showed that five articles were published by these co-authors, all with an average publication year before 2020. The author with the highest number of cooperating publications was G. T. Kyle, with four publications and 280 citations as a co-author. The author with the highest average citations is Hammitt (Hammitt et al., 2006a; Jun et al., 2012), with 258 citations for only two articles. His average citations per paper were 129, and the average regular citations were 0.8664.

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The authors further analyzed four quantitative studies authored by G. T. Kyle (Jun et al., 2012; G. T. Kyle et al., 2010; Landon et al., 2021; Patwardhan et al., 2020). The results revealed that G. T. Kyle and colleagues' research focuses on exploring the psychological and social interactions between humans and recreational and natural environments. These studies share a commonality in analyzing how motivations, attitudes, and attachments shape individuals' behaviors and preferences in specific environments. G. T. Kyle et al. (2003) initially highlighted the amplifying role of place identity in influencing the public's attitudes toward fees for public lands and preferences for income distribution. Subsequent research confirmed the link between family and community attachments and willingness to adopt wildfire mitigation measures (G. T. Kyle et al., 2010). The following work redefined the persistence of leisure involvement, considering identity identification as a key factor driving emotional and behavioral outcomes (Jun et al., 2012). The latest research provided a new perspective through self-determination theory, indicating that the satisfaction of psychological needs is an important driving force in forming an attachment to a place (Landon et al., 2021). These findings underscore the connection between individuals and places and their impact on decision-making and interactions within these spaces, demonstrating the importance of place attachment and identity in environmental behavior research.

Additionally, the authors utilized the Scimago Graphica tool to depict the publication output of the studied countries/regions. As shown in Figure 3, the depth of the circle colors indicates relatively high publication volumes in the United States, United Kingdom, China, and Australia, which have rich academic publishing volumes and significant collaboration with other countries. Although countries or regions such as Belarus and French Polynesia have fewer publications, the number of connections with other countries reveals their existence to a certain extent within the global academic cooperation network.

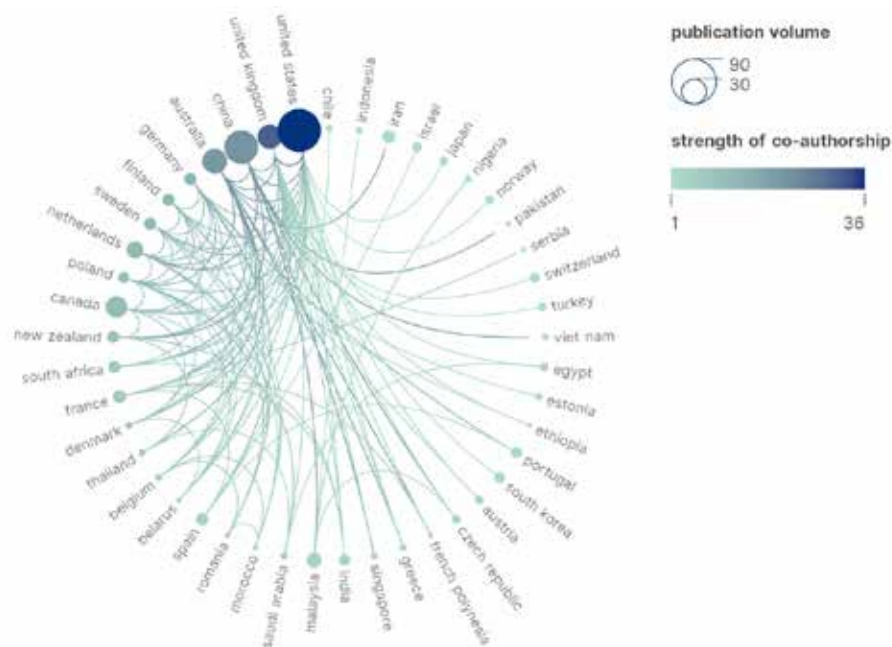


Figure 3: Academic collaboration and publication volume network analysis

Furthermore, Figure 4 illustrates the quantitative data of academic output in the field of sense of place research and the structure of the global collaboration network. From the figure 4, it is clear that in sense of place research, European countries' contributions are significantly higher than those of other continents, with Asia following closely behind. Overall, South America has relatively fewer research outcomes in this field.

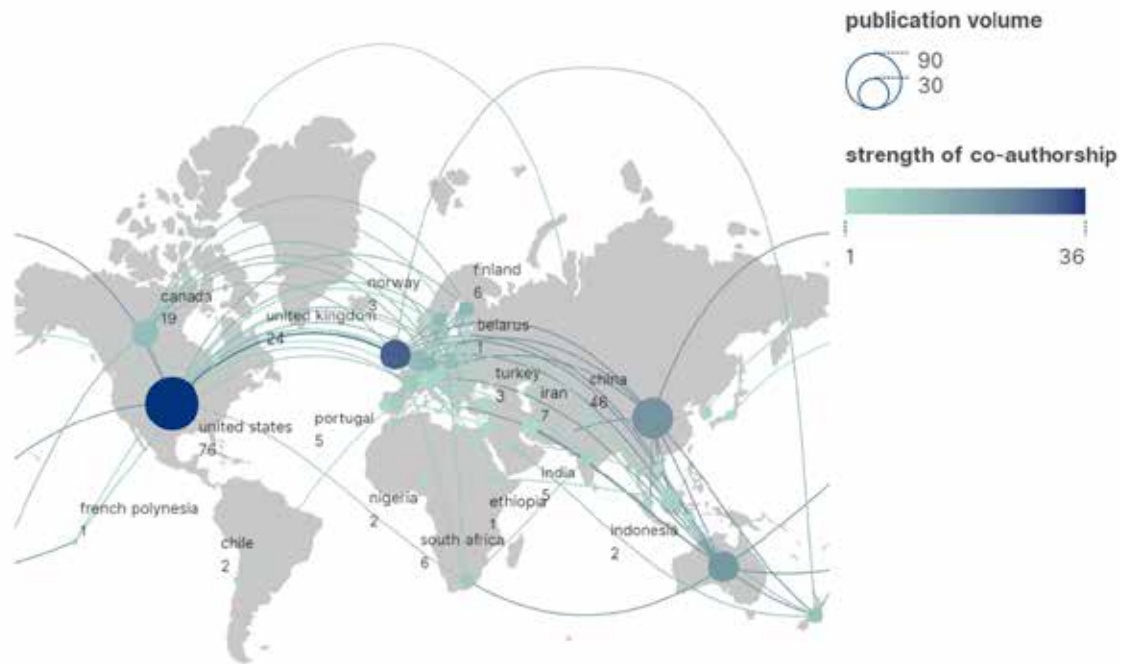


Figure 4: Global academic output and collaboration network in the sense of place

Visualization of Co-occurrence

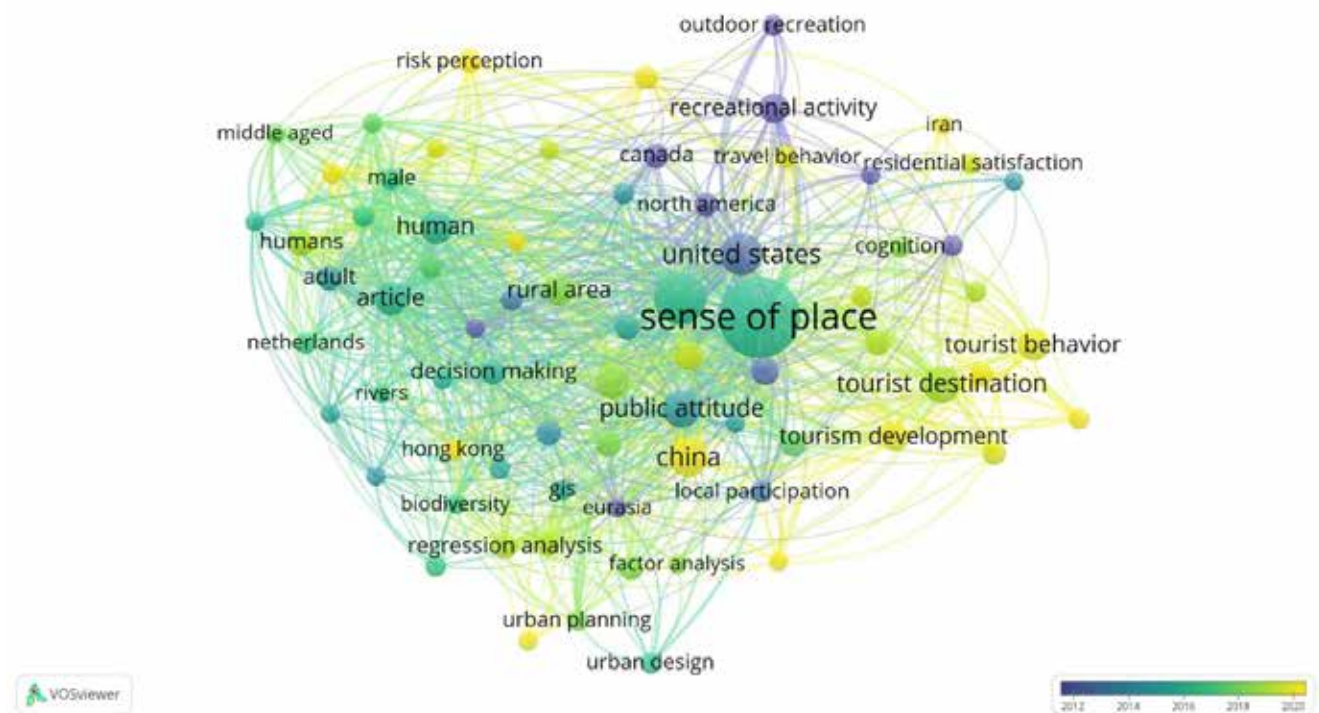


Figure 5: Overlay visualization of co-occurrence

After full counting, there are 962 indexed keywords in 249 documents related to the quantification of sense of place, and there are 74 keywords that appear more than five times repeatedly (as shown in Figure5). The results of co-occurrence visualization can reflect the change in the frequency of indexed words. For example, from 2012-2014, the indexed keywords focused on “public attitude”, “adult”, “attitudinal survey”, and “environmental protection”; from 2014 to 2016, “sense of place”, “psychology”, and “human” became the main index terms; from 2016 to 2018, “tourist destination” was the most frequent index term; after 2018, “China”, “quality of life” and “quality of life” and “tourist attraction” gradually became the main indexing keyword. In addition, from the results of the co-occurrence visualization, there are 11 terms with at least 15 occurrences (as shown in Figure6). The most frequently studied themes related to the quantification of sense of place are “sense of place”, “perception”, and “United States”.

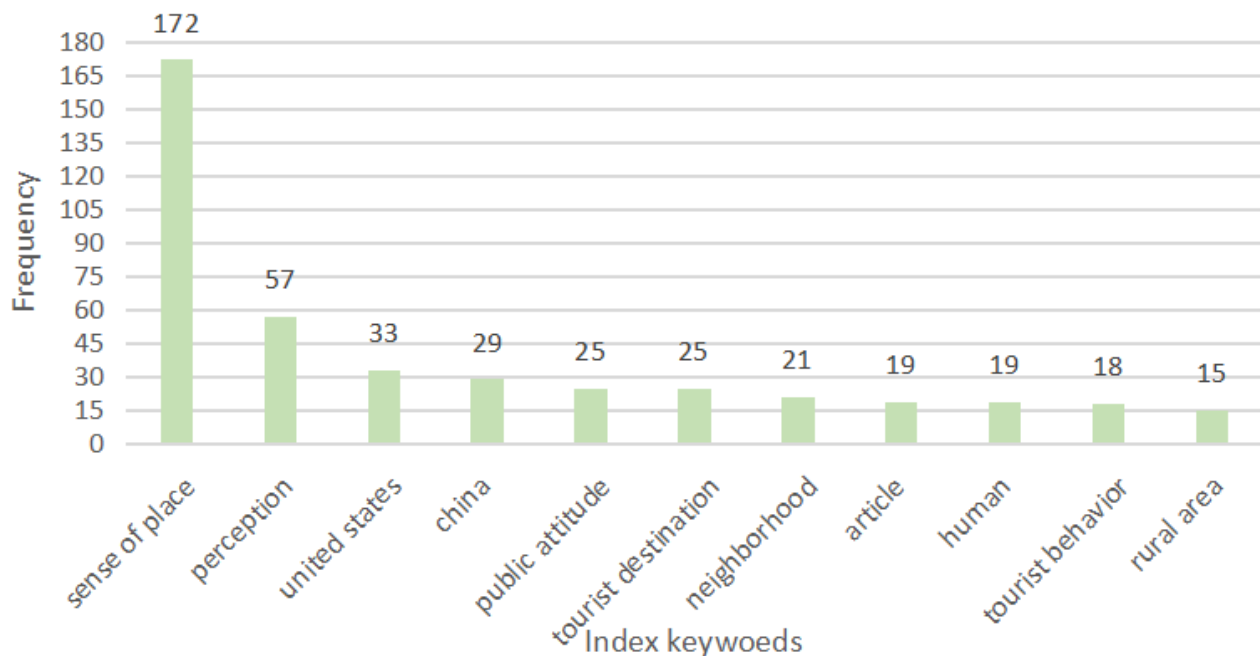


Figure 6: The index keyword occurrence frequency is at least 15

Visualization of Citation

The researchers used the VOS viewer citation analysis visualization to reflect the essential articles in the quantitative research on the sense of place. First, the researchers set the minimum number of citations to 50. Then, based on the threshold, 69 out of 249 articles were selected. Of the 69 items in the network, 11 were not interconnected with others, so the most extensive set of connected items consists of 58 items (Figure 7). Jorgensen and Stedman (2001) some of which are well established in attitude research. Attitude theory can provide a basis for conceiving of SOP as cognitive, affective and conative relationships with human environments. In this study, Sense of Place was defined as a multidimensional construct comprising: (1 and Stedman (2003a) much research has emphasized the social construction of sense of place and neglect the potentially important contributions of the physical environment to place meanings and attachment. This article presents research that tests several models that integrate (1 had two circles that were much bigger than the others, suggesting that these two articles were cited more often. In addition, although the circle of Raymond (2010) and others are not very large because the location is in the center of the map, it indicates that the connection with other reference articles is the most firm.

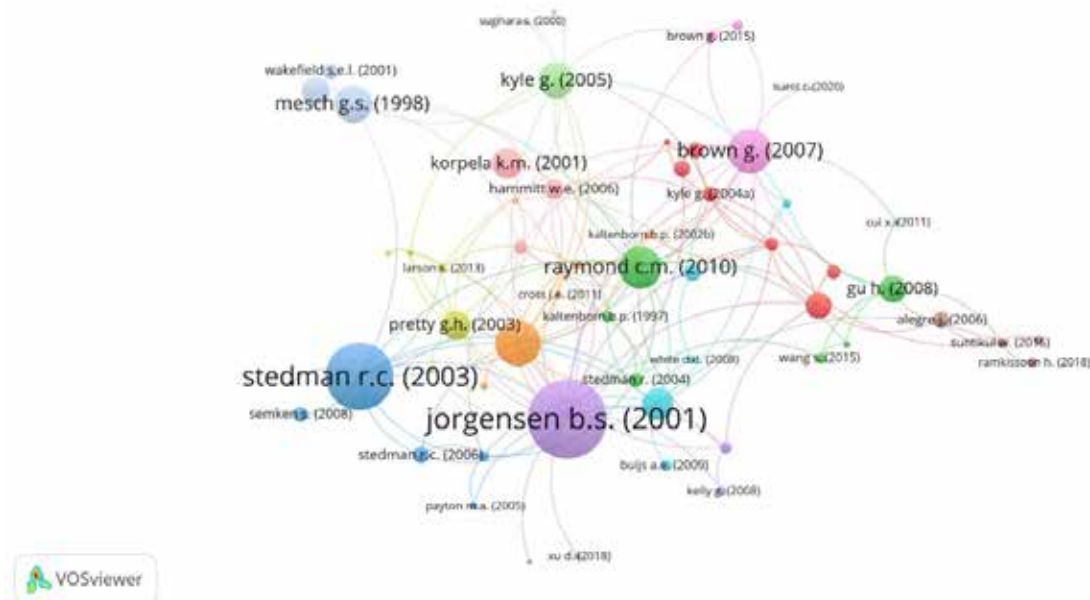


Figure 7: Network visualization of co-occurrence

Table 2 displayed the details of papers with over 200 citations among the quantitative research on the sense of place. Among these high-frequency cited articles, there is a general agreement that a sense of place is a complex psychological state with influences related to landscape values (Brown & Raymond, 2007), tourism (Gu & Ryan, 2008) but does so with reference to theories of place attachment or place identity. It therefore addresses two gaps in the literature—namely, (a) leisure activities (Hammit et al., 2006b; G. Kyle et al., 2003, 2005), social relationships and environmental (Mesch & Manor, 1998), age (Hay, 1998; Pretty et al., 2003), etc. Furthermore, this literature has proposed different research methods for different research areas, thus providing solid support for the development of the field of quantitative research on the sense of place.

Table 2: Details of articles with more than 200 citations

No.	Terms	Citation	Avg. pub. year	Norm. citations
1	Jorgensen and Stedman (2001)	895	2001	2.3709
2	Stedman (2003a)	770	2003	1.9286
3	Hay(1998)	521	1998	1.0911
4	Brown and Raymond (2007)	507	2007	2.7258
5	Raymond et al. (2010)	479	2010	6.0209
6	Mesch and Manor (1998)	434	1998	0.9089
7	Kyle et al. (2005)	412	2005	1.6382
8	Jorgensen and Stedman (2006)	365	2006	2.1429
9	Korpela et al. (2001)	356	2001	0.943
10	Pretty et al. (2003)	334	2003	0.8366
11	Kim and Kaplan (2004)	328	2004	1.8427
12	Gu and Ryan (2008)	314	2008	1.96
13	Kyle et al.(2003)	304	2003	0.7614
14	Hammit et al.(2006b)	225	2006	1.3209

Visualization of Bibliographic Coupling

Figure 8 identifies and visualizes those journal sources that publish quantitative research on the sense of place. With no restriction on the number of citations and a minimum number of journals publishing papers of 5, 10 out of 131 journals meet the threshold. Figure 6 demonstrates how the *Environment and Behavior* journal is closely related to all other nine journals and has many more items than the other journals. As early as 1998, Environment and Behavior published “*Social Ties, Environmental Perception, And Local Attachment*” (Mesch & Manor, 1998). The article was about the emotional attachment of people to specific places.

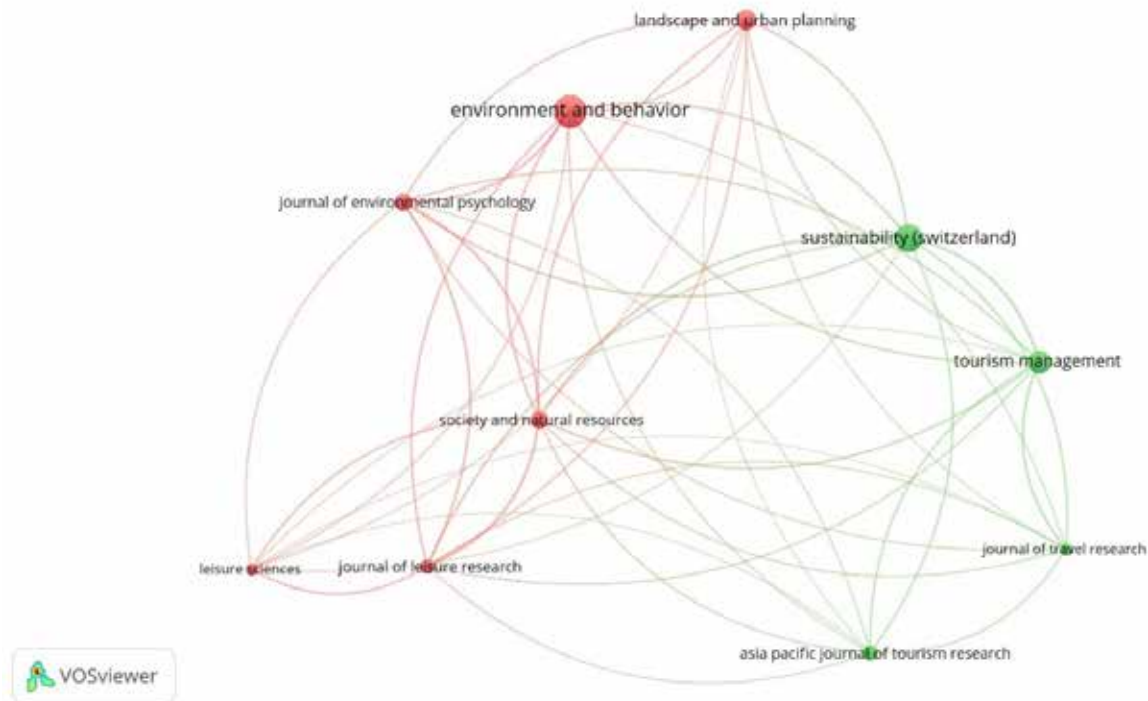


Figure 8: Visualization of bibliographic coupling

The specifics of number coupling are shown in Table 3. Although just seven pertinent papers were published, Table 3 shows that the *Journal of Environmental Psychology* is the most important journal, with 2325 citations and an average citation count of 332.1429. Besides, the top three journals are *Environment and Behavior*, *Sustainability (Switzerland)*, and *Tourism Management*.

Table 3: Details of bibliographic coupling

No.	Journal Sources	Documents	Citations	Avg. citations	Avg. norm. citations
1	<i>Asia Pacific Journal of Tourism Research</i>	6	81	13.5	0.554
2	<i>Environment and Behavior</i>	13	2052	157.8462	1.1267
3	<i>Journal of Environmental Psychology</i>	7	2325	332.1429	1.9842
4	<i>Journal of Leisure Research</i>	6	669	111.5	0.6089
5	<i>Journal of Travel Research</i>	5	530	106	3.6376
6	<i>Landscape and Urban Planning</i>	8	323	40.375	1.005
7	<i>Leisure Sciences</i>	5	561	112.2	0.8364
8	<i>Society & Natural Resources</i>	7	1094	156.2857	1.0556
9	<i>Sustainability (Switzerland)</i>	11	49	4.4545	0.5398
10	<i>Tourism Management</i>	9	848	94.2222	2.378

Visualization of Terms

The researchers used VOS viewer software to count the terms appearing in the titles and abstracts of the articles. The results showed that 5,767 terms appear in 249 documents that suggest the object of study and related areas of quantitative research on the sense of place. Analysis of these terms provides comprehensive and detailed information on developments along this research line, challenges, and possible opportunities for follow-up. Table 4 lists the terms that appear at least 30 times. These high-frequency terms indicate that quantitative research on the sense of place has received widespread attention and that some results have been achieved in this research direction.

Table 4: Terms with a frequency of at least 30 occurrences

No.	Terms	Frequency of occurrence	Avg. pub. year	Avg. citations	Avg. norm. citations
1	tourist	84	2017	63.5238	1.8849
2	place dependence	77	2015	77.7013	0.9018
3	scale	57	2014	156.4386	1.2808
4	visitor	56	2016	57.3571	1.3353
5	tourism	50	2015	83.88	1.7695
6	destination	47	2017	43.8298	1.1376
7	China	45	2018	32.8444	1.522
8	intention	42	2017	34.1667	1.2416
9	neighbourhood	38	2016	33.8158	0.6625
10	neighborhood	35	2014	39.7429	0.8216
11	willingness	34	2017	17.2059	0.8879
12	life	33	2016	69.8485	1.479
13	term	33	2015	47.1818	0.9764
14	image	32	2018	38.5625	1.295
15	support	31	2014	52.3226	1.1858
16	health	30	2014	68.6	0.9327
17	measure	30	2012	184.8667	1.3587

The visualization term shows that “tourist” is the main object of quantitative research on the sense of place, appearing 84 times, with an average year of publication of 2017 and average citations is 1.8849. Figure 9 shows the overlay visualization of the terms, with the colors mapping the articles’ publication time. It is clear from the graph that the terms “measure”, “hiker”, “restoration”, and “place dependence” have received attention earlier. In contrast, the terms like “evacuation willingness”, “disaster occurrence”, “responsibility”, and “rural urban migrant”, “urban attachment”, “responsible behaviour”, and “service quality” have only recently received attention in quantitative research of the sense of place. This shift reflects a tendency in earlier research to focus more on establishing foundational concepts and theoretical frameworks, delving into classic issues. However, in recent years, the ongoing changes in society and the environment have spurred researchers’ attention towards new issues, thus driving the development and evolution of quantitative studies on the sense of place.

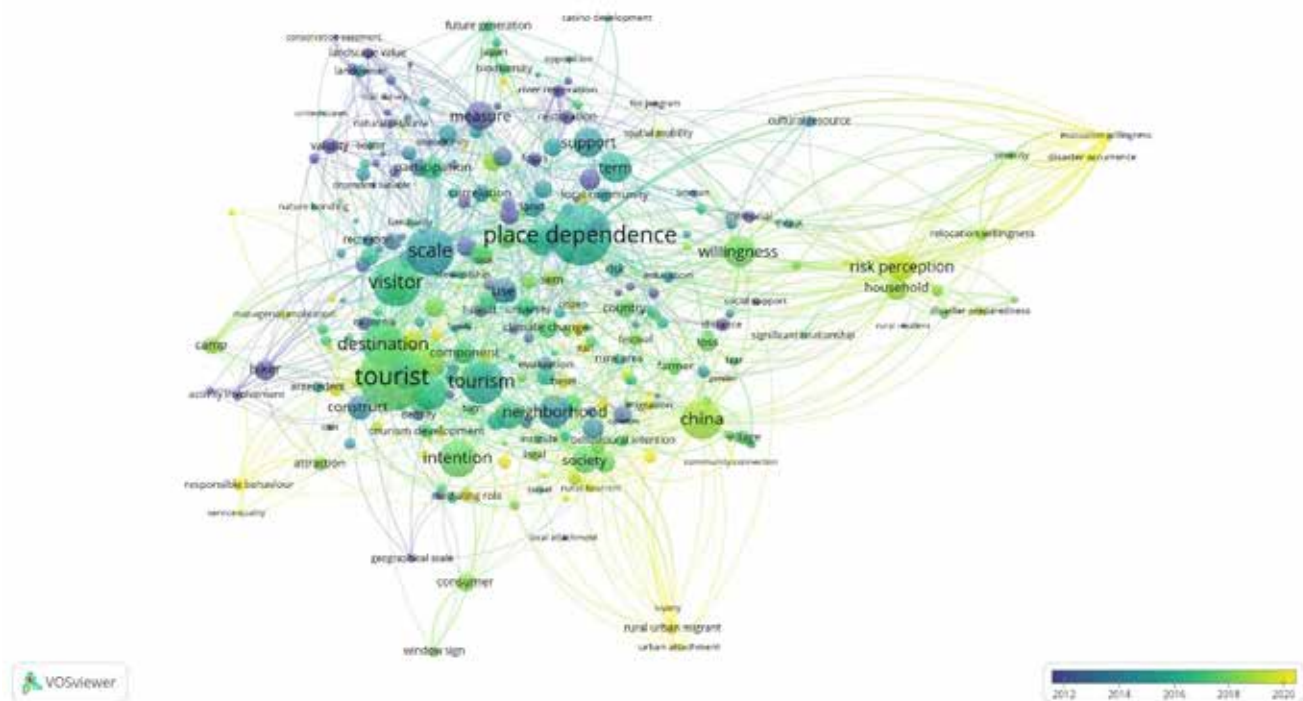


Figure 9: Overlay visualization of terms

It is noteworthy that, in conjunction with Figure 5, key terms related to tourism or tourists frequently appear in recent years' sense of place research. The authors screened and reviewed studies related to tourism or tourists in the past five years and summarized the main themes of 24 articles (Table 2). These studies cover various aspects including economic development, community/destination management, attitudes of residents/tourists, cultural experiences, heritage conservation, ecological/environmental protection, and the relationship between tourists and local residents.

Table 5: Main themes of tourism/tourist-related articles

Author		Main Themes		Main Themes					
				economic development	community/destination management	attitudes of residents/tourists	cultural experiences	heritage conservation	ecological/environmental protection
1	Zuo et al. (2023)								
2	Nian et al. (2022)								
3	Patwary et al. (2022)								
4	Mohamed et al. (2022)								
5	Cheng et al. (2021)								
6	Confente and Scarpi (2021)								
7	Otoo et al. (2021)								
8	Zhou et al. (2021)								
9	Shaykh-Baygloo (2021)								
10	Li and Zhao (2021)								
11	Ganji et al. (2021)								
12	Khoi et al. (2020)								
13	M. Kim and Koo (2020)								
14	M. Kim and Kim (2020)								

Main Themes		economic development	community/destination management	attitudes of residents/tourists	cultural experiences	heritage conservation	ecological/environmental protection	the relationship between tourists and local residents
Author								
15	Kwong and Li (2020)							
16	B. Li et al. (2020) this study utilized an analysis model of perceived rural tourism impacts (P							
17	Patwardhan et al. (2020)							
18	Isa et al. (2020)							
19	McCarthy (2019)							
20	Marshall et al. (2019)							
21	Scarpi et al. (2019)							
22	Ried et al. (2019)							
23	Douglas et al.(2019)							
24	Chen et al.(2019)							

Noted: Shading represents research-supported themes.

Firstly, one of the primary motivations in the sense of place research is to utilize the sense of place at tourist attractions to create positive economic impacts. The tourism industry plays a crucial role in the economic growth of many countries and regions. Thus researchers have emphasized exploring how to enhance the sense of place at tourist destinations to restore economic growth, bring about more economic benefits, and promote sustainable tourism development (Nian et al., 2022; Patwary et al., 2022; Zhou et al., 2021; Zuo et al., 2023). Secondly, community or destination management is also a significant focus of research. These studies investigate how to manage relationships and tensions in tourism spaces effectively, as well as how managers listen to the opinions of residents to foster the co-creation of tourism value by residents and tourists (Isa et al., 2020; Kwong & Li, 2020; McCarthy, 2019). Additionally, high-quality services can enhance tourist satisfaction, thereby establishing positive perceptions of the destination among tourists and supporting intentions for repeat visits. Therefore, researchers have focused on studying the impact of service quality on tourists' sense of place attachment and environmental responsibility behavior, as well as the significant influence of sense of place on tourist behavior and attitudes (Isa et al., 2020; Ried et al., 2019; Scarpi et al., 2019). Nevertheless, some studies also highlight the importance of cultural experiences in the tourism industry for place attachment (Mohamed et al., 2022; Otoo et al., 2021; Patwardhan et al., 2020).

Discussion

The discussion of the relationship between theory and empirical evidence on the sense of place has continued for a long time. Through systematic reviews and bibliometric analysis provides valuable insights into the current state of quantitative research on the sense of place. First, a visual analysis based on co-authors shows that G. T. Kyle has published the most prominent number of articles and citations among co-authors of quantitative research on the sense of place. In addition, the most closely collaborating authors were J. D. Absher, A. R. Graefe, W. E. Hammitt, J. Jun, G. T. Kyle, and K. M. Woosnam. The publications of these co-authors (Hammitt et al., 2006b; J. Kim & Kaplan, 2004; Korpela et al., 2001; G. Kyle et al., 2003; Mesch & Manor, 1998) self-regulation, and place attachment. University students (n = 101 suggested that sense of place is an essential factor influencing human's behaviour behaviors perceptions, and willingness to pay for a particular location. Therefore, it is crucial to incorporate the sense of place into policy making,

and governments should strive to promote local people's sense of place in order to promote local environmental protection behaviors and economic development and to increase tourists' willingness to pay through the development of local tourism resources and attractions. Furthermore, as the researcher who collaborates most frequently with other scholars, Kyle's involvement in research reveals the close connection between individuals and places, highlighting their significant influence on environmental behavior. This emphasizes the pivotal role of a sense of place attachment and identity in environmental behavior research.

Second, in the coupling of keywords and terminology overlay visualization, researchers found that quantitative research in the sense of place is getting more and more attention from academics. From 2010 to the present, academic research on the sense of venue has increased yearly. The keywords "perception", "tourist destination", "public perception", "tourist destination," and "public attitude" are all influential core concepts in the sense of place research and have a high impact. Among the keywords ranked by the number of literature citations, "tourist destination", "public attitude", "neighborhood", and "article" ranked at the top. Academics are paying more attention to the study of the sense of place, and the perspective of the study is gradually widening. In addition, from the keywords sorted by the citations number, it can be found that starting in 2010, "tourist behavior", "tourism development", "attitudinal survey", "humans", "regression analysis", "tourist attraction", "sustainability", "surveys", "numerical model" are rising. Academic research on the sense of place from a traditional perspective also expands to include multidisciplinary perspectives such as sociology, psychology and economics. The evolution of these key terms signifies the diversification of academic research directions. It hints at the shifting societal and cultural trends, policy formulations, and research interests across different regions globally. For instance, terms like "public attitude" and "environmental protection" reflect earlier concerns regarding public attitudes and environmental consciousness. At the same time "sense of place" and "psychology" indicate explorations of the essence and psychological dimensions of sense of place. Similarly, the emergence of "tourist destination" as a key term signifies growing interest in the identity formation of tourist destinations and psychological aspects of tourism research. In recent times, terms such as "China", "quality of life", and "Tourist attraction" may reflect the increasing importance attributed to economic growth, improvements in quality of life, and tourism industry development in sense of place research.

Third, the analysis of citations found that "*Sense of Place as an Attitude: Lakeshore Owners Attitudes Toward Their Properties*" (Jorgensen & Stedman, 2001) some of which are well established in attitude research. Attitude theory can provide a basis for conceiving of SOP as cognitive, affective and conative relationships with human environments. In this study, Sense of Place was defined as a multidimensional construct comprising: (1 has the highest coupling in the field of quantitative research on the sense of place, with the highest number of links and citations. That is a side reflection of the high quality of this article. According to the results of VOS viewer software, it can be found that quantitative research on global perception has developed during 1989-2023, in which the number of citations and influence are on the rise, indicating that this field of research is receiving more and more attention.

Fourth, the visualization of journal sources provides a visualization of relevant articles published in the field. From 131 different journals, there were 249 articles about quantitative research in the sense of place. The *Asia Pacific Journal of Tourism Research*, *Environment and Behavior*, *Journal of Environmental Psychology*, *Journal of Leisure Research*, *Journal of Travel Research*, *Landscape and Urban Planning*, *Leisure Sciences*, *Society & Natural Resources*, *Sustainability (Switzerland)*, *Tourism Management* have the highest number of publications. According to VOS viewer's analysis, *Environment and Behavior* is the most

influential journal. In contrast, *Sustainability (Switzerland)* has the lowest number of citations, most likely due to the late publication of the relevant articles on average.

Fifthly, researchers analyzed of frequent terms in the titles and abstracts of the 249 documents, revealing that the average publication year for sense of place quantification studies was 2015. This indicates that the field is still in its nascent stage of development, with numerous issues awaiting in-depth exploration. Therefore it is necessity to delve into the underlying mechanisms and influencing factors of sense of place, thereby driving the maturity and advancement of this field. Sense of place quantification research encompasses various dimensions, including the contribution of tourism to economic development, community and destination management, attitudes of tourists and local residents, and service quality. This underscores that sense of place studies not only focus on individual behaviors and attitudes in specific environments but also examine how tourism affects community and regional development, while exploring effective management of various relationships and potential conflicts within the tourism environment.

Conclusion

This study provides the current state and trends in quantitative research on the sense of place through a systematic literature review and bibliometric analysis. The findings revealed that globalization and economic factors have jointly propelled the development of the tourism industry, consequently drawing significant attention to sense of place as a crucial emotional link and experiential aspect connecting individuals with destinations. Economic development was identified as the primary driver for sense of place research, particularly in tourism and related domains. While research also encompasses topics such as heritage conservation, ecological sustainability, and the relationship between local residents and tourists, these areas remain relatively underexplored. Therefore, future research should delve more deeply into these areas to enrich and refine the theoretical and practical foundations of sense of place studies, thus providing clearer direction and guidance for the further development.

Additionally, the study highlights that social and environmental changes are pivotal factors driving trends and developments in sense of place research, with the United States leading in scholarly publications in this field. At the same time, Europe and Asia exhibit higher involvement in global collaborative networks. Citation analysis indicates that landscape value, tourism, leisure activities, social relationships and environmental, and age are the significant factors influencing the sense of place.

Despite the limitation of relying on the Scopus database, which may not comprehensively cover all relevant literature, the results underscore the sense of place as an interdisciplinary field with diverse research themes and methodologies. Future research should continue exploring new quantitative methods to assess the sense of place and delve deeper into understanding the relationships between its components. Specifically, there is a need to enhance understanding of how economic, social, cultural, and environmental factors collectively shape a sense of place, leveraging quantitative methods to analyze their influence.

While this study sheds light on the current status and themes of quantitative research on sense of place, it is imperative to acknowledge its limitations, such as the exclusion of other databases that may contain relevant literature, which could potentially lead to an incomplete understanding of the field. Moreover, the study does not extensively explore differences in sense of place research across different regions and cultural backgrounds, which provides an avenue for future research expansion.

Finally, this study summarizes the current state and themes of quantitative research on sense of place and provides necessary essential theoretical and

practical foundations for future research directions. Journals such as “Environment and Behavior”, “Sustainability (Switzerland)”, and “Tourism Management” are recommended as preferred platforms for publishing quantitative research on the sense of place. Future research endeavors should pay closer attention to the relationship between a sense of place and individual/group behavior, as well as explore how enhancing a sense of place can promote sustainability in the tourism industry and local development.

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