MAPPING THE GREEN PATH: A COMPREHENSIVE BIBLIOMETRIC ANALYSIS OF GREEN TOURISM RESEARCH TRENDS

Carmen Nastase
E-mail: carmen.nastase@usm.ro
ORCID:
Affiliation: Faculty of Economics, Administration and Business, "Ștefan cel Mare" University of Suceava, Romania
ROR: https://ror.org/035pkj773

Carmen Chasovschi
E-mail: carmenc@usm.ro
ORCID:
Affiliation: Faculty of Economics, Administration and Business "Ștefan cel Mare" University of Suceava, Romania
ROR: https://ror.org/035pkj773

Ancuta Lucaci
E-mail: ancuta.lucaci@usm.ro
ORCID:
Affiliation: Faculty of Economics, Administration and Business "Ștefan cel Mare" University of Suceava, Romania
ROR: https://ror.org/035pkj773

Annotation. Environmental protection and business development are priorities for the European Union, and the successful implementation of Green Pact policies will be of great importance to all parties involved. The primary objective is to perform a comprehensive examination of scientific results by using bibliometric analysis in order to understand the existing structure of studies and potential directions for research connected to business environment improvements through green economy implementation. Business and sustainable development will be an engine as we transition to a more resource-efficient and green economy, one in which economic growth, equitable distribution of resources, and human development interact with environmental security. The transition to an environmentally friendly green economy will generate substantial financial advantages. Greening the economy is a new economic engine, an incubator for sustainable jobs, and an essential instrument for eliminating poverty. The bibliometric investigation found 1643 documents that appeared on the Web of Science database between 1991 and 2023. The VOSviewer programme has been used to analyse its scientific content.

Keywords: green tourism, sustainable development, literature, bibliometric analysis.

JEL classification: Q18, Q57.

Introduction

Green tourism is a critical perspective for assessing the dynamics of the global tourism industry in pursuit of sustainable development and environmental management. To understand the many facets of green tourism, this article methodically investigates the existing literature in this field. Through critical examination and synthesis of prestigious academic papers, this in-depth research aims to brighten

important themes, theoretical frameworks, and methodological approaches that shape an argument regarding green tourism.

There is growing interest in sustainable travel practices and destinations that incorporate green economy concepts into their business strategy. This phenomenon has also been intensely driven by the Coronavirus pandemic. As a result, current research in the field of tourism is addressing, among other things, the concept of green tourism as a solution to minimize the impact of tourism on the environment. Admittedly, in addition to the environmental component, green tourism has social and economic influences. From this perspective, this article has thoroughly explored the fundamental concepts that make up green tourism: environmental conservation, community involvement and economic sustainability. The focus is on mapping the intellectual structure of green tourism knowledge by examining academic contributions.

The purpose of this paper is to review research in the field of green tourism. Furthermore, the review addresses the following research questions (RQ):

RQ1: What are key growth trends in research on green tourism?

RQ2: What authors, organisations, countries, documents and sources in the literature have had the greatest influence on green tourism research over the years?

RQ3: What topics in the green tourism literature have been studied with the greatest frequency and are currently attracting the greatest attention?

RQ4: What are the key concepts that have been explored on the topic of green tourism and how are they related?

RQ5: What is the intellectual structure of the knowledge base on green tourism?

In the following section, we performed a theoretical background related to green tourism. The third section describes the research methodology that was undertaken for the bibliometric analysis. The results and discussion of the bibliometric analysis are included in Section 4.

1. Theoretical Background

Global climate change has become an important issue, as it determines how people can survive while the environment continues to degrade. Individuals, organisations, communities, and nations need to reconsider how they produce, consume, and use products, services, and technology as mitigation actions (Ferreira *et al.*, 2020).

The concept of a "green economy" emerged more than 20 years ago (Barbier, 2009). The implementation of the green economy concept has been described as a long-term strategy for national economies to overcome the crisis (Barbier, 2009), with the goals of economic recovery; eradicating poverty; and reducing carbon emissions and halting ecosystem degradation.

The green economy is the economy in which people's welfare and employment growth are ensured due to state and social investments that ensure the reduction of emissions and environmental pollution and stimulate the efficient use of energy and resources, as well as prevent any damage to biodiversity and ecosystem (Diyar *et al.*, 2014; Stjepanović *et al.*, 2017; Smaliukiene and Monni, 2019).

Tourism, as any other human activity, is based on a deep and complex bilateral relationship with the surrounding environment, which affects and is affected by tourist inflows (Budowski, 1976).

Tourism is one of the most valuable commercial activities in the world because it stimulates economic growth. However, it has a dark side in that it adversely affects the environment, which is becoming a rising concern. The tourism and hospitality sector is one of the most notable contributors to a higher carbon footprint globally (Lenzen *et al.*, 2018).

The strength of the tourism industry as an economic contributor has created a level of awareness among tourism stakeholders to ensure sustainable tourism development without threatening the needs of the future generation (Joshi and Rahman, 2015).

The green economy paradigm presents a new situation of change for tourism. Most of the energy use in tourism is still based on fossil fuels, and the sector continues to emit increasing levels of greenhouse gas (GHG) emissions (Hall, 2013; Scott *et al.*, 2008).

Tourism sustainability conceptualises the facets of tourism by preserving the atmosphere against several environmental issues such as mitigating air, water, and soil emissions as well as reducing travellers and practitioners' waste. It emphasises protecting landscapes, ecosystems, wind plants, and the environmentally sustainable characteristics of animals. Second, social development is related to the standard of living of the urban community and describes the protection of the quality, past, culture, and diversity of destination areas (Astina *et al.*, 2021; Cobbinah *et al.*, 2013; Kebete, 2021).

Although sustainability in tourism has been researched extensively in the last few decades (see, e.g., Lane, 2009) and studies are increasingly focused on tourism and climate change (see, e.g., Becken and Hay, 2012; Scott *et al.*, 2008), as yet, very few studies have researched the new concept of a green economy from a tourism perspective (see, e.g., Law *et al.*, 2012; Lipman *et al.*, 2012; UNEP, 2011).

Green tourism is the term used in the practice of sustainable tourism that secure the future needs of sufficient environmental, economic, social and cultural resources (Azam and Sarker, 2011). Green tourism is a form of eco-tourism development concept. According to Fandeli (2000) eco-tourism introduced by organization of The Ecotourism Society in 1990 and explained that ecotourism was a form of travel to natural areas that is done with the aim of conserving the environment and preserves the life and well-being of local residents.

All sectors of the economy depend directly or indirectly on ecosystem services, for many of which replacement is costly or limited. Collapse of these ecosystem services could lead to substantial economic costs (Johnson *et al.*, 2021).

2. Methodology

The purpose of this study is to investigate the literature on green tourism. For this purpose, we conducted a bibliometric analysis. Numerous researchers are currently using bibliometric analysis for investigating the literature because this method provides important details on the current state of research in an area of study. Bibliometric analysis can additionally identify the most appreciated authors, scientific publications, partnerships between authors, organisations, and nations, the co-occurrence of keywords, and the amount of citations in a certain topic. The conclusions of the bibliometric studies provide important resources that many stakeholders, such as policymakers and scholars, may use.

Table 1. Guidelines for bibliometric research

Main phases	Implementation
Phase 1: Identifying the database for the collection of scientific documents	▯ Database: Web of Science
Phase 2: Selection of scientific documents	▯ Time horizon: all years ▯ Search keyword: "green tourism" ▯ Web of Science Core Collection: SCI-EXPANDED, SSCI, AHCI ▯ Document types: all documents
Phase 3: Background analysis of scientific documents	▯ Evolution of academic papers ▯ Prolific authors, organisations, countries, publication titles, publishers, research areas
Phase 4: Bibliometric analysis of scientific documents	▯ Co-occurrence, co-authorship, citation

Source: created by the authors.

VOSviewer is a current software used by many researchers to perform bibliometric analysis. The VOSviewer implementation offers the added advantage of providing a comprehensive perspective of the links between articles, authors, groups, countries, and keywords. Several researchers have been using this software for performing bibliometric analysis in recent years.

Table 1 provides the main guidelines for the bibliometric analysis. Therefore, for conducting the bibliometric investigation we have set a number of four phases: (1) Identifying the database for the collection of scientific documents, (2) Selection of scientific documents, (3) Background analysis of scientific documents, and (4) Bibliometric analysis of scientific documents. Each phase carries a high degree of significance.
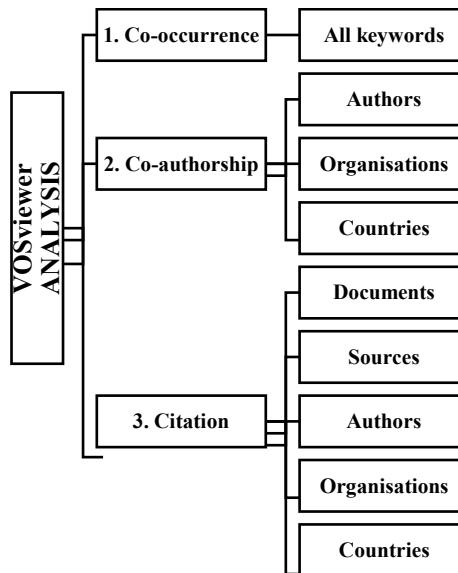

Source: created by the authors.

Figure 1. **Research Scheme Applied to the Study**

The bibliographic analysis of green tourism included, among other characteristics, an investigation of the most noteworthy academic papers, organizations, authors, and countries, as well as keyword and citation analysis *(Figure 1)*.

3. Bibliometric Analysis of Literature: Results and Discussion

3.1 An Overview of Green Tourism

The 1,643 documents selected from the Web of Science platform for bibliometric analysis include several types of scientific papers, the most representative being articles (92.9%), review articles (5.54%), early access (4.3%), and proceeding papers (1.2%). *Figure 2* illustrates the chronological distribution of scientific publications that have addressed the topic of green tourism. During the period 1991-2006, the interest of researchers in the field of green tourism is poor, and this is reflected in the limited number of scientific publications. Green tourism has been studied more thoroughly by researchers since 2007. Therefore, awareness of the importance of green practices in tourism is growing in the academic world, so that the activities performed are environmentally friendly and sustainable. Furthermore, the most scientific papers that addressed green tourism were published in the 2021-2023 timespan, after the Covid-19 pandemic that caused significant changes in the global tourism sector. Following the health crisis, travel behaviour has gradually changed, with a greater emphasis on sustainability and green issues.
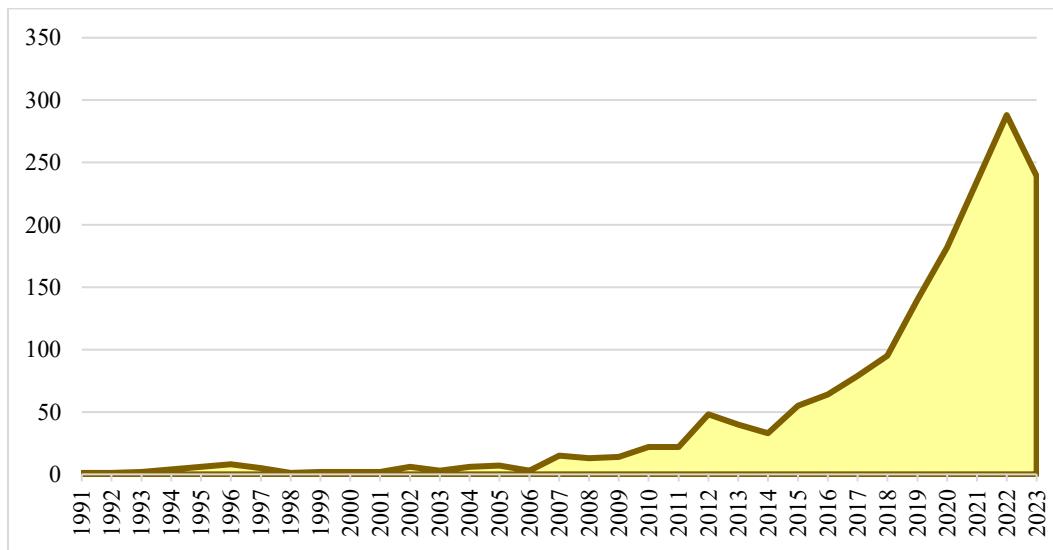
Source: authors' representation based on Web of Science database.

Figure 2. **The Evolution of Scientific Publications Related to "Green Tourism"**

According to the information presented in *Table 2,* the most notable **authors** whose valuable research has incorporated green tourism are *Han Heesup* (25 scientific publications) and *Font Xavier* (14 scientific publications). Han Heesup is a professor at Sejong University (South Korea) and among his research interests are environmental practices in tourism, customer behaviour intentions, green tourism, and green consumerism. Furthermore, Font Xavier carries out its research activities at University of Surrey (United Kingdom). The main research themes approached by the author are sustainable management in tourism, green behaviour of management representatives in tourism field, sustainable and green practices in tourism, and environmental certifications.

In terms of **organisations**, the *Chinese Academy of Sciences* (52 scientific publications), *Sejong University* (30 scientific publications), *Egyptian Knowledge Bank EKB* (29 scientific publications) and the *State University System of Florida* (28 scientific publications) have contributed significantly to the development of green tourism through the important number of scientific publications. These organisations originate on three continents: *Asia* (China and South Korea), *Africa* (Egypt), and *North America* (USA). Furthermore, out of the ten organisations, it is noticeable that four come from People's Republic of China and two from Australia, which suggests a high level of interest among research specialists in the study of green tourism in these geographical areas. The Eastern Mediterranean University of Cyprus is the only European organisation included in the ranking.

Table 2. Top authors, organisations, and countries publishing on green tourism

Top authors		Top organisations		Top countries	
Authors	*TP*	*Organisations*	*TP*	*Countries*	*TP*
Han, Heesup	25	Chinese Academy of Sciences (PRC)	52	Peoples R China	449
Font, Xavier	14	Sejong University (South Korea)	30	USA	207
Bekun, Festus Victor	7	Egyptian Knowledge Bank EKB (Egypt)	29	England	146
Shang, Yunfeng	7	State University System of Florida (USA)	28	Spain	128
Filimonau, Viachaslau	7	Griffith University (Australia)	26	Australia	110
Chao, Ren-Fang	6	University of Queensland (Australia)	25	Italy	106
Elshaer, Ibrahim A.	6	Hong Kong Polytechnic University (Hong Kong)	21	Taiwan	97
Wong, IpKin Anthony	6	Institute of Geographic Sciences Natural Resources Research CAS (PRC)	21	South Korea	73
Tang, Chengcai	6	University of Chinese Academy of Sciences CAS (PRC)	16	Pakistan	60
Ruhanen, Lisa	6	Eastern Mediterranean University (Cyprus)	15	Malaysia	56

Source: authors' representation based on Web of Science database.

The ranking by **country** highlights that the *People's Republic of China* is the leading country in terms of scientific publications with research topics on green tourism, accounting 449 papers. The ranking is followed by the *USA* with 207 scientific publications and *England* with 146 scientific publications reported in the period 1991-2023. Furthermore, about 50% of the countries mentioned in the ranking are located in Asia, suggesting a significant interest of researchers in this geographical area for the concepts examined. The European countries in the ranking are England, Spain, and Italy, all strong economies that contribute substantially to Europe's economic progress. In addition, Australia also contributes significantly to the field of green tourism with a high number of scientific publications.

Table 3. Top publications, publishers and research areas with significant contributions in the field of 'green tourism'

Top publication titles		Top publishers		Top research areas	
Publication titles	*TP*	*Publishers*	*TP*	*Research areas*	*TP*
Sustainability	240	Elsevier	399	Environmental Sciences Ecology	784
Journal of Sustainable Tourism	110	MDPI	345	Science Technology Other Topics	449
Environmental Science and Pollution Research	45	Taylor & Francis	244	Business Economics	257
International Journal of Hospitality Management	37	Springer Nature	137	Engineering	91
Journal of Cleaner Production	37	Emerald Group Publishing	66	Geography	64
International Journal of Contemporary Hospitality Management	34	Wiley	66	Public Administration	47
Tourism Management	33	Sage	64	Public Environmental Occupational Health	43
International Journal of Environmental Research and Public Health	32	Frontiers Media SA	29	Biodiversity Conservation	38
Land	27	Channel View Publications	27	Urban Studies	38
Current Issues in Tourism	20	Parlar Scientific Publications	17	Energy Fuels	35

*Source:* authors' representation based on Web of Science database.

Furthermore, *Table 3* highlights the most important publications, publishers and research areas with significant contributions in the field of 'green tourism'. Accordingly, the ranking by **publication titles** highlights important journals with scientific papers published in the field of green tourism. The impact factor of the journals is very high, reflecting the quality of scientific publications. In this respect, *Sustainability* has the highest number of scientific documents published (240), followed by *Journal of Sustainable Tourism* (110). Elsevier (399 scientific publications), MDPI (345 scientific publications) and Taylor & Francis (244 scientific publications) are the **publishers** with the largest number of scientific publications addressing green tourism. In terms of **research areas**, the majority of the scientific documents have been published in Environmental Sciences Ecology (784), Science Technology Other Topics (449), and Business Economics (257).

3.2 Co-Authorship Analysis

The collaboration network between the **authors** for the publication of scientific papers in the field of green tourism is represented in the map below *(Figure 3)*. The minimum number of scientific papers published by a university is two. This criterion was met by 464 of the 4977 authors. The map includes 507 links between authors, i.e. 180 collaborative clusters.

The nodes on the map represent the number of academic papers published by the authors. From this perspective, the more prominent nodes indicate a higher proportion of academic works significant to green tourism among authors. *Han Heesup*, *Font Xavier*, *Bekun Festus Victor*, and *Filimonau Viachaslau* can be considered to have written a significant number of scientific works.

Furthermore, the total link strength of collaboration is higher for *Han Heesup* (37), *Dong Suocheng* (16), *Xia Bing* (16), and *Priskin Julliana* (16). This indicates that the authors in question were actively involved in the publication of academic papers on green tourism.
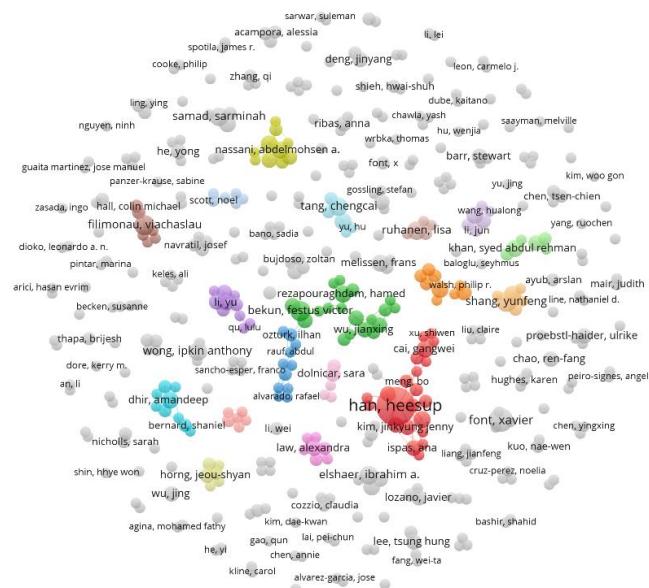
Source: authors' representation in VOSviewer.

Figure 3. **Map of the co-Authorship Network of Authors**

The network of collaboration between **organisations** to publish scientific articles on the subject of green tourism can be seen in *Figure 4*. The minimal number of scientific articles published by a university has been set at two. This requirement was met by 542 universities out of a total of 2,118. The generated map highlights 1,455 relationships established between universities, corresponding to 33 clusters showed in different colours. The overall intensity of the links between the nodes is 1,753.
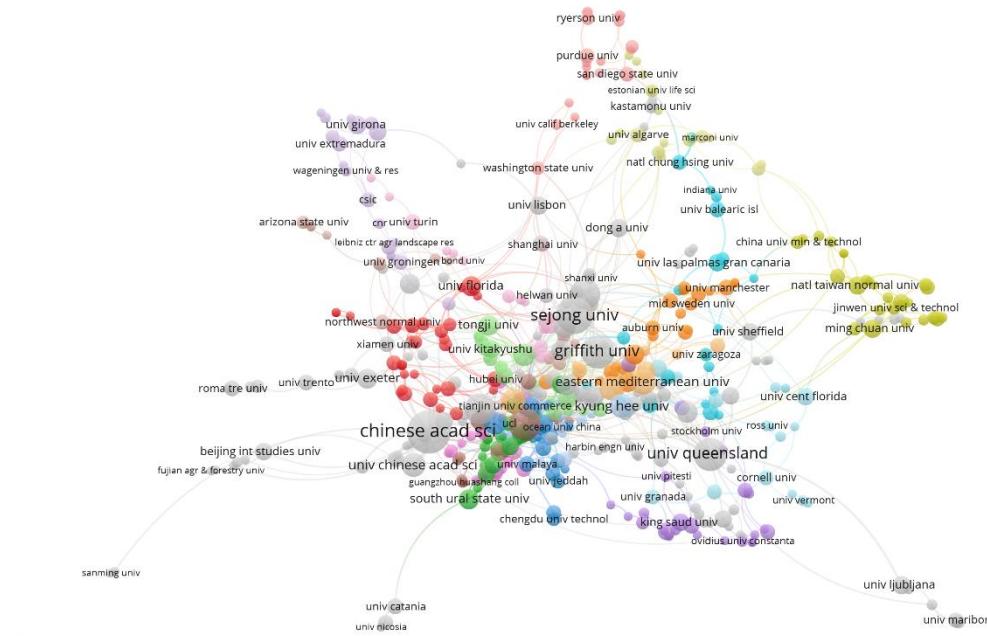
Source: authors' representation in VOSviewer.

Figure 4. **Map of the co-Authorship Network of Organisations**

The number of scientific articles published by these institutions is indicated by the colourful nodes within the map. The most prominent nodes display a significant number of research publications related to green tourism published by universities. The *Chinese Academy of Sciences* in the People's Republic of China (43 publications), *Sejong University* in South Korea (30 publications), the *University of Queensland* (25 publications), and *Griffith University* in Australia (25 publications) are notable among them.

The links between nodes highlight the state of the collaboration between organisations. The overall intensity of collaboration with other institutions was more pronounced for the following universities: *Chinese Academy of Sciences* in the People's Republic of China (link strength: 61; academic papers: 43), *University of Johannesburg* in South Africa (link strength: 48; academic papers: 21), *Sejong University* in South Korea (link strength: 40; academic papers: 30), *Sun Yat-sen University* in the People's Republic of China (link strength: 38; academic papers: 24), and *Taylor's University* in Malaysia (link strength: 35; academic papers: 11). From this perspective, it is apparent that countries on the Asian continent are more interested in collaborating in the field of green tourism. The clusters outlined on the network map show the general patterns of collaboration between universities in the field of research.

Figure 5 illustrates the collaboration between **countries** in the publication of scientific papers that emphasise the notion of green tourism. In the VOSviewer program, a minimum of two scientific papers from a country was required, and 91 of the 118 countries met this requirement. The overall intensity of the connection in all countries is 1,534, indicating significant collaboration between researchers from various countries.
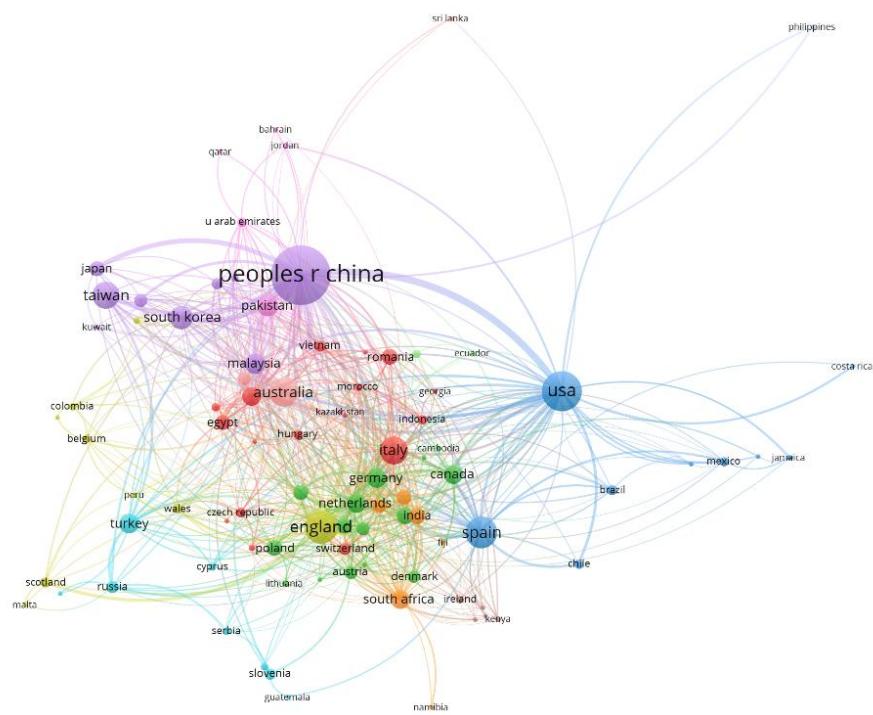
Source: authors' representation in VOSviewer.

Figure 5. **Map of the co-Authorship Network of Countries**

The prominent nodes on the map indicate a large number of scientific articles published in a particular country. From this point of view, we emphasize the dominant position of the *People's Republic of China* (449 publications; 6,102 citations), the *United States of America* (205 publications; 6,458 citations), *England* (141 publications; 4,650 citations), and *Spain* (127 publications; 3,721 citations). Other countries with important papers addressing green tourism are Italy, Australia, Taiwan, Turkey, and the Netherlands.

In terms of clusters and country connections, we highlight the following important issues.

- A close cooperation of the People's Republic of China with countries in the Asian continent for the publication of scientific articles (Taiwan, South Korea, Kuwait, Japan, Thailand).
- A strong research collaboration of the United States of America with Spain, Germany, Brazil, Chile, Mexico, and Jamaica.
- A strong research partnership of Turkey with Russia, Scotland, Wales, and Kyrgyzstan.

Italy highlights a close research cooperation with Romania, Indonesia, Vietnam, and Kazakhstan.

3.3 Citation Analysis

Figure 6 shows a map of the most frequently cited **documents** on green tourism. In this case, the bibliometric analysis requires a maximum of 20 document citations. The criteria are met by 311 scientific documents out of 1,643 total.

The documents that were published by *Camargo* (2006; 1,310 citations), *Smetacek* (2013; 535 citations), *D'Amato* (2017; 464 citations), *Mcafee* (1999; 458 citations), and *Watson* (2016; 311 citations) are distinguished by higher node sizes and that suggests a higher number of citations for these papers. Furthermore, the prominent nodes in the centre of the map indicate that the authors' scientific publications have received a significant amount of citations and are of extreme importance.

Regarding the connections established among nodes, they emphasise how the authors of the papers cited other scientific publications whose findings they used to conduct their investigation. More strong links are observed in the cases of *Sharma* (2020), *Merli* (2019), *Gao* (2016), and *Font* (2002). Several authors whose articles were included in this study pointed out both of these authors' academic works.
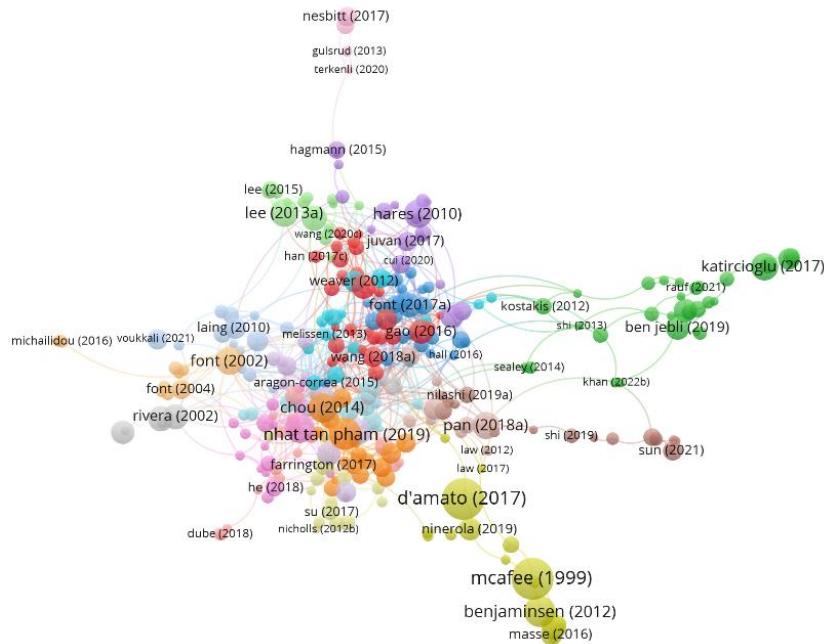
Source: authors' representation in VOSviewer.

Figure 6. **Map of the Citation Network of Documents**

The ranking of the most cited papers on green tourism is shown in *Table 4*. All of the documents are published in prestigious publications run by reputable publishing houses. The leading publisher is **Elsevier**, with six scientific papers published in leading journals. Most of the documents address topics such as *green practices in tourism*, *bio-ecosystem*, *environmental policies*, or *green development*.

Table 4. The most cited documents on 'green tourism'

Journal / Publisher	Documents	Authors	No. of citations
Environment International / Elsevier	"Ecological and toxicological effects of inorganic nitrogen pollution in aquatic ecosystems: A global assessment" (2006)	Julio A. Camargo	1,310
Nature / Springer	"Green and golden seaweed tides on the rise" (2013)	Victor Smetacek	535
Journal of Cleaner Production / Elsevier	"Green, circular, bio economy: A comparative analysis of sustainability avenues" (2017)	Dalia D'amato	464
Environment and Planning D: Society and Space / Sage	"Selling Nature to save It? Biodiversity and Green Developmentalism" (1999)	Kathleen Mcafee	458
Harmful Algae / Elsevier	"The re-eutrophication of Lake Erie: Harmful algal blooms and hypoxia" (2016)	Susan B. Watson	311
Tourism Management / Elsevier	"Greening the hospitality industry: How do green human resource management practices influence organizational citizenship behavior in hotels? A mixed-methods study" (2019)	Nhat Tan Pham	278
Journal of Peasant Studies / Taylor & Francis	"Conservation, green/blue grabbing and accumulation by dispossession in Tanzania" (2012)	Tor A. Benjaminsen	263
Tourism Geographies / Routledge	"The COVID-19 crisis as an opportunity for escaping the unsustainable global tourism path" (2020)	Dimitri Ioannides	244
Tourism Management / Elsevier	"Resources and capabilities as drivers of hotel environmental marketing strategy: Implications for competitive advantage and performance" (2013)	Leonidas C. Leonidou	229
Tourism Management / Elsevier	"Hotels' environmental policies and employee personal environmental beliefs: Interactions and outcomes" (2014)	Chia-Jung Chou	223

Source: authors' representation based on Web of Science database.

Furthermore, *Figure 7* illustrates the current state of the **journals** based on the number of citations recorded by the corresponding academic papers. As a starting point, a minimum of four cited documents were selected, and only 67 of the 445 journals enclosed this standard.

The database frameworks that *Journal of Sustainable Tourism* (4,045), *Tourism Management* (2,586), *Sustainability* (2,426), and *Journal of Cleaner Production* (1,919) have registered the highest number of citations. Furthermore, *Sustainability* and *Journal of Sustainable Tourism* are journals displayed on the map by significant nodes, indicating that they are influential on the field of green tourism.

The lines that connect the nodes on the map reveal that the authors of scientific articles published in one journal cited scientific articles published in other journals. In this respect, *Journal of Sustainable Tourism* (595), *Sustainability* (568), *International Journal of Hospitality Management* (361), and *Tourism Management* (298) have the highest total link strength. It can be observed that all the journals activate in tourism and sustainability.
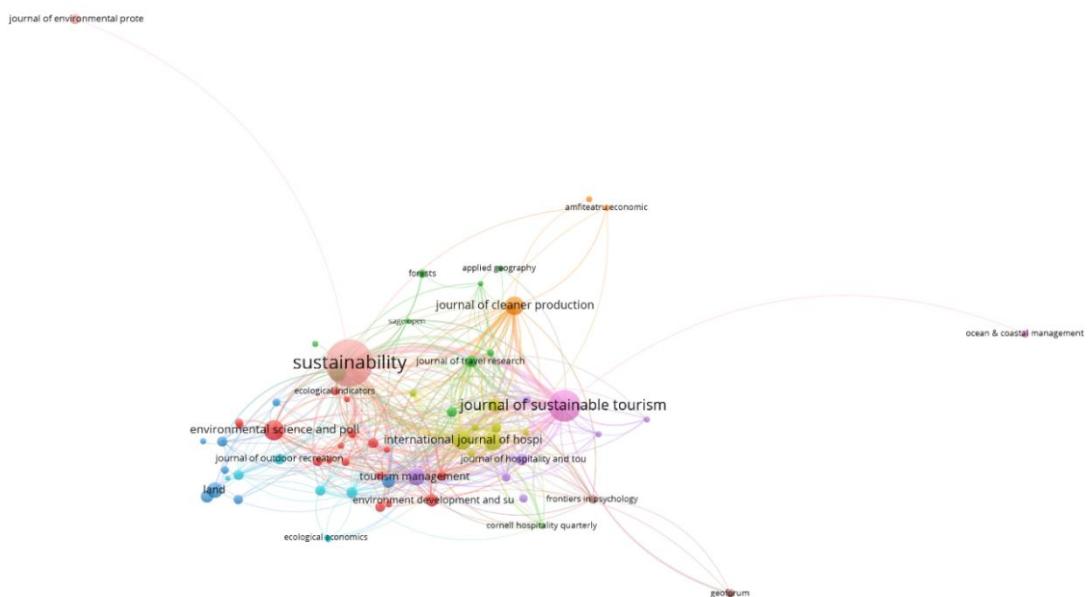
Source: authors' representation in VOSviewer.

Figure 7. **Map of the Citation Network of Journals**

It can be observed on the map in *Figure 8* the situation regarding the citation of authors. In VOSviewer, we selected a minimum of four documents of an author for the author citation study. We observed that out of 4,977 authors, only 49 met this limit. The 49 authors were classified into 9 clusters with 137 links between the authors. The most representative clusters are highlighted on the map in *red, blue, yellow, green* and *orange*. In the green cluster, the most important author is highlighted with a larger node. The author is Han Heesup. Furthermore, the yellow cluster is represented by Font Xavier. Filimonau Viachaslau and Wong Ipkin Anthony are the leading authors of the red cluster. However, Bekun Festus Victor distinguishes himself as the representative of the orange cluster. In the green cluster, Tang Chengcai is the author with the most prominent node.
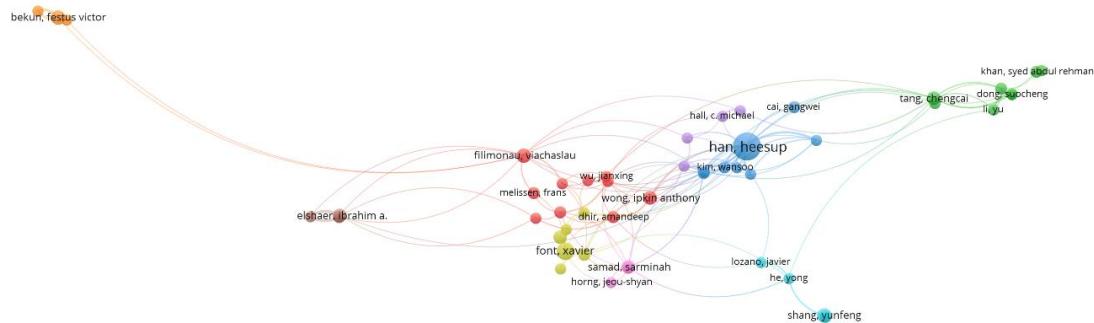

Source: authors' representation in VOSviewer.

Figure 8. **Map of the Citation Network of Authors**

The authors with the most citations of scientific papers published in the field of green tourism are *Han Heesup* (951 citations; 25 documents), *Font Xavier* (671 citations; 10 documents), *Nilashi Mehrbakhsh* (341 citations; 5 documents), *Samad Sarminah* (329 citations; 6 documents) and *Lee Tsung Hung* (296 citations; 4 documents). Further, the authors with the stronger citation links are *Han Heesup* (63), *Elshaer Ibrahim* (33), *Azazz Alaa* (30), *Fayyad Sameh* (27), *Wang Jing* (21), and *Wang Shanyong* (21). This situation suggests that other authors are very interested in the scientific results of these authors.

In addition, the context of the citation of **organisations** publishing scientific papers focused on green tourism is highlighted in *Figure 9*. The map representation encompassed at minimum six papers from a university. Of 2,118 universities, 87 met this condition. The prominent nodes highlighted on the map illustrate the universities whose scientific publications have received the most citations. Consequently, *Griffith University* from Australia (1,198 citations), *Sejong University* from PRC (1,061 citations), *Chinese Academy of Sciences* from PRC (704 citations), *University of Johannesburg* from South Africa (650 citations), *Bournemouth University* from England (531 citations) and *University of Surrey* from England (516 citations) are the most prominent nodes on the map, suggesting a significant number of citations and influence in the field of green tourism.

Sejong University (138), *University of Johannesburg* (98), *Bournemouth University* (86), and *Griffith University* (82) show the highest total link strength. This situation underscores the significant role of these institutions in the green field of tourism. The colours highlighted on the map indicate clusters that have been grouped in accordance with the citation process. Within the *red cluster*, the Chinese Academy of Sciences, Griffith University, and the University of Johannesburg are the most prominent organisations. Another important cluster is marked on the map in *yellow* and Sejong University is the leading organisation.
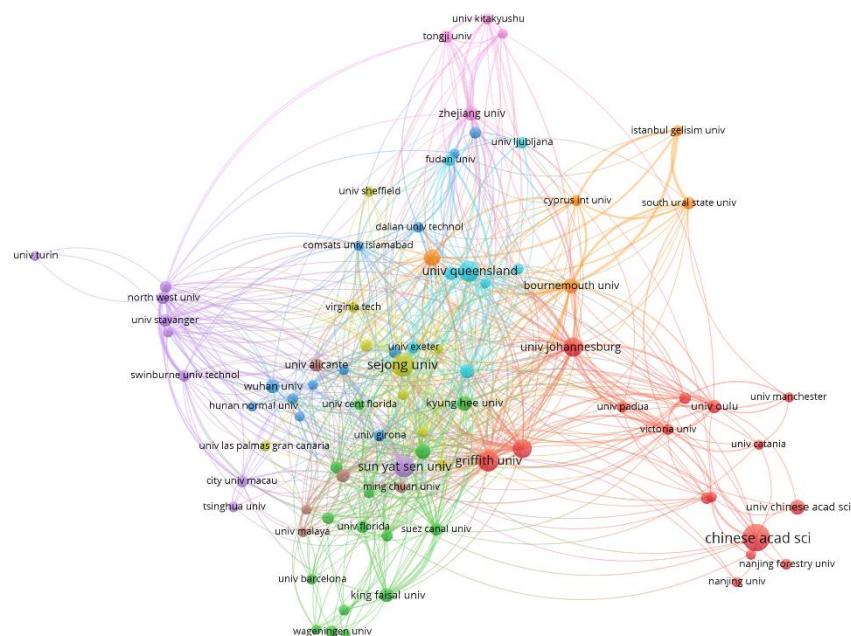
Source: authors' representation in VOSviewer.

Figure 9. **Map of the Citation Network of Organizations**

The map in *Figure 10* highlights the position of the most frequently cited documents by **country**. We established a minimum number of six countries and only 57 out of a total of 118 countries addressed this requirement. The substantial coloured nodes represent the most prominent countries in terms of citations to published academic papers. From this point of view, the *People's Republic of China*, the *United States of America*, *England*, *Spain*, *Australia*, and *Taiwan* are the countries that are the most representative in terms of publications. The People's Republic of China was also found to have the most citations on the topic of green tourism.
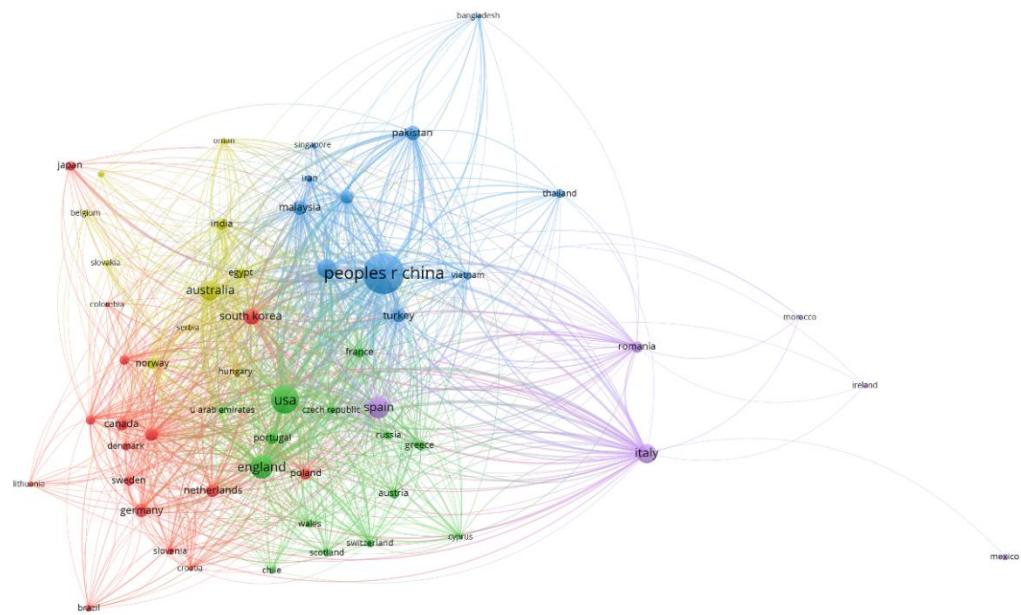
Source: authors' representation in VOSviewer.

Figure 10. **Map of the Citation Network of Countries**

Furthermore, scientific articles published by authors in the People's Republic of China, the United States of America, England, Australia, and Spain have been cited by numerous authors from other countries. This situation is underlined by the strong links between nodes. Countries not included on the map have particular significance. They tend to be more separated in this regard since they lack significant citation relationships with other countries. Mexico, Ireland, and Morocco are notable in this category. The most representative *clusters* belong to the People's Republic of China, the United States of America, Spain, and Australia.

3.4 Co-Occurrence Analysis

The **co-occurrence** of keywords is an important issue of the bibliometric analysis. The keyword co-occurrence approach involves identifying the most frequently used keywords in scientific publications, as well as the relationships that are created between different keywords. In VOSviewer, a minimum of six occurrences of a keyword were defined, and of the total of 7,459 keywords, 464 have fulfilled this criterion. The shaded nodes, which can be seen in the map of *Figure 11*, indicate the frequency of keywords used in scientific publications dealing with green tourism. Likewise, the more prominent nodes displayed on the map point out a higher frequency of keyword use in scientific publications.

Therefore, the most commonly used keywords in scientific publications on green tourism are *tourism*, *sustainability*, *impact*, *green*, *management*, *sustainable tourism*, *model*, *behaviour*, *performance*, *attitudes*, and *planned behaviour*. Other important keywords addressed by the authors are conservation, consumption, hospitality, co2 emissions, climate-change, industry, innovation.

The link strength is higher for the following keywords: *corporate social-responsibility* (600), *perceptions* (591), *co2 emissions* (588), *satisfaction* (574), *industry* (573), *pro-environmental behaviour* (531), *hotels* (472), *green hotel* (458), *quality* (452), and *intention* (449). This scenario suggests that green tourism has been explored more thoroughly in connection with these keywords.

There are seven major clusters in different shades on the map in *Figure 9*. For example, the cluster coloured in red, tourism has strong connections with conservation, ecotourism, perceptions, climate change, health, growth, and energy. For the blue cluster, sustainability and green have strong connections with hospitality, environmental sustainability, performance, the hotel industry, and competitive advantage.
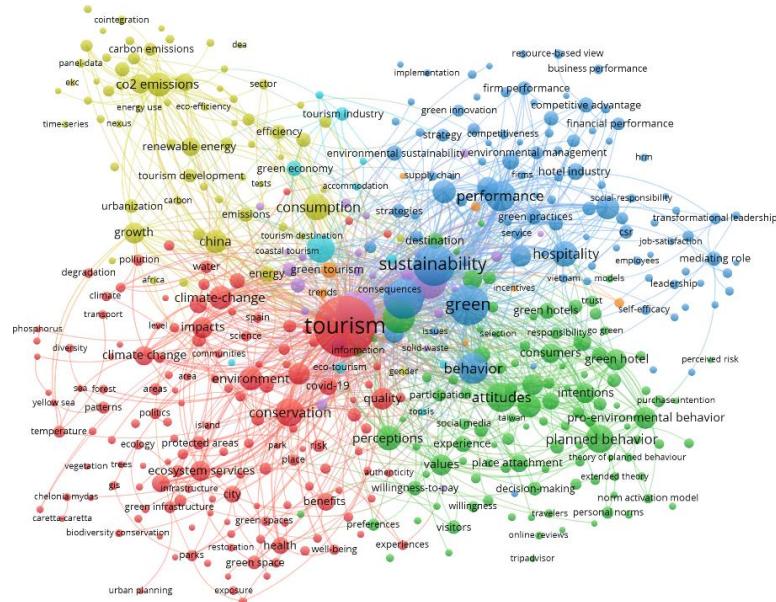
Source: authors' representation in VOSviewer.

Figure 11. **Map of the co-Occurrence Keywords**

In the **red cluster**, the most occurrences were of the following keywords: *tourism* (475), *management* (195), *conservation* (98), *sustainable development* (97), *perceptions* (77), *climate change* (67), *environment* (66), *ecotourism* (60), *growth* (56), and *impacts* (54). In the face of climate change issues, tourism management plays an important role in leading the sector towards sustainable development and conservation. Strategic management strategies that prioritise conservation efforts are required to maintain the delicate balance between tourism expansion and environmental consequences. Stakeholder attitudes, which range from local people to visitors, influence the trajectory of sustainable tourism. Understanding the critical need for environmental responsibility, the tourist sector is shifting towards ecotourism, which promotes a symbiotic link between travel and conservation. This increase in

ecotourism marks a positive step towards combining tourism activities with environmental protection. In summary, competent tourist management, informed by changing perspectives and considerations of climate change, is critical for fostering sustainable growth and ensuring that the sector becomes a steward rather than a destroyer of the global environment.

In the ***green cluster***, we can observe that the following keywords had the most occurrences: *model* (126), *attitudes* (111), *planned behaviour* (100), *satisfaction* (70), *pro-environmental behaviour* (61), *quality* (61), *green hotel* (57), *values* (57), *intention* (53), and *consumers* (48). The complex relationships between essential variables such as attitudes, planned activity, and satisfaction serve as the foundation of a complete model for understanding consumers' pro-environmental conduct in the context of green tourism. Consumer attitudes, determined by their beliefs and perceptions of a green hotel's commitment to sustainability, have a substantial impact on their intentions to engage in pro-environmental conduct during their stay. In the context of green hotels, service quality is critical, since client happiness serves as both a result and a motivator for pro-environmental behaviour. The amalgamation of consumers' values, attitudes, and intentions creates a dynamic framework wherein sustainable choices are not merely influenced by external factors but are deeply rooted in individual beliefs. Harmonising out these interrelationships not only improves our understanding of consumer behaviour in the green hotel sector, but it also provides valuable insights for hospitality industry stakeholders to foster and promote sustainable practices in response to changing consumer values and expectations.

Furthermore, the following keywords had the most occurrences within the ***dark blue cluster***: *sustainability* (212), *impact* (203), *green* (202), *sustainable tourism* (162), *performance* (117), *hospitality* (81), *corporate social-responsibility* (69), *industry* (67), *hotels* (57), and *innovation* (55). The interconnected linkages between sustainability, impact, and innovation provide a dynamic framework that influences the hospitality business environment, particularly in the field of sustainable tourism. As the need for environmentally friendly practices grows, hotels are realising the symbiotic link between sustainability and performance. Adopting sustainable practices not only fits with corporate social responsibility, but also improves the hotel industry's total environmental effect. Innovative approaches to sustainability, such as the incorporation of eco-friendly technology and responsible resource management, not only improve industry performance but also establish hotels as leaders in the quest of sustainable tourism. In such an evolving context, the notion of 'green hospitality' stands out as a lighthouse, emphasising not just environmentally sustainable operations but also a dedication to corporate social responsibility. The relationship between sustainability, impact, and innovation therefore becomes a driving force, transforming the industry to satisfy the rising demands of environmentally concerned consumers while also encouraging a more responsible and forward-thinking attitude within the hospitality sector.

With regard to the ***yellow cluster*** marked on the map, we highlight a high number of occurrences for the following keywords: *consumption* (90), *co2 emissions* (71), *china* (67), *economic-growth* (48), *renewable energy* (42), *energy consumption* (41), *green tourism* (32), *carbon footprint* (27), *efficiency* (27), and *international tourism* (27). The link between green tourism and numerous terms, such as consumption, CO2 emissions, China, economic growth, renewable energy, energy consumption, carbon footprint, efficiency, and international tourism, is complex and interwoven. Green tourism, defined by ecologically responsible travel practices, seeks to reduce the environmental effect of tourism operations. Renewable energy and energy efficiency are important concepts for decreasing CO2 emissions and the total carbon footprint of tourism. China, as a fast rising tourism destination, confronts the issue of combining

economic growth with sustainability, making it a focal point in the debate over green tourism. The integration of renewable energy sources and increased energy efficiency in tourism infrastructure is critical for balancing economic development and environmental responsibility. The collaborative efforts of destinations and travellers to embrace green practices are having a growing impact on the worldwide tourism scene, emphasising the need of a global approach to sustainability. In essence, the link between these phrases emphasises the significance of taking comprehensive and long-term steps in the tourist sector to solve environmental problems while promoting economic growth.

The final cluster on the map is highlighted in ***purple***. Within this cluster, the following keywords had the most occurrences: *behaviour* (119), *mediating role* (27), *CSR* (23), *moderating role* (20), *commitment* (19), *human resource management* (17), *service* (17), *transformational leadership* (17), *local food* (13), and *organizational citizenship behaviour* (13). The dynamics of green tourism have an unbreakable connection to the relationships between various keywords such as behaviour, mediating role, CSR (Corporate Social Responsibility), moderating role, commitment, human resource management, service, transformational leadership, local food, and organisational citizenship behaviour. The behaviour of both visitors and tourism organisations is crucial, impacted by variables such as adherence to sustainable practices and corporate social responsibility efforts. Transformational leadership, as a moderating function, may instill dedication to green ideals inside an organisation, encouraging organisational citizenship behaviour that goes beyond conventional obligations. Human resource management techniques play an important role in enforcing sustainability standards and ensuring that staff are aligned with the organization's green culture. The emphasis on local food in the service sector is not only a manifestation of sustainable practices but also impacts the behavior of both service providers and consumers towards supporting local economies and lowering ecological footprints. Overall, these phrases contribute to the complex web of behaviours and practices that define and develop the field of green tourism.

Table 5. The most popular keywords in the field of "green tourism"

Keywords	Frequency	Total link strength	Keywords	Frequency	Total link strength
tourism	475	3127	planned behaviour	100	848
sustainability	212	1568	conservation	98	646
impact	203	1478	sustainable development	97	619
green	202	1483	consumption	90	652
management	195	1362	hospitality	81	685
sustainable tourism	162	1193	perceptions	77	591
model	126	865	co2 emissions	71	588
behaviour	119	834	satisfaction	70	574
performance	117	918	corporate social-responsibility	69	600
attitudes	111	889	industry	67	573

Source: authors' representation in VOSviewer.

Green tourism has been thoroughly studied in correlation with important subjects related to *sustainable tourism*, *conservation*, *hospitality*, *CO2 emissions* and *industry (Table 5)*. In truth, green tourism tackles a new method of tourism by reducing negative consequences through environmental protection, sustainable development, and corporate social responsibility. Genuinely, green tourism addresses an

entirely novel way of performing tourism by reducing harm to the environment through environmental protection, sustainable development, and corporate social responsibility. Furthermore, climate change has fuelled the shift to green tourism, and companies working in this sector should reassess their business strategy by minimizing CO2 emissions.

Conclusions and Limitations

The growth trends in research on green tourism highlights a growing interest of academics for studying the characteristics of green tourism between 2021 and 2023. As mentioned within the article, the Coronavirus had a significant impact on green tourism research. Many tourism destinations implemented green practices after the Coronavirus pandemic as tourists sought eco-friendly experiences. The health crisis has highlighted the connection of human health and the environment. Currently, people are becoming more aware of how their travel decisions affect the environment. Green tourism focuses on sustainability and responsible practices and is in line with the increased environmental consciousness developed by many people during the health crisis.

In terms of authors, Han Heesup (25 scientific publications) and Font Xavier (14 scientific publications) have had the greatest influence on green tourism research over the years. Furthermore, the Chinese Academy of Sciences (52 scientific publications), Sejong University (30 scientific publications), Egyptian Knowledge Bank EKB (29 scientific publications) and the State University System of Florida (28 scientific publications) have contributed significantly to the development of green tourism through the significant number of scientific publications. In terms of countries, the People's Republic of China is the leader in scientific publications on green tourism, presenting 449 publications. In the United States, 207 scientific publications and 146 published in England were reported between 1991 and 2023. The journals that had the greatest influence on green tourism are Sustainability (240 academic papers) and the Journal of Sustainable Tourism (110 academic papers).

The topics in the green tourism literature that have been studied with the greatest frequency and are currently attracting the greatest attention include tourism, sustainability, impact, green, management, sustainable tourism, model, behaviour, performance, attitudes, and planned behaviour.

The limitations of our in-depth research arise from the database that we used for conducting the bibliometric analysis. For example, Web of Science and Scopus have different coverage of journals and publications and this state may have impacted the comprehensiveness and robustness of the research findings. A future research direction would be to analyse the academic papers related to green tourism included in the Scopus database to highlight the differences and similarities.

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ŽALIOJO KURSO ŽEMĖLAPIS: IŠSAMI ŽALIOJO TURIZMO TYRIMŲ TENDENCIJŲ BIBLIOMETRINĖ ANALIZĖ

Carmen Nastase, Carmen Chașovschi, Ancuţa Lucaci, Maria Orhean Vrânceanu

Santrauka. Aplinkos apsauga ir verslo plėtra yra Europos Sąjungos prioritetai, o sėkmingas žaliojo kurso politikos įgyvendinimas labai svarbus visoms susijusioms šalims. Straipsnio tikslas – atlikti išsamų mokslinių rezultatų tyrimą pritaikius bibliometrinę analizę, siekiant suprasti esamų tyrimų struktūrą ir galimas tyrimų kryptis, susijusias su verslo aplinkos gerinimu įgyvendinant žaliąją ekonomiką. Verslas ir tvarus vystymasis bus esminiai pereinant prie efektyvios išteklius tausojančios žaliosios ekonomikos, kurioje ekonomikos augimas, teisingas išteklių paskirstymas ir žmogaus raida sąveikauja su aplinkos saugumu. Perėjimas prie aplinkai nekenksmingos žaliosios ekonomikos duos reikšmingų finansinių privalumų. Ekonomikos žalinimas yra naujas ekonomikos variklis, tvarių darbo vietų inkubatorius ir esminė priemonė skurdui panaikinti. Atliekant bibliometrinį tyrimą aptikti 1643 dokumentai, į duomenų bazę „Web of Science" įtraukti nuo 1991 iki 2023 m. Mokslinis turinys analizuotas pasitelkus programą „VOSviewer".

Reikšminiai žodžiai: žaliasis turizmas; tvarus vystymasis; literatūra; bibliometrinė analizė.