

## Evolution of Ecotourism Research in the Context of Sustainable Development Goals: A Bibliometric Analysis (2015-2024)

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### Abstract

Ecotourism as a tool for achieving sustainable development is gaining increasing importance amidst the structural transformations of the global economy, particularly as the tourism sector contributes approximately 10% to global GDP and provides about 10% of total employment opportunities. The World Tourism Organization has included ecotourism within the pillars of the 2030 Sustainable Development Agenda, recognizing it as a means to maximize economic returns while mitigating negative environmental impacts. The shift towards ecotourism is a direct response to growing pressures on natural resources and rising demand for tourism consumption patterns with low environmental costs. This is reflected in the accelerated growth of specialized scientific production in this field, highlighting the need to analyze research trends to understand the dynamics of ecotourism evolution and its role in supporting sustainable development.

This study aims to delineate the intellectual structure of research on Sustainable Development Goals within the tourism sector, employing a bibliometric analysis of ecotourism literature from 2015 to 2024. This is achieved by identifying and analyzing the relationships between the most influential topics that have shaped the knowledge base of this discipline. The analysis facilitated the examination of publication trends, key subject areas, and productivity by country, author, and journal. Additionally, it explored collaborative networks and the most frequently used keywords.

By employing bibliometric analysis methods and data visualization using the VOSviewer tool and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, a total of 2430 articles indexed in the Scopus database were analyzed. The findings reveal a significant increase in the number of publications in recent years. The scientific output is concentrated in a limited number of countries and research institutions, and a disparity exists between the productivity and scientific impact of researchers and journals. The results also demonstrate the presence of international research collaboration networks and the dominance of a set of core concepts related to ecotourism and sustainable development within the academic literature during the studied period.

**Keywords:** Ecotourism, Bibliometric Analysis, Sustainable Development, VOSviewer

## Introduction

Ecotourism represents a paradigm-shifting approach to travel, one that seeks to harmonize exploration with the imperatives of environmental conservation and community empowerment. It is founded on a philosophy that encourages tourists to deeply engage with natural landscapes and cultural heritage, while concurrently instilling a sense of respect and responsibility for local ecosystems and populations (Moorman et al., 2024) (Alfiandri & Mayarni, 2023). This stands in stark contrast to conventional tourism, a model frequently critiqued for resource exploitation and the disruption of fragile environments. In its place, ecotourism prioritizes sustainable practices, strives for minimal environmental impact, and fosters meaningful engagement with local cultures (Vipriyanti et al., 2024) (Alam et al., 2024). Consequently, participation enables individuals to undertake enriching personal journeys while directly contributing to biodiversity conservation, the protection of endangered species, and the socio-economic well-being of host communities (Nguyen et al., 2022). Furthermore, by integrating education, raising awareness, and promoting conscious decision-making, ecotourism acts as a catalyst for positive transformation. It thereby cultivates a deeper connection between people and the natural world, paving the way toward a more sustainable future (Harahab et al., 2021).

Ecotourism constitutes a distinct form of sustainable tourism, explicitly oriented towards fulfilling the broader objectives of global sustainable development (Fennell, 2008). The concept's emergence and rise in popularity are largely a response to the adverse social and environmental consequences linked to mass tourism. Mass tourism has historically prioritized economic income and growth over the conservation of natural environments and the socio-cultural integrity of host communities, a limitation that ecotourism seeks to redress (Ziffer, 1989).

The 2030 Agenda for Sustainable Development (United, 2025) provides a comprehensive global framework comprising 17 Sustainable Development Goals (SDGs), supported by 169 targets and 231 indicators, designed to address pervasive challenges including poverty, inequality, and climate change. This agenda is conceptually underpinned by several key theoretical frameworks: sustainable development theory, which advocates for the integrated pursuit of social, environmental, and economic objectives to attain long-term sustainability; stakeholder theory, which underscores the necessity of collaborative action among diverse entities; and systems theory, which emphasizes the interconnected nature of all components striving for a collective outcome. Tourism is widely recognized as a strategic sector for advancing multiple SDGs. The United Nations World Tourism Organization (L'ONU, 2025) specifically highlights its significant contributions to SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 14 (Life Below Water), particularly within island and coastal contexts. Nevertheless, while tourism's contributions to specific SDGs are well documented (Fauzi et al., 2024).

Ecotourism facilitates a direct, immersive experience of natural beauty, simultaneously fostering a more profound understanding of the imperative for environmental stewardship (Harahab et al., 2021) (Alfitri et al., 2023) (Alarcón-del-Amo et al., 2023). By cultivating and sustaining awareness of the importance of conservation, it also serves as a vehicle for educating participants about critical planetary challenges such as climate change and

biodiversity loss, which threaten long-term sustainability (Deason et al., 2023) (Sobhani et al., 2022). Beyond its educational and conservational roles, ecotourism functions as a vital mechanism for expanding economic opportunities within local communities. This includes generating employment and enhancing infrastructure and public services in tourism-dependent regions (Sobhani et al., 2022) (Deason et al., 2023). By integrating the core values of conservation, education, and sustainable economic development, ecotourism possesses significant potential to reconcile developmental objectives with environmental protection, thereby fostering a more harmonious balance between human activity and the natural world (Xu et al., 2023). The effective implementation of ecotourism, however, is contingent upon supportive policy frameworks. Such policies are crucial for formalizing and advancing environmental preservation and sustainable tourism development. They may encompass regulations that limit visitor access to ecologically sensitive areas, manage tourist capacity, and mandate the allocation of tourism revenues toward conservation initiatives and local community development. (Regmi & Walter, 2017) (Zhang et al., 2012). Furthermore, policies can establish operational standards for tourism providers, ensuring their activities adhere to sound ecological and social principles.

Ecotourism emerged as a distinct sector within the tourism industry during the 1980s. Throughout this formative period, considerable efforts were undertaken by both academic researchers and social organizations to develop a precise conceptual definition and establish foundational guiding principles for the practice. Notably, the International Union for Conservation of Nature (IUCN) positioned ecotourism as a viable alternative to conventional tourism, promoting it as an approach that enables visitors to experience natural and cultural attractions while concurrently contributing to local environmental protection and sustainable development objectives (Walter, 2013). The paradigm is widely recognized for its three core functions: environmental conservation, the enhancement of community well-being, and the provision of high-quality educational and recreational experiences for tourists (Orams, 1995) (Gössling, 1999). However, as ecotourism expanded in scale and scope, its multifaceted impacts—both environmental and social—became increasingly apparent. Scholars began to critically examine the potential negative consequences for host destinations, highlighting issues of ecological disturbance and cultural commodification (Hawkins & Khan, 1999) (Koens et al., 2009). In direct response to these identified challenges, the subsequent decade witnessed significant scholarly investment in developing robust normative theories for the effective management and evaluation of ecotourism. This period yielded several notable contributions, including advances in management tools theory and foundational research by Buckley on the identification of potential ecological indicators for monitoring impacts (Buckley, 2003).

Additionally, there is a growing number of people who point at the tourism industry and its development as the root cause of much environmental damage (Wang et al., 2020). For this reason, the development of sustainable products is becoming more important than ever in today's tourism and accommodation industry, making environmental sustainability the main issue that needs to be addressed (Han, 2021). This justifies why companies in the sector are implementing strategies for the management of sustainable practices (Madanaguli et al., 2022). Similarly, many organizations recognize the importance of developing sustainable behavior based on the premise that society and businesses should use available resources at a rate that does not compromise the wellbeing of future generations (Nave et al., 2021)

The attainment of the Sustainable Development Goals (SDGs) necessitates policy interventions that critically engage with existing political and economic structures while integrating a plurality of voices and knowledge systems. A fundamental implication of this requirement is the imperative to reconceptualize tourism development models. Such a redefinition must explicitly incorporate ecological limits and prioritize mechanisms for inclusive stakeholder engagement (Scheyvens et al., 2016) (Boluk et al., 2019). The concept of sustainable tourism has itself undergone significant evolution, transitioning from an initial emphasis on environmental conservation toward a more comprehensive framework of sustainable tourism development. This expanded paradigm now encompasses cultural, social, economic, and ethical dimensions as integral components (Moyle et al., 2020) (Niñerola et al., 2019a). Reflecting this broader scope, the academic literature has increasingly examined these multifaceted aspects. Key areas of investigation include the intersection of tourism with gender equality (Alarcón & Cole, 2019), access to clean water and sanitation (Cole et al., 2020), and the implementation of corporate social responsibility (CSR) within the sector (Gao et al., 2024).

Recent bibliometric analyses have been instrumental in mapping and synthesizing the rapidly expanding body of ecotourism scholarship. For instance, (Hasana et al., 2022) conducted a review focused on ecotourism in protected areas, identifying dominant research themes and persistent challenges in policy implementation. Similarly, . (Dinç et al., 2023) and (Singh et al., 2022) mapped global trends and collaboration patterns, revealing a fragmented research landscape and underexplored regional networks. While these studies provide valuable descriptive overviews, their engagement is often limited; they seldom identify foundational conceptual gaps or critically evaluate the practical efficacy of ecotourism as a tool for sustainability.

Emerging research from 2024–2025 has begun to advance this critical discourse. (Lin et al., 2025), in their analysis of 3,982 publications, emphasized the critical need for greater integration between management objectives and conservation goals. (Singh et al., 2022) confirmed the rising prominence of sustainability themes but noted a persistent deficit in longitudinal impact studies. (Riaz et al., 2024), through a systematic review of ecotourism's economic contributions, called for clearer performance metrics and more nuanced regional analyses. Other studies have highlighted specific methodological and thematic frontiers. (Amadu et al., 2025) advocated for the expanded use of Geographic Information Systems (GIS) in spatially-grounded planning, while (Aprianoro et al., 2024) mapped the burgeoning field of halal ecotourism.

Research on specific ecosystems has also yielded important insights. (Aji et al., 2024) performed a detailed bibliometric analysis of mangrove ecotourism, revealing a strong thematic focus on biodiversity, conservation, and carbon sequestration, while also noting Asia's dominance in publication output and underscoring the importance of socio-ecological systems. Similarly, (Sutiksno et al., 2024) explored the growth of geoheritage-based ecotourism, identifying key trends in financial inclusion and geoscience integration. Both studies, however, acknowledged limitations such as geographic bias and methodological homogeneity, pointing to a need for broader comparative frameworks.

Addressing conceptual fragmentation directly, (Esparza-Huamanchumo et al., 2024) conducted a comparative bibliometric review of ecotourism, sustainable tourism, and nature-

based tourism. Their findings reveal that the separate treatment of these overlapping concepts has led to a disjointed literature base. They strongly advocate for integrated research models that unify these streams to enhance theoretical clarity and improve policy relevance.

Despite widespread recognition of tourism's environmental impacts, the literature examining the sector's relationship with the Sustainable Development Goals (SDGs) remains imprecise and, in many cases, limited to perfunctory acknowledgments of tourism's responsibility. There is a notable scarcity of research that explicitly investigates how tourism can actively promote and contribute to the *achievement* of the SDGs (Nguyen et al., 2022). This gap underscores a critical need for targeted research within the SDG framework, aimed at constructing innovative, inclusive, and competitive business models. Such models must be designed not only to mitigate negative impacts but also to generate positive outcomes for businesses and, crucially, for the natural environment

In this context, a bibliometric analysis is well-positioned to play a significant role in advancing SDG-focused research within tourism. The substantial growth in scientific output in recent years has itself generated a need for systematic indicators to analyze this evolving field. Given this heightened academic interest and the absence of focused, synthesized reviews, there is a timely imperative to map the existing literature comprehensively to identify key trends and suggest coherent directions for future inquiry.

Bibliometric analysis offers a robust methodology for this purpose. It enables the quantitative and qualitative examination of scientific production, helping to orient the scholarly community toward focal points and developmental progress within a specific knowledge domain. This approach facilitates the analysis of various elements, including author collaboration networks, geographic distribution of scientific activity, citation patterns, and the impact of publications and journals (Donthu et al., 2020) (Donthu et al., 2021a) (Duque & Cervantes, 2019) (Rocio et al., 2023).

Based on the foregoing, this research aims to examine the key patterns and trends within the academic literature on the Sustainable Development Goals (SDGs) in the tourism sector through a comprehensive bibliometric analysis. The study is guided by the following research questions:

- 1- What is the distribution of publications on the role of Ecotourism as means to achieve Sustainable Development research by year and by research field over the past decade?
- 2- What are the most relevant journals and authors on the role of Ecotourism as means to achieve Sustainable Development research?
- 3- What are the most productive countries on the role of Ecotourism as means to achieve Sustainable Development research area?
- 4- What are the primary research keywords for the last decade on the role of Ecotourism as means to achieve Sustainable Development?

### Material and methods

This review aimed to reveal the most prolific studies carried on Ecotourism and Sustainable Development area. To achieve this bibliometric analysis review was conducted in this study. This research was conducted on 13/12/2025. The Scopus database was used to select a sample for the current survey. This is a database that is capable of providing detailed information on documents that are recognized by the academic community (Caviggioli & Ughetto, 2019).

The initial search revealed 5308 articles in Ecotourism for Sustainable Development research area. The keywords that were used Ecotourism for Sustainable Development these were chosen based on the experience of previous studies (Khanra et al., 2021). The keywords may appear in the titles, abstracts, and author's keywords; however, this study only focused on searching for them in the titles because using a broader search would retrieve unrelated documents (Niñerola et al., 2019b). This research covered the last 10 years from 2015 to 2024. This research included Social Sciences, Environmental Science, Energy, Business, Management and Accounting, Computer Science, Earth and Planetary Sciences, Agricultural and Biological Sciences, Economics, Econometrics and Finance. Finally, the research language used only articles published in English language excluded any other languages. Moreover, the final articles used in this review were 2430 articles in Ecotourism and Sustainable Development research area.

### 1- bibliometric analysis

**Bibliometric analysis** Bibliometric analysis is a quantitative analysis method used to describe, evaluates, and monitors published academic literature to trace the structure and trend of knowledge expansion (Lima & Bonetti, 2020); (Greener, 2022); (van Eck & Waltman, 2025). Bibliometric data analysis can be utilized primarily for two purposes such as performance analysis and science mapping (Tyagi, 2024). Recently, a different type of research has applied bibliometric analysis to present novel views on research trends. Scholars are able to identify emerging research areas within their discipline and establish links between different academic institutions and organizations through this technique (Donthu et al., 2021b). People interested in a subject area can use this technique to get an overview of literature basics and how it has changed over time (Greener, 2022). This Bibliometric method made it easier to identify emerging research areas in the discipline and develop collaboration between academic institutions and organizations (van Eck & Waltman, 2025). Researchers can utilize bibliometric analysis to quickly show the basics of the literature and how it has evolved through time (Liu et al., 2019). Bibliometric indicators can also be utilized to evaluate the quantity and quality of publications (Singh et al., 2021); (Donthu et al., 2021b). Performance analysis and science mapping, two bibliometric techniques, were combined and employed as the analysis methods of this study. The performance analysis is related to evaluating the impacts of individual publications, countries, and affiliated institutions. Science mapping is a visual representation of a field to visualize its structure, subjects, and linkages with other disciplines (Haojing & YP, 2023)). Several bibliometric indicators were applied in this study including authors, institution, country, and journals, co-citation, keyword co-occurrences, and bibliographic coupling.

This research utilized a bibliometric analysis using VOS viewer, which is one of the most common used softwares in the area of bibliometric analysis. Bibliometric analysis is a quantitative methodology employed to describe, evaluate, and monitor published academic literature, thereby tracing the structure and evolutionary trends within a field of knowledge (Lima & Bonetti, 2020); (Greener, 2022); (van Eck & Waltman, 2025). The analysis of bibliometric data primarily serves two purposes: performance analysis and science mapping (Tyagi, 2024). This technique is increasingly applied to provide novel insights into research trends, enabling scholars to identify emerging thematic areas within a discipline and map connections between academic institutions and organizations (Donthu et al., 2021b). It offers researchers and interested stakeholders an efficient overview of a literature's foundational elements and its development over time (Greener, 2022). Furthermore, bibliometric indicators

are instrumental in assessing both the quantity and the qualitative impact of scientific publications (Singh et al., 2021); (Donthu et al., 2021b).

The present study adopts an integrated approach, utilizing both performance analysis and science mapping. Performance analysis focuses on evaluating the contributions and impact of constituent elements such as authors, institutions, countries, and journals. Science mapping, in contrast, provides a visual representation of the intellectual structure of the field, illustrating key subjects, thematic clusters, and their interrelationships with other disciplines (Haojing & YP, 2023). To this end, several specific bibliometric indicators were examined, including publication and citation metrics for authors, institutions, countries, and journals; co-citation networks; keyword co-occurrence patterns; and bibliographic coupling.

This research implemented its bibliometric analysis using VOSviewer software, a widely recognized and commonly utilized tool in the field of bibliometric science.

Bibliometric analysis in VOSviewer begins with the importation of bibliographic data, typically extracted from the Scopus database and saved in RIS or CSV format. The software's core functionality lies in generating visual representations of bibliometric networks, including co-authorship, keyword co-occurrence, and citation networks. Its integrated zoom and pan features facilitate a detailed examination of network structures and thematic clusters, enabling precise analysis and clear visual interpretation even for extensive networks encompassing hundreds or thousands of nodes . (van Eck & Waltman, 2025)

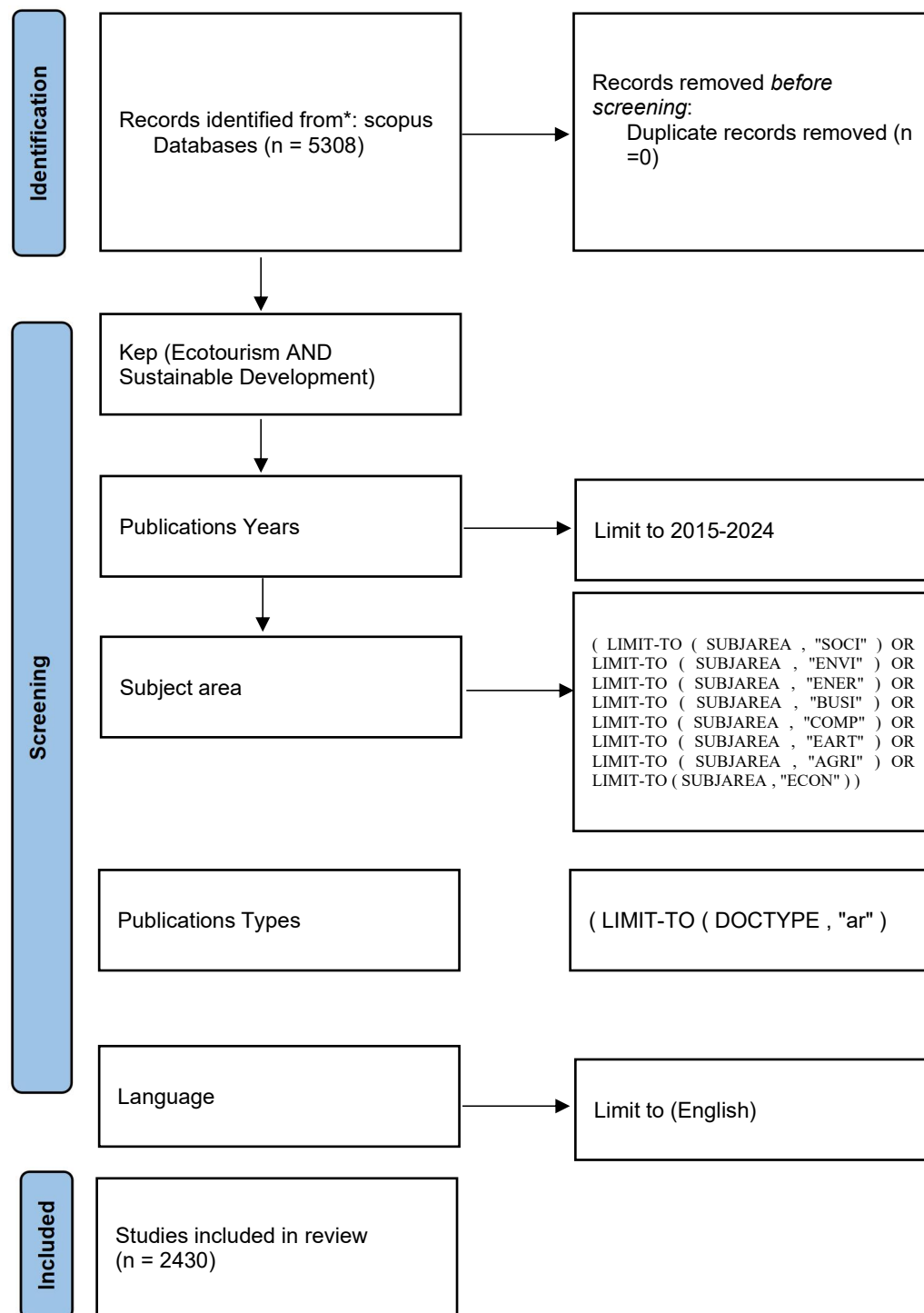
In systematic review studies, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram is frequently used in the data search and selection processes. PRISMA comprises a four-stage review flow diagram. These stages in the flow diagram include identification, screening, an eligibility search, and inclusion, and have flexible structures that can be adapted according to data volume, quality, etc. All publications that provide relevant information and an abstract can be included in the analysis (Page et al., 2021) (Haojing & YP, 2023)

For the data search and selection process, this study adhered to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The PRISMA framework employs a four-stage flow diagram—Identification, Screening, Eligibility, and Inclusion—which provides a structured yet flexible methodology adaptable to the volume and quality of the retrieved literature. Publications deemed to provide relevant substantive information and an abstract were considered eligible for inclusion in the final analysis (Page et al., 2021) (Haojing & YP, 2023)

For this study, the final corpus of 2,430 publications identified and extracted from Scopus was loaded into the analysis software. Bibliometric analyses were subsequently conducted in alignment with the research objectives. These analyses included an examination of co-authorship networks among institutions, an assessment of international collaboration patterns between leading countries, and a co-occurrence analysis of the most prominent keywords within the scientific literature.

**Figure 1. The systematic literature review process using the PRISMA statement template based on four phases that are identification, screening, eligibility and included.**

Scoups search 13/12/2025



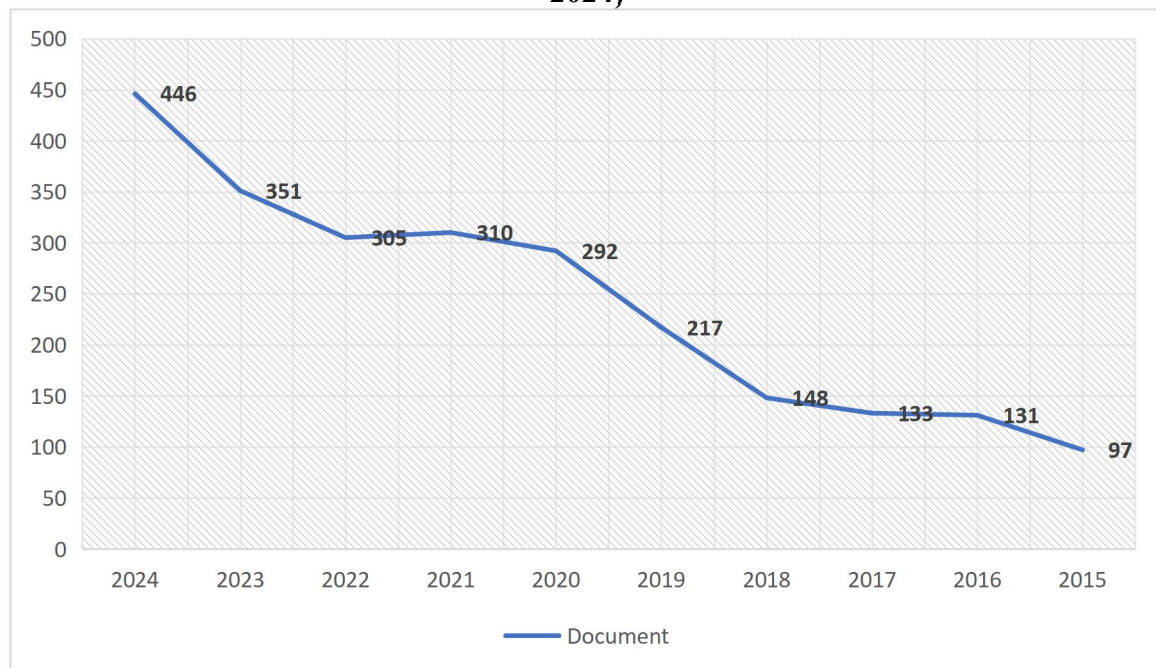
## Descriptive Analysis of Results

### 1- Annual Publication Distribution and Key Research Domains Analysis

The annual distribution of publications highlights the evolving research interest in ecotourism for achieving sustainable development. Analyzing the research domains reveals the multidimensional nature of the topic, which can be examined through various lenses such as economics, environmental science, and social sciences. Consequently, this section facilitates the discussion of the study's first research question.



**Figure 2. Distribution of publications by years (2015–2024)**

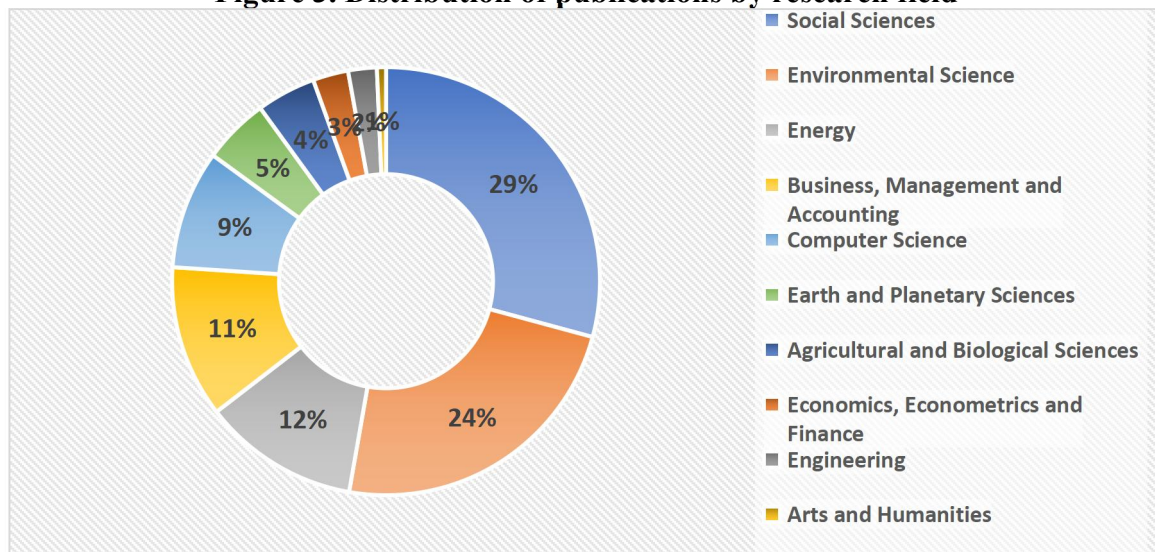


**Source:** prepared by the researchers

Figure 2 illustrates the annual output of scientific articles indexed in the Scopus database related to ecotourism for achieving sustainable development during the period 2015-2024, with the total number of publications reaching 446 in 2024.

Analysis of the past decade reveals that the number of published works did not exceed 100 in 2015. The period from 2015 to 2018 was the least productive, a trend attributable to the nascent stage of integrated approaches linking ecotourism with economic, environmental, and social sustainability dimensions at that time.

Subsequently, until 2020, the volume of publications increased notably. The trend line indicates the most significant surge in scientific output occurred between 2022 and 2024, highlighting the growing engagement of the scientific community with ecotourism as a pathway to sustainable development. Scientific production peaked in 2024 with 446 articles, representing approximately 78% of the total publications during this final three-year phase. This acceleration is influenced by heightened global awareness of climate change issues, the green economy, and low-impact tourism, alongside the integration of sustainable tourism into the 2030 Sustainable Development Goals agenda. Consequently, the findings underscore the imperative to prioritize the tenets of ecotourism as a key activity supporting the Sustainable Development Goals.

**Figure 3. Distribution of publications by research field**

**Source:** prepared by the researchers

Figure 3 presents the distribution of academic publications on ecotourism for sustainable development by subject field. The data reveals that Social Sciences dominate with 1,743 articles, constituting 29% of the total. This underscores the central importance of social, cultural, and behavioral dimensions in advancing ecotourism. It confirms that individual and community behaviors, tourism consumption patterns, and environmental awareness levels are fundamental determinants for the success of ecotourism policies and the achievement of Sustainable Development Goals (SDGs), particularly concerning social inclusion and cultural heritage preservation.

Environmental Science follows with 1,407 articles, indicating a strong research focus on assessing the environmental impacts of tourism activities. This includes studies on natural resource management, biodiversity conservation, pollution mitigation, and the evaluation of environmental sustainability for tourist destinations. This substantial presence reflects the core environmental dimension of ecotourism, positioned as a development model seeking to balance the economic utilization of natural resources with their preservation for future generations.

The field of Energy appears with 704 articles, highlighting the significance of issues related to energy efficiency, renewable energy adoption, and the reduction of the carbon footprint within tourism operations. This emphasizes the economic-managerial aspect of ecotourism, especially within the context of the global transition towards a green economy. It affirms that achieving sustainability in ecotourism requires effective management models, sustainable investments, and supportive public policies for a clean energy transition within the tourism sector.

While other fields such as Business Management, Technology and Computer Science, Earth and Planetary Sciences, Agriculture, and Economics recorded comparatively lower contributions, their roles remain strategically important. They reflect the contribution of technological innovation, information systems, and economic analysis in supporting environmental tourism policies.

This multidisciplinary diversity confirms that ecotourism for sustainable development constitutes a complex, multidimensional research topic. It necessitates integrated approaches that synthesize social, environmental, economic, and technological perspectives to ensure policy effectiveness and the realization of long-term sustainable development.

## 2- Analysis of the Most Relevant Journals and Authors in the Research Field

Analyzing the distribution of publications by journals and authors helps identify the most influential scholarly channels and the most prominent contributing researchers within the field. This analysis also aids in assessing the quality and dissemination of scientific research and in identifying suitable journals for publication and potential avenues for academic collaboration. Furthermore, it reveals trends in scientific output and the structure of research networks within the discipline, which is essential for evaluating the impact of scholarly journals and measuring their role in shaping the academic research agenda. Consequently, this section addresses the study's second research question.

**Table 1. The top 10 most productive journals in the field of Ecotourism for Sustainable Development**

Journal	TP	TC	Cite Score	The Most Cited Article (Reference)	Times Cited	Publisher
Sustainability (Switzerland)	58414	450030	7.7	Recent Advances in the Remediation of Textile-Dye-Containing Wastewater: Prioritizing Human Health and Sustainable Wastewater Treatment	290	Multidisciplinary Digital Publishing Institute (MDPI)
Journal of Sustainable Tourism	499	10195	20.4	The influence of social support from intermediary organizations on innovativeness and subjective happiness in community-based tourism	170	Taylor & Francis
Geojournal of Tourism and Geosites	783	2862	3.7	ENHANCING 21ST CENTURY SKILLS THROUGH INTEGRATED STEM EDUCATION USING PROJECT-ORIENTED PROBLEM-BASED LEARNING	31	Editura Universitatii din Oradea
Environment, Development	3249	36078	11.1	Environmental-,	202	Springer Nature

and Sustainability				social-, and governance-related factors for business investment and sustainability: a scientometric review of global trends		
International Journal of Sustainable Development and Planning	1314	3479	2.6	Cyber-Environment in the Human Rights System: Modern Challenges to Protect Intellectual Property Law and Ensure Sustainable Development of the Region	21	International Information and Engineering Technology Association
Journal of Environmental Protection and Ecology	1224	1569	1.3	AN EFFECTIVE METHOD FOR MANAGING WASTE IN SMART CITIES BASED ON DEEP RESIDUAL NEURAL NETWORK APPROACH	53	Scibulcom Ltd.
Current Issues in Tourism	887	13786	15.5	Artificial intelligence's impact on hospitality and tourism marketing: exploring key themes and addressing challenges	212	Taylor & Francis
Journal of Ecotourism	92	601	6.5	The role of ecotourism in developing local communities in Indonesia	34	Taylor & Francis
Asia Pacific Journal of Tourism Research	337	2431	7.2	The effect of virtual tourism experience on tourist responses: the lens from cognitive appraisal theory	34	Taylor & Francis
Land	8068	47519	5.9	Research Progress of the Impacts of Comprehensive	57	Multidisciplinary Digital Publishing

				Transportation Network on Territorial Spatial Development and Protection		Institute (MDPI)
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Note: TP = Total Publications, TC = Total Citation.

Source: prepared by the researchers

Both the number of published articles and the citation count are key bibliometric indicators used to assess the influence of scientific journals and measure their contribution to shaping academic research in the field of ecotourism and sustainable development. Within this framework, Table 1 presents the top ten scientific journals ranked according to these two metrics, enabling the identification of the most prominent and impactful publications in this research area.

The journal *Sustainability (Switzerland)* ranks first, with 58,414 published articles and 450,030 citations. This leading position can be attributed to the journal's interdisciplinary nature, covering topics related to sustainability across environmental, economic, social, and cultural spheres, making it a highly suitable platform for research linked to ecotourism. The high citation count also indicates the broad dissemination and uptake of the journal's content within the scientific literature. Among its publications, the most cited article is titled "Recent Advances in the Remediation of Textile-Dye-Containing Wastewater: Prioritizing Human Health and Sustainable Wastewater Treatment."

The *Journal of Sustainable Tourism* ranks second, with 499 articles and 10,195 citations. Despite a numerical gap compared to *Sustainability*, it is considered a specialized journal in the field of sustainable tourism (Lu & Nepal, 2009), making it highly relevant for examining ecotourism issues. Its focus on the theoretical and applied aspects of the relationship between tourism, the environment, and local development explains its relatively high citation-to-article ratio.

Journals such as *GeoJournal of Tourism and Geosites*, *Environment, Development and Sustainability*, and *International Journal of Sustainable Development and Planning* also show significant contributions in terms of publication volume and citations. Their stable performance levels reflect consistent publishing activity and sustained research interest in the topic of ecotourism and sustainable development.

**Table 2. List of the 15 most prolific authors in the Ecotourism for Sustainable Development research area**

Author	Year of 1st Publication	TP	h-Index	TC	Current Affiliation	Country
Trišić, Igor	2019	17	10	274	University of Belgrade	Serbia
Štetić, Snežana	2019	17	10	284	International Research Academy of Science and Art	Serbia
Hall, C. Michael	2016	11	97	39,722	Massey University Auckland	New Zealand

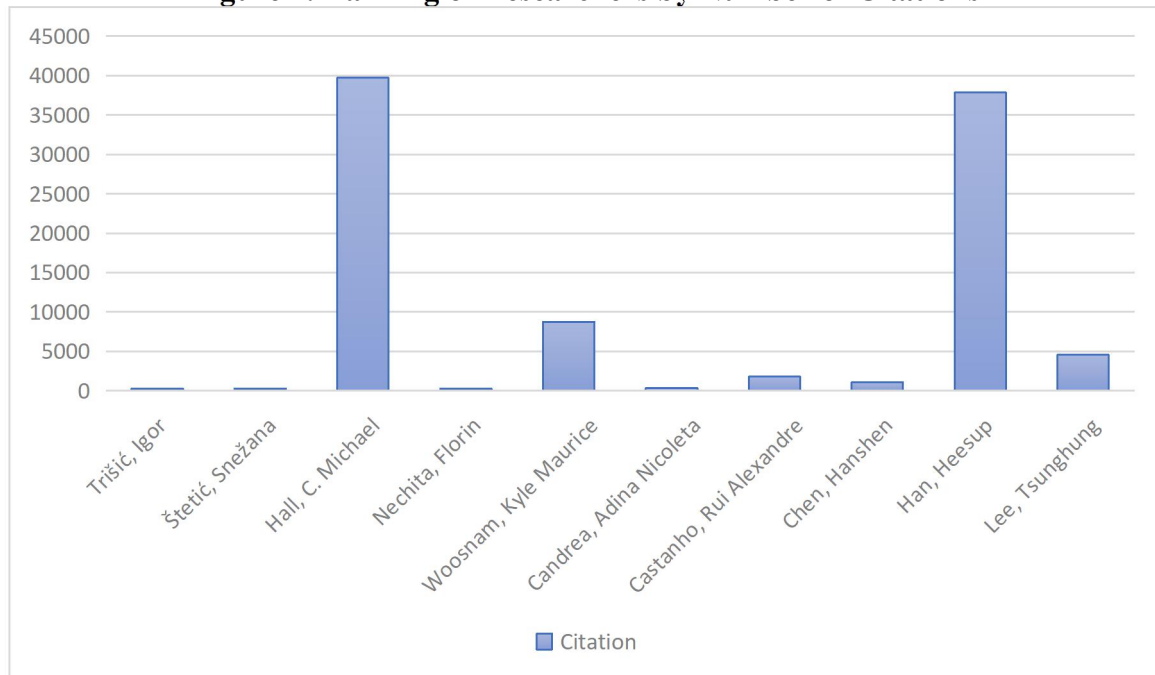
Nechita, Florin	2023	9	10	259	Universitatea Transilvania din Braşov	Brasov
Woosnam, Kyle Maurice	2017	9	52	8,767	University of Georgia	United States
Candrea, Adina Nicoleta	2021	8	10	365	Universitatea Transilvania din Braşov	Brasov
Castanho, Rui Alexandre	2018	8	22	1,772	Politécnico de Portalegre	Portugal
Chen, Hanshen	2015	8	18	1,099	Chung Shan Medical University	Taiwan
Han, Heesup	2018	8	94	37,838	Sejong University	South Korea
Lee, Tsunghung	2015	8	28	4,547	National Yunlin University of Science and Technology	Taiwan

**Source:** prepared by the researchers

The data in the table 2 indicate that researcher Trišić, Igor is the most prolific contributor in the field of ecotourism as an approach to sustainable development, having published 17 articles since his first research in 2019, which have garnered 274 citations. The researcher is currently affiliated with the University of Belgrade in Serbia, reflecting the active role of Serbian academic institutions in supporting scientific research related to ecotourism.

Researcher Štetić, Snežana ranks second in terms of publication count, also with 17 articles published since 2019. However, her work has accumulated 284 citations, and she is affiliated with the International Research Academy of Science and Art in Serbia. This discrepancy between publication volume and citation count highlights that scientific impact is not solely a function of quantity, but also of the extent to which other researchers rely on the findings within the scientific literature.

The contributions of other prominent researchers, such as Hall, C. Michael, Nechita, Florin, and Woosnam, Kyle Maurice, demonstrate sustained and effective engagement in this field. Their body of work includes recent publications that have advanced knowledge on ecotourism and sustainable development, underscoring the continued global research interest in this topic. Overall, the analysis reveals that the ranking of researchers based on impact differs from their ranking by publication count. Impact is primarily determined by citation frequency and the rate at which peers utilize their research findings. This reflects each researcher's ability to generate applicable scientific knowledge that can influence the development of policies and practices related to ecotourism and sustainable development.

**Figure 4. Ranking of Researchers by Number of Citations**

**Source:** prepared by the researchers

The data reveals in Figure 4 a clear disparity between scientific productivity and the impact of researchers in the field of ecotourism as a tool for achieving sustainable development. Hall, C. Michael from Massey University Auckland, New Zealand, is the most impactful researcher, with his articles receiving over 39,000 citations. This reflects the capacity of his research to shape academic knowledge and provide a robust scientific foundation for ecotourism applications.

Meanwhile, Han, Heesup from Sejong University, South Korea, holds the second position in terms of impact with over 37,000 citations, despite having published only 8 articles. This underscores that the value of scientific research is not determined solely by publication volume, but rather by the extent to which peers rely on its findings.

Woosnam, Kyle Maurice from the University of Georgia, USA, ranks third in impact with 8,767 citations, reflecting his sustained contribution to enriching scientific research in ecotourism and sustainable development.

The most productive researchers in terms of article count are Trišić, Igor from the University of Belgrade, Serbia, and Štetić, Snežana from the International Research Academy of Science and Art, Serbia, each having published 17 articles since 2019, albeit with different citation counts (274 and 284, respectively). This indicates that a researcher's ranking based on productivity does not necessarily align with their ranking based on citation impact, highlighting the importance of both quantity and quality in evaluating scientific contributions. Overall, these findings confirm that scientific impact in ecotourism research is contingent upon the quality of the research and its citation frequency, while productivity indicates the volume of scientific output. The combination of productivity and impact reflects a researcher's ability to advance knowledge and influence policies and practices related to ecotourism and sustainable development.



### 3. Analysis of the Distribution of the Most Productive Countries and Institutions, and Research Collaboration

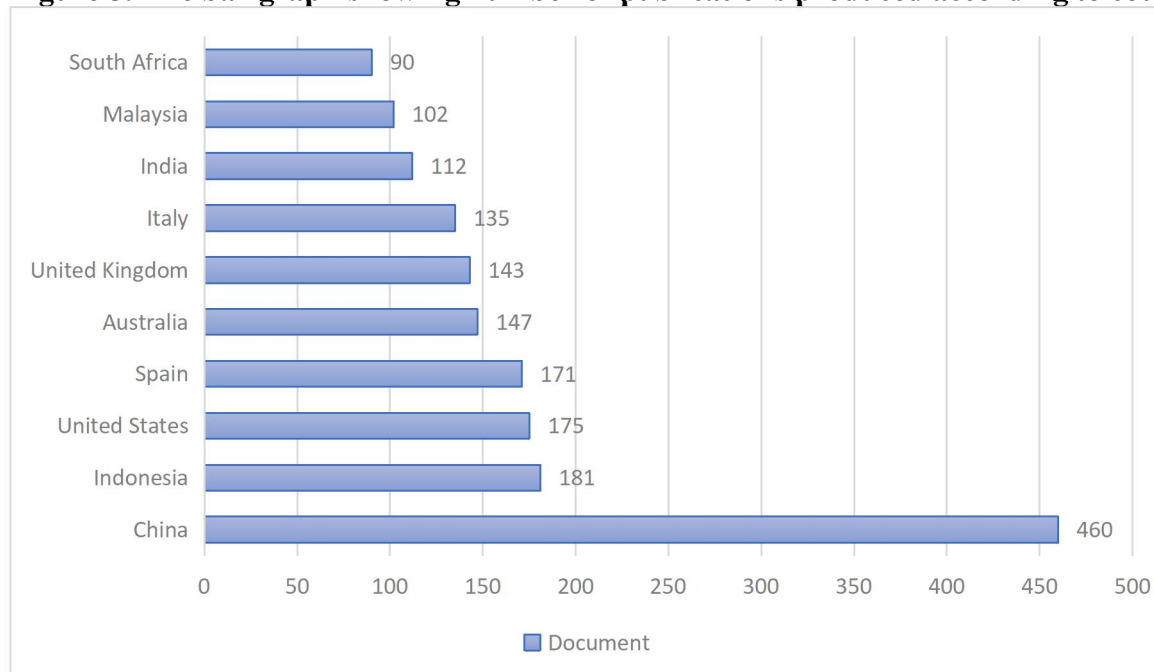
This analysis highlights the global research landscape and centers of excellence in the field by identifying the most productive countries and institutions. It further elucidates the patterns of collaboration between nations and institutions, revealing the extent of international engagement in scientific inquiry. This, in turn, aids in understanding the dynamics of knowledge production and guides the formation of future research partnerships. Consequently, this section addresses the study's third research question.

**Table 3. List of the top 10 countries and educational institutions in Ecotourism for Sustainable Development**

Country	educational institutions	TP
China	Deakin University	460
Indonesia	IPB University (Bogor Agricultural University)	181
United States	Texas A and M University	175
Spain	Wageningen University	171
Australia	Taylor's University	147
United Kingdom	University of Central Lancashire	143
Italy	University of East Anglia	135
India	Mekelle University	112
Malaysia	Taylor's University	102
South Africa	Breda University of Applied Sciences	90

Source: prepared by the researchers

**Figure 5. The bar graph showing number of publications produced according to country.**



Source: prepared by the researchers

The data presented in the table 3 and the chart 5 reveal a clear geographic disparity in the volume of scientific output related to ecotourism and sustainable development. China leads



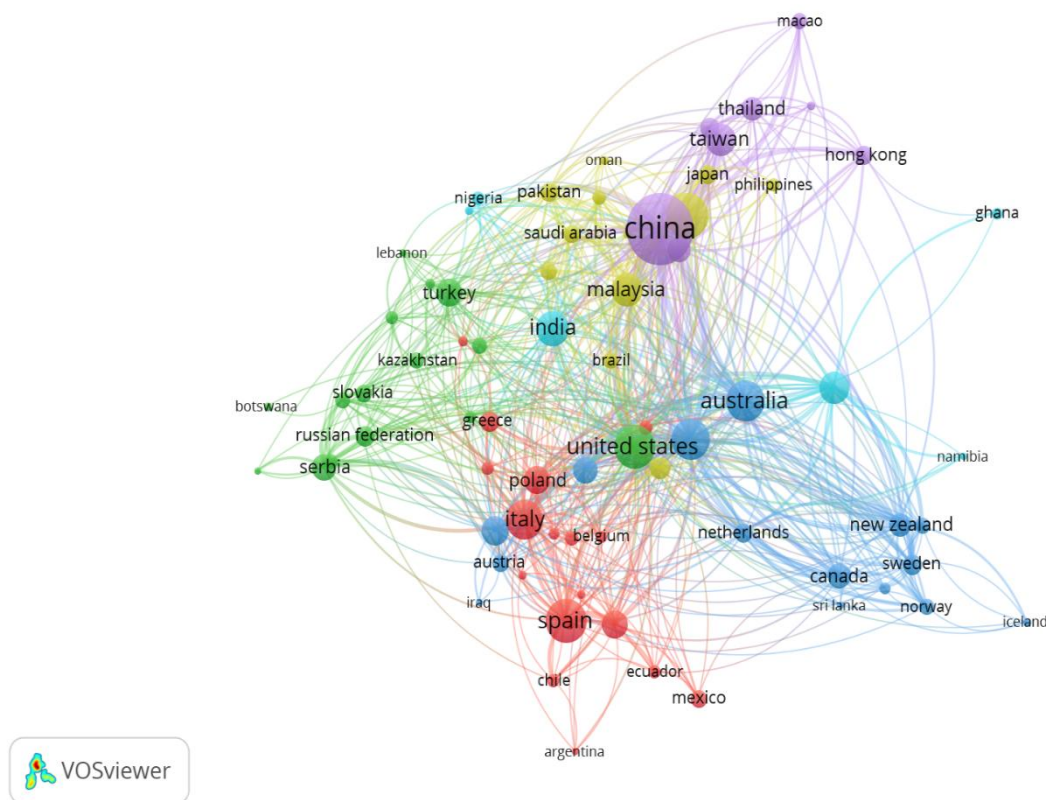
the list of the most publishing countries in this field, with its publications reaching 460 articles in 2024, reflecting the level of research and institutional interest in this topic. Deakin University is ranked as the most influential institution in terms of citation count, indicating its strong presence in the scientific literature associated with ecotourism and sustainable development.

Indonesia follows in second place with 181 articles, and IPB University (Bogor Agricultural University) ranks first nationally in terms of scientific impact, being the most cited institution in the field of ecotourism as a tool for achieving sustainable development. This ranking reflects the focus of Indonesian scientific research on utilizing ecotourism for natural resource management and supporting local development.

In third place, the United States of America accounts for 175 articles, with Texas A&M University being the most influential institution in terms of citation count, indicating its role in producing research with significant scientific impact in this field.

The data also shows substantial contributions in terms of citation counts from Spain, Australia, the United Kingdom, South Africa, and other countries, reflecting the international spread of research in ecotourism and sustainable development. The interest of these countries in this field is linked to the availability of significant and diverse tourism resources and natural destinations, alongside their orientation toward adopting developmental models that rely on the utilization of tourism resources while preserving the environment, thereby supporting the achievement of sustainable development goals.

**Figure 6. Network Map of International Collaboration in Ecotourism for Sustainable Development Research.**



**Source:** prepared by the researchers

The figure 6 illustrates distinct interconnections among the countries actively engaged in research concerning ecotourism as an approach to sustainable development. Larger node sizes represent nations with higher scientific output, with China, Indonesia, the United States, and Spain being the most prominent. The connecting lines indicate established research collaboration links, reflecting the current level of scientific partnerships within this field.

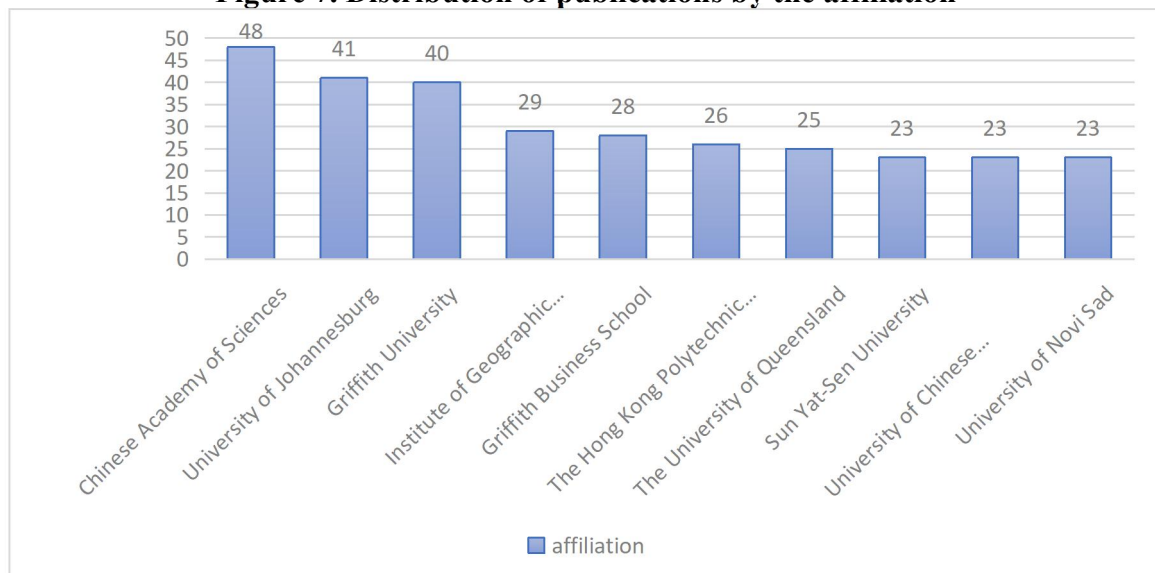
This interconnectedness can be attributed to several interrelated factors. Firstly, geographic proximity and the economic significance of the tourism sector in these nations play a key role. Tourism often constitutes a primary source of national income, necessitating effective management strategies that balance economic benefit with environmental and natural resource conservation.

Secondly, shared environmental and tourism-related challenges, such as pressure on fragile ecosystems, management of protected natural areas, and climate change impacts, foster collaboration. These common issues encourage the exchange of expertise, best practices, and applied models across borders.

Thirdly, robust research infrastructure, including internationally ranked universities and research centers, alongside joint research funding programs, significantly facilitates and strengthens international cooperation. Furthermore, the convergence of research methodologies and a high degree of academic openness streamline co-publication efforts and the exchange of scientific data.

These collaborative research networks indicate that international cooperation not only enhances the production of shared scientific knowledge on ecotourism but also enables the adoption of integrated strategies to support sustainable development, effectively bridging environmental, economic, and social dimensions.

**Figure 7. Distribution of publications by the affiliation**



**Source:** prepared by the researchers

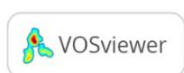
The data indicates a clear disparity in scientific output at the institutional level within the field of ecotourism as a tool for achieving sustainable development. This reflects variations in research resources, scientific expertise, and the institutional strategies employed to support this domain.

The Chinese Academy of Sciences leads as the most productive institution with 48 articles, underscoring its pivotal role in Asia and its capacity to steer academic research towards sustainable development priorities and environmental policies. This performance is attributed to its advanced research infrastructure, sufficient funding, and robust national and international networks that support scientific inquiry, facilitating the production of high-quality research and a significant volume of publications.

Following closely is the University of Johannesburg with 41 articles, highlighting its prominent role in Africa in advancing research on ecotourism as an instrument for sustainable development, particularly in contexts requiring the sustainable management of natural and tourism resources.

The presence of Griffith University in third place with 40 articles signifies the contribution of Australian universities in fostering interdisciplinary research, notably by integrating the environmental, economic, and social dimensions of sustainable tourism.

**Figure 8. Network Map of Institutional Collaboration in Ecotourism for Sustainable Development Research**



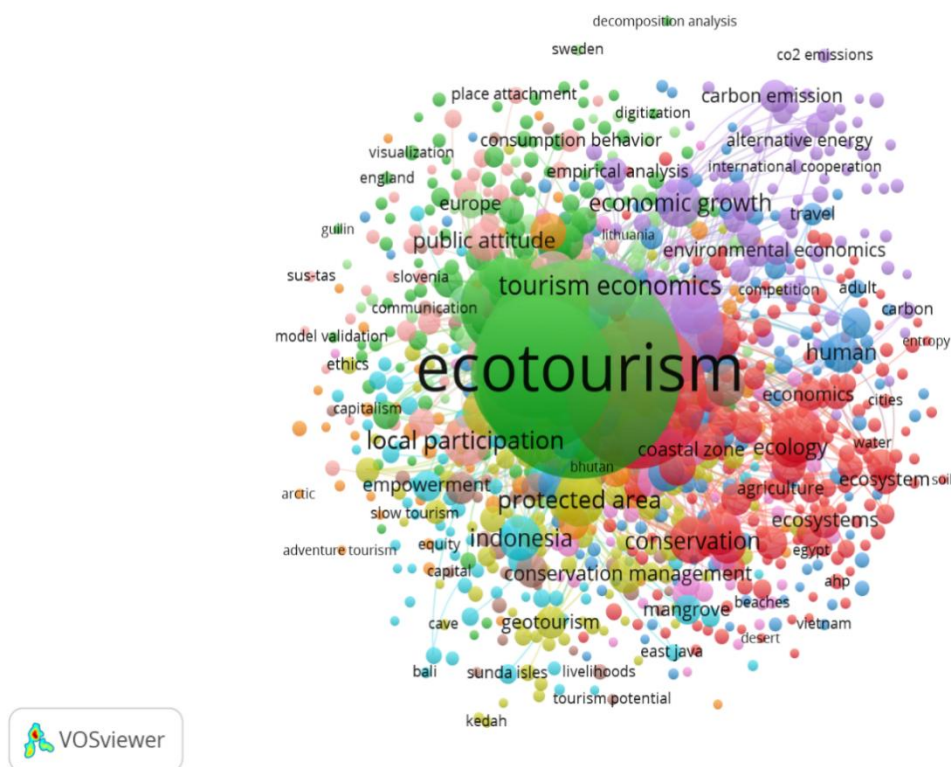
**Source:** prepared by the researchers

The accompanying network visualization in Figure 8 highlights the critical role of inter-institutional collaboration. The size of the nodes (circles) corresponds to the prominence of the institutions, while the connecting lines represent collaborative ties. This structure of scientific interconnectedness underscores the importance of multinational research partnerships in enhancing the quality of scientific output, facilitating knowledge exchange, and promoting co-authorship, all of which contribute to the increased academic and citation impact of the published research.

From a strategic perspective, this analysis reveals that the most productive and impactful institutions are those that successfully integrate environmental considerations with economic and social development, positioning ecotourism as a central pillar of sustainable development strategies. Furthermore, the network's density illustrates that success in this field necessitates global scientific cooperation and the alignment of research policies, particularly in addressing shared environmental challenges such as tourism-induced pressure on ecosystems, climate change, and biodiversity conservation.

#### 4. Analysis of the Distribution of the Most Frequently Used Keywords in the Research Field

**Figure 9. A map based on the relationship of co-occurrence with all keywords.**



The figure 9 presents a network map of the most frequently used keywords in research related to ecotourism and sustainable development, illustrating their co-occurrence relationships. The size of the nodes (circles) represents the frequency and prominence of each keyword.

This network structure indicates that 'ecotourism' is intrinsically linked to 'tourism development,' and the integration of 'sustainable development' concepts—particularly the environmental dimension—forms a central pillar in contemporary studies. These results help

in understanding prevailing research trends and identifying the most influential and high-priority themes within the field of ecotourism and sustainable development.

### Discussion of Findings

The bibliometric findings indicate that scientific research in the field of ecotourism as an approach to achieving sustainable development has experienced accelerated growth over the past decade. The volume of publications was relatively limited in the period 2015–2018, before rising gradually between 2019 and 2021, and then increasing significantly from 2022 to 2024, reaching 446 articles in 2024. This trend reflects the escalating academic interest in linking tourism with ecosystem conservation, alongside a focus on sustainable development strategies. This heightened interest is attributed to several factors, most notably: environmental pressures resulting from the expansion of the tourism sector; the need to conserve biodiversity and natural resources; increasing global awareness of the importance of sustainability; and international trends toward achieving the Sustainable Development Goals (SDGs), which have become a primary catalyst for generating scientific knowledge in this field.

Research productivity is concentrated in a limited number of leading countries such as China, Indonesia, and the United States. This reflects these nations' capacity to leverage research resources and advanced scientific infrastructure, as well as the significance of the tourism sector in their national economies. The international collaboration networks indicate that cooperation between countries and institutions contributes to enhancing research quality, facilitating the exchange of expertise, and unifying research standards. This, in turn, enables the development of integrated strategies that link tourism growth with environmental protection.

At the institutional level, the Chinese Academy of Sciences leads in productivity with 48 articles, followed by the University of Johannesburg with 41 articles and Griffith University with 40 articles. The institutional interconnections reveal that collaboration between universities strengthens research impact and contributes to disseminating scientific knowledge that can be practically applied within sustainable tourism policies. Regarding individual researchers, the analysis clarifies that scientific impact is not measured solely by publication count. Hall, C. Michael achieves the highest citation level with over 39,000 citations, followed by Han, Heesup with over 37,000 citations, and then Woosnam, Kyle Maurice with 8,767 citations. Meanwhile, both Trišić, Igor and Štetić, Snežana remain the most productive authors, each with 17 articles since 2019. This underscores the importance of considering both quantity and quality when evaluating scientific contributions to the advancement of knowledge and its practical applications.

The keyword network confirms that ecotourism, tourism development, and sustainable development are the central, interlinking concepts within the literature. The clear interconnections between them reflect a research focus on how to integrate ecotourism into tourism activity development in a manner that considers environmental, social, and economic dimensions. This highlights the research emphasis on ecotourism as a strategic tool for natural resource management and achieving a balance between economic growth and environmental preservation. These findings align with the results of studies by (Rodríguez-Castro et al., 2024) (Pathmanandakumar, 2025) (Heriyanto et al., 2024) (Le & Nguyen, 2023) (Rabadán-Martín et al., 2025)



Overall, these findings reflect that ecotourism has evolved into a globally integrated research focus, combining productivity, impact, and international collaboration. The escalating interest in this field stems from environmental pressures, sustainability trends, and the need for integrated policies to support sustainable development. This analysis confirms that the accelerated growth in publications and citations reflects the scientific community's capacity to generate applicable knowledge that supports strategic decision-making and the achievement of sustainable development through ecotourism. This establishes the field as multidisciplinary and influential for policy and practical applications at national and international levels.

## Conclusion

This study provided a comprehensive analysis of the scientific output in the field of ecotourism as a tool for achieving sustainable development over the past decade. It highlighted the temporal evolution of research, the geographical distribution of leading institutions and countries, the impact of key researchers, and the primary research topics.

The results demonstrated accelerated growth in the number of publications and citations, reflecting the increasing interest in developing knowledge that links tourism with environmentally sustainable practices, and the importance of integrating environmental, social, and economic dimensions into development policies. The study also showed that scientific output is concentrated in countries with strong research infrastructure and a vital tourism sector, with a prominent role for international cooperation among institutions and researchers in enhancing research quality and academic impact.

Furthermore, the results of the keyword analysis highlighted that ecotourism, tourism development, and sustainable development constitute the fundamental axes of research, with clear interconnections between them. This indicates the scientific community's recognition of the importance of ecotourism as a strategic tool for achieving sustainable development, protecting natural resources, and enhancing economic and social benefits. The analysis also revealed that the scientific impact of researchers depends not only on the number of articles but also on research quality and citation frequency, reflecting the capacity of the produced knowledge to guide policies and practical applications.

This study confirms that ecotourism is not merely an economic activity, but rather an integrated framework for achieving sustainable development. It connects environmental protection, the improvement of local community livelihoods, and the promotion of economic growth. The growing interest in this field underscores the need to support multidisciplinary scientific research and enhance cooperation between nations and institutions. This is essential to ensure the development of sustainable tourism policies and practices capable of addressing contemporary environmental and social challenges.

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