

# Global Research Trends in Tourism and Education: A Bibliometric Overview for 2000-2024

## Turizm ve Eğitim Alanında Küresel Araştırma Eğilimleri: 2000–2024 Yılları İçin Bibliyometrik Bir Bakış

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### ABSTRACT

Tourism and education are two different disciplines that have a strong academic relationship with each other. While the tourism sector plays a critical role in terms of economic growth and cultural interaction, education is a key factor in enhancing the sustainability and quality of tourism. In this context, a systematic review of the academic literature examining the relationship between tourism and education is important for understanding current trends and providing guidance for future research. This study aims to identify academic research trends in the field of tourism and education by analyzing 1826 articles indexed in the SCOPUS database between 2000 and 2024 through bibliometric analysis. Parameters such as the change in the number of publications over the years, the most published and cited sources, the most published and cited countries, the most used keywords and co-occurrence authors' keyword analysis were used in the study. The analyses were conducted with R Studio and VOSviewer programs. The findings reveal that academic publications in the field of tourism education have increased significantly in recent years, the themes of digitalization and sustainability have come to the fore, and this field has become increasingly interdisciplinary. The study contributes to academic and sectoral decision-making processes by providing a comprehensive framework for future research on tourism and education.

**Keywords:** Tourism, Education, Bibliometric analysis, VOSviewer, R studio

### ÖZ

Turizm ve eğitim konuları akademik açıdan birbirleri ile güçlü bir ilişkiye sahip olan iki farklı disiplindir. Turizm sektörü, ekonomik büyüme ve kültürel etkileşim açısından kritik bir rol üstlenirken, eğitim ise turizmin sürdürülebilirliğini ve kalitesini artırmada temel bir faktör olmaktadır. Bu bağlamda, turizm ve eğitim ilişkisini inceleyen akademik literatürün sistematik olarak değerlendirilmesi, mevcut eğilimlerin anlaşılması ve gelecekteki araştırmalar için yol gösterici bilgiler sunulması açısından önem arz etmektedir. Bu çalışma, 2000-

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2024 yılları arasında SCOPUS veri tabanında indekslenen 1826 makaleyi bibliyometrik analiz yöntemiyle inceleyerek turizm ve eğitim alanındaki akademik araştırma eğilimlerini belirlemeyi amaçlamaktadır. Çalışmada yıllara göre yayın sayısının değişimi, en çok yayın yapan ve atıf alan kaynaklar, en fazla yayın yapan ve atıf alan ülkeler, en çok kullanılan anahtar kelimeler ve yazarların ortak anahtar kelime kullanımı (co-occurrence authors' keyword) analizi gibi parametreler kullanılmıştır. Analizler, R Studio ve VOSviewer programlarıyla gerçekleştirilmiştir. Bulgular; turizm eğitimi alanında akademik yayınların son yıllarda önemli bir artış gösterdiğini, dijitalleşme ve sürdürülebilirlik temalarının öne çıktığını ve bu alanın giderek disiplinler arası bir yapıya büründüğünü ortaya koymaktadır. Çalışma, turizm ve eğitim konularında gelecekteki araştırmalar için kapsamlı bir çerçeve sunarak akademik ve sektörel karar alma süreçlerine katkı sağlamaktadır.

**Anahtar Sözcükler:** Turizm, Eğitim, Bibliyometrik analiz, VOSviewer, R studio

## INTRODUCTION

The tourism sector is recognized as one of the most important elements of the world in terms of cultural interaction and economic growth. According to 2023 economic data, revenues from tourism reached USD 1.7 trillion and accounted for almost 10% of total global GDP (Gross Domestic Product) (UNWTO, 2023). However, tourism does not only provide economic gains, but also contributes to social integration, preservation of cultural heritage and enhancing environmental sustainability (Hall & Williams, 2019). Particularly in developing countries, the tourism sector plays a critical role in generating foreign exchange earnings and creating jobs (Sharpley & Telfer, 2015). Especially in countries with strong potentials in terms of tourism, it is of great importance to develop a qualified workforce and innovative service understanding (Yılmaz, 2017). Depending on these factors, it has become important for the tourism sector to offer training opportunities to adopt a qualified workforce and innovation approach.

Education is one of the most important factors that support economic development by improving individuals' personal or social knowledge and skills. According to the report published by UNESCO in 2022, receiving quality education is an important factor that supports the development of societies and makes this development sustainable (UNESCO, 2022). In this context, vocational and technical education programs have a vital function in training qualified workforce, especially in service sectors (Baum, 2007). In the tourism sector, which is one of the leading fields with a dynamic structure, training employees in customer relationship management, cultural awareness and sustainability directly affects the quality of the service (Ak-baba & Kılınc, 2001; Ülen, 2024). With the age of digitalization, especially after the 2000s, e-learning, distance learning and simulation-based teaching methods have become more and more widely used in tourism and education-related activities (Sigala, 2020). The interaction between tourism and education is of great importance both in terms of supporting education processes with applied learning opportunities and training the human resources needed by the sector (Sheldon & Hsu, 2015; Kumar et al., 2024).

One of the most common systematic methods used to determine the relationship of one or more themes in the literature, which sub-topics are prominent, influential publications and

academic collaborations is bibliometric analysis (Donthu et al., 2021). In this context, bibliometric studies on tourism and education serve as a guide for future research by analyzing the academic contributions and research trends at the intersection of two major disciplines (Ritchie & Crouch, 2003; Hall, 2011). Accordingly, bibliometric studies not only provide guidance for future research, but also constitute a valuable source of information for sector stakeholders in strategic decision-making processes (Tuncer, 2024).

This study aims to identify the academic research trends between these two fields by examining scientific articles in the field of tourism and education between 2000 and 2024 through bibliometric analysis. The data set to be used in the study was obtained from the SCOPUS database, which is widely used in bibliometric studies. In order to obtain the dataset in accordance with the purpose of the study, various screening processes were performed and accordingly, 1826 articles were obtained. The bibliometric analyses provide a comprehensive overview framework of the development of tourism and education topics, academic collaborations with each other, the most studied themes and future research opportunities. The findings are expected to provide a roadmap for future research in the field of tourism education, as well as important clues for strengthening the links between the sector and academia.

## CONCEPTUAL FRAMEWORK

### Tourism Education

Tourism education is emerging as a discipline that is constantly evolving in parallel with the rapid changes in the global tourism sector and has strategic importance in both academic and professional fields. While the service-oriented nature of the tourism industry brings with it the increasing need for qualified human resources, academic circles also focus on the need to restructure the content and methods of education programs to meet these needs (Airey, 2005). In this context, the main objectives of tourism education are to increase the knowledge and skill levels of individuals working in the sector, to establish a sustainable tourism approach and to provide students with an international perspective (Dredge et al., 2013).

In the theoretical framework, tourism education is considered as an interdisciplinary field arising from the synthesis of theoretical knowledge and practical approaches (Karakoyunlu &

Uslu, 2023). Tribe (1997), while examining the epistemological foundations of tourism education, found that this field has a bidirectional development with the capacity to both produce academic knowledge and respond to the practical needs of the sector. Similarly, Cooper and Shepherd (1997) draw attention to the importance of maintaining the depth of tourism education by arguing that critical and analytical thinking skills should be included in the curriculum, rather than seeing tourism education only as a tool to serve the industry.

Historically, tourism education has evolved from models based on vocational practices to globalization and interdisciplinary approaches. Between 1950 and 1980, vocational programs focused on hotel management, guiding and other technical skills, while in the 1980-2010 period, interdisciplinary approaches gained strength by integrating tourism with fields such as economics, sociology and environmental sciences. Today, digitalization, artificial intelligence and sustainability-oriented transformation are the determining factors in the structuring of tourism education programs (Zagonari, 2009; Baum, 2007).

Applied education models are among the most important components of tourism education and facilitate the integration of students into the sector after graduation. Internship programs, workplace learning experiences and university-industry collaborations play a critical role in helping students gain practical skills and put their theoretical knowledge into practice. These approaches are being intensively researched by higher education institutions, especially in Europe and Asia, with the aim of producing qualified graduates in line with the expectations of the labor market (Baum, 2007; Zagonari, 2009).

The four main trends in tourism education in recent years are sustainability, digitalization, internationalization and innovative teaching methods. Studies by Farsari (2021) highlights that sustainable tourism education not only increases environmental awareness but also improves students' ethical decision-making skills. In this context, training programs for community-based tourism, ecotourism and green tourism practices enable future tourism professionals to fulfill not only their economic but also their social and environmental responsibilities (Moscardo, 2008).

The integration of digital technologies is leading to revolutionary changes in tourism education. Virtual tourism simulations, augmented reality (AR) applications, and AI-supported educational tools offer interactive and personalized educational environments while strengthening students' experiential learning processes (Gretzel et al., 2020). Sezer and İlban (2024) state that hybrid learning models have become widespread after the COVID-19 pandemic and the effective use of online education platforms plays an important role in ensuring continuity in education. In addition, opportunities such as international student exchange programs, dual diploma arrangements and Erasmus+ have added an international dimension to tourism education, supporting students to get to know different cultures and develop a global perspective (Fayos-Solà, 2002). In addition, traditional lecture methods are being replaced by case study, project-based learning and simulation-based teaching mod-

els, allowing students to develop critical thinking and problem-solving skills (Lashley, 2011). These innovative approaches provide students with the opportunity to reinforce theoretical knowledge with practical applications, thus accelerating the adaptation process of graduates to the sector.

Future projections suggest that artificial intelligence, big data analytics and sustainability concepts will play a more central role in tourism education. Studies by Ivanov, et al. (2022) suggest that the demand for flexible, modular and digitally driven education models will increase with the post-pandemic era. In this context, educational policies and curriculum structures need to be updated to adapt to the ever-changing industry dynamics Buhalis & Law (2008).

Tourism education, with its interdisciplinary nature and both theoretical and practical aspects, continues to evolve as a dynamic field that responds to the needs of the global tourism industry. While key factors such as digitalization, sustainability and internationalization are shaping the future of tourism education, bibliometric analysis is an important tool for identifying research trends and developing educational policies. Collaboration between academia and industry representatives increases the academic legitimacy of tourism education and enables the training of qualified graduates to respond to industrial needs. This dynamic process can form the basis of strategic planning and practices for tourism education in the future.

## BIBLIOMETRIC ANALYSIS

Bibliometric analyses are systematic and quantitative methods used to measure, evaluate, classify and interpret scientific publications on a particular topic or set of topics (Donthu et al., 2021). Bibliometric analyses reveal the trends of published studies in the academic literature, the most influential sources, the level and direction of development of the research topic and field under study, and finally academic collaborations. Thus, it provides important and guiding information for future studies on the subject (Aria & Cuccurullo, 2017; van Eck & Waltman, 2010). Bibliometric analyses in multidisciplinary fields such as tourism and education allow researchers to discover details that they may not notice through individual article-sized reviews and systematize the accumulation of knowledge in the literature (Gretzel et al., 2008; Benckendorff & Zehrer, 2013).

The parameters used in this bibliometric study consist of reliable and effective metrics that can accurately assess previously identified topics in the literature. Below, literature-supported definitions are provided for each parameter used for bibliometric analysis.

Bibliometric analysis is an indicator that examines the annual or monthly distribution of the studies published in the literature on a subject to be analyzed in a certain period. Thus, the academic development of the subject within that time interval can be monitored (Moed, 2005). This parameter helps to identify emerging or declining research areas and to reveal scientific trends (Bornmann et al., 2011).

Identifying the scientific sources with the highest number of publications in the academic literature on a particular topic is a critical step in understanding the centers of science and the most influential publishing bodies (Garfield, 2006). Journals with a high number of publications are considered as academic platforms that can shape the general debate on the subject (Zupic & Čater, 2015). Therefore, in bibliometric studies conducted in the literature, there are publications in which the sources with the highest number of publications on the subject are also subjected to examination (McKercher, 2005).

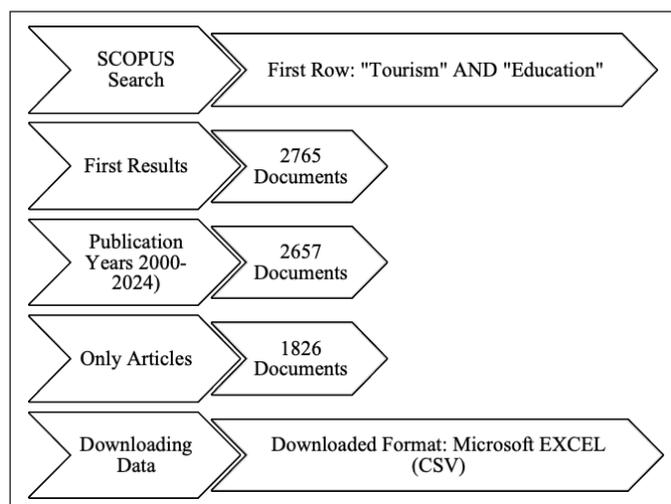
In bibliometric studies, the number of publications made by scientific sources can provide important information about the subject. However, monitoring the sources only according to the number of publications will lead to incomplete inferences. It is also important to measure the citations received by the sources within the scope of their studies. Accordingly, in bibliometric studies, it is necessary to analyze not only the number of publications of the sources on the subject but also the total number of citations they receive on that subject (Egghe & Rousseau, 1991). Total citation analyses reveal that scientific productivity and academic impact are different concepts and allow not only quantitative but also qualitative evaluation (Bornmann & Daniel, 2008). Therefore, in many of the studies conducted in the literature, the total citations received by the sources publishing on the researched topic are also examined (Tribe, 2002; Airey, 2005).

Measuring the scientific productivity of countries is also an important indicator to understand the global distribution of a particular academic field and which regions are leading in this field (Leong et al., 2021). In bibliometric studies in the literature, it has been determined that the geographical distribution of academic production is directly related to countries' academic investments, economic prosperity and science policies (Leydesdorff & Wagner, 2008). In many bibliometric studies in the literature, it has been observed that developed countries contribute at a higher rate in scientific productivity, while academic publications are increasing in developing countries (King, 2004; May, 1997). Therefore, it becomes important to determine the academic development rates of developing countries and to examine the countries with the highest number of publications and the periodic changes in the number of publications in order to determine the current situation of developed countries. However, the number of studies conducted by countries on a particular subject does not provide sufficient findings on that subject. Therefore, in bibliometric analyses, just like resource analyses, the number of citations is taken into account in country-based analyses (Glänzel, 2001). Countries with high citation counts are generally accepted as academic centers that are more prominent in terms of research quality and impact (Small, 1973). For example, when articles on tourism and education are analyzed in the literature, it is seen that the countries with the highest number of citations are generally countries with strong and developed tourism infrastructure (Sigala, 2021). Therefore, it is important to consider this parameter in bibliometric analyses.

"Most Used Keywords and Co-Occurrence Analysis" is another widely used technique in bibliometric analysis. Keywords used in scientific research give important clues about the studies. Classification and evaluation of the keywords used in the studies conducted within the scope of a particular subject gives important clues about the related subject (Callon et al., 1991). In addition, comparing studies using similar keywords can allow simple but effective inferences to be made about the common and different aspects of the studies. Accordingly, keyword analyses are widely used in bibliometric studies (Benckendorff & Zehrer, 2013). In particular, co-occurrence analyses help to map the relationships between different subtopics by analyzing how certain keywords are used together (Chen et al., 2010).

## METHODOLOGY

In this study, a bibliometric analysis of scientific studies related to tourism and education issues published between 2000 and 2024 and consisting entirely of articles was conducted. The data used in the analysis were obtained from the SCOPUS database. In the study, certain verification steps were applied to ensure the reliability of the data obtained from SCOPUS. These include cleaning duplicate and erroneous records, cross-checking the articles for compliance with the specified criteria, and selecting the software used in the analysis from reliable sources. The steps followed in obtaining the data are shown in Figure 1 below. The steps followed in obtaining the data are shown in Figure 1 below.



**Figure 1.** The process of obtaining data from the SCOPUS database.

In Figure 1, first of all, depending on the subject, the SCOPUS database was searched through the keywords "tourism" and "education". The search resulted in 2765 documents. When the time range was adjusted to include studies between 2000 and 2024, the number of studies decreased to 2657. Then, since the research only included articles, the only articles option in SCOPUS was checked and the number of articles decreased to 1826. Thus, the data set to be used in the bibliometric analysis for the articles related to tourism and education, which consti-

tutes the purpose of the study, was downloaded in CSV format in Microsoft Excel and used in the analysis.

The analysis was performed with the “biblioshiny” interface of the R Studio (version: 4.1.3) program, which is frequently used for bibliometric analysis (Guleria and Kaur, 2021). In addition, VOSviewer (version: 1.6.18), a program designed by Nees Jan van Eck and Ludo Waltman (2010) to visualize bibliometric data, was also used to increase the visual power and descriptivity of the study. Finally, the visualizations required for some histograms and bar charts were created with the help of Microsoft Excel 2016.

Through the parameters obtained by supporting the conceptual framework with the literature, bibliometric analyses of scientific articles related to tourism and education were carried out through R Studio and VOSviewer programs, and the findings obtained are visualized and interpreted below.

### Research Questions

This study aims to analyze the scientific literature on tourism and education by addressing the following research questions:

- What are the main trends in academic research on tourism and education between 2000 and 2024?
- Who are the most influential authors, journals, and publications in this field?
- What are the most frequently studied subtopics and themes related to tourism and education?
- How have collaboration networks (among authors, institutions, and countries) evolved in this research area?
- What insights can be derived from bibliometric analysis regarding future research directions in this field?

### FINDINGS

The findings obtained as a result of the bibliometric analysis are analyzed separately in the sections of general findings, number of publications by years, findings on sources, findings on countries and finally findings on keywords.

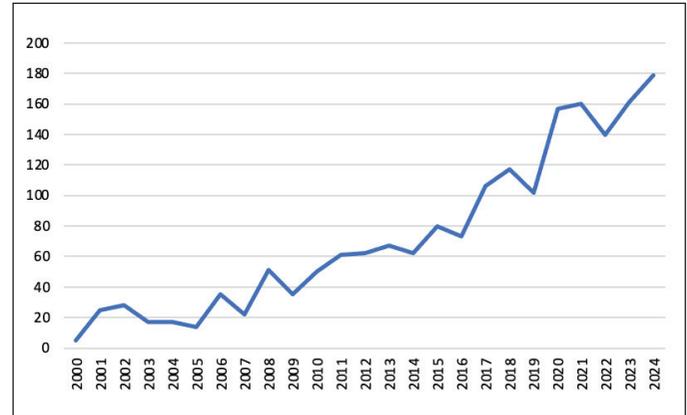
*General Findings:* In the analysis, firstly, general information about the data set used for bibliometric analysis is mentioned. Findings regarding general information are shown in Table 1.

**Table 1:** General Information

Description	Results
Documents	1826
Sources (Journals, Books, etc)	688
Annual Growth Rate %	16.08
Average citations per doc	17.06
References	79464
Author's Keywords (DE)	5079
Authors	4643

According to the information in Table 1, 1826 articles used for the analysis and published between 2000 and 2024 were included in a total of 688 sources. Again, the annual growth rate of the articles on the relationship between tourism and education is 16.08%. The studies were cited 79464 times in total. The citation rate per study is 17.06. Finally, while 4643 authors participated in the study, the total number of keywords used was 5079.

*Number of Publications by Year:* Findings for studies published between 2000 and 2024 are shown in Figure 2.



**Figure 2:** Development of publications by years.

When Figure 2 is analyzed, it is seen that the number of studies using the themes of tourism and education together has increased regularly over the years. Another striking point in the figure is that while there was a steady increase in the number of studies until 2019, there was a significant increase in the number of publications in only one year from 2019 to 2020. Similarly, there was an increase in the number of publications after 2022 and 2024 was the year with the highest number of publications.

*Findings on Sources:* Figure 3 shows the top 10 sources with the highest number of publications on the subject among the 688 sources that include studies on tourism and education, as indicated in Table 1.

When Figure 3 is analyzed, it is seen that the Journal of Teaching in Travel and Tourism is the only source that published more than one hundred articles with 121 publications. Again, Sustainability (Switzerland) ranked second with 99 articles and Journal of Hospitality, Leisure, Sport and Tourism Education ranked third with 86 articles. The figure also shows the other sources and the total number of articles they published. Finally, another noteworthy point in the figure is that most of the top ten journals that published the most studies related to tourism and education were tourism-related journals.

In addition to the number of published studies, another important criterion is the number of citations (Gasparyan & Yessirkepov, 2018; Medina & Draugalis, 2019; Mustafa et al. 2023). Accordingly, the top ten most cited sources within the scope of the studies on tourism and education are shown in Figure 4 present.

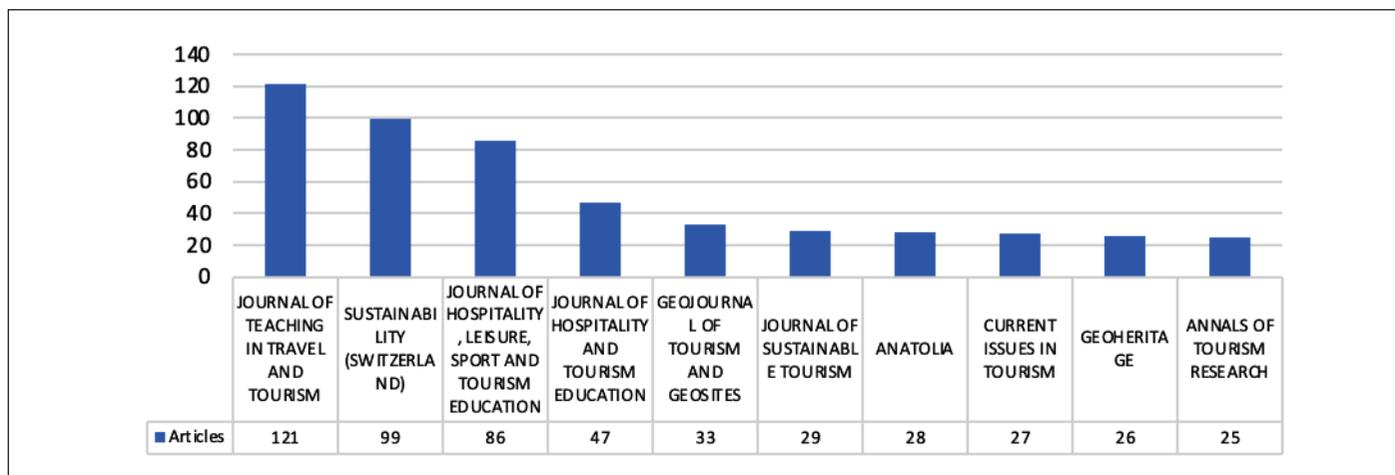


Figure 3: Most published sources.

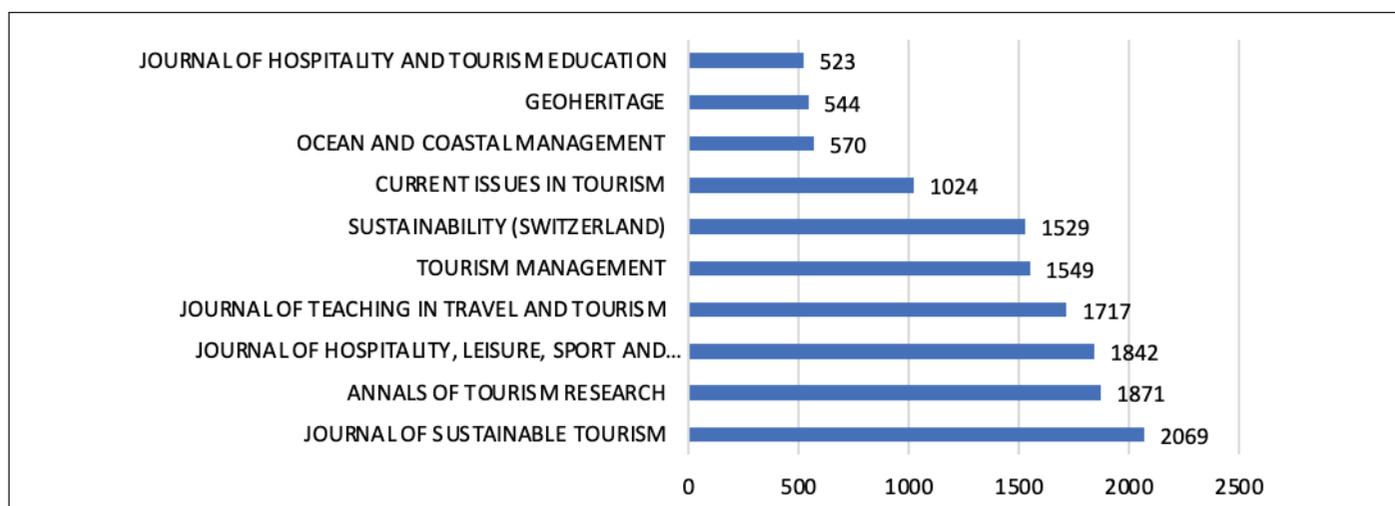


Figure 4: Most cited sources.

Figure 4 shows that the Journal of Sustainable Tourism is the only source with 2069 articles and over 2000 citations. It can be concluded that the Journal of Sustainable Tourism is the most effective source related to the subject, as the journal, which is seen in Figure 3 to have published 29 articles, is the most cited source. Similarly, Annals of Tourism Research ranked tenth with 25 articles and was the second most effective source with 1871 citations. With 121 articles, the Journal of Teaching in Travel and Tourism received 1717 citations and with 99 articles, Sustainability (Switzerland) received 1529 citations. Apart from all these, the other most cited sources are also seen.

*Findings for Countries:* The map of the countries with the highest number of publications within the scope of 1826 articles used in the bibliometric analysis is shown in Figure 5.

When the map shown in Figure 5 is analyzed in general, it is seen that there is a concentration in North and South America, Europe, South and East Asia regions in terms of studies. In the map, it is seen that the USA has the highest number of publications and a total of 552 articles have been published.

In second place, China, another developed country, published 530 articles. Australia comes third with 374 articles. Again, the UK published 268 articles and Spain 247 articles. Finally, one of the most important points that draws attention on the map is the surprisingly poor performance of the Russian Federation.

In addition to the highest number of studies, it is also an important parameter to examine the increase in the number of studies over the years. Accordingly, the development of the 5 countries with the highest number of publications over the years is analyzed and shown in Figure 6.

Figure 6 shows the development of the 5 countries with the highest number of broadcasters over the years. First of all, it is seen that all countries have increased significantly after 2010. If the figure is analyzed on a country-by-country basis, while the UK was the country with the highest number of broadcasters in the early 2000s, other countries have been on the rise over time, and by 2024, the USA and China shared the top spot at close rates. While Australia and Spain were in a very weak position in the early 2000s, they have shown a serious develop-

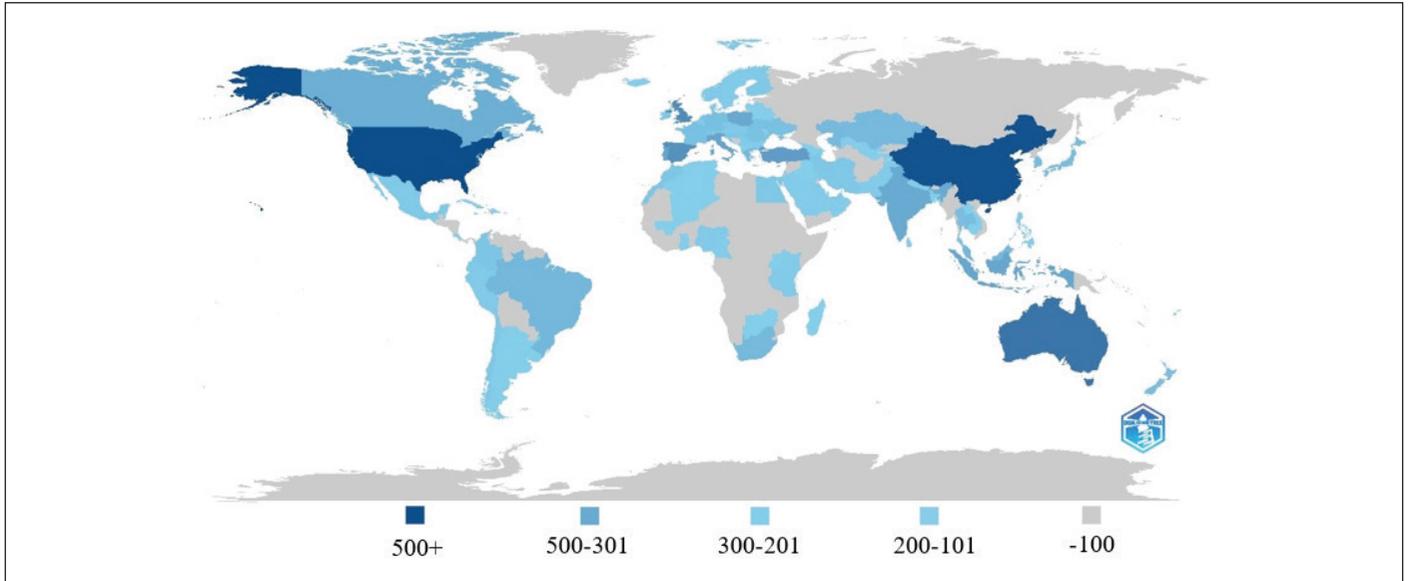


Figure 5: Map of the countries with the most publications.

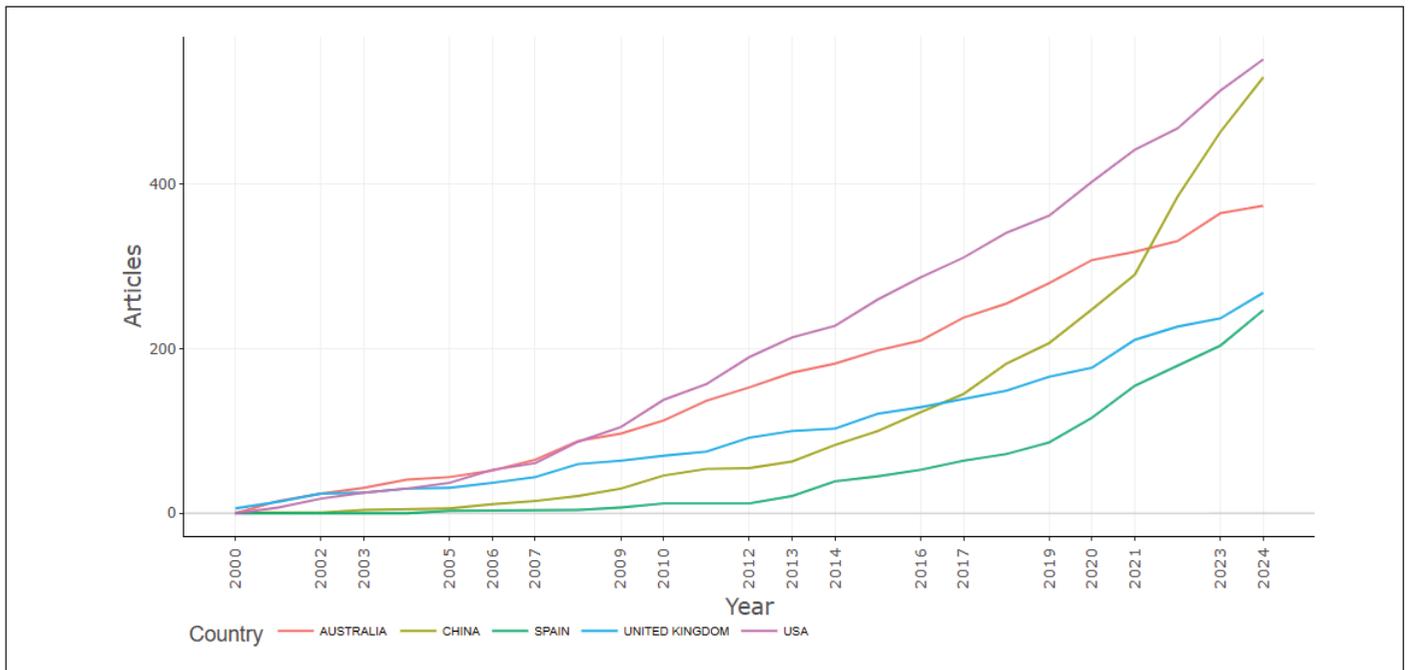


Figure 6: Country production over time.

ment especially after the 2010s. Finally, one of the most striking points in the figure is that China surpassed Australia with a serious rise after 2021. Depending on this serious rise, it is estimated that it will overtake the USA, which has experienced a relatively more stable growth over the years, and become the first.

Finally, unlike the number of studies, it is also important to analyze the number of citations that countries receive depending on their studies. Accordingly, the top ten countries with the highest number of citations for their studies are shown in Figure 7.

*Findings on Keywords:* One of the key parameters of bibliometric analysis is the examination of keywords from which important inferences can be made about the studies. Accordingly, the most used keywords among the 1826 articles analyzed are shown in Table 2.

Table 2 shows the 20 most frequently used keywords among the 1826 articles related to tourism and education. When the table is analyzed, the words “tourism” and “education” are naturally the most used keywords. Apart from these, keywords such as “article”, “human”, “female”, “ecotourism” and “environmental education” also draw attention.

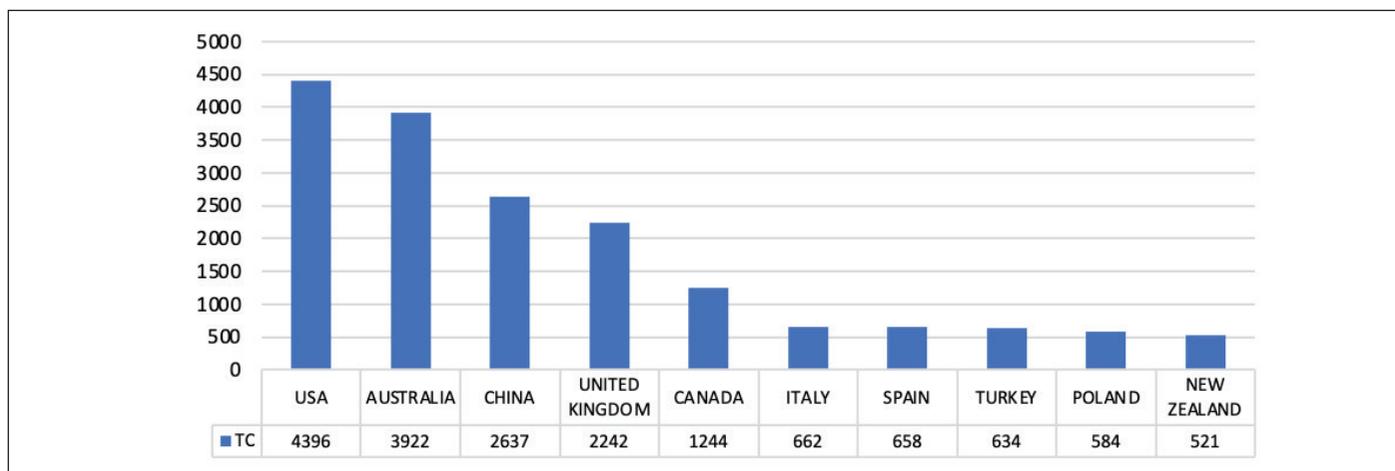


Figure 7: Status of countries according to citations.

Table 2: Most Used Keywords

Words	Occurrences
tourism	536
education	491
article	293
human	287
female	197
adult	186
tourism development	182
humans	181
male	180
ecotourism	160
medical tourism	152
travel	139
china	133
environmental education	130
sustainable development	126
perception	107
student	107
higher education	100
sustainability	91
tourism management	86

Although the frequency of use of keywords provides some important inferences, it is not enough on its own. The links between keywords also provide important inferences. Accordingly, the co-occurrence authors' keywords analysis conducted through the VOSviewer program is shown in Figure 8.

In Figure 8, 216 articles with at least 5 links were analyzed, considering that a visualization of all 1826 articles would be overly complex and studies with few links would not be able to provide important inferences. In this way, the keywords with more links and the most common keywords were analyzed more clearly and descriptively.

When Figure 8 is analyzed, it is seen that the keywords contain 590 words in total, divided into 13 different clusters. In the figure, it is seen that "tourism", one of the words with the highest number of links, was used 324 times and had a total of 590 links. The second most frequently used word "education" was used 235 times and had a total of 467 links. "tourism education" was used 244 times and had a total of 273 links. When the keywords and their links are analyzed in general, apart from the main topics of tourism and education, sub-topics such as sustainable tourism, e-learning and entrepreneurship come to the fore.

Again, Figure 8 was analyzed within the scope of keyword cluster analysis and the findings are shown in Table 3.

Table 3: Keyword Clusters Obtained as a Result of Co-occurrence Authors' Keywords Analysis

Cluster	Thematic Focus	Featured Keywords
Cluster 1 (Red)	Tourism Education and Student Experiences	Tourism education, higher education, curriculum, student engagement
Cluster 2 (Blue)	Sustainability and Environmental Education	Sustainable tourism, environmental education, sustainability, ecotourism
Cluster 3 (Green)	Digital Learning and Technology	E-learning, online education, blended learning, virtual reality
Cluster 4 (Yellow)	Entrepreneurship and Employment	Entrepreneurship, employability, human capital, skills
Cluster 5 (Orange)	Health and Medical Tourism	Health tourism, medical tourism, global health
Cluster 6 (Purple)	Geography and Cultural Tourism	Heritage tourism, cultural tourism, geoparks, rural tourism





and that these journals stand out in terms of subject-specific publications.

According to 2024 data, the USA is the leader with 552 articles and China is in second place with 530 articles, indicating that it may become the leader in the future with an exponential annual growth rate of 25% after 2021. On the other hand, in some developing countries such as Russia and India, lower performances are observed due to lack of funding, lack of academia-industry collaborations and the negative effects of regional dynamics. While this situation points to research and application imbalances on a global scale, it reveals the need to restructure competition between countries through strategic policies and investment models. A country-by-country analysis reveals that the US, China, Australia, UK and Spain are the leaders in research. Moiwo & Tao (2013) and Wu, et al. (2024) support this study by pointing out that the fact that the US and China will reach similar publication numbers by 2024 indicates that competition on a global scale is increasing. The poor performance of the Russian Federation indicates that regional differences and lack of resources create disadvantages in research production in some countries.

The analysis of keyword networks and co-occurrence authors' keywords revealed the existence of 13 thematic clusters that play a decisive role in the evolution of tourism education. Among these clusters, the main axes of digital transformation, sustainable development, cultural heritage and locality, and employment and entrepreneurship stand out. The explosion in the use of technological concepts such as "ChatGPT", "artificial intelligence" and "metaverse", especially in the 2021-2024 period, is interpreted as a harbinger of the transition to new technology-oriented paradigms in tourism education. The prediction of Güzey et al. (2023) provides important clues that artificial intelligence-supported learning models will radically change the traditional education structure. These findings show that digital transformation and distance education applications have gained momentum during the pandemic process and that the results we obtained with our time series analysis are supported by these studies in the literature.

Time series analyses show that in the 2000-2010 period, basic concepts (e.g., "tourism education", "curriculum") were prominent, which aligning with Fidgeon (2010), who emphasized the prevalence of classical themes in tourism education. In the 2011-2020 period, digitalization and sustainability themes gain importance; in the 2021-2024 period, technological innovations such as ChatGPT, virtual reality and artificial intelligence are on the rise in the field. Similar results of Eskici & Altun (2023) study show that the themes of digitalization and sustainability are gaining importance, while technological innovations such as ChatGPT, virtual reality and artificial intelligence are on the rise in the field in the 2021-2024 period.

In the field of tourism and education, research trends are increasingly focused around digitalization, sustainability and innovative technologies. The interdisciplinary nature of the field offers broad perspectives for both academic and practical applications. It is recommended that future research in tourism

and education should prioritize technological transformation and sustainability.

In terms of academic and sectoral contributions, the study can be evaluated in three main dimensions. First, it systematically demonstrates how digitalization and sustainability are redefining the global research agenda. Second, an assessment of cross-country competition and collaborations, particularly the leadership strategies of countries such as the US and China, provides guidance for developing funding sources and collaboration models for other countries. Thirdly, the recommendations for curriculum reform offer strategic steps for the industry and academia to achieve common goals through the integration of practical skills (e.g. virtual reality simulations) and ethical leadership training into curricula. In this context, prioritizing technology integration in tourism schools, developing appropriate sustainable certification programs, and building academia-industry bridges with global brands stand out as important strategies to increase competitiveness at both international and local levels.

Considering the methodological limitations of the study, the use of only SCOPUS database-based data resulted in the exclusion of studies published in Web of Science or regional journals. Language and regional bias led to an underrepresentation of countries in the global south, as only English-language publications were analyzed, and the incomplete indexing process of some articles from 2024 meant that recent trends could not be fully reflected. These limitations necessitate future research to focus on topics such as conducting comparative analyses using qualitative methods in developing countries such as Turkey, India, and Brazil, examining the ethical and pedagogical effects of new technologies such as ChatGPT through experimental designs, analyzing curriculum transformation in detail within the framework of the EU's Green Deal goals, and designing open access education platforms to reduce digital inequality in regions such as Africa and South Asia.

In the case of Turkey, given the country's tourism potential and rich cultural heritage, it is crucial to support digital infrastructure investments in cooperation with TÜBİTAK and the Ministry of Culture and Tourism. Integrating elements from the UNESCO Intangible Cultural Heritage list into tourism curricula can provide a strategic advantage in terms of preserving and promoting local culture. In addition, hands-on learning programs with industry leaders will accelerate the adaptation of students to the industry and build strong bridges between academia and industry.

Overall, the transformation driven by digitalization and sustainability is expected to define tourism education over the next decade, and strategic approaches that are fair, inclusive and based on global collaborations need to be adopted. This comprehensive analysis reveals the interdisciplinary nature of the synergies between tourism and education, the impact of technological developments on education, and the integration of sustainability-oriented innovations, providing critical findings for both academics and policymakers.

The findings of this study contribute to the theoretical development of tourism education by highlighting the evolving research trends, particularly in digitalization, sustainability, and technological innovation. The increasing emphasis on artificial intelligence, virtual reality, and online learning platforms suggests a paradigm shift in educational methodologies, aligning with contemporary educational theories such as constructivism and experiential learning. Additionally, the bibliometric trends confirm that sustainability has become a core theme in tourism education, reinforcing the relevance of sustainable development theories in the field.

From a practical perspective, these findings provide valuable insights for educators, policymakers, and industry stakeholders. The rapid growth of digitalization-related research indicates the necessity for curriculum reforms that incorporate AI-driven and immersive learning experiences. Furthermore, the dominance of publications from countries like the US and China underscores the need for global collaboration to bridge the research gap between developed and developing nations. Institutions and policymakers should focus on fostering academia-industry partnerships to ensure that tourism education aligns with the evolving demands of the labor market.

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**The Authors Contributions:** ZY; designed the study, carried out data collection, analysis and interpretation, conducted the literature review, made critical evaluations and approved the final version. İAG; contributed to data analysis, reviewed the manuscript, made critical evaluations and approved the final version. SÖ; translated, edited the manuscript, reviewed the content and approved the final version. SK; Contributed to the application of bibliometric methods, supported the interpretation of the findings, reviewed the manuscript and approved the final version.

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