INTELLECTUAL INFLUENCE OF SMART TOURISM DESTINATIONS 2000-2023

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Abstract

Purpose - This paper conducts a meticulous bibliometric analysis of 659 documents indexed in the Web of Science database, exploring the intellectual evolution of Smart Tourism Destinations (STD) and contributing to understanding the evolution of scientific literature on STD until December 2023, guiding future explorations in this dynamic and evolving field.
Methodology/Design/Approach - By unifying the conceptual structure and highlighting key descriptive elements with the application of statistical methods, this research provides insights into the intellectual fabric of STD research.
Findings - Our findings show the evolution of the conceptual structure, influential authors, institutions and countries involved in STD research, as well as the evolving social structure within the field. The surge in scientific output, especially since 2019 aligns with the integration of advanced technologies, including artificial intelligence, immersive mechanisms, big data, and robotics, prompting uncertainty in business implementation and stakeholder responses.
Originality of the research - This study sheds light on the intellectual evolution of STD by summarising a wide range of literature, helping the authors to be informed about future research directions in the field.
Keywords Smart tourism destination, smart city, technology integration, destination management.

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INTRODUCTION

Tourism, regarded as one of the most prominent and swiftly developing sectors in the world that is creating growth, generating employment and also helping to diminish global poverty. According to the UNWTO (2022), the tourism sector accounts for 10.4% of global GDP (approximately USD 9.2 trillion), 10.6% of total employment worldwide (334 million) and was accountable for generating 1 in 4 of all new jobs across the globe.

Therefore, tourism raises many expectations on the part of governments and policy makers. They see it as a potential source of growth for their economies, as activities with a strong inclusive dimension and as a method to improve the well-being of their population. In this perspective, it is understandable that destinations seek to take advantage of their natural resources, history or culture, in order to attract as many tourists as possible. In order to achieve so, tourism is undergoing significant variations in operational processes after the arrival of online businesses, as well as with the development and further use of Information and Communication Technologies (hereafter, ICT). For instance, the introduction of platforms in the sector such as Uber, Airbnb, Google Travel, TripAdvisor, among others, has led to changes in tourist purchasing behaviour, as well as the promotion of so-called *'smart travel'* (Pradhan et al.2018). In this context, the term '*smart tourism'* is a growing concept, applied to the increasing dependence of tourism destinations, their industries and tourists on ICT, which allows large amounts of data to be transformed into tourism value propositions (Gretzel et al., 2015; Díaz et al, 2022). The concept is based on the fact that the tourism information service that visitors receive in a general way is done anywhere and on the basis of any particular requirement by the consumer (Liet al., 2017). In other words, the consumption of tourism services is tailored to the visitor and can take place at any stage of the trip and at any location. The opportunity to carry in one hand the technology needed to access tourism services becomes a fundamental part of the trip.

Consequently, the boundless development of ICT has greatly eased the transition from the ordinary city to the smart city and, therefore from the ordinary touristic destination to the Smart Tourism Destination. Through the appropriate use of technology, tourism can help the present and future sustainability of destinations (Heslinga, et al., 2019). It is in this context that so-called smart cities emerge, which aim to improve the standard of living of residents through the use of technology, accessibility and sustainability. The application of these pillars to the field of tourism gives rise to the term *'smart tourism destinations'* (hereafter, STD). Hence, creating a label or a tag that has been appealed in recent years by a number of regions and territories around the globe.

While reviewing the scientific production, it was revealed that a number of bibliometric studies on the application of technology in tourism have been published. For instance, Soliman et al. (2021) reviewed the studies on smart experiences in tourism. In addition, Baggioet al. (2020) made use of machine learning topic modelling techniques to analyse the existing academic literature. In another study, Singh & Bashar (2023) used a bibliometric method to analyse the e-tourism publications to reveal the state of the literature. Sustacha et. al (2023) used a meta-analysis to understand the influence of technology on the tourism experience in smart destinations and to offer an overview of its effects. Nevertheless, despite the growth in academic research

on STD, it stood out that no bibliometric analysis has been done specifically on the topic (Moreno-Gil et al, 2020). Bibliometric aspects such as trends in academic output, leading sources, academics and institutions or the conceptual structure were not evaluated in addition to the evolution of articles on STD through time.

Therefore, this paper was conceived to contribute to scientific knowledge by providing a global vision of this research topic. In other words, this study serves as a pivotal effort to establish a standardized definition of STD by conducting a thorough and systematic review of the concept's contextual landscape and aims to offer both theoretical insights and empirical findings that illuminate the evolutionary trajectory of the term, its historical antecedents, and practical applications. In addition, by consolidating the dispersed conceptual frameworks and elucidating its primary descriptive elements, this paper elucidates the pathways that shape the publication behaviours surrounding STD.

The significance of this research lies in its role as a beacon for the unification of the varied conceptual structures within the realm of STD. By synthesizing existing literature, this study delineates a roadmap for future research endeavours, pinpointing gaps, discerning emerging trends, and delineating potential avenues for further exploration. Through a comprehensive bibliometric analysis, this study aims to address the following key questions that have hitherto remained underexplored:

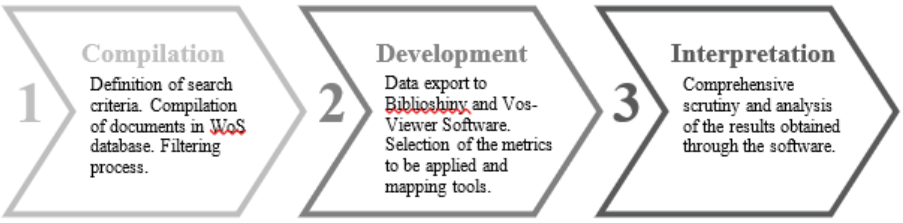
- How has the scientific production evolved?
- What are the main sources in which these articles have been published?
- Which documents can be considered as the most influential?
- Who are the leading researchers in this discipline?
- What countries and institutions demonstrate a higher interest for this type of research? What is the field's conceptual structure like?

To achieve the established objectives, this research firstly provides a description of the methodology used, the origin and the sources of the research data utilised, and the analytical process. Secondly, the outcomes of the descriptive bibliometric study and the conceptual structure are then presented. Lastly, conclusions and findings are discussed together with the research limitations, and suggest several directions for future study.

1. METHOD AND DATA

Despite the rise of the smart city and smart tourism destination (STD) concepts in the tourist behaviour literature, there are still few studies that delve into the relationships and characteristics of these concepts. A bibliometric analysis consists of applying statistical methods to determine quantitative and qualitative changes in a particular research topic, establishing the profile of publications in the topic, and detecting trends within a discipline (De Bakker et al. 2005). At the same time, it provides valuable information for researchers seeking to assess scientific activity (Duque Oliva et al., 2006).

Figure 1: **Methodological steps of bibliometric analysis**



Source. Prepared by the author based on Bibliometrix R Package.

The Web of Science (WoS) database contains academic publications from all fields in the best-regarded journals for the scientific community. It served as the source for the data used in this article. The WoS platform has previously been regarded by scholars as one of the most trustworthy sources of information for performing comprehensive literature reviews. The research data used in this document were obtained from WoS platform, which includes scientific publications from all disciplines, in the top-ranked journals for the scientific arena.

The methodology of this research has been conducted with a bibliometric mix-method using two complementary bibliometric analysis tools; namely Vos-viewer and Biblioshiny. Nevertheless, in order to reduce duplication and redundancy, a first search was conducted with Vos-viewer, which has been ultimately supplemented by Biblioshiny, according to the search query detailed in the following lines. In this context, this work will present data extracted from Biblioshiny software exclusively, which is a software deemed useful on its own for examining the social and intellectual structures as well as the conceptual framework of a specific area of research. Biblioshiny for Bibliometrix software is widely accepted as one of the most useful and comprehensive tools for this type of analysis (Aria & Cuccurullo, 2017). This tool is specifically designed for creating and visualising bibliometric systems or networks. These interconnected systems may include connections between different types of academic documents such as articles, journals, researchers, or institutions. The bibliometric network can be built based on citations and references, co-citation or co-authorship and bibliographic coupling relations. In addition, Biblioshiny allows text extracting functionality which could be applied to build and display co-occurrence networks of important and relevant terms and key words taken from any set of

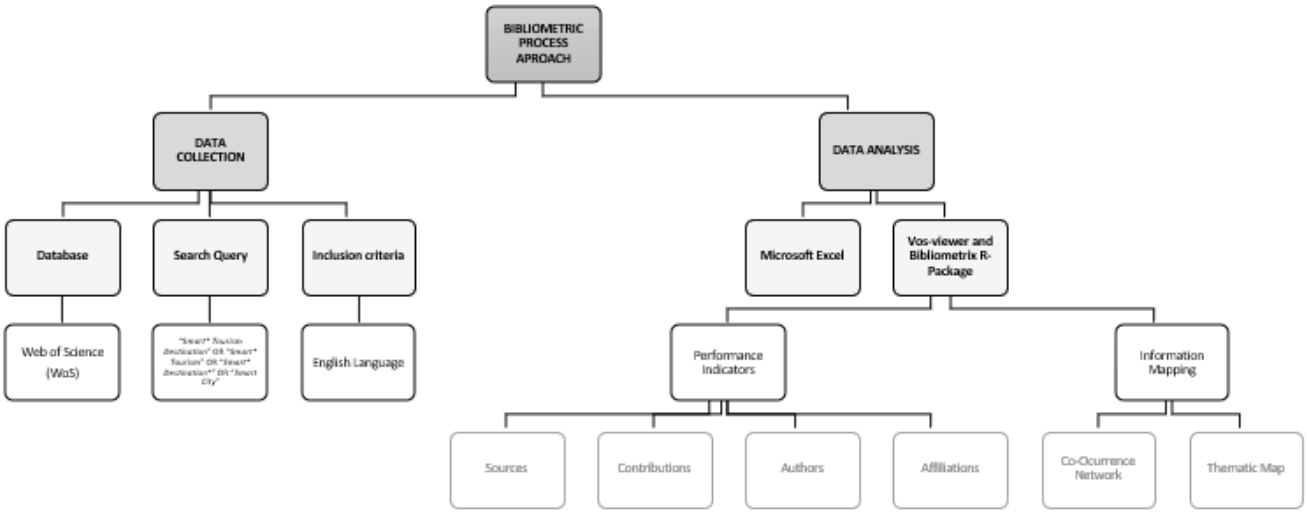
documents of scientific literature. Biblioshiny software makes it possible, on the one hand, to design strategic diagrams useful for detecting the potential of the research fields in the field of STD. On the other hand, it enables to carry out a performance analysis to measure (not only quantitatively but also qualitatively) the production contribution of topics and subject areas to all research in the field based on basic bibliometric indicators, i.e., the number of published papers.

1.1. Data collection and analysis

The Web of Science database (WoS), the world's premier multidisciplinary academic database for published articles and citations (Castillo-Vergara et al., 2018; Goyal & Kumar, 2021) has been the source where data has been collected from. In this sense, this chapter includes an analysis of a bibliometric approach to address a comprehensive review with mapping tools used on articles published between 2006 to 2023 in journals indexed by the Web of Science database. It starts in 2006 since that is when the term smart city was first mentioned in Shapiro's research (2006). This analysis also uses bibliometric maps to visually show the associations between the main concepts addressed by STD and smart cities. In addition, the findings categorise the tourism domains, journals and authors that get the most attention and should therefore be considered in future research. This chapter further quantifies and visualises the evolution of the main research streams and sub-domains in smart city and STD research. These results should assist to understand the state of the art on these terms and to identify potential lines of research to explore in relation to STD.

In order to explore the scientific production associated with the terms '*smart city'* and '*smart tourist destination*', a bibliometric analysis is carried out combining a search for both terms with the aim of checking the contributions to the scientific literature of STD, as well as their future lines of research. With efficiency in mind, the search query was restricted to publications in English Language and performed by title, abstract and keywords, using Boolean operators "*AND*" and "*OR*", with an asterisk symbol as a proximity operator ("*") to ensure that all alternative terminology was accounted. In addition to this, a number of query keyword combinations were applied as part of the search query to maximise results. For instance, "S*mart* Tourism Destination*" OR "*Smart* Tourism*" OR "*Smart* Destination**" OR "*Smart* City*". This approach helped to develop a general overview of the field of destination intelligence, reflecting the origins of STD and their relationship with smart cities. For this purpose, the previous query was set within the advance search functionality in the aforementioned database on 31st December 2023.

Figure 2: **Bibliometric Process Approach**



Source. Prepared by the author based on Bibliometrix R Package.

Upon completion of the process of data search and collection after English Language Only filter was applied, a final database with *659* contributions was established. Each document's title, abstract and keywords have been examined using performance analysis and science mapping techniques which are presented in the following section of this work.

2. RESULTS AND DISCUSSION

As stated earlier, the first article that developed the term smart city was developed by Shapiro (2006),and discussed the growth of cities and the need to understand the reasons for this growth. The descriptive features of the extracted sample are shown in Table 1. A total of 659 articles were found and published in 310 different journals from 2000 to 2023. All these papers incorporated 884 keywords and 2043 author's keywords. These articles were written by a total of 1632 academics, of which as little as 63 papers were published by a single author. In this research topic, collaborative authorship is mainly predominant, as revealed by the Collaboration Index, 3.12, or the ratio of papers per author (0.403).

Table 1: **Descriptive features of the literature on the "Smart Tourism Destination"**

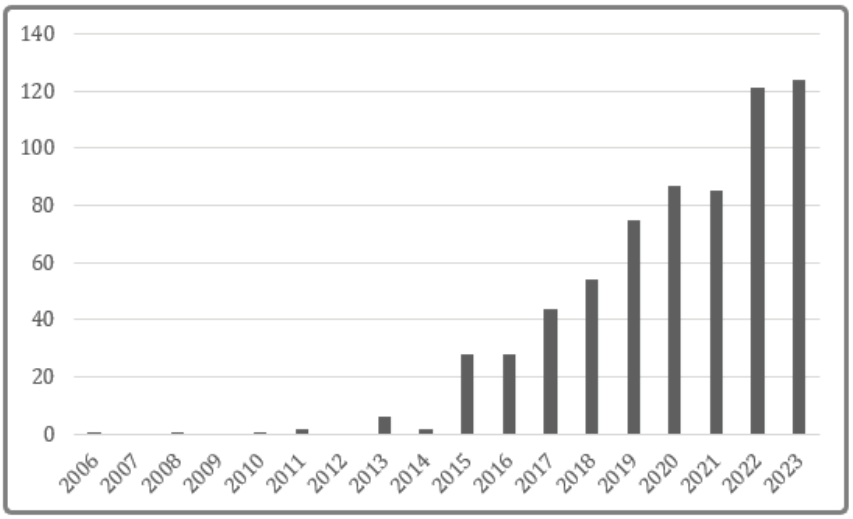
Description	Results
Timespan	2000:2023
Sources	310
Documents	659
Annual Growth Rate	23.32
Document Average Age	2.99
Average Citations Per Document	18.91
Keywords Plus (ID)	884
Author's Keywords (DE)	2043
Authors	1632
Authors of single-authored documents	56
Authors of multi-authored documents	1576
Single-authored documents	63
Documents per Author	0.403
Authors per Document	2.476
Collaboration Index	3.12

Source. Prepared by the author based on Bibliometrix R Package.

2.1. Trends in academic output

The popularity of the term STD is accompanied by a still limited but growing scientific output (Boes et al., 2015), as shown in Figure 3, which illustrates the evolution of the academic discipline through the number of articles published until 2023. In the graph, three different periods can be observed. The first period runs from 2006 to 2015; where a small number of published papers is seen, with an annual average of 1.44 publications. In 2015-2021 the rate of growth of academic production on STD rose significantly, reaching almost 90 scientific documents published in 2020 and being 52.67 the annual average of publications within the said time period. Finally, the years 2022 and 2023 stand out with a production of over 120 published articles.

Figure 3: **Number of articles in WoS focusing on smart cities and STD (2006 - 2023)**

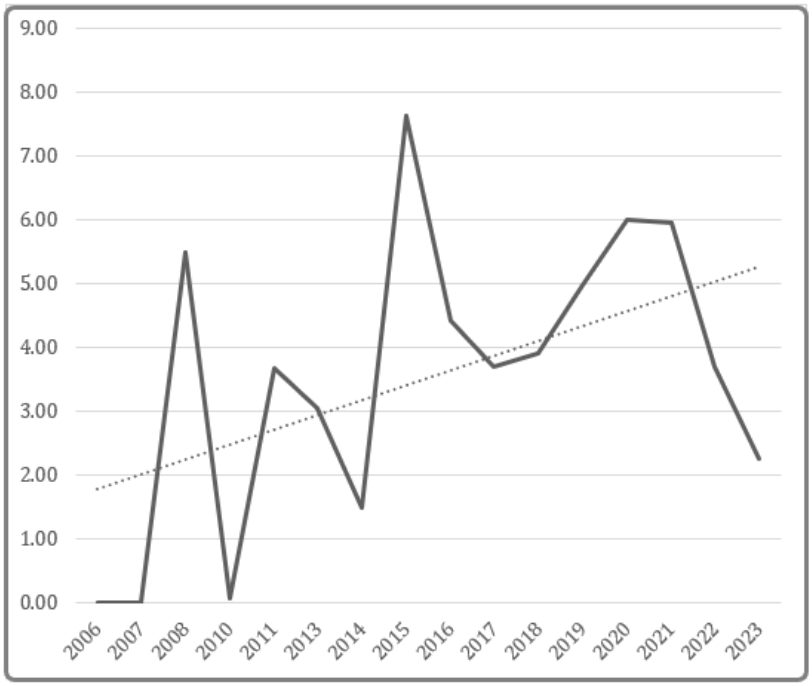


Source. Prepared by the author based on Bibliometrix Package.

When it comes to the analysis of yearly citations, the following graph displays an overall increasing pattern from 2006 onwards, being 2008, 2015 and 2020 the years with the highest average of citations. Although this tendency decreased during the following two years (2016 and 2017), citations per year averaged more than three. Starting 2018, trend in citations rises again until 2020, slightly decreasing in 2021, followed by a drastic drop in citations in the following year. For the current year, it stands at 2.2, its lowest level since 2014.

The previous graph indicates how interest has increased in recent years in SDT. This research topic has captured significant attention within both society and the social sciences research community. Given its prominence, there is a growing imperative for the scientific community to delve deeper into this field of study.

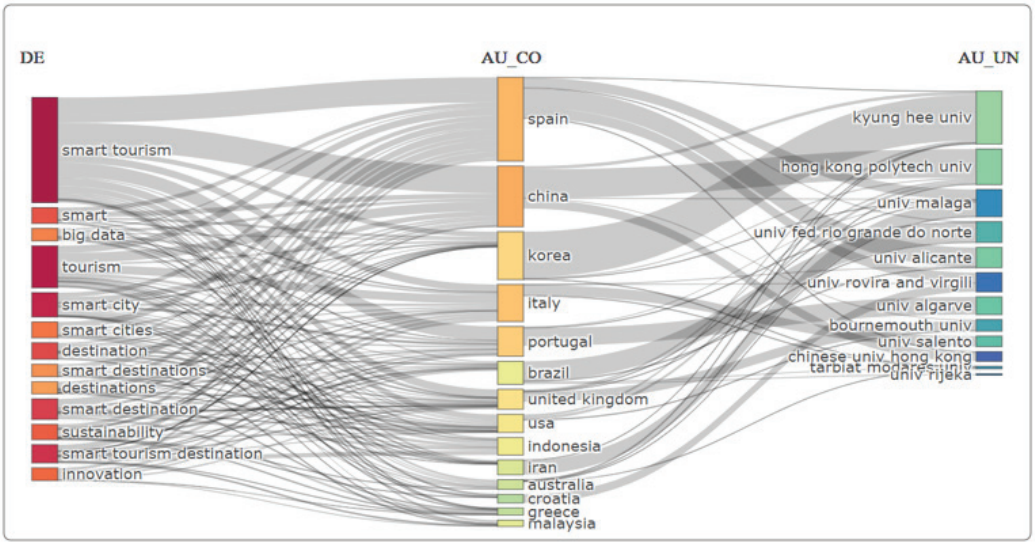
Figure 4: **Average citations per year**



Source. Prepared by the author based on Bibliometrix R Package.

It is meaningful exploring the main topics and the states where the papers were developed as well as their creators' affiliations. In the following diagram, a three-way chart (keywords on the left-hand side, affiliations on the right-hand side while countries are indicated in the middle) is shown. It is visible that Spain, in absolute terms, is the nation that has produced the most on all topics connected to STD, shadowed by China, which has issued mainly on smart tourism, tourism and smart city. Other states of particular weight in all topics are Korea and Italy. The universities with the highest number of publications are Kyung Hee University (South Korea) and The Hong Kong Polytechnic University (China). Universities of Malaga and Alicante stand out for Spain with collaborations with other universities in Italy, Portugal, China and United Kingdom.

Figure 5: **Three-fold analysis of Smart Tourism Destination literature**



Source. Prepared by the author based on Bibliometrix R Package.

2.2. Sources

2.2.1. Journals

An in-depth bibliometric study entails an examination of the sources where the documents have been published. Upon analysis of the research data, the main characteristic that was observed was the multitude of sources where the papers on 'smart tourism destination' were published. Altogether, there are 310 sources listed in Web of Science, which indicates that there are not many specialised journals on this topic. Among the overall publications, 29.14% corresponds to 9 sources that have produced 10 or

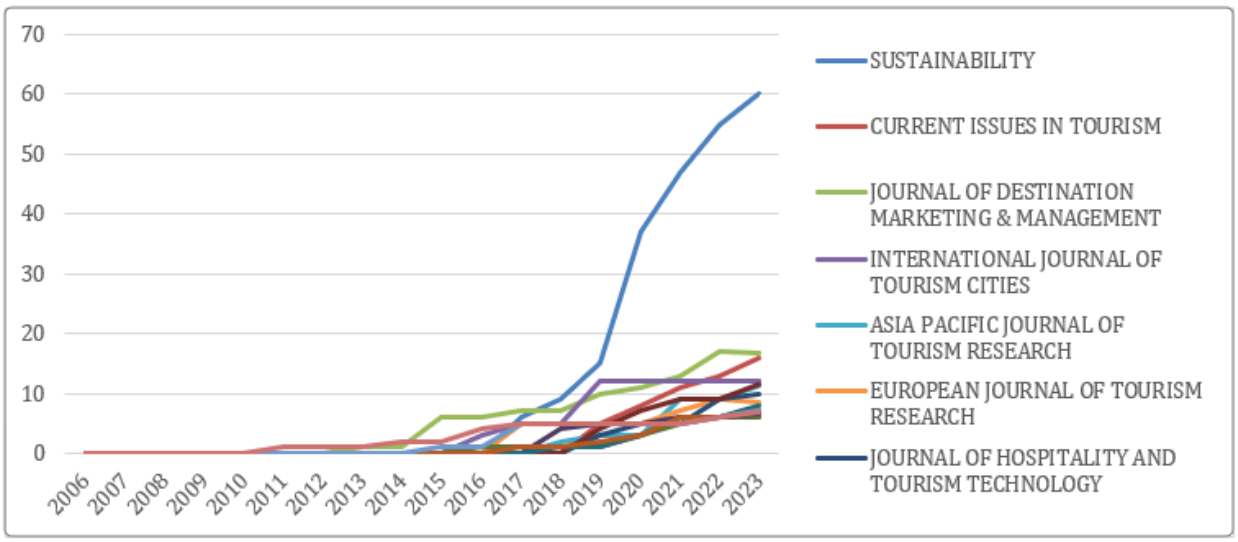
more papers. Notably, the journal with the highest volume of articles on this subject is Sustainability, contributing a total of 75 articles. Following closely are Current Issues in Tourism and Journal of Destination Marketing & Management, securing the second and third positions with 22 and 19 papers, respectively. International Journal of Tourism Cities trails behind with 18 papers. On the contrary, 221 journals find themselves at the lower end of the ranking, having published only 1 paper on STD, collectively constituting 33.54% of the scientific production.

Eugene Garfield (1972) developed a technique to measure the calibre of scientific journals known as the Journal Impact Factor (JIF). Widely utilised for evaluating the academic influence of articles, the JIF proves immensely valuable in assessing the visibility of journals. Based on their JIF, each article is categorised into a quartile, with Q1 being the most significant. An analysis of the quartiles to which journals belong reveals that 33.02% of them, in various categories, occupy the first quartile, indicating remarkably high quality. Notably, journals with the highest volume of articles on STD (Sustainability, Current Issues in Tourism, and Journal of Destination Marketing & Management) are all situated in Q2.

2.2.2. Source Dynamics

Figure 6 illustrates the progression of the leading five publications from 2006 to 2023. According to Royston (1992) the Loess smoothing technique, which is the locally weighted smoothing, uses regression analysis to demonstrate the smooth line with the help of a time plot or scatter plot. Royston ascertains that Loess smoothing helps to better understand trends over time.

Figure 6: **Source development based on the quantity of publications per year**



Source. Prepared by the author based on Bibliometrix R Package.

The journals analysed are Sustainability, Current Issues in Tourism and Journal of Destination Marketing & Management, International Journal of Tourism Cities and APAC Journal of Tourism Research. Since 2014, there has been an increase in the quantity of publications in the field of Sustainability, which is the main journal for publishing STD papers, being the journal with the highest growth since 2017. In the current year 2023, Sustainability continues to be the journal with the highest value. The other four journals have also seen an increase to their scores specially over the last seven years.

2.3. Documents

2.3.1. Highly cited papers

The number of citations of any research is extensively accepted as one of the main factors for the relevance of academic papers. This study studies 659 papers on STD, which together have achieved 12.461 citations in Web of Science. To identify the papers with the highest impact, the study has been based on the ten papers with the highest number of citations.

Table 2: **Top ten most cited papers**

Ranking	Title	Author	Year	Total Citations	TC per Year
1	Smart tourism: foundations and developments	Gretzel, U., Sigala, M., Xiang, Z. and Koo, C.	2015	691	76,78
2	COVID-19: potential effects on Chinese citizens' lifestyle and travel	Wen, J., Kozak, M., Yang, SH. and Liu, F.	2021	397	132,33
3	Smart tourism destinations: ecosystems for tourism destination competitiveness	Boes, K; Buhalis, D and Inversini, A.	2016	287	35,88
4	Tourists' intention to visit a destination: The role of augmented reality (AR) application for a heritage site	Chung, N; Han, H and Joun, Y.	2015	268	29,78
5	SoCoMo marketing for travel and tourism: Empowering co-creation of value	Buhalis, D. & Foreste, M.	2015	257	28,56
6	Technological disruptions in services: lessons from tourism and hospitality	Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S. and Hofacker, C.	2019	254	50,80
7	Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article	Buhalis, D	2019	249	62,25
8	Tourism analytics with massive user-generated content: A case study of Barcelona	Marine-Roig, E & Clave, SA	2015	206	22,89
9	Knowledge transfer in smart tourism destinations: Analyzing the effects of a network structure	Del Chiappa, G and Baggio, R.	2015	201	22,33
10	The concept of smart tourism in the context of tourism information services	Li Y, Hu, C, Huang, C and Duan, L.	2017	199	28,43

Source. Prepared by the author based on Bibliometrix R Package.

The top-ranked paper in terms of citations is Gretzel et al. (2015), with 691 citations since its publication and averaging 76.78 citations per annum. This paper encompasses 5.55% of the total citations across all the documents examined. In this article, smart tourism is named, with the idea of differentiating it from e-tourism, which had been developed so far. Consequently, STD is a further development of the smart city concept. Occupying the second position in the ranking for total citations, but holding the record for the highest number of citations per year at 132.33, is the paper by Wen et al. (2021). The authors intend to predict the consequences of the COVID-19 outbreak on the global tourism and hospitality industry.

In the third position is the work of Boes et al. (2016) with 287 total citations. In their paper, they found that although ICT is critical for STD, it is insufficient to introduce smartness solely on its own. Chung, Han and Joun ranked fourth with 268 total citations, with an article that emphasizes the crucial role played by AR applications in shaping and enhancing tourists' experiences at heritage sites, shedding light on the intersection of technology and tourism intentions.

The article by Buhalis and Foreste (2015) has 257 citations so far and ranks fifth. The authors propose social context mobile (SoCoMo) marketing as a new framework that enables marketers to increase value for all stakeholders at the destination. Ranking sixth with 254 citations the paper by Buhalis et al. (2019) highlights key insights and lessons learned from the experiences of technological disruptions in the dynamic landscape of tourism and hospitality services.

Buhalis. D (2020) authored the seventh paper in the ranking which was cited a total of 249 times. It stands out as it is the third highest number of citations per year (62.25). The author provided a comprehensive perspective on the evolution of technology in tourism, tracing its journey from information communication technologies to the emergence of e-Tourism and smart tourism.

The following article by Marine-Roig and Clave (2015) ranked eight and has 206 citations. The paper highpoints the utility of big data analytics to support smart destinations and presents a case study for the city of Barcelona.

Del Chiappa and Baggio (2015) rank second to last of the top ten article ranking in STD. This paper has a total of 201 citations and revealed in order to be an effective knowledge-based destination, both the virtual and the real components of the network structure of the destination should be considered.

Finally, the paper that concludes the roster of the ten most cited papers has accumulated 199 citations. Li Y. et al. compare the characteristics and features of traditional tourist information services and those incorporated in smart tourism. Then, recommendations are provided and future research/industrial directions are discussed.

2.4. Authors

2.4.1. Most relevant authors

The impact of various authors on the subject is typically assessed through several indicators. The total number of citations received for a researcher's scholarly output is frequently employed to gauge the author's influence within the academic community. In other words, the total amount of citations will allow to recognise the most relevant researchers for the field of knowledge associated to the terms '*smart city'* and '*smart tourist destination*'. Furthermore, the impact of authors is always measured using the H-Index, which combines impact (quality) with productivity (size or quantity) into a single number as a bibliometric indicator of scholarly performance when a citation distribution is given for a publication set (Hirsh, 2005). It has now become overwhelming popular as a performance indicator (Bornmann & Marx, 2011).

Nevertheless, many approaches for fractionalising the h-index taking into account multiple authorship have been proposed (Prathap, 2020). In this sense, fractional authorship quantifies an individual researcher's contribution to a set of papers (following the hypothesis of uniform contribution of all co-authors at each document). It is seen as more meaningful, in the context of fractionalization, to read the h-index off the impact sequence, rather than the citation sequence as the former is based on an intensive property that does not change with fractionalization (Prathap, 2020).

Table 3 designates the top 10 researchers according to the achieved number of total citations and their respective academic performance indicators in relation to the proposed topic.

Table 3: **Most relevant authors**

Author	Times Cited	Number of Papers	Times Cited/ Number of Papers	H_Index	Articles fractionalised
Koo, Chulmo	1,220	11	110.9	9	3.25
Buhalis, Dimitrios	1,152	9	128	8	4
Gretzel, Ulrike	1,013	9	112.6	7	4.95
Chung, Namho	920	15	61.33	12	4.67
Xiang, Zheng	726	2	363	2	0.58
Sigala, Marianna	691	1	691	1	0.25
Ivars-Baidal, Josep A.	464	7	66.29	6	2.02
Kozak, Metin	453	3	154	3	1.25
Yang, Shaohua	410	2	205	2	0.5
Wen, Jun	399	2	199.5	2	0.42

Source. Prepared by the author based on Bibliometrix R Package.

According the total number of received citations, the most significant authors are Koo, Buhalis, and Chung, each surpassing 1000 citations with 1,220, 1,152, and 1,013 citations, respectively. The importance of these authors is further affirmed by their H-Index and Articles Fractionalised scores. The Articles Fractionalised metric involves assigning fractions of a publication to each author based on their contribution, providing a nuanced representation of individual contributions in multi-authored papers. In this context, Koo, Buhalis, and Chung stand out with significantly higher H-Index and Articles Fractionalised scores compared to other authors. Chung, in particular, has contributed the highest number of papers on STD, totalling 15, and attains the second-highest fractionalised article score of all authors, with a score of 4.67. Chung also averages almost 61.33 citations per paper. Noteworthy is Sigala, who, with only one paper, received 691 citations, demonstrating a high average citations per paper. Xiang follows as the second-highest in terms of average citations per paper, averaging 363 citations per article. Additionally, Gretzel achieved the highest fractionalised article score, obtaining a mark of 9.5

By applying Lotka's law to the dataset, we aim to conclude the scrutiny of the most relevant authors. This law developed by Alfred Lotka is a bibliometric law, on the distribution of authors according to their productivity (Lotka, 1926). In accord with this law, the largest number of authors publish the smallest number of papers. In contrast, the smallest number of authors publish the largest number of papers, this being the most prolific group (Price, 1973). The results referring to Lotka's law for the extracted data are shown in the following table.

Table 4: **Author's productivity through Lotka's law**

Documents produced	No. of Authors	Proportion of authors	Cumulative percentage
15	1	0,06%	0,06%
11	2	0,12%	0,18%
9	2	0,12%	0,31%
7	4	0,25%	0,55%
6	4	0,25%	0,80%
5	9	0,55%	1,35%
4	15	0,92%	2,27%
3	41	2,51%	4,78%
2	170	10,42%	15,20%
1	1384	84,80%	100,00%

Source. Prepared by the author based on Bibliometrix R Package.

It is evident that merely three authors among the 1,632 in the data set have authored ten or more papers pertaining to STD, accounting for a mere 0.18% of the total authors. The count of researchers contributing more than one paper on the subject is 248, constituting 15.20% of all authors. The majority, comprising 1,384 academics (84.80% of the authors), have contributed solely one paper on the topic.

2.4.2. Most relevant affiliations

The following table displays the leading countries based on the overall count of publications and the corresponding cited references they have gathered for papers published on STD.

Table 5: **Top ten countries according to publications and article cited references**

Country	Freq	Country	Total Citations
China	359	South Korea	2,126
Spain	261	Spain	1,600
Italy	160	United Kingdom	1,555
Portugal	119	China	1,361
South Korea	110	Italy	1,198
United Kingdom	90	USA	816
USA	86	Turkey	465
Indonesia	83	Portugal	396
Brazil	67	Iran	261
Malaysia	67	Australia	250

Source. Prepared by the author based on Bibliometrix R Package.

Within the most relevant countries in terms of scientific production are Spain with 261publications while achieving 1,600 citations and thus ranking second place in number of articles published and total citations, China, with 359 papers and 1,361 citations. Italy follows with 160 papers and 1,198 citations. South Korea is in fifth place with 110 publications, while in terms of received citations, it holds the first place with 2,126 citations. Other countries displayed in the top ten according to number of articles published are Portugal, South Korea, Brazil, and The United Kingdom, among others.

The most relevant affiliations are shown in Table 6, presenting the universities that hold the top ten positions.

Table 6: **Most Relevant Affiliations**

Rank	Affiliations	Articles
1	Kyung Hee University	67
2	Hong Kong Polytechnic University	48
3	University of Alicante	29
4	University of Algarve	22
5	University of Salento	22
6	Federal University of Rio Grande do Norte	21
7	Bournemouth University	19
8	University of Malaga	18
9	Tarbiat Modares University	18
10	University of Rijeka	15

Source. Prepared by the author based on Bibliometrix R Package.

Kyung Hee University (South Korea) published 67 papers on STD. Ranking second place, with 48 papers, is the Hong Kong Polytechnic University (China). It is followed by University of Alicante (Spain) with 29 articles and Universities of Algarve (Portugal) and Salento (Italy) with 22 articles each. Federal University of Rio Grande do Norte (Brazil), Bournemouth University (UK), University of Málaga (Spain), Tarbiat Modares University (Iran) and University of Rijeka (Croatia), close the ranking with 21, 19, 18, 18 and 15 papers respectively.

2.5. Conceptual structure

In this segment, the conceptual framework of research on STD is introduced. To achieve this, a co-occurrence network has been constructed using the interrelationships among the keywords in the papers. This network aims to evaluate various themes related to STD across time. Subsequently, a two-dimensional matrix has been created, housing the word networks forming the "thematic map." Lastly, an analysis is conducted on the progression and evolution of this thematic map.

2.5.1. Co-Occurrence Network

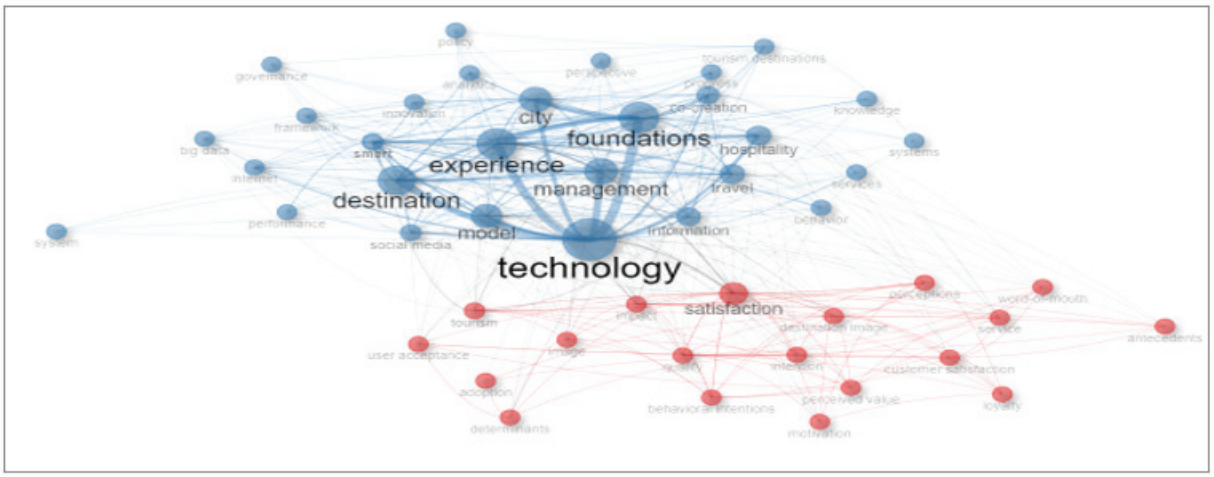
Co-word analysis is a method used to gain insight into the meaning of the content of papers and map the structure and development of a scientific discipline (Zupic & Čater, 2014). This method focuses on two main premises: first, keywords which are carefully selected by researchers to denote the content of their papers adequately; second, the co-occurrence of two topics in different articles indicates the correlation between them (Feng et al., 2017).

The following co-occurrence network has been generated from the keywords plus with the Biblioshiny software. It shows that the keyword relationships are disseminated in three clusters entangled with each other through associations between some keywords. The clusters represent groups of textual information that can be understood as semantic or conceptual groups of different topics of the research field (Cobo et al, 2011).

The primary cluster is the blue grouping, prominently featuring the term "technology," followed by "experience," "destination," "management," "foundation," and "city." This suggests a robust connection between discussions of technology and these associated concepts, signifying the noteworthy co-occurrence of these terms in the examined context. Furthermore, it is deduced that these keywords serve as pivotal nodes in the collaborative word network, establishing links with other keywords. The cluster of interconnected words indicates that STD authors have focused their work on how destinations and cities have strived to use technology in an attempt to improve how they collect and use information for tourism purposes. The results are consistent with Gretzel et al. (2018), who describe Smart Tourism as consisting of five layers: 1) a physical layer that includes natural and human-made touristic resources as well as transportation and service infrastructures; 2) a smart "technology" layer that links to this physical infrastructure and provides back-end business solutions and front-end consumer applications; 3) a data layer that includes data storage, open data clearing houses and data-mining applications; 4) a business layer that innovates based on the available "technologies" and respective data sources; and, finally, 5) an experience layer in which the resulting technology- and data-enhanced "experiences" are consumed.

In the red cluster, the words "satisfaction" has a dominant position followed by other themes such as "impact", "destination-image", "perceptions", "perceived value", etc. This cluster of associated terms identifies studies that have been carried out on STD in the academic world which have focused on scrutinising the factors or reasons that support the decision-making process of the tourist when selecting the travel destination.

Figure 7: **Co-occurrence network**



Source. Prepared by the author based on Bibliometrix R Package.

2.5.2. Thematic Map

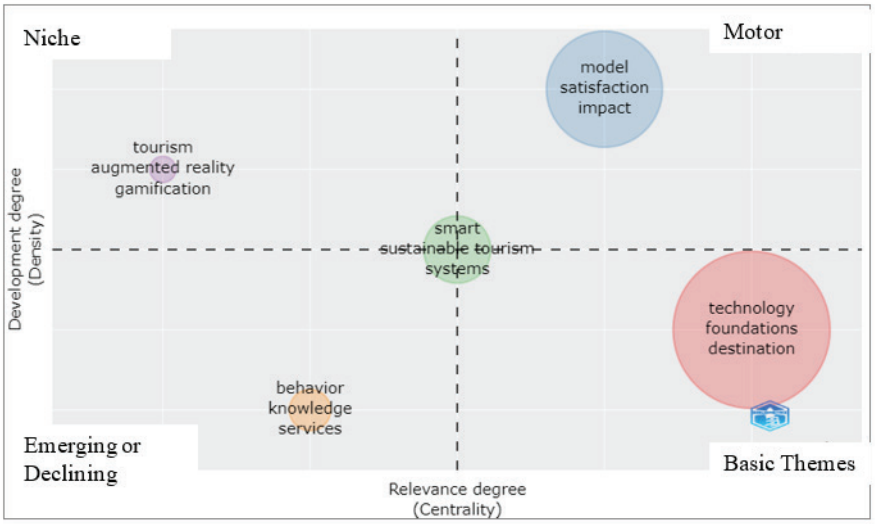
In accordance with Callon et al. (1995), the research themes depicted in the earlier keyword co-occurrence relationship are presently illustrated in a two-dimensional thematic map based on centrality and density scores (Figure 8). The primary sphere refers to all subjects pertaining to technology, destination, foundation, management and experience, among others. With a medium-high level of centrality and hight density, Themes in this quadrant are not only central to the overall research but are also densely connected, indicating a closely-knit and integrated set of concepts. The domain "model, satisfaction and impact" appears, allowing to identify it as one of the driving and central themes of STD. Academic research shows how correlations between identified technological attributes to satisfaction, overall destination image, and visitors' loyalty intentions (revisit and recommendation).

With high centrality and low density this sphere is represented on the bottom right, meaning that the central themes in this quadrant may play a crucial role, but they might have fewer direct connections to other themes, suggesting a more focused or specialised aspect of the research. In the middle of the graph, the domain composed by "Smart", "Sustainable Tourism" and "Systems" is found, deemed with a standard relevance and development degree. This is interpreted as the central values on which most of current literature is based in order to reach specific research conclusions. In other words, these topics are moderately central to the overall research and has a moderate level of connectivity with other themes (average centrality and density).

In the second quadrant of the chart, the field associated with "tourism," "augmented reality," and "gamification" is depicted. This indicates that this theme is considered on the periphery however with significant likelihood for development. With a low level of both centrality and density, "behaviour," "knowledge," and "services" can be identified. It may be interpreted as declining topics within STD research. Currently, research on smartness attributed to these themes is no longer pursued.

Consequently, the academic research approaches the concept of STD from an extensive array of standpoints, leading to the presence of many different areas and proposals. In this sense, the structure of STD academic literature and professional documents is rich and complex with a high degree of specialization. In many instances, information-technology has been one of the main drivers. In addition, for the majority of cases, smart is unquestionably associated with technologies and can be used to nurture destination management that locates destinations in an improved position to face crisis situations.

Figure 8: **Thematic Map**



Source. Prepared by the author based on Bibliometrix R Package.

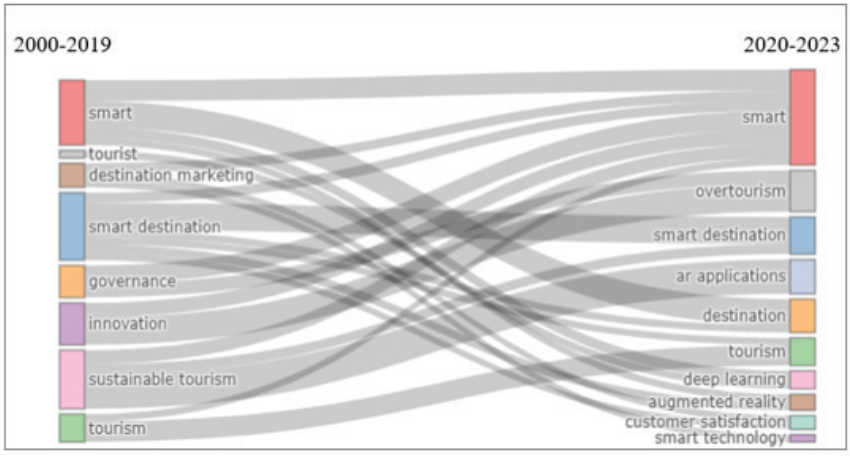
2.5.3. Thematic Evolution

Aside from the thematic map shown beforehand, the thematic evolution is also taken into consideration (Figure 9), illustrating the historical development of literature on STD. The examination of this thematic evolution is based on Author's Keywords. As displayed, the thematic evolution is segmented into two distinct time frames – the first spanning from 2000 to 2019 and the second from 2020 to the current date. Over time, topics have undergone notable changes.

Consistent with the findings of the current bibliometric study, during the initial period, academic literature on STD predominantly focused on a limited set of topics that have traditionally been central to research over the past two decades. In this context, scholarly documents primarily addressed smart destinations, smartness, and sustainable tourism, with lesser emphasis on themes such as innovation, governance, and destination marketing.

Moving into the second period, covering the four years from 2020 to the present, STD literature has diversified across various topics. Smartness continues to hold a significant position in STD research, accompanied by emerging themes like deep learning, augmented reality applications, and smart technology. This suggests that in the current decade, studies are likely to concentrate on technological advancements contributing to the enhancement of customer satisfaction within tourist destinations.

Figure 9: **Thematic Evolution**



Source. Prepared by the author based on Bibliometrix R Package.

CONCLUSIONS

Theoretical implications

For almost two decades, academic production and researchers have approached the concept of Smart Tourism Destination and its phenomena from an abundant variety of angles, resulting in numerous areas, sources and proposals. To suggest new directions for future research agendas, it is important to consider what has already been put forth about it. As a result, this work has reviewed the existing literature by studying relevant aspects of scientific documents, the topics researched and the established conceptual structure in terms of relationships between them. The following findings have provided a comprehensive perception of the most significant and influential developments in the field, enabling the identification of key contributions and pioneering approaches developed by recognised scholars and experts with regards to STD. This familiarity offers a solid foundation and basis in order to contextualise this research, ensuring its relevance and uniqueness in relation to existing knowledge.

The analysis carried out in this paper made it possible to establish that, for the scientific literature on STD between 2000 and 2023, as many as 1,632 researchers have contributed to the publication of 659 documents which have been duly indexed into Web of Science directory. The most cited article during this period is by Gretzel et al. (2015), which provided a definition for smart tourism and analysed the existing smart tourism tendencies at that moment as well as dragging attention to the necessity to continue exploring and fostering research in the research field. This publication not only provided a foundational definition for smart tourism but also critically studied existing trends, emphasising the necessity for continuous exploration and research in the field. This influential work has likely played a pivotal role in shaping the trajectory of subsequent research and discussions surrounding STD.

Among the most illustrative outcomes of the descriptive analysis, the following are worth highlighting findings: the author with the highest H-index is Chulmo Koo (h_index: 9), who has produced a total of 15 articles, including the most cited paper on STD mentioned before in collaboration with Gretzel et al. (2015). The journal with the highest number of published articles is Sustainability (Multidisciplinary Digital Publishing Institute, 2022) with over 50 papers, whereas the source with the highest Journal Impact factor (12.7) is Tourism Management (Elsevier Sci Ltd, 2022) underscoring the influence of both journals in the academic community. In terms of the most representative institutions, Kyung Hee University (Seoul, South Korea) stands atop with 67 articles, followed by the Hong Kong Polytechnic University with 48 papers. This institutional representation signifies a strong research focus and commitment to advancing knowledge in the field. Spain is the nation with the most academic output (261 publications), ranking second in total number of publications and total number of citations on the topic after South Korea, country that stands out at average article citations (59,1 citations per article). These findings collectively highlight key influencers, publishing sources, and institutional and regional contributors in the field. The academics' impactful contributions, the prominence of specific journals, and the involvement of institutions and nations accentuate the multifaceted nature of research in this dynamic topic.

In the co-occurrence research of words used in titles, abstracts and keywords (Martínez-Toro et al., 2018), new terms associated with smart tourism, smart destinations and smart city have been recognised; management, experience, model, knowledge and satisfaction. Thus, assisting in identifying trends in current research areas such as impact and social media. Similarly, it was possible to discover emerging themes that still need to be developed, being artificial intelligence, augmented reality and big data the most prominent ones. The identification of the said emerging technologies signifies the evolving nature of research in the STD domain. This nuanced understanding of research trends and gaps serves as a valuable foundation for future studies in the dynamic and evolving field of STD.

In summary, Smart Tourism Destinations leverage information and communication technologies to improve the efficiency, sustainability, and competitiveness of destinations. As these technologies become integral to tourism development, it is crucial to systematically analyse the academic literature to gain insights into the global discourse surrounding STD. New technologies have the potential to revolutionise hospitality and tourism industries by replacing a large portion of the labour force. While the future is uncertain, technological developments like Narrowband IoT/5G, Cloud Computing, Internet of Things, Machine Learning and Artificial Intelligence, Blockchain, Robots, Virtual Reality, Augmented Reality and Extended Reality and Metaverse, among others, are rapidly turning all tourism resources into smart resources in tourism destinations and will drastically alter the sector, namely in terms of job displacement, ethical implications, and the equitable distribution of benefits. In this sense, investing in new technologies, including those related to VR/AR, to improve services and overall performance may prove to be a successful strategy (Lodhi et al, 2024). Moreover, the transformative impact of these technologies shall ensure alignment with sustainable and inclusive practices in the evolving landscape of the hospitality and tourism industries. Further research is required to better grasp and comprehend the wide-ranging effects of the recent technological advancements.

Practical implications

The research carried out aims to critically acknowledge what has been said and what is still missing in the existing literature using bibliometric analysis, thus helping authors to be informed about future research directions in the field. Moreover, it offers pragmatic contributions to smart tourism research field. This paper has decisively reviewed the academic output and has categorised the

existing leading journals according to their relevance for authors to publish. In addition, it has identified foremost scholars currently devoted to this discipline as well as the most cited articles and the most frequent topics of research. Despite the fact that the number of academic outputs on STD's has risen recently, additional future research should deepen the understanding on the topic.

Social implications

During the 23 years analysis of the scientific production on *"Smart Destinations"* conducted in this paper, the slowness with which the concept has been positioned at the level of the global scientific community it is, indeed, striking to note. In fact, there have been nearly 15 years of low scientific production, followed by a second period in which the trend is interrupted and concludes with a high emphasis in productivity covering the last 8 years. This is justified in the recognition expressed by all the authors reviewed in this paper, in relation to the growing importance of *"Smart Destinations"*, for the integral development of tourist destinations. The bibliometric analysis revealed that scientific production is totally concentrated in business, management, social sciences, economics and finance. In the same way, the scientific production in Smart destinations and its derivatives, is compiled in mainly 4 journals. This is very relevant for the scientific development of the area as there is a space recognised by the international scientific community for the dissemination of knowledge which does not occur in the same way in other areas linked to the management of organisations.

In addition, what is relevant at the level of scientific productivity, is the strong focus on "Smart Tourism Destinations", leaving the other categories of the construct in a less relevant spot. Looking at other specific aspects, it was observed that Technology was the most prevalent STD-related theme, virtually monopolising the attention and focus of scientific research. Moreover, in the case of leading scholars (given the well-defined concentration at author level, where only four of them produced the vast majority of scientific development in STD and subsequently, accumulate by far the highest levels of citations and co-citations) the treatment of the human resource as a pivotal element to deliver the experience led the research with regards to creating regular visitors and establishing fidelity towards the destination. Also, there has been a very high clustering at continent and country levels involved in the development of academic productivity related to STD. A trend that is expected to be reversed in the near future on account of the great relevance that the subject is undergoing at a global level. These high levels of concentration are replicated as well in relation to the conceptual evolution, types, areas and journals.

Limitations and future lines of investigation

The limitations of this paper primarily stem from the dataset selection and bibliometric methods employed. A single database, WoS, was utilised for the selection of academic documents under analysis. For future research, expanding the dataset to include other databases, such as Scopus, SpringerLink, or ScienceDirect, among others, is recommended. Additionally, to enhance bibliometric approaches, considerations could be given to executing co-creation and co-citation analysis, exploring social and intellectual structures, or implementing bibliographic coupling.

The study has also identified new research trends that researchers might use in their upcoming projects for scientific affiliations keen on broadening this subject area can be directed to particular academic journals to have them accessible to their researchers. In this sense, future research agenda on STD could also be potentially amplified by conducting studies in collaboration with other fields: an interdisciplinary approach with disciplines such as economy, sustainability, environment or geography. Furthermore, papers comparing the smart tourism practices of cities, destinations and countries may be carried out. Similarly, new bibliometric reviews of the existing literature at any point in the future may be conducted to continuously expose the status of the scientific production with the latest data.

Also, the application and development of research on STD, from the perspectives analysed in this work, must be based on governance, innovation, technologies, sustainability and accessibility, all of which have an impact on the quality of life of citizens through the so-called technological transition process.

Table 7: **Future lines of investigation and potential research questions**

Future lines of investigation	Actions and Results
Governance	How could an STD be managed in a more transparent, open and participatory way? How could an STD be managed responsibly and in a controlled manner? How efficient are tourism governance structures and processes in terms of agility in decision-making, policy implementation and coordination of actions to become a STD? How can the effectiveness of a destination's tourism governance be measured and evaluated while becoming STD, considering indicators of participation, transparency and efficiency?

Innovation	What types of collaborations and partnerships are being formed between tourism companies, academic institutions and other relevant stakeholders to foster innovation in the tourism sector? How are they contributing to the generation of innovative ideas and projects? What are the emerging trends in terms of innovation in the tourism sector globally, and how can they be applied to boost competitiveness and destination differentiation?
Technology	What are the benefits for destination managers who have access to systematised and ordered tourism knowledge through the tourism intelligence system? What is the impact of implementing a tourism intelligence system in terms of improving tourist experience, satisfaction and loyalty, and generating new business opportunities? What are the best practices and lessons learned from other tourism destinations that have successfully implemented tourism intelligence systems? How can they be adapted and applied to strengthen their position as a STD?
Sustainability	What are the practices and measures taken to protect and preserve the environment, minimising the negative impacts of tourism on natural resources and promoting more environmentally responsible and sustainable tourism? What are the indicators used to measure and evaluate tourism sustainability, considering economic, social and environmental aspects? How can follow-up and monitoring systems be improved to make informed decisions and effectively track progress in sustainability?
Accessibility and Mobility	How can the economic and social development of the local population be promoted in the context of tourism sustainability, to ensure that the economic benefits generated by tourism are equitably distributed and contribute to community well-being?
Lifestyle	What is the economic impact of tourism, both in terms of job creation and economic growth in terms of diversifying the tourism offer and attracting responsible investment?

Additionally, future studies must look as well at how users and consumers will perceive the introduction of technology advancements (namely artificial intelligence, big data, augmented, extended and virtual reality, Blockchain or robotics) in the tourism, travel and hospitality fields based on the impact of automation and robotics on destinations and on tourists' experiences. Hamid et al., (2023) affirms that modern virtual tours have enormous potential in the tourism industry. Therefore, further research is required to examine how businesses might plan to integrate these new technologies into their daily operations and workflows. Moreover, examining how workers are likely to respond to this is needed too.

Further to the above, the lines of research to be drawn from this work should focus on business intelligence, analytics and big data; intelligent management on the role of AI; energy transition and efficiency.

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