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# Smart experiences in tourism

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**Abstract.** The term “smart” is increasingly being applied to aspects of our daily lives. It is linked mainly to technology that makes routine tasks easier for us. Also, in the case of tourism, its emergent application has a consequence of the evolution of the sector, and a result of the current needs and consumption habits of tourists. Technology already plays a role throughout the entire tourist purchasing process, from information search to post-trip valuations, both conducted online. New smart products and services have emerged to facilitate travel and enjoy a destination, such as augmented reality in tourist attractions, smart cards for public transport and smart rooms in hotels. The present work aims to contribute to a better understanding of the concept of smart tourism; to that end, this paper undertakes a bibliometric study of the historical research on smart tourism, analyzing the main related themes and determining that direction of the leading research in this field.

**Keywords:** tourism, smart tourism, experiences, research, Scopus.

## 1 Introduction

The term “smart” is a buzzword linked to technology, specifically, economic, social and technological development driven by technology itself. Examples include big data, open data, information exchange, Near Field Communication (NFC) and the Internet of things (IoT), among others [1]. This intelligence is the result of a global advance or interconnection of different technologies [2] that occurs by exploiting data in real time, sharing these data, analyzing them, modeling them, optimizing them and visualizing them to yield the best decisions [3]. The smart concept applies to different fields and entities, e. g. destinations and cities. A smart city is understood as a city that uses technology innovatively, optimizing its resources, management, sustainability and quality of life [1]. But there are many more realities to which we now attach the smart tag: smartphone, smart TV, smart economy, smart switch or smart card.

Smart tourism has also emerged as an industry to which the characteristics described above are applicable. Starting from the traditional concept of tourism, smart tourism can be seen as a consequence of the sector’s evolution, and a result of the current needs and consumption habits of tourists. Today’s tourist makes use of new technologies throughout the process of purchasing tourist products or services, from the search for

information and assessment of alternatives (in the form of web comparisons, opinions of other tourists on social networks and specific tourism platforms, etc.) to online shopping and post-consumption valuations.

This study contributes to a better understanding of the concept of smart tourism, a fast-changing reality, as tourism now aims to become “smart” in response to the behaviors and demands of today's tourist. Thus, in the first place, a theoretical review of the term and the relevant technologies is performed, followed by a bibliometric study of the research undertaken in this sector.

## 2 Smart tourism

Smart is a marketing term used for all dimensions that are incorporated into or improved by technology [4]. This is how the fusion of tourism and information and communications technology (ICT) gives rise to the term smart tourism.

Smart tourism is in its conceptual infancy. Its roots date back to 2000, when Phillips [5] defined it as a holistic, long-term and sustainable approach to planning, developing, operating and marketing tourism products and businesses. The same author divided the concept into two categories: (i) smart demand and the use of management techniques to manage that demand; and (ii) smart marketing techniques, capable of targeting the right customer segments to which relevant information can be delivered [5]. The current idea of the concept has diverged, in some ways, from that early interpretation. The basic idea of transmitting relevant information to tourists and using techniques to manage demand remains, but the associated concept of technology is now privileged.

At the beginning of the decade, around 2010, several organizations began to define this new concept, taking a leap in time with respect to Philips's early approach. The United Kingdom's Organization for Smart Tourism defines smart tourism as the application and use of technology to the tourism sector [6]. Molz [7] associates it with the use of mobile digital connectivity aimed at creating more intelligent, sustainable and meaningful connections between the destination and tourists.

Currently, smart tourism is already part of the tourism development policy of some countries; one such country is China, where they have divided the concept into a maximum of 7 categories, one of which is the application of technology to the tourism industry [8]. But the concept is even broader. According to Ma and Liu [9], it is characterized by human, green, scientific and technological innovation. In short, smart tourism makes it possible to improve the quality of tourist services through the use of information technologies. In addition, it has become a trend that has changed the tourists' consumption habits, as well as tourism itself, by incorporating scientific and technological development.

One of the factors that has driven this trend is the immersion of tourism in a global and dynamic environment, where innovation is key to making tourist destinations competitive. To reach a wider target audience, these destinations and their management bodies should maximize the online availability of information [10]. More precisely, the

digital revolution that has characterized the last two decades, along with the development of ICT, have generated new technological scenarios, making smart destinations the most competitive in today's tourism marketplace [11].

### 3 Smart experiences

Some technologies that demonstrate the exchange of specific information within the smart tourism context are: e-commerce, virtual reality (VR), augmented reality (AR) and destination image formation [12]. Tourist services acquired through online purchases, such as airline tickets, accommodation and car rental services, are part of the data system to be analyzed in the field of tourism-related e-commerce [13]. As for VR, the user browses through simulated environments on his computer [14]; these virtual tours are also currently under academic scrutiny, as they employ the experiences of previous tourists to influence the perceptions of potential tourists [12]. AR in the form of commercial and historical information projected through a device [14], is also part of the tourism sector's link to ICTs.

Investigating smart experiences requires knowledge of the current techniques at the market and service levels. Focusing on the experiences of tourists, according to Werthner et al. [15], reveals smart experiences, including the development of mobile applications capable of operating across multiple devices, an Internet with permanent connectivity, new paradigms of human-computer interaction, such as intuitive search and recommendation approaches (emotional, implicit, sensor-based and proactive), and applications based on the use of advanced automatic learning techniques or the use of games. Over the last decade, special interest and growth has been observed in the use of games beyond their original domain [16], in this case, in tourism; this phenomenon is known as gamification. Gamification seeks to involve users and influence their behavior through the use of game mechanics in areas beyond the scope of the traditional gaming context [17].

A smart destination is one that, through the analysis of data at all levels and the collective intelligence of the users, incorporates a series of elements and improvements that facilitate the travel process throughout. For example, Barcelona airport offers unlimited Wi-Fi, as well as Bluetooth sensors in the security checks to determine how long it takes travelers to pass through, incorporating self-checking machines, introducing touch screens, etc. Upon arrival at the primary destination point, the second contact is the transfer to the accommodation. In this second phase, Barcelona has planned implementation of T-mobilitat, a single prepaid contactless card for the city's entire public transportation network [18]. Once tourists arrive at their accommodations they find that many hotels are implementing a smart philosophy, e.g., intelligent rooms controlled via mobile phone or smart watch. The application of the smart experience even reaches places and attractions, such as museums. In May 2018, Madrid's Thyssen Museum presented visitors with the first VR experience. This initiative allowed visitors to delve into three works from the permanent collection, by walking through them in a three-dimensional space that recreated the experience of strolling through the meadows of Auvers as painted by Van Gogh, the streets of New York that inspired Mondrian, or the

flowers and insects of a Dutch still life [19]. The data set generated by the exchange of information and the interaction of tourists and users at the destination must be captured and stored for further analysis. This is the first step of the important challenge of applying big data to the tourism sector. In the second step, all the information obtained should be transferred quickly to its practical application to offer personalized experiences to the tourist.

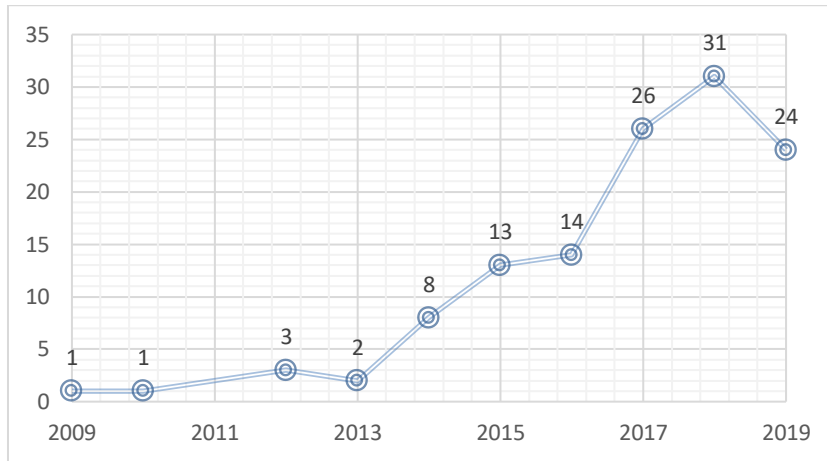
## **4 Methodology**

To analyze the topics that have been researched in the field of smart tourism, and more specifically, the relevant experiences in this area, while investigating the most current trends, this work carries out an analysis of the papers published in this area. The papers analyzed were collected from the Scopus database, one of the largest and highest-quality abstract and citation databases of peer-reviewed literature on the Internet [20] [21]. A historical search of all articles published in this field has been performed, to identify the terms “smart experiences+tourism,” which were used as a filter in the title, keywords and abstract of the articles, obtaining a total of 221 documents. As a second filter, the proceedings of congresses, books, book chapters and reviews have been discarded, narrowing the focus of the present paper to scientific articles. This reduced the study sample to 124 items.

The main subject areas addressing the main topic, smart tourism, are identified in the sample. Further, two specific aspects are analyzed: 1) fields of study and knowledge that are related to this subject, for which an analysis of the content and frequencies of the titles and keywords of the work are carried out; and 2) the direction of cutting-edge research in this field, which requires the analysis of the main topics addressed by the current reference authors.

## **5 Main results**

The 124 documents analyzed were published in the period 2009-2019, given that this new area of study is characterized by very recent research. The highest number of articles published was in 2018 (31 articles), but 2019 presents results indicating a growing trend is the number of articles published this year is expected to exceed that of the previous year, because, by July, there were already 24 published works on the subject. Figure 1 presents the evolution of the articles published on smart experiences in tourism. The number of papers published in 2018 doubled those published in 2016, which reflects the growing interest in the subject.



**Figure 1.** Articles published on smart experiences in tourism

Of the total analyzed works, the discipline that published the greatest number is computer science, with 50.1%. Business, management and accounting (32.1%) and social sciences (31.2%) follow closely on its heels.

To determine the main themes that are addressed, as a second stage of research, this study undertakes an analysis of the content and frequencies of relevant words within the 124 selected works, first from the titles and then from the keywords. As far as the titles are concerned, the total number of words analyzed is 1.545, of which 593 different words were identified. After discarding articles and prepositions, it can be seen that tourism and the smart -central axis of the papers, along with experiences, mobile, technology, destination, service, reality, cultural, city and heritage are positioned as recurrent themes (Table 1).

**Table 1.** Ranking of most used words in paper titles

Rank	Word	Frequency	%	Rank	Word	Frequency	%
2	tourism	72	4.66%	22	reality	9	0.58%
3	smart	64	4.14%	25	technologies	8	0.52%
10	experience	21	1.36%	26	cultural	8	0.52%
11	mobile	13	0.84%	27	city	8	0.52%
14	technology	13	0.84%	28	Heritage	8	0.52%
15/16	destination/destinations	12/11	0.77/0.71%	34	application	7	0.45%
18	development	11	0.71%	36	augmented	7	0.45%
19	service	10	0.65%	40	digital	6	0.39%
21	experiences	9	0.58%	42	systems	6	0.39%

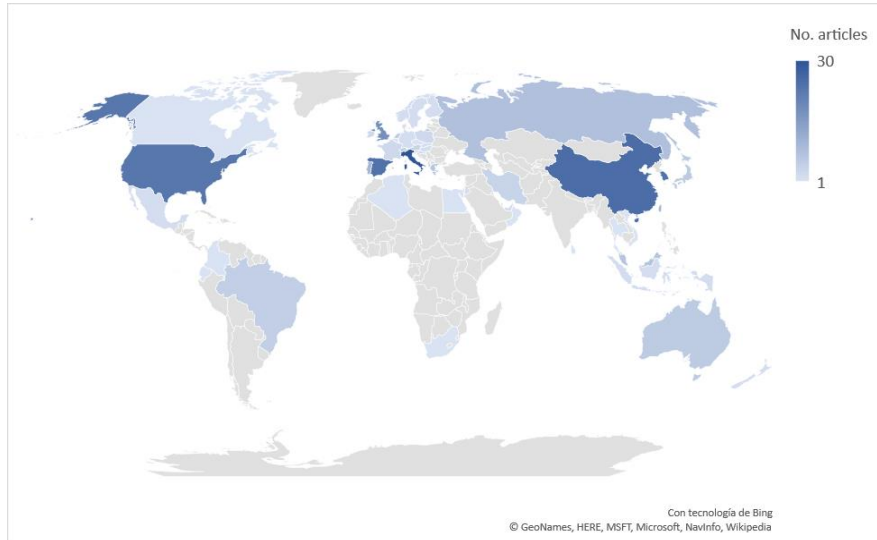
As for the keyword analysis, the total number of words analyzed is 1,066, of which 428 were distinct words. The keywords refer to the key themes covered in the papers, with “tourism” and “smart” again being the most repeated terms, followed by “experience”, “technology”, “mobile”, “tourist”, “destination”, “service”, “information” and “cultural” (Table 2).

**Table 2.** Top 20 most used keywords

Rank	Word	Frequency	%	Rank	Word	Frequency	%
1	tourism	105	9.85%	11	and	11	1.03%
2	smart	97	9.10%	12	value	11	1.03%
3	experience	33	3.10%	13	social	10	0.94%
4	technology	23	2.16%	14	design	9	0.84%
5	mobile	21	1.97%	15	travel	9	0.84%
6	tourist	20	1.88%	16	satisfaction	8	0.75%
7	destination	19	1.78%	17	innovation	7	0.66%
8	service	18	1.69%	18	heritage	7	0.66%
9	information	12	1.13%	19	systems	7	0.66%
10	cultural	11	1.03%	20	city	7	0.66%

Worldwide, 6 authors have each published at least 4 works in the last 5 years: the Koreans Chung, N. and Koo, C. (6 works each, co-authoring 3 of them); the English Buhalis, D. (4 works); and the Brazilians Cacho, A., Cacho, N. and Lopes, F. (4 works each, also with co-authors). These articles have become the reference texts in this subject. After an analysis of the content of these 19 documents, it can be seen that the most frequently recurring themes associated with experiences in smart tourism are the following: i) the use of social networks, especially images and photographs, as an influence on tourist preferences in the context of deciding on possible travel itineraries; ii) mobiles or smartphones, not only for the use of social networks but also as tools for other applications that help to provide more realistic tourist experiences, such as tourist guides, VR and gamification; iii) AR, one of the technologies that is increasingly used and exploited in the tourism industry, as it makes the tourist a participant, capturing greater attention and achieving a more satisfactory experience; and iv) geotag, the GPS location of photo and video locations, informing users of the exact locations visited by other tourists.

Although the authors who have conducted the most research in this field are from Korea, the United Kingdom and Brazil, these are not the countries that top the rankings for most research conducted in this field, although they are in the top positions. In that context, Italy leads, followed by China, South Korea, Spain and the United States, with more than 20 papers published in these countries in the last decade (Figure 2).



**Figure 2.** Countries with the highest number of smart tourism publications

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## 6 Discussion and Conclusions

The smart concept is becoming increasingly important in everyday life, as many products and services employ technologies and the “smart” approach, which seeks to make life easier for consumers. Given the change in consumer habits, the tourism sector has incorporated innovations through ICT to make the tourism experience more satisfactory. Through the use of new technologies, such as VR, AR and tourist guides in smartphones, tourist destinations and resources are now more attractive and competitive. Smart tourism also seeks to facilitate the entire process of purchase and consumption; tourists can access online, through various devices, a large amount of information about a given destination (online tours, photos with geolocation, videos, and opinions of other tourists). The current traveler is connected before, during and after the trip, and tourist destinations are aware of this. For that reason they take advantage of the high connectivity to facilitate experience as much as possible, even personalizing the services offered to each client.

Research in the field of smart tourism is still scarce, which is to be expected given that it is such a recent phenomenon, with barely a decade of history. For example, 25% of all existing research is concentrated in 2018. The research focuses mainly on the role of the mobile phone. Through the smartphone, it is easy to access a large amount of information anytime, anywhere, via access to specific applications and social networks. With the popularization of the smartphone and the greater coverage of high-capacity Wi-Fi networks, destinations can offer multiple services through apps. The inclusion of



GPS in mobile devices has also provided a great boost to the tourism sector and been integral to the promotion of destinations, turning tourists into content creators of content, as it is the users themselves who label the location of the photos and videos they take and upload to social networks. Finally, AR and VR are novel technologies that involve tourists in participatory experiences. Through games or specific devices, e. g., AR glasses, tourists become more involved in an attractive technology.

In conclusion, we face a phenomenon in the growth stage of its life cycle, in which there are many ideas and projects still in progress. It is a field that continues to interest, both from developers and researchers, whose projects and studies are growing, and from tourism destination managers, who see an opportunity to capture the attention of tourists and facilitate their travel experiences.

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