

Smart tourism: a scientometric review (2008-2020)

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Abstract

The fast path of smart tourism developments within the tourism and hospitality field clarifies the need to identify its intellectual structures and monitor its evolution. 43% of the articles ever published are from the last two years. An initial work, covering the papers published between 2008 and 2018, reveal five dimensions under a humanware approach: (i) smart technologies; (ii) smart ecosystems; (iii) value creation; (iv) tourism experience; and, (v) sharing economy. With this classification framework, the present work aims to identify emerging trends and future research paths using a scientometric analysis of smart tourism research from 2008 to 2020. The scientometric analysis was conducted over the 1321 papers referenced and retrieved from Web of Science and Google Scholar, narrowed to the 225 classified as tourism and hospitality. These articles were subject to content, citation and authorship analysis. The content analysis produced eight clusters that represent the main research streams. This result confirms the field's fast evolution path since two of these clusters emerged in the last three years. The twenty most cited articles were reviewed and classified under the humanware framework. The vast majority of the works are still related to smart ecosystems and technologies, unveiling the need to enrich knowledge related to the other streams and the tourism and hospitality response to Covid-19 supported by smart technologies.

Key words: smart tourism; humanware; smart ecosystems; smart technologies; tourist experience; scientometric review

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Introduction

The fast evolutionary path undergone by technology has impact tourism in distinctive ways: change consumer expectations and behaviour, as well as industry and strategic management decisions (Koo, Park, & Lee, 2017). The adoption of technology in the tourism industry is not recent. It is expectable to be determinant in the future (Ivanov, 2019), especially considering the Covid-19 challenges in service-logics (Gursoy & Chi, 2020). Its use was enhanced and reshaped in the latest years from the convergence of three domains - internet of things, tourism, and local development - originating the smart tourism paradigm (Gretzel, Koo, Sigala, & Xiang, 2015; Koo *et al.*, 2017).

Buhalis (2020) underlined that smart tourism appeared due to the e-tourism and web evolution, providing the infostructure to create innovative value proposals for all stakeholders. The author also claims that the next step of this evolution will be Ambient Intelligence (Aml) Tourism, where individual and collective interests will be aligned to promote the optimization of collaborative performance and competitiveness. This new phase of Aml Tourism relies on new disruptive technologies adopted by brands to increase their co-creation capabilities and explore the "nowness" effects (Buhalis & Sinarta, 2019).

With a little more than two decades of existence (1998-), the buzzword "smart tourism" never attracted so much attention as in the last years, both from academic and managerial perspectives (Mehraliyev, Chan, Choi, Koseoglu, & Law, 2020; Tiago, Borges-Tiago, & Verissimo, 2019). Several authors presented review articles, covering the publications until 2018, to establish state-of-the-art smart tourism research (Mehraliyev *et al.*, 2020; Mehraliyev, Choi, & Köseoglu, 2019; Tiago *et al.*, 2019; Topsakal, Bahar, & Yüzbaşıoğlu, 2020). The initial work of Tiago *et al.* (2019) identified five structural dimensions: (i) smart technologies; (ii) smart ecosystems; (iii) value creation; (iv) tourism experience; and (v) sharing economy. To develop this framework, the authors considered the notion present by Sigala (2017) that smart tourism could not be reduced to technology-driven elements (software, hardware, netware, or infoware). It needs to consider how tourists explore and adopt technology before, during, and post-travel and how the tourism and hospitality ecosystem can exploit it to promote personalized experiences (Del Chiappa & Baggio, 2015; Li, Hu, Huang, & Duan, 2017; Sigala, 2018; X. Wang, Li, Zhen, & Zhang, 2016). From 2015 onwards, according to Web of Science records, 874 papers were published, representing 89% of all papers ever published related to smart tourism, which reflects its growth path and concept maturity. Furthermore, from these total, 380 articles were published after 2018 helping to consolidate and clarify the concept in different settings and contexts. Thus, a new critical review work is essential to strengthen the previous framework and unveil future research directions.

This work provides a comparative and evolutionary snapshot of the research conducted in this field by (i) reviewing the concepts related to smart tourism, (ii) analyzing the research reported in the twenty-two years window, (iii) classifying the research according to the humanware framework, and (iv) suggesting future research directions.

This research acknowledges smart tourism articles from 1998 through 2020, focusing the scientometric analysis on two separate periods: the first period from 2008 to 2018, with 582 articles; and the second period from 2018 to 2020, with 404 articles. These articles, retrieved from Web of Science and Google Scholar databases, were classified following a compose criteria: number of citations, journal, and publication year, applying the review protocol of Tiago *et al.* (2019).

The initial content analysis generated eight clusters of research streams, showing that in the last three years two new clusters emerged, reinforcing two of the five dimensions found in the humanware

framework: smart technologies and smart ecosystems. A split of the analysis period is presented in a second stage, aiming to highlight the new research paths emerging in the last three years. Afterwards, the analysis focused on twenty papers classified according to their primary thematic approach and considered as anchor works due to their citation numbers.

Classification Framework

Gretzel, Sigala, Xiang, and Koo (2015) created the concept representing smart tourism "tourism supported by integrated efforts at a destination to collect and aggregate/harness data derived from physical infrastructure, social connections, government/organizational sources and human bodies/minds in combination with the use of advanced technologies to transform that data into on-site experiences and business value-propositions with a clear focus on efficiency, sustainability and experience enrichment." (pp.181).

However, and as noticed by Li *et al.* (2017), the popularity of the concept led to the misuse of the term, been smart tourism used to different types of activities and initiatives somehow linked to the tourism and hospitality industry. Sigala (2017) noted that smart tourism needs to be above all built around user-capabilities and user-needs, having what she denominates as humanware perspective.

Topsakal *et al.* (2020) found that "smart" adjectives have been used in many fields since the fourth industrial revolution, reflecting the use of new generation technologies. Leung (2018) noted that smartness in tourism is associated with adopting smart technologies within the tourism ecosystem. It has been ascertained that smart technologies positively affect the tourist decision process (Chung, Han, & Joun, 2015) and experience (Lee, Lee, Chung, & Koo, 2018), since it can enhance the value of the tangible and intangible attributes of a destination before, during and after travelling.

Thus, as technology evolves and impels firms into its adoption, arose the need to integrate different technologies and convert tourism processes into smart tourism resources (Sigala, 2018). The tourists also changed, becoming smatter tourists who demand more sophisticated and interconnected experiences (Buhalis & Leung, 2018) and influence through content shared peers' perceived image and buying decision process (Borges-Tiago, Arruda, Tiago & Rita, 2020). Furthermore, these tourists demand to customize interaction models with destinations and tourism and hospitality firms (Almeida-Santana & Moreno-Gil, 2017; Azis, Amin, Chan, & Aprilia, 2020; Boes, Buhalis, & Inversini, 2016).

Despite growing research in smart tourism, relatively little research has examined smart tourism considering an approach that focuses not only on the technology itself but also on how different tourism industry stakeholders explored it. The integration of these perspectives led to developing a framework from a humanware approach (Tiago *et al.*, 2019), that comprehends five dimensions: (i) smart technologies, (ii) value creation, (iii) sharing economy, (iv) smart ecosystems, and (v) tourism experience.

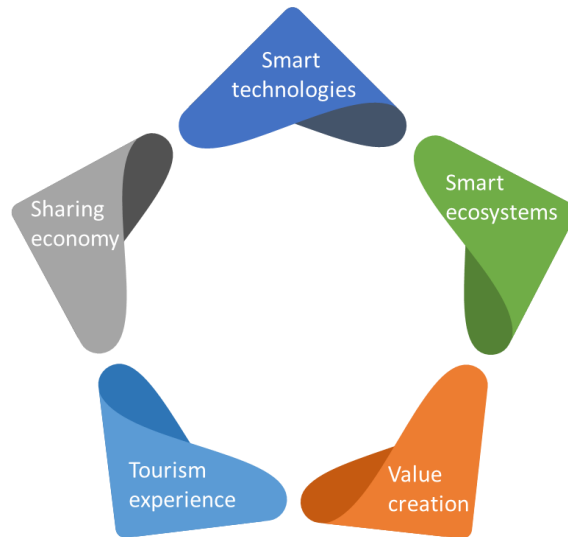


Figure 1. Smart tourism framework from a humanware approach

Detailed background studies have been carried out portraying the influence of technology on tourism from different perspectives: destinations (Boes *et al.*, 2016; Della Corte, D'Andrea, Savastano, & Zamparelli, 2017; Gil, Fernandez, & Herrero, 2015; Neuhofer, Buhalis, & Ladkin, 2012; Wang, Li, & Li, 2013); tourism and hospitality firms (Kim, Hlee, & Joun, 2016; Melian-Gonzalez, Bulchand-Gidumal, & Lopez-Valcarcel, 2013; Toh, Raven, & DeKay, 2011; Yao, Qiu, Fan, Liu, & Buhalis, 2019); and, tourists (Amanda, Santos, Rizal, & Iop, 2018; Buhalis, López, & Martinez-Gonzalez, 2020; Dinhopl & Gretzel, 2016; Edwards, Cheng, Wong, Zhang, & Wu, 2017; Ghaderi, Hatamifar, & Henderson, 2018; Lee *et al.*, 2018; Pachni-Tsitiridou & Fouskas, 2019). In smart tourism, technology is a baseline infrastructure that supports value creation for smart destinations. Thus, the digital transformation in tourism needs to understand not only tourist adaptation behaviours as they relate to smart technologies, but also how users cope with and capture each destination's unique value propositions, which enhances the tourist experience (Briciu, Briciu, & Kavoura, 2020; Dan Wang, Park, & Fesenmaier, 2012). This implies adopting an ambidextrous approach to technology that considers a two-way flow of data that allows tourism suppliers to customize and enhance tourism experience in a unique smart tourism ecosystem (Buhalis, 2020; Gretzel, Werthner, Koo, & Lamsfus, 2015). The coined "sharing economy" of AirBnB, Uber, and others have begun to take advantage of this technological ambidexterity when allowing both provider and client to rate each other (Bae, Lee, Suh, & Suh, 2017; Tham, 2016; Yao *et al.*, 2019) and use this information in future transactions.

Study Methods

As previously noticed (Tiago *et al.*, 2019; Topsakal *et al.*, 2020), research in smart tourism is not confined to journals in the hospitality and tourism field, and relevant materials are scattered across various journals. Therefore, this work comprehends three stages within the scientometric analysis:

- Stage I – Scientometric analysis on smart tourism in all different disciplines, including mapping the fields and authors with significant contributions.
- Stage II – Scientometric analysis on smart tourism in the tourism field, divided by the two periods of analysis.

- *Stage III - Scientometric analysis on smart tourism in the tourism field, applying a humanware approach.*

A fourth phase of content analysis was conducted on the top twenty articles most cited, using the classification structure the humanware framework.

Following Tiago *et al.* (2019) protocol, Web of Science, and Google Scholar were the online journal databases chosen to conduct this research, due to their easily-search and accessibility to students and young researchers.

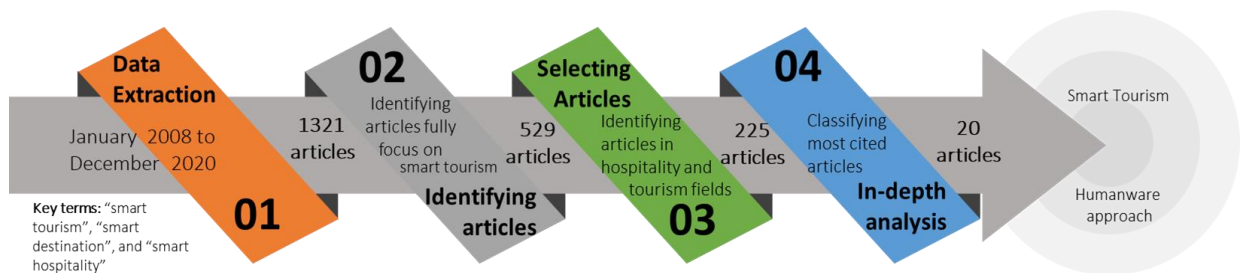


Figure 2. *Research design*

The first phase comprehends the data extraction, conducted in Web of Science and Google Scholar databases, using as search keywords "smart tourism", "smart hospitality" and "smart destination", and covering all articles available/publish online between January 2008 and December (1st) 2020. Google Scholar presented a wider range of articles. Differences are also found in what concerns the number of citations of each article. Nonetheless, this database is considered relevant for this study, since it is the most common database search by undergraduate students and young researchers.

The second phase involved a title, abstract, and article analysis to ensure the articles' alignment with the smart tourism concept. In a third phase, twenty articles were chosen considering the following criteria:

1. *Articles must have been published in recognized academic journals in the H&T field between 2008 and 2020.*
2. *They should have involved at least one of the five dimensions found in the humanware framework.*
3. *They should have researched the topic from a tourism and hospitality perspective, rather than a general perspective.*
4. *They should represent the relevant research articles in the field, and for that reason, the papers were ranked according to their number of citations.*

Only journals with a double-blind review process and high impact factor CiteScores were selected, aiming to identify the most representative smart tourism research in the hospitality and tourism field. This process guarantees enhancing quality control (Sivarajah, Kamal, Irani, & Weerakkody, 2017), but sometimes it may lead to a mainly older portfolio since the most cited articles tend to be older. In the present case, due to the fast growing and novelty of the field, this limitation was not found.

Subsequently, two authors rescanned both databases to validate the solution found, employing the same research keywords and not imposing time constraints. The articles were then thoroughly

examined, and a sample of 225 was obtained, containing all articles fully related to smart tourism. This database was used to run all the scientometric and content analysis. Although this search was not exhaustive, it can be used as a base for gaining an understanding of best practices in smart tourism.

Smart tourism scientometric analysis in different fields

From the search conducted in both databases, 1321 articles were retrieved and analyzed in this initial phase. Mapping the articles by publication year, it can be noticed that the number of articles published related to smart tourism has significant growth since the initial work of Buhalis (1998)(see Figure 3). In the last years, different journals (e.g., Electronic Markets, Current Issues in Tourism, International Journal of Tourism Cities, Journal of Sustainable Tourism, Asia Pacific Journal of Tourism Research, Tourism Review) produced special issues on the topic.

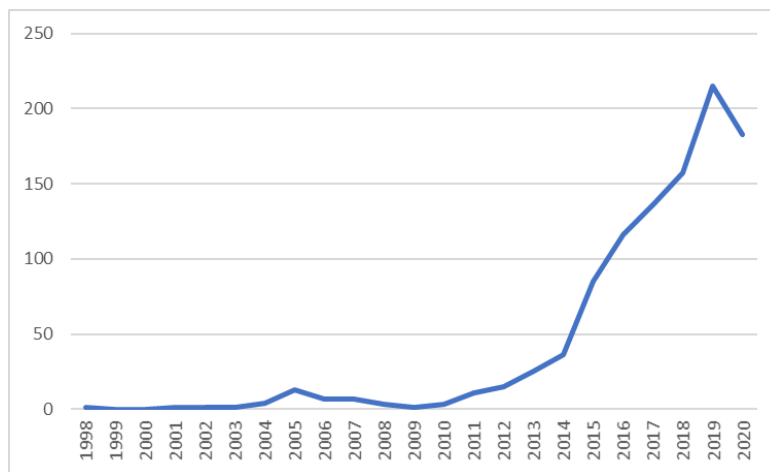


Figure 3. Number of articles published

Figure 3 presents the evolution of smart tourism research publications from 1998 to 2020 (December 1st). The results reveal an increase in the amount of research, reflecting the field's importance, although 2020 has a smaller number of articles. Apparently, this small decrease in 2020 reflects the Covid-19 pandemic and the researchers focus on Covid-19 related matters. In the first decade (1998-2008), 38 articles were published. This figure increase to 585 in the next decade and the last two years 398 articles were published.

From 1321 articles published in this twenty-two-year timeframe, 792 were presented at international conferences and published as conference proceedings. Sigala (2018) noted that smart tourism is a topic that embraces a multi-disciplinary approach, as results from this analysis shown in Figure 4.

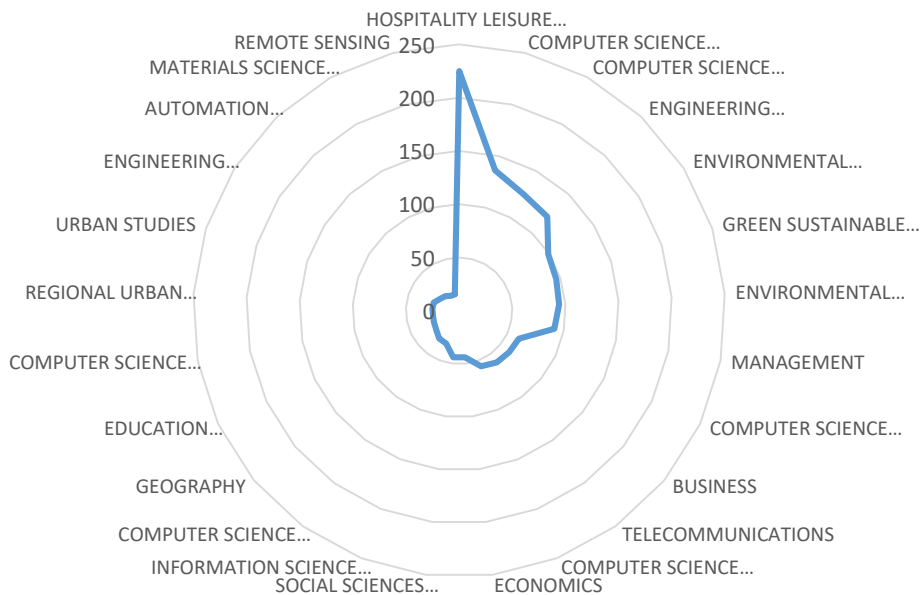


Figure 4 Articles distribution by all different disciplines

The 1321 references were classified in specific analysis fields, reflecting the journal main field and authors' chosen keywords. Within these, 225 were classified as hospitality, leisure, sports, and tourism, using the criteria adopted by Web of Science. The leftover papers belong to other research fields, ranging from management and business, engineering and different computer science-related subfields.

To better understand the field while also considering that research can be cross-domain, a clustering graph was composed of the major topics addressed in 1321 references (see Figure 5).

On the top left-hand side (red), the most significant cluster aggregates 136 items related to technology acceptance and user behaviour. With 34 items, the top-centre cluster (orange) represents the user usage of ICTs, the and the right-hand top cluster (green) with 127 items is centred in the smart tourism ecosystem. The bottom right-hand side (purple) with 112 items represents research linked to digital tools. Moreover, the middle right-hand cluster (navy blue) with a centre point in the industry and 76 items is linked to future technology trends. Three small clusters can be found integrating different technologically driven elements: big data and smart city (8 items); systems integration and Covid-19 challenges (12 items); and smart technologies and media usage by travellers (17 items). Analyzing the first author's contribution the following figure is obtained (see Figure 6).



t disciplines



score

As noticed in Figure 6, ten leading authors are responsible for 109 articles published on this topic, in journals from different disciplinary fields. The circle's dimension reflects the number of citations that each work has, leading to consider that some papers have more impact on the research field than others and the overall produce an h-index of 39. Most research focuses on Asia (189 articles), followed by Europe (328 articles), the United States (98 articles), and Australia (41 articles).

Scientometric analysis of smart tourism in the tourism field

The increasing utilization of technology in tourism has altered how tourism and hospitality firms access information and communicate with clients and have also transformed the business processes and the tourism experience (Koo *et al.*, 2017). These challenges are widely patent when a scientometric analysis is conducted confined to the tourism field (see Figure 7).

When focusing only on the tourism field journals, the number of central concepts found is smaller. The larger cluster found (top right-hand red cluster) with 128 items link smart tourism with smart cities and destinations. The bottom green cluster, with 26 items, refers to the effects of smartness on tourists' experiences. The remaining clusters are smaller and have the following agglomeration: future trends in smart tourism; destination challenges and processes; new smart technologies impact on tourism and hospitality; sharing economy and social media; and, communities and stakeholders participation in smart tourism ecosystem.

Under the smart tourism umbrella, articles cover smart tourism impacts on tourism experiences and business ecosystems and the changes and adaption processes that occurred because of technology evolution and its implications for management. For this reason, the field has undergone significant changes over the years (see Figure 8).

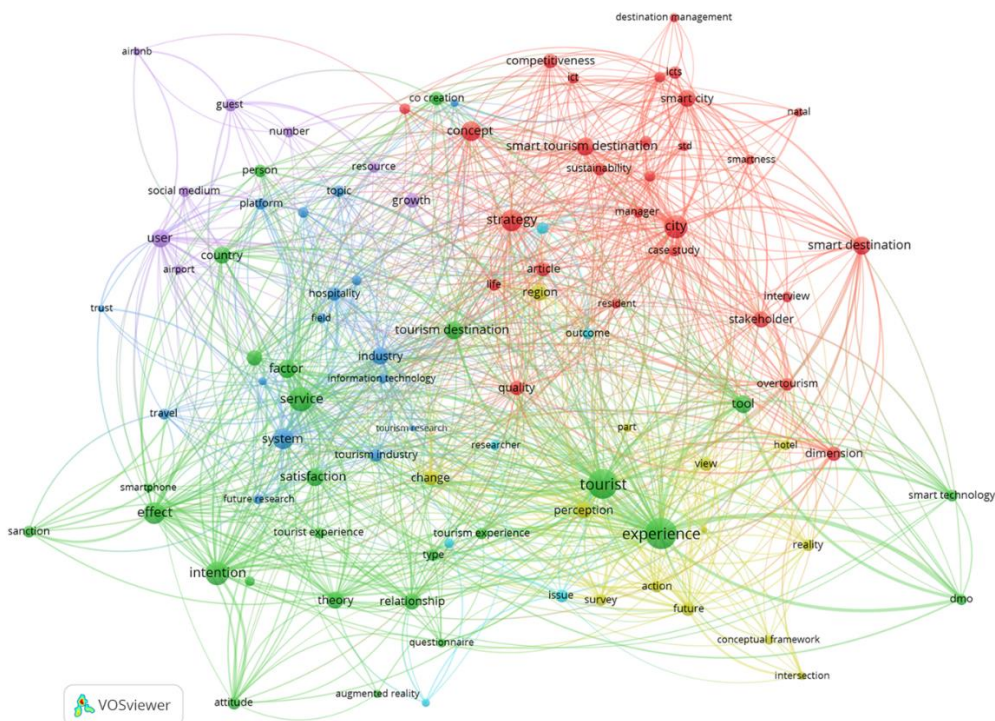


Figure 7. Key concepts network visualization

Table 1. *Distribution of articles according to the proposed classification model*

Authors	Title	Journal	Year	Citations		Humanware Dimensions	Main conceptual approach	Findings
				Web of Science	Scholar			
Wang, Dan; Park, Sangwon; Fesenmaie, Daniel R.	The Role of Smartphones in Mediating the Touristic Experience	Journal of Travel Research	2012	275	719	Smart technologies	Smart technology that enables individual information through mobile devices	Tourists rely on smartphone apps to provide a "smoother" and more "delightful" tourism experiences.
Kajanus, M; Kangas, J; Kurttila, M	The use of value focused thinking and the A'WOT hybrid method in tourism management	Tourism Management	2004	134	410	Value co-creation	SMART techniques can be applied to support destination strategic management.	The local culture has the potential to create new value propositions.
Boes, Kim; Buhalis, Dimitrios; Inversini, Alessandro	Smart tourism destinations: ecosystems for tourism destination competitiveness	International Journal of Tourism Cities	2016	120	284	Smart ecosystems	Smartness concept as a means for destination competitiveness	Technology combined with human capital are core components of smartness
Buhalis, Dimitrios; Foerste, Marie	SoCoMo marketing for travel and tourism: Empowering co-creation of value	Journal of Destination Marketing & Management	2015	117	299	Value co-creation	Value co-creation through context-based and use of mobile devices during travel	More advanced context-aware services will allow tourism experiences co-creation in real-time and push to the re-engineering tourism ecosystem.
Marine-Roig, Estela; Anton Clave, Salvador	Tourism analytics with massive user-generated content: A case study of Barcelona	Journal of Destination Marketing & Management	2015	112	234	Smart ecosystems	UGC analysis to extract business intelligence (BI) concerning the destination	Destinations aiming to offer high-quality tourism experiences can use UGC's business intelligence tools to enhance their current offer.
Wang, Dan; Li, Xiang (Robert); Li, Yunpeng	China's smart tourism destination initiative: A taste of the service-dominant logic	Journal of Destination Marketing & Management	2013	106	295	Smart ecosystems	Tourism co-creation in real-time and multi-directional supported by smart technologies.	Governmental smart tourism destination initiatives can revolutionize business ecosystem and consequently, the tourists experience creation.
Del Chiappa, Giacomo; Baggio, Rodolfo	Knowledge transfer in smart tourism destinations: Analyzing the effects of a network structure	Journal of Destination Marketing & Management	2015	99	234	Smart ecosystems	Knowledge acquisition and transfer within a destination ecosystem.	A robust structural cohesion between the real and the virtual components of a destination is needed. It led to conclude that the destination ecosystem should integrate knowledge sharing infrastructures that integrate both sources of information.

Authors	Title	Journal	Year	Citations		Humanware Dimensions	Main conceptual approach	Findings
				Web of Science	Scholar			
Li, Yunpeng; Hu, Clark; Huang, Chao; Duan, Liqiong	The concept of smart tourism in the context of tourism information services	Tourism Management	2017	87	263	Tourism experience	Smart tourism as a tourist support system, assisted by technology and information.	Tourists rely on the information available through different technologies to enhance their tourism experience
Wang, Xia; Li, Xiang (Robert); Zhen, Feng; Zhang, JinHe	How smart is your tourist attraction?: Measuring tourist preferences of smart tourism attractions via a FCEM-AHP and IPA approach	Tourism Management	2016	82	199	Smart ecosystems	Smart destination attraction	Tourists' preferences regarding a smart destination attraction unveiled can be used to plan and (re)build new smart destinations.
Buhalis, Dimitrios; Sinarta, Yeyen	Real-time co-creation and nowness service: lessons from tourism and hospitality	Journal of Travel & Tourism Marketing	2019	61	116	Smart ecosystems	Real-time service based on different technologic gateways	The adoption and integration of different technologies into a system that allows service nowness.
Buoninconti, Piera; Micera, Roberto	The experience co-creation in smart tourism destinations: a multiple case analysis of European destinations	Information Technology & Tourism	2016	59	130	Tourism experience	Smart destination configuration to enhance tourist co-creation experiences	Smart tourism destinations through the use of innovative technologies can improve experience co-creation.
Buhalis, Dimitrios; Leung, Rosanna	Smart hospitality-Interconnectivity and interoperability towards an ecosystem	International Journal of Hospitality Management	2018	56	129	Smart technologies	Smart hospitality ecosystem	The adoption of smart technologies by hospitality firms can enhance their profitability, competitiveness and value offer to tourists
Navio-Marco, Julio; Manuel Ruiz-Gomez, Luis; Sevilla-Sevilla, Claudia	Progress in information technology and tourism management: 30 years on and 20 years after the internet - Revisiting Buhalis & Law's landmark study about eTourism	Tourism Management	2018	49	123	Smart ecosystems	From eTourism to smart tourism	eTourism updated to smart tourism, taking advantage of all new smart technologies and users behaviour.
Dinhopl, Anja; Gretzel, Ulrike	Selfie-taking as touristic looking	Annals of Tourism Research	2016	49	156	Smart technologies	Smart technologies used as a tourism experience enhancer	How tourists use smartphones and social media to portrait their experiences and influence peers.

Authors	Title	Journal	Year	Citations		Humanware Dimensions	Main conceptual approach	Findings
				Web of Science	Scholar			
McGehee, Nancy Gard	Volunteer tourism: evolution, issues and futures	Journal of Sustainable Tourism	2014	49	151	Sharing Economy	The interface of technology and volunteer tourism	Even though it is still in an embryonic phase, the influence of technology on volunteer tourism can be found before, during and after the experience, following a similar path to other tourism offers.
Chung, Namho; Lee, Hyunae; Kim, Jin-Young; Koo, Chulmo	The Role of Augmented Reality for Experience-Influenced Environments: The Case of Cultural Heritage Tourism in Korea	Journal of Travel Research	2018	48	107	Smart technologies	Augmented reality adoption to enhance tourism experience	As in any other technology, to fully explore the potential of AR technologies is necessary to establish tourists adoption model
Ivars-Baidal, Josep A.; Celdran-Bernabeu, Marco A.; Mazon, Jose-Norberto; Perles-Ivars, Angel F.	Smart destinations and the evolution of ICTs: a new scenario for destination management?	Current Issues in Tourism	2019	46	121	Smart ecosystems	Smart destination model	A smart destination model's success does not rely only on users and technology but also influences governance.
Tribe, John; Mkono, Muchazondida	Not such smart tourism? The concept of e-lienation	Annals of Tourism Research	2017	43	87	Smart ecosystems	e-lienation drivers	The perceived negative impact of technology in the authenticity and interpersonal experience.
Hao, Jin-Xing; Yu, Yan; Law, Rob; Fong, Davis Ka Chio	A genetic algorithm-based learning approach to understand customer satisfaction with OTA websites	Tourism Management	2015	42	84	Smart technologies	OTA websites	OTAs need to have optimized, updated, attractive and responsive websites that attract customers and customize offers.
Sigala, Marianna	New technologies in tourism: From multi-disciplinary to anti-disciplinary advances and trajectories	Tourism Management Perspectives	2018	41	92	Smart ecosystems	Technology agents	Technology agents have the capability of co-create, transform or destroy a destination offers.

Among the five smart tourism dimensions, smart technology is no longer the most common point, given space to the smart ecosystems. The tourism experience is rank in fourth place, followed by value co-creation and sharing economy. The value creation lost focus of research and represented in 2018 the same percentage of the sharing economy, with a small rise in 2019–2020.

Similar proportions are found when analyzing the 225 articles published in all tourism and hospitality journals. However, when looking at the full spectrum of articles (1321), the sharing economy and value co-creation increase their share.

Final considerations

Smart tourism is undoubtedly a promising research field (Gretzel, Werthner, *et al.*, 2015). In this study, 1321 smart tourism papers published between 2008–2020 were found; 225 were reviewed; and, 20 were selected due to their significant impact on the field. Considering the predicted evolution of smart tourism into Aml tourism (Buhalis, 2020), the findings shared here can fuel future research since it guides literature reviews by listing previous studies and identifies research gaps.

Over the last ten years, many researchers have attempted to study the emerging smart tourism field from different perspectives. The approaches and results differed across countries and sectors of analysis, reflecting the research's embryonic phase in this field. At this point, technology remains the dominant element that interconnects every study, and future research works can explore even more focusing on the smaller clusters found. Considering the literature gap found and changes caused by Covid-19 pandemic, it is expected to find in the next two-year period publications related to artificial intelligence, robots, chatbots, blockchains, virtual reality, augmented reality, service automation and self-service technologies.

However, some researchers have begun to challenge this focus and put forward different frameworks for measuring the impact and influence of smart tourism's different dimensions (Tribe & Mkono, 2017). In the top 20 most cited papers, there are far more technology-driven papers that present empirical evidence. Several studies reviewed examined how destinations can use and integrate different technological solutions to enhance tourists' experiences. Tiago *et al.* (2019) looking into research produce between 2008–2018, found that several studies focus on how smart destinations take advantage of technology to enhance their value proposition and differentiate from competitors. These authors acknowledge the need for more research in this stream. Their findings remain actual since literature does not fully explore technology's potential as infostructure that supports the co-creation of tourist-centric and enhancement experiences.

A quite interesting range of research works uses the technology acceptance model (TAM) or traditional consumer behaviour models to validate existing paradigms or unveil new theories. Moreover, different tourist segments based on the high or low use of technology during their travel are noteworthy.

The need to explore semantically-rich links between data retrieved from heterogeneous sources and business insights arises from tourism and hospitality stakeholders. Even though evidence shows that improvements and the adoption of technology in tourism enhance social interaction and value creation, two dimensions are found less frequently in the top 20. Considering that in a near-future technology will be more than hardware and software; it will be humanware (Sigala, 2018). Future research should focus more on value creation, tourism experience, and sharing economy, not forgetting that the new pos-Covid-19 context technology will enhance and support many new processes in the tourism and hospitality industry, as noted by Gursoy and Chi (2020).

Although the field of smart tourism is relatively new, it has the potential to continue to develop insights into different areas of studies, such as smart cities or sustainable destinations, as well as evolve into an artificial intelligence-driven phase such as Ambient Intelligence (Aml) Tourism (Buhalis, 2020).

Some limitations need to be acknowledged in this work, mostly driven from the protocol followed. The first to report relies on the chosen language of analysis. Although the vast majority of works is written in English (95,86%), there are some publications in Spanish (2,36%) as the Gil *et al.* (2015) article, Portuguese (0.8%) among others. Therefore, these non-English publications were excluded from the analysis. However, the percentage of English written publications increases when considering only academic journals in Tourism and Hospitality. The narrowing the scope of analysis to journals of Tourism and Hospitality can also be pointed as a limitation. It excludes works published in journals from other fields or conference proceedings and practitioner magazines, such as Gretzel, Sigala, Xiang and Koo (2015) article published in *Electronic Markets*. The last limitation concerns the keywords used to find and retrieve the articles. In some cases, the article authors may not use them, and for that reason, these works would not appear in the database search results and consequently not included in the analysis.

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