Smart tourism: a scientometric review (2008-2020)

Teresa Borges-Tiago *, José Manuel Cristóvão Veríssimo 2 and Flávio Tiago 3

1 Business Department, University of the Azores, Ponta Delgada, Portugal, Rua da Mae de Deus, 9501-801 Ponta Delgada – Azores – Portugal. E-mail: maria.tp.tiago@uac.pt
2 ISEG – Lisbon School of Economics & Management, Universidade de Lisboa, Portugal. E-mail: jose.verissimo@iseg.ulisboa.pt
3 Business Department, University of the Azores, Ponta Delgada, Portugal. E-mail: flavio.gb.tiago@uac.pt

*Corresponding author

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

Citation: Borges-Tiago, T., Veríssimo, J.M.C. and Tiago, F. (2022). Smart tourism: a scientometric review (2008-2020). European Journal of Tourism Research 30, 3006.
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 infrastructure to create innovative value proposals for all stakeholders. The author also claims that the next step of this evolution will be Ambient Intelligence (AmI) Tourism, where individual and collective interests will be aligned to promote the optimization of collaborative performance and competitiveness. This new phase of AmI 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, & Koseoglu, 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 smarter 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.
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, Buhalís, & 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, & Buhalís, 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](image)

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 constrains. 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](image)

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.
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).
Figure 5. Key concepts network visualization in all different disciplines

Figure 6. Network visualization of authors by citation 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](image-url)
The evolution of central research over the years is quite evident. In the earliest years, the focus was on user adoption of technology. Later on, pass to experience co-creation, and more recently moves towards smart and sustainable tourism. This evolution is also patent in research works focusing on technological solutions and their adoptions by tourists or hospitality and tourism firms, such as hotels, museums, festivals, and events. Initial tools are related to information systems, that gave space to augmented reality, virtual reality and other smart technologies such as chatbots, robots and artificial intelligence. These latest concepts emerged in the newest network branches.

Thus, the remaining work attempts to review the last decade of smart tourism research from a humanware approach. For this purpose, the 20 most cited articles from tourism and hospitality journals were further scanned considering the conceptual framework used (see, Figure 1). The most cited article regarding smart tourism, authored by Gretzel, Sigala, Xiang and Koo, titled “Smart tourism: foundations and developments” was published in 2015 in the Electronic Markets journal. And, for this reason was not considered in the content analysis.

The twenty articles chosen were reviewed and categorized by the main dimension addressed. The summary in Table 1 was developed for each of the top 20 articles and presents: (1) number of citations in Web of Science and Scholar; (2) Humanware dimension mainly focus; (3) primary conceptual approach adopted; and (4) a summary of the significant findings.
| Authors                           | Title                                                                 | Journal                                      | Year | Web of Science | Scholar | Humanware Dimensions | Main conceptual approach                                                                 | Findings                                                                                                                                                                                                 |
|----------------------------------|----------------------------------------------------------------------|----------------------------------------------|------|----------------|---------|----------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wang, Dan; Park, Sangwon; Fesenmaie, Daniel R. | The Role of Smartphones in Mediating the Touristic Experience | Journal of Travel Research                     | 2012 | 275            | 719     |                      | 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 AWOT hybrid method in tourism management | Tourism Management                             | 2004 | 134            | 410     |                      | 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     |                      | 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 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     |                      | 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     |                      | 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     |                      | 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 | Web of Science | Scholar | Humanware Dimensions | Main conceptual approach                                                                 | Findings                                                                                       |
|-------------------------|-----------------------------------------------------------------------|----------------------------------|------|-----------|----------------|---------|----------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 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 andnowness 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 onwowness. |
| Buonincontri, 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 Buhal's & 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 | Web of Science | Scholar | Humanware Dimensions | Main conceptual approach                                                                 | Findings                                                                                                                                                                                                 |
|------------------------------|-----------------------------------------------------------------------|----------------------------------|------|----------------|---------|----------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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;   | The Role of Augmented Reality for Experience-Influenced Environments:  | 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                                                                          |
| Kim, Jin-Young; Koo, Chulmo  | The Case of Cultural Heritage Tourism in Korea                        |                                   |      |                |         |                      |                                                                                           |                                                                                                                                                                                                           |
| Ivars-Baidal, Josep A.;      | Smart destinations and the evolution of ICTs: a new scenario for      | 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.                                                                                             |
| Celdran-Bernabeu, Marco A.;  | destination management?                                               |                                   |      |                |         |                      |                                                                                           |                                                                                                                                                                                                           |
| Mazon, Jose-Norberto; Perles- |                                                                                  |                                  |      |                |         |                      |                                                                                           |                                                                                                                                                                                                           |
| Ivars, Angel F.              |                                                                                  |                                  |      |                |         |                      |                                                                                           |                                                                                                                                                                                                           |
| Tribe, John; Mkono, Muchazo   | 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.                                                                                                            |
| Ndida                        |                                                                                  |                                  |      |                |         |                      |                                                                                           |                                                                                                                                                                                                           |
| Hao, Jin-Xing; Yu, Yan; Law, | A genetic algorithm-based learning approach to understand customer    | 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.                                                                                 |
| Rob; Fong; Davis Ka Chio     | satisfaction with OTA websites                                         |                                  |      |                |         |                      |                                                                                           |                                                                                                                                                                                                           |
| Sigala, Marianna             | New technologies in tourism: From multidisciplinary to anti-disciplinary| 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 post-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 (AmI) 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.

Acknowledgements: We gratefully acknowledge financial support from FCT- Fundação para a Ciência e Tecnologia (Portugal) through research grants UIDB/04521/2020 Advance/CSG and ISEG; and UIDB/00685/2020 Centre of Applied Economics Studies of the Atlantic. This study is a contribution to the research project 'SMART TOURISM AZORES’ (Ref. ACORES-01-045-FEDER-000017) funded through FEDER (85%) and regional funds (15%) via ‘Programa Operacional Açores 2020’. We also much appreciated, and we thank the editor and the reviewers for their complimentary comments and suggestions.

References
Almeida-Santana, A., & Moreno-Gil, S. (2017). New trends in information search and their influence on destination loyalty: Digital destinations and relationship marketing. Journal of Destination Marketing & Management, 6(2), 150-161. doi:10.1016/j.jdmm.2017.02.003
Amanda, R., Santosa, P., & Rizal, M. (2018). Analysis of Tourists Preferences on Smart Tourism in Yogyakarta (Case: Vredeburg Fort Museum). Journal of Physics: Conference Series, 1007, 012040. doi:10.1088/1742-6596/1007/1/012040
Azis, N., Amin, M., Chan, S. F., & Aprilia, C. (2020). How smart tourism technologies affect tourist destination loyalty. Journal of Hospitality and Tourism Technology, 11(4), 603-625. doi:10.1108/jhtt-01-2020-0005
Bae, S. J., Lee, H., Suh, E. K., & Suh, K. S. (2017). Shared experience in pretrip and experience sharing in posttrip: A survey of Airbnb users. Information & Management, 54(6), 714-727. doi:10.1016/j.im.2016.12.008
Boes, K., Buhalis, D., & Inversini, A. (2016). Smart tourism destinations: ecosystems for tourism destination competitiveness. International Journal of Tourism Cities, 2(2), 108-124. doi:10.1108/ijtjc-12-2015-0032
Borges-Tiago, T., Arruda, C., Tiago, F., & Rita, P. (2021). Differences between TripAdvisor and Booking.com in branding co-creation. Journal of Business Research, 123, 380-388. doi:https://doi.org/10.1016/j.jbusres.2020.09.050
Briciu, A., Briciu, V.-A., & Kavoura, A. (2020). Evaluating How ‘Smart’ Brașov, Romania Can Be Virtually via a Mobile Application for Cultural Tourism. Sustainability, 12(13), 5324. doi: 10.3390/su12135324
Buhalis, D. (1998). Strategic use of information technologies in the tourism industry. Tourism Management, 19(5), 409-421. doi:10.1016/S0261-5177(98)00038-7
Buhalis, D. (2020). Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article. *Tourism Review, 75*(1), 267-272. doi: 10.1108/TR-06-2019-0258

Buhalis, D., & Foerste, M. (2015). SoCoMo marketing for travel and tourism: Empowering co-creation of value. *Journal of Destination Marketing & Management, 4*(3), 151-161. doi: 10.1016/j.jdmm.2015.04.001

Buhalis, D., & Leung, R. (2018). Smart hospitality-Interconnectivity and interoperability towards an ecosystem. *International Journal of Hospitality Management, 71*, 41-50. doi: 10.1016/j.ijhm.2017.11.001

Buhalis, D., López, E. P., & Martínez-Gonzalez, J. A. (2020). Influence of young consumers’ external and internal variables on their e-loyalty to tourism sites. *Journal of Destination Marketing & Management, 15*, 100409. doi: 10.1016/j.jdmm.2020.100409.

Buhalis, D., & Sinarta, Y. (2019). Real-time co-creation and nowness service: lessons from tourism and hospitality. *Journal of Travel & Tourism Marketing, 36*(5), 563-582. doi: 10.1080/10548408.2019.1592059

Buonincontri, P., & Micera, R. (2016). The experience co-creation in smart tourism destinations: a multiple case analysis of European destinations. *Information Technology & Tourism, 16*(3), 285-315. doi:10.1007/s40558-016-0060-5

Chung, N., Han, H., & Joun, Y. (2015). Tourists’ intention to visit a destination: The role of augmented reality (AR) application for a heritage site. *Computers in Human Behavior, 50*, 588-599. doi: 10.1016/j.chb.2015.02.068

Chung, N., Lee, H., Kim, J. Y., & Koo, C. (2018). The Role of Augmented Reality for Experience-Influenced Environments: The Case of Cultural Heritage Tourism in Korea. *Journal of Travel Research, 57*(5), 627-643. doi:10.1177/0047287517708255

Del Chiappa, G., & Baggio, R. (2015). Knowledge transfer in smart tourism destinations: Analyzing the effects of a network structure. *Journal of Destination Marketing & Management, 4*(3), 145-150. doi:https://doi.org/10.1016/j.jdmm.2015.02.001

Della Corte, V., D’Andrea, C., Savastano, I., & Zamparelli, P. (2017). Smart Cities and Destination Management: Impacts and Opportunities for Tourism Competitiveness. *European Journal of Tourism Research, 17*, 7-27.

Dinhopl, A., & Gretzel, U. (2016). Selfie-taking as touristic looking. *Annals of Tourism Research, 57*, 126-139. doi: 10.1016/j.annals.2015.12.015

Edwards, D., Cheng, M. M., Wong, I. A., Zhang, J., & Wu, Q. (2017). Ambassadors of knowledge sharing: Co-produced travel information through tourist-local social media exchange. *International Journal of Contemporary Hospitality Management, 29*(2), 690-708. doi:10.1108/ijchm-10-2015-0607

Ghaderi, Z., Hatamifar, P., & Henderson, J. C. (2018). Destination selection by smart tourists: the case of Isfahan, Iran. *Asia Pacific Journal of Tourism Research, 23*(4), 385-394. doi:10.1080/10941665.2018.1444650

Gil, A. M. L., Fernandez, B. Z., & Herrero, J. L. C. (2015). The Smart Tourism Destination and the Territorial Intelligence: problems and opportunities. *Investigaciones Turisticas*(10), 1-25.

Gretzel, U., Koo, C., Sigala, M., & Xiang, Z. (2015). Special issue on smart tourism: convergence of information technologies, experiences, and theories PREFACE. *Electronic Markets, 25*(3), 175-177. doi: 10.1007/s12525-015-0194-x

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: foundations and developments. *Electronic Markets, 25*(3), 179-188. doi: 10.1007/s12525-015-0196-8

Gretzel, U., Werthner, H., Koo, C., & Lamsfus, C. (2015). Conceptual foundations for understanding smart tourism ecosystems. *Computers in Human Behavior, 50*, 558-563. doi: 10.1016/j.chb.2015.03.043

Gursoy, D., & Chi, C. G. (2020). Effects of COVID-19 pandemic on hospitality industry: review of the current situations and a research agenda. *Journal of Hospitality Marketing & Management, 29*(5), 527-529. doi: 10.1080/19368623.2020.1788231
Borges-Tiago et al. (2022) / European Journal of Tourism Research 30, 3006

Hao, J. X., Yu, Y., Law, R., & Fong, D. K. C. (2015). A genetic algorithm-based learning approach to understand customer satisfaction with OTA websites. *Tourism Management, 48*, 231-241. doi: 10.1016/j.tourman.2014.11.009

Ivanov, S. (2019). Ultimate transformation: How will automation technologies disrupt the travel, tourism and hospitality industries? *Zeitschrift Fur Tourismuswissenschaft, 11*(1), 25-43. doi: 10.1515/zt-f-2019-0003

Ivars-Baidal, J. A., Celdran-Bernabeu, M. A., Mazon, J. N., & Perles-Ivars, A. F. (2019). Smart destinations and the evolution of ICTs: a new scenario for destination management? *Current Issues in Tourism, 22*(13), 1581-1600. doi: 10.1080/13683500.2017.1388771

Kajanus, M., Kangas, J., & Kurttila, M. (2004). The use of value focused thinking and the A’WOT hybrid method in tourism management. *Tourism Management, 25*(4), 499-506. doi: 10.1016/s0261-5177(03)00120-1

Kim, J. Y., Hlee, S., & Joun, Y. (2016). Green practices of the hotel industry: Analysis through the windows of smart tourism system. *International Journal of Information Management, 36*(6), 1340-1349. doi: 10.1016/j.ijinfomgt.2016.05.001

Koo, C., Park, J., & Lee, J. N. (2017). Smart tourism: Traveler, business, and organizational perspectives. *Information & Management, 54*(6), 683-686. doi: 10.1016/j.im.2017.04.005

Lee, H., Lee, J., Chung, N., & Koo, C. (2018). Tourists’ happiness: are there smart tourism technology effects? *Asia Pacific Journal of Tourism Research, 23*(5), 486-501. doi:10.1080/10941665.2018.1468344

Leung, R. (2018). Smart hospitality: Taiwan hotel stakeholder perspectives. *Tourism Review, 0*(0), null. doi: 10.1108/TR-09-2017-0149

Li, Y., Hu, C., Huang, C., & Duan, L. (2017). The concept of smart tourism in the context of tourism information services. *Tourism Management, 58*, 293-300. doi: https://doi.org/10.1016/j.tourman.2016.03.014

Marine-Roig, E., & Clave, S. A. (2015). Tourism analytics with massive user-generated content: A case study of Barcelona. *Journal of Destination Marketing & Management, 4*(3), 162-172. doi: 10.1016/j.jdmm.2015.06.004

McGehee, N. G. (2014). Volunteer tourism: evolution, issues and futures. *Journal of Sustainable Tourism, 22*(6), 847-854. doi: 10.1080/09669582.2014.907299

Mehraliyev, F., Chan, I., Choi, Y., Koseoglu, M., & Law, R. (2020). A state-of-the-art review of smart tourism research. *Journal of Travel & Tourism Marketing, 37*(1), 78-91. doi: 10.1080/10548408.2020.1712309

Mehraliyev, F., Choi, Y., & Köseoglu, M. (2019). Progress on smart tourism research. *Journal of Hospitality and Tourism Technology, 10*(4), 522-538. doi: 10.1108/JHTT-08-2018-0076

Melian-Gonzalez, S., Bulchand-Gidumal, J., & Lopez-Valcarcel, B. G. (2013). Online Customer Reviews of Hotels: As Participation Increases, Better Evaluation Is Obtained. *Cornell Hospitality Quarterly, 54*(3), 274-283. doi: 10.1177/1938965513481498

Navio-Marco, J., Ruiz-Gomez, L. M., & Sevilla-Sevilla, C. (2018). 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, 69*, 460-470. doi: 10.1016/j.tourman.2018.06.002

Neuhofer, B., Buhalis, D., & Ladkin, A. (2012). Conceptualizing technology enhanced destination experiences. *Journal of Destination Marketing & Management, 1*(1-2), 36-46.

Pachni-Tsitiridou, O., & Fouskas, K. (2019). Location-Aware Technologies: How They Affect Customer Experience *Strategic Innovative Marketing and Tourism* (pp. 1199-1206): Springer.

Sigala, M. (2017). Adelaide must be smart in developing its tourism industry. *Adelaide News*.

Sigala, M. (2018). New technologies in tourism: From multi-disciplinary to anti-disciplinary advances and trajectories. *Tourism Management Perspectives, 25*, 151-155. doi: 10.1016/j.tmp.2017.12.003
Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. *Journal of Business Research, 70*, 263-286. doi: 10.1016/j.jbusres.2016.08.001

Tham, A. (2016). When Harry met Sally: different approaches towards Uber and AirBnB-an Australian and Singapore perspective. *Information Technology & Tourism, 16*(4), 393-412. doi: 10.1007/s40558-016-0070-3

Tiago, F., Borges-Tiago, T., & Veríssimo, J.M.C. (2019). *A Review of Smart Tourism Studies in the Tourism and Hospitality Fields* Paper presented at the Travel and Tourism Research Association's 2019 European Chapter Conference, Bournemouth University.

Toh, R., Raven, P., & DeKay, F. (2011). Selling rooms: Hotels vs. third-party websites. *Cornell Hospitality Quarterly, 52*(2), 181-189. doi: 10.1177/1938965511400409

Topsakal, Y., Bahar, M., & Yüzbaşıoğlu, N. (2020). Review of Smart Tourism Literature by Bibliometric and Visualization Analysis. *Journal of Tourism Intelligence and Smartness, 3*(1), 1-15. Retrieved from https://dergipark.org.tr/en/pub/jtis/issue/53359/706543

Tribe, J., & Mkono, M. (2017). Not such smart tourism? The concept of e-lienation. *Annals of Tourism Research, 66*, 105-115. doi: 10.1016/j.annals.2017.07.001

Wang, D., Li, X., & Li, Y. P. (2013). China’s "smart tourism destination” initiative: A taste of the service-dominant logic. *Journal of Destination Marketing & Management, 2*(2), 59-61. doi: 10.1016/j.jdmm.2013.05.004

Wang, D., Park, S., & Fesenmaier, D. R. (2012). The role of smartphones in mediating the touristic experience. *Journal of Travel Research, 51*(4), 371-387. doi:10.1177/0047287511426341

Wang, X., Li, X., Zhen, F., & Zhang, J. H. (2016). How smart is your tourist attraction? Measuring tourist preferences of smart tourism attractions via a FCEM-AHP and IPA approach. *Tourism Management, 54*, 309-320. doi: 10.1016/j.tourman.2015.12.003

Yao, B., Qiu, R. T., Fan, D. X., Liu, A., & Buhalis, D. (2019). Standing out from the crowd—an exploration of signal attributes of Airbnb listings. *International Journal of Contemporary Hospitality Management, 31*(12), 4520-4542. doi: 10.1108/ijchm-02-2019-0106

Received: 22/02/2019
Accepted: 19/04/2021
Coordinating editors: Maro Vlachopoulou and Konstantinos Fouskas