

# CONVERGENCE OF SCIENTIFIC PRODUCTION ON SMART CITIES AND SMART TOURISM DESTINATIONS: **bibliometric synthesis and theoretical framework**

APROXIMAÇÃO DA PRODUÇÃO CIENTÍFICA ENTRE CIDADES  
INTELIGENTES E DESTINOS TURÍSTICOS INTELIGENTES:  
síntese bibliométrica e estrutura teórica dos campos



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## RESUMO

O presente artigo mapeia o estado atual das pesquisas sobre cidades inteligentes (CI) e destinos turísticos inteligentes (DTI), a fim de verificar similaridades ou dissonâncias que reflitam a estrutura teórica dos campos, das agendas de pesquisa vigentes e de possíveis lacunas teórico-metodológicas. Para tanto, realizou-se revisão sistemática com suporte da bibliometria (software VOSviewer e Rayyan), a partir de artigos indexados na Web of Science. A amostra totalizou 39 artigos sobre CI e 28 artigos sobre DTI. Os resultados indicam que o periódico que mais concentra publicações de ambas as temáticas é Sustainability. Os autores como maior número de publicação de CI e DTI são diferentes, evidenciando que não há pesquisadores em comum que produzam pesquisas em ambos os temas. Os resultados da análise do corpus textual sugerem cinco agendas que são mais frequentes em CI: governança e gestão das cidades inteligentes; inteligência aplicada a contextos urbanos; dimensão social e inclusão do cidadão; big data e gestão ética de dados; crítica ao determinismo tecnológico. Já em DTI as principais agendas são: governança e gestão de destinos turísticos



inteligentes; tecnologias, inovação e cocriação de valor; dimensão da experiência inteligente; base teórico-metodológica dos DTI; perspectiva crítica do modelo. Dentre os conteúdos debatidos, a governança é o tópico que transita de forma consistente nas duas temáticas, todavia, a sustentabilidade, que é uma premissa dos modelos orientadores para CI e DTI, é tangenciada, o que se configura como uma lacuna de estudos, principalmente em trabalhos empíricos que retratem DTI como estratégia para a melhoria da sustentabilidade.

**Palavras-chave:** Cidades Inteligentes, Destinos Turísticos Inteligentes, Bibliometria.

## ABSTRACT

This article aimed to map the current state of research on smart cities (SC) and smart tourism destinations (STD) in order to verify similarities and differences that reflect their theoretical frameworks, current research agendas and possible theoretical and methodological gaps. To this end, a systematic review was conducted with the support of bibliometrics (VOSviewer and Rayyan software), based on articles indexed in Web of Science. The total sample was 39 articles on SC and 28 articles on STD. The results indicate that the journal that most concentrates publications on both subjects is *Sustainability*. The authors with the highest number of publications on SC and STD are different, showing that there are no researchers studying both subjects. The results of the corpus analysis suggest five agendas that are more frequent in SC: governance and management of smart cities; intelligence applied to urban settings; social dimension and citizenship inclusion; big data and ethical data management; criticism of technological determinism. In STD, in turn, the main agendas are: governance and management of smart tourism destinations; technology, innovation and co-creation of value; smart experience dimension; theoretical and methodological foundations of STD; critical view of the model. Of the contents discussed, governance is the subject that moves consistently between the two subjects. However, sustainability, which is a premise of the guiding models for SC and STD, is poorly addressed and configures a research gap in the studies, especially in empirical studies that portray STD as strategic to improving sustainability.

**Keywords:** Smart Cities, Smart Tourism Destinations, Bibliometrics.

## INTRODUCTION

The revolution brought about by the development of and access to information and communication technologies (ICT) has been striking and far-reaching. With the increase of ICT use, the term “smart” has become a new



catchword to describe everything that is supposed to be state of the art (Gretzel, Sigala, Xiang & Koo, 2015b). In tourism, smart implies the use of technologies to improve the quality of relationships between companies, destinations and tourists, besides boosting territorial development models that can increase the competitiveness of destinations, but without neglecting human, social and environmental capital as core elements of this process.

In the early 21st century, several concepts emerged to define these new territorial models that integrate ICT into the daily life of residents and tourists. Such models, based on a smart perspective, have reverberated in the context of smart cities (SC) and smart tourism destinations (STD) as being supposedly committed to the habitat and to the improvement of the quality of civic life and the economy of destinations, through technologically advanced and more sustainable elements (Sigalat-Signes, Calvo-Palomares, Roig-Merino & García-Adán, 2021).

Faced with the need to make territories suitable for contemporary times, from the perspective of more sustainable management, based on detailed information and data, destinations around the world have invested in technological development. However, the validation of such concepts in the media has led to the frequent and arbitrary self-declaration of cities as "smart." Although this is sometimes based on particular criteria of the meaning of smart, the theoretical consolidation of smart cities (SC) and smart tourism destinations (STD) is not well understood in practice nor unanimously accepted as a scientific concept (Gretzel & Mendonça, 2019; Soares, Ruiz & Baidal, 2021). Furthermore, Mínguez and Ruiz (2014) point to a lack of theoretical and methodological grounding when it comes to effective actions to transform traditional destinations into smart tourism destinations.

A growing body of research has reflected the general understanding of how technology changes society. The scientific debate regarding the application of smart principles to urban environments is a well-established sphere of knowledge, spanning three decades of research (Vanolo, 2013;



Coca-Stefaniak, 2020). However, the theoretical framework applied to tourist destinations is still incipient and imprecise, lacking more consolidated definitions.

Given the above, this study is based on the following questions: What is the current state of research on smart cities and smart tourism destinations? To what extent do both subjects present converging or diverging points? Therefore, the objective was to map the available research on these two study subjects in a systematic way, in order to verify similarities and/or dissonances that offer insight into the theoretical frameworks of these areas, their current research agendas and possible theoretical and methodological gaps capable of supporting empirical research.

To this end, a systematic literature review was used, combined with bibliometric mapping based on Zipf's Law, considering the global qualified scientific production published in the journals of the Web of Science database. The choice to evaluate the production of scientific articles published in an international repository stems from the need to study the performance of scientific activity based on production. Moed (2017) calls this process output, in which analysis is solely restricted to the bibliographic production of scientific articles, excluding other types of bibliographic or non-bibliographic production such as: book chapters, academic papers, congress articles, editorials, opinions, sets of research data, software, tools and instruments, videos, registration of intellectual property rights, among others.

Literature reviews, especially high-quality systematic reviews, gather, synthesize and criticize one or more subjects to provide an overall impression of the extent, nature and quality of evidence concerning a specific research question, highlighting gaps between what is known and what needs to be known (Siddaway, Wood & Hedges, 2019). Therefore, for academic research, it is essential that knowledge advance based on the previously produced theoretical body.



## MATERIALS AND METHODS

In terms of investigative method, this theoretical research undertakes a systematic literature review supported by a bibliometric study that provided input for the synthetic analysis of data (Pereira, Santos, Oliveira & Leão, 2019). This study can also be classified as exploratory and descriptive, since it explores theoretical productions and subjects that are still in the process of consolidation, identifying the reality of the theoretical body on SC and STD.

Systematic reviews are important because they follow specific protocols and aim to understand and logically organize a large documentary corpus (Galvão & Ricarte, 2019), besides offering a summary of the literature added to critical interpretations of the diagnosis made.

Bibliometric analysis, in turn, relates to mapping a field of knowledge, making it possible to understand the evolution and development of a subject (Pereira et al., 2019), besides evaluating the existence of prominent authors or groups of scholars and the respective domain on the subject. Mai (2005) explains that the process of highlighting a set of articles or a group of people who work cooperatively on a specific subject constitutes a domain.

It should be noted that the aim of the domain-centered approach is to visualize the intellectual framework based on citations and the relationships between them (Grácio, 2020), recognizing active participants in the domain, in particular the joint citations of authors by the citing community. Thus, multidimensional maps are built related to the parameters of the domains in order to visualize the set of subjects that are being addressed and the studies that stand out and, consequently, consolidate the domain (Grácio, 2020).

To this end, this study examined the production of articles on two study subjects: smart cities and smart tourism destinations. The conjunction between the areas of knowledge and the different theoretical approaches found in the academic literature provides input for the construction of bibliometric indices



and analyses that make it possible to refine and understand the scientific production with a focus on its applicability (Pereira et al., 2019).

### Methodological procedures

As for the methodological procedures, three phases were required: (1) data search and collection; (2) sample selection; and (3) metadata analysis and descriptive synthesis of results, described in Table 1.

Table 1.

#### Summary of methodological procedures

Phase 1 – Data search and collection			
Round 1 – Adherence test		Round 2 – Collection of articles	
Choice of time frame and other search criteria		Web of Science search based on criteria defined in Round 1	
SC 17.749 documents	STD 576 documents	SC “smart cities” OR smart city” (966 articles) Relevance per citation index (100 articles)	STD “smart tourism destination” OR “smart tourism destinations” (33 articles)
Phase 2 – Sample selection			
Screening with Rayyan QCRI software (Qatar Computing Research Institute)			
a) screening and deletion of duplicate articles			
b) reading of titles and abstracts			
c) exclusion of articles not aligned with the research			
SC 39 articles		STD 28 articles	
Etapa 3 – Metadata descriptive analysis			
Mapping with VOSviewer software			
co-occurrence networks - Zipf's Law			
authorship network			
authors with the most articles			
most cited articles			
keyword co-occurrence			

Source: Authors, 2022.

#### *Phase 1: data exploration and collection*

Data exploration involved a two-round search for manuscripts in the bibliographic repository of the Web of Science platform. This platform was chosen for being multidisciplinary and offering a relevant international database for the research in question.

The first round aimed to conduct an adherence test with the possible strings to be used: *smart city*, *smart city AND tourism*, *smart cities AND tourism*,



*smart destination*, *smart tourism destinations*, evaluating the Boolean operators AND and OR, in addition to the possibilities of restrictions by areas of knowledge offered by the database. The strings were inserted primarily in English, since international databases prioritize English as the search language (Galvão & Ricarte, 2019).

Considering that according to a preliminary survey on Web of Science, the oldest article, which addresses smart tourism destinations, dates from 2015, the period from 2015 to 2021 was defined as the time frame to analyze the research path of the two subjects, with the understanding that this interval of the last seven years reflects the current state of scientific research. After the testing round, the strings with adherence and relevance for the research were screened and data were collected in accordance with the established criteria, shown in Table 2.

Table 2.

**Database search criteria**

Database	Web of Science
Search strings restricted to titles	" <i>smart cities</i> OR <i>smart city</i> " " <i>smart tourism destination</i> " OR " <i>smart tourism destinations</i> "
Language	English
Time frame	2015 to 2021
Type of publication	Articles only
Inclusion criteria	Full peer-reviewed article; title-restricted strings; social science citation index from Web of Science.
Exclusion criteria	Conference proceedings; book chapters; review chapters; letters; duplicate articles.

Source: Authors, 2022.

Following the definition of the strings *smart cities* OR *smart city* for the research on the scientific production of SC and *smart tourism destination* OR *smart tourism destinations* for STD, the articles on both subjects were separately screened, using the inclusion and exclusion criteria to define the sample (Table 2).

The search for the smart cities research field, without any type of restriction, turned up a total of **17,749** documents. Following the application of inclusion and exclusion screening and criteria, the number dropped to **966**



articles. Regarding smart tourism destinations, in turn, the search turned up a total of **576** documents indexed in the database. With the application of the inclusion and exclusion criteria, the final result was **33** articles.

It should be mentioned that the number of documents indexed in Web of Science was significantly higher for smart cities. This difference may be related to the fact that SC is a subject studied by authors from different areas, such as geography, business administration, architecture, engineering, technology, among others. This required the compilation of a more representative sample. Therefore, the 966 articles were subjected to the following selection on Web of Science: **item relevance -> citations-> sort by: most cited first**. Thus, priority was given to the first 100 (one hundred) articles that appeared, totaling approximately 10% of the total number of indexed articles on the subject.

#### *Phase 2: Sample selection*

After being collected, the data were exported in tabulated text format and subjected to the Rayyan QCRI (Qatar Computing Research Institute) software, which is a free web application to support systematic reviews. The work with Rayyan comprised three stages: a) screening and exclusion of duplicate articles; b) reading of titles and abstracts; c) exclusion of articles that were not aligned with this research, such as: bibliometric studies and systematic reviews, studies on application experiments and other specific resources that did not address the actual research subjects. Of the total number of articles submitted to Rayyan (**SC n= 100 and STD n=33**), the final sample was cut down to **n=39** articles on SC and **n=28** articles on STD.

#### *Phase 3: Metadata for data descriptive analysis*

Following the systematic process undertaken with the aid of Rayyan, the articles were exported in CSV Excel format and subjected to analysis in VOSviewer software,<sup>1</sup> a tool used for the construction and visualization of

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<sup>1</sup> Available at: <https://www.vosviewer.com/>





bibliometric networks. It offers text exploration functionalities for the design and presentation of networks of co-occurrence of important terms, extracted from a body of scientific literature or of indexing keywords, list of references present in the articles, among others.

In the graphic visualization generated by VOSviewer, the co-occurrence networks identify closely linked items, in which the diameter of a circle or label and its position on the map denote its relevance in the analysis performed. The diameter is directly proportional to the frequency of occurrence of the term in titles and abstracts. It should be noted that VOSviewer performs the search according to the principle of Zipf's Law, whereby the most recurrent themes related to a field of knowledge must be estimated (Corrêa, Gosling & Gonçalves, 2019). A cluster presents a set of items on a map, which is subdivided by colors to indicate the proximity of items related to each other, and the connecting lines between the clusters indicate the amount of links between the analyzed items, representing the domain (May, 2005).

Thus, for each subject, networks were mapped for authorship, authors with the largest number of articles in the sample, most cited articles and, finally, keyword co-occurrence. Once the mapping had been concluded, a qualitative analysis was performed using the data extracted from the summaries. Then the articles were sorted out to compose a synthesis table of research on smart cities and smart tourism destinations that reveals the main research agendas as well as possible gaps to constitute new theoretical and empirical research agendas.

## LITERATURE REVIEW

Smart cities concepts have been systematically discussed since the 1990s. Authors such as Albino, Berardi and Angelico (2015); Caragliu, Del Bo and Nijkamp (2009); Zygiaris (2013); Del Chiappa and Baggio (2015); Güell (2015), Buhalis and Amaranggana (2013); Greenfield (2013); Lytras et al. (2018, 2019)



bring relevant approaches to the studies, and researchers from different areas of knowledge focus on this subject.

At the same time, discussions about smart tourism destinations were also gradually gaining ground thanks to authors such as Buhalis & Amaranggana (2013, 2014); Komninos, Pallot and Schaffers (2013); Komninos (2015); Minguéz and Ruiz (2014); Gretzel, Werthner, Koo and Lamsfus (2015a); Gretzel, Sigala, Xiang and Koo, (2015b); Gretzel (2018); Gretzel and Scarpino (2018); Gretzel and Mendonça (2019); Del Chiappa and Baggio (2015); Invattur (2015); Sociedad Estatal para la Gestión de la Innovación y las Tecnologías Turísticas (Segittur) (2013); Femenia-Serra and Ruiz (2018); Liberato, Alen and Liberato (2018); Baidal, Monzonis and Sanchez (2016); Baidal and Rebollo (2019); Gajdošík (2019); Santos, Souza, Pereira, Gândara and Silva (2016); Santos, Gândara, Leite and Souza (2020); among others. Although the discussions were intensified from 2015 onwards, Bastidas-Manzano, Sánchez-Fernández and Casado-Aranda (2021) claim that few studies delve deeper into the subject and current research does not offer an overview of the evolution, current scope and potential domains of interest to scientific advancement.

Smart city definitions and concepts have been in the political and academic arenas in recent years (Caragliu & Del Bo, 2021), and have been prominently applied in urban areas (Gretzel et al. 2015a). Stimmel (2015) corroborates this and claims that the smart city defines a new urban environment, which is redesigned to improve economic, social and environmental performance through ICT, with the aim of ensuring a better quality of life to the local population.

Many definitions of smart cities focused exclusively on information and communication infrastructure (Clemente et al., 2021). However, it is important to emphasize that such meanings are no longer sufficient, as the mere incorporation of technologies in the urban fabric falls short of endowing a city with “intelligence,” and this excessively simplistic and biased approach to the



technological dimension of smart cities has come under severe criticism (Güell, 2015).

Nowadays, challenges related to environmental and energy issues, population aging, quality of life, economic competition or transparency in decision-making have been added to the agenda of smart cities. Thus, in recent years the concept of smart cities as hyper-technological objects has lost ground, and in its place “a holistic conception has gained relevance as a complex and multidimensional functional system in which citizens share decisions with other economic agents” (Güell, 2015, p. 22).

It should be clarified that, in the context of cities, several subareas or dimensions of “smart” have emerged. The European Parliament (2014) considers smart economy, smart mobility, smart environment, smart people, smart living and smart governance as dimensions to be considered for a smart city perspective. These dimensions can be directly applied to tourism destinations that often have characteristics of urban areas.

The conceptual principles of smart cities were direct drivers of the emergence of smart tourism destinations. Therefore, such principles are similar since they integrate technological infrastructures and end-user devices with the aim of providing more satisfactory experiences for residents and tourists (Huertas, Moreno & Pascual, 2021). It should be noted that smart cities and smart tourism destinations converge, not only due to their technological foundations, but also for involving other aspects of contemporary society related to the search for environmental, economic and social integrity.

Since the first debates, smart tourism destinations were conceived as innovative destinations, grounded on cutting-edge technological infrastructure that guarantees the storage and analysis of data to guide the sustainable development of the territory, with a focus on improving the tourist experience at the destination (Segittur , 2013; Gretzel et al., 2015a; Silva & Mendes, 2016).



It is known that ICT are important elements in the process of transforming conventional cities and destinations into smart ones (Brandão, Joia & Teles, 2016), but this is not only about the use of technology, since changes are required in several other factors linked to the territories (Muniz, 2020). It is a challenging setting, due to the mythification of technology as a unified response to the challenges of contemporary cities. Data are seen as a panacea for complex socioeconomic problems, so it is becoming increasingly clear that being smart is not a purely technocentric approach. The information and facilities provided by various technological tools need to be analyzed and organized by people who hold management power and establish priority actions and audiences. In other words, technology alone will not bring results if it is not linked to responsible and sustainable ideals.

Khomsî and Bédard-Bédard (2016) consider that the aforementioned issues are even more debatable when it comes to distinguishing precisely between a smart city and a smart destination, as the intrinsic characteristics of their respective target audiences, both citizens and tourists, are different. Buhalis and Amaranggana (2014) further explain that the technologies needed for a STD are fundamentally different from those required for a SC, as tourists use technology before, during and after the trip, while the local population remains limited to using it in their daily life in the city. In addition, the global SC project does not sufficiently meet the management needs of tourism destinations and, on the other hand, the smart destination initiative does not fulfill the holistic perspective in terms of tourism planning and management, because, as argued by Soares et al. (2021), it does not yet include the transversality of tourism.

The study of the evolution of urban environments has revealed different conceptions of what is often called smart. Therefore, "it has become a concept often used to drive specific political agendas and sell technological solutions" (Gretzel et al., 2015b, p.180). Validation of the concepts by the media has also led to the arbitrary self-declaration of cities as "smart" (Zygiaris,



2013). Due to the current attention and growing debate generated by initiatives on smart cities, it is opportune and appropriate to reflect on their current and future validity and viability (Güell, 2015), as “one should not forget that there are multiple and powerful sectoral interests at play that skew the concept of urban intelligence in one direction or another” (Güell, 2015, p. 22). Furthermore, the use of the term to label “smart” initiatives may relate to one-off actions and not necessarily overall change. Thus, there may be cities that are considered examples of smart cities in more specific dimensions such as mobility, education and data dissemination, and which do not, for example, meet the principles of smart governance.

Similarly, Baidal and Rebollo (2019) argue that, in the specific case of STD, their characteristics and dimensions have been basically promoted through institutional initiatives, supported in most cases by technology companies. Furthermore, the authors consider that initiatives concerning smart cities and destinations influence traditional planning models and provide new methods and techniques for analysis, participation and decision-making. This leads – or at least should lead – to the emergence of new practices that favor planned management, albeit not unambiguously, since the analysis of development policies and processes reveals different directions in the design, scope and development of so-called smart strategies.

## RESULTS AND DISCUSSION

### Analysis of the scientific production domain

According to the general aspects of the records shown in Table 3, **39 articles** on **SC** were analyzed, written by **98 authors** (average co-authorship of 2.5), linked to **72 different institutions** based in **25 countries**, with studies published in **25 different journals**. Regarding **STD**, **28 articles** were analyzed, written by **66 authors** (average co-authorship of 2.3), linked to **40 institutions** from **16 different countries** and published in **18 different journals**. This shows that



the articles on smart tourism destinations present in Web of Science are quantitatively smaller in all aspects considered.

Table 3.

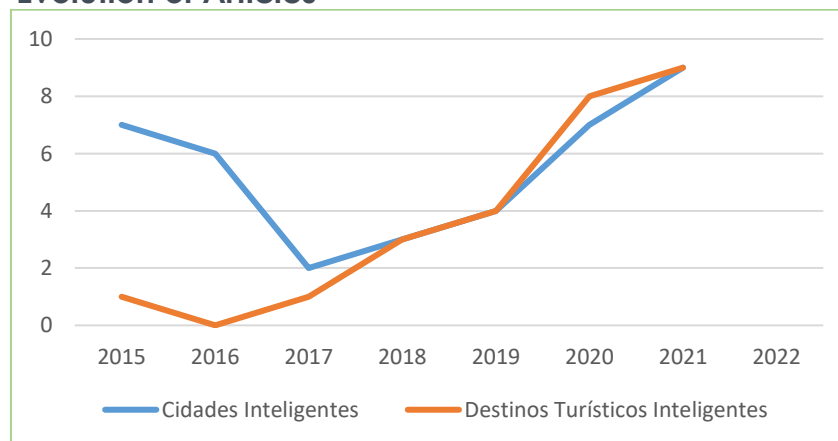
**Overall sample characteristics**

SMART CITIES		SMART TOURISM DESTINATIONS	
Characteristics	Total No.	Characteristics	Total No.
Articles	39	Articles	28
Journals	25	Journals	18
Institutions	72	Institutions	40
Countries	25	Countries	16
Authors	98	Authors	66
Keywords	230	Keywords	189

Source: Authors, based on Web of Science, 2022.

On the other hand, with regard to the evolution of articles (Graph 1), we see an increase in the number of published articles on both subjects. The number of articles on smart cities decreased between 2016 and 2017, but then the annual number increased steadily, reaching nine articles published in 2021. The number of articles on STD, in turn, starts out with one article in 2015 and none in 2016 to then grow consistently year by year, also reaching nine articles in 2021.

Graph 1.  
**Evolution of Articles**



Source: Authors, using Rayyan software, 2022.

It should be mentioned that before 2015, Web of Science has only 1 indexed article in each year, which means that research on STD was still in its

infancy at the time. In turn, the evolution of articles on SC shows a contrasting scenario, as the first article containing the term smart cities in the title was published in 1993. Therefore, in 2015, the number of articles on the subject was booming. Since 2018, the number of articles increases in both subjects, which may be related to the growing developments and interest in this field by researchers from interdisciplinary areas in Latin American countries, such as Brazil.

Regarding journals, the study shows that articles on SC were published in 25 journals from 25 different countries. Most articles are concentrated in four journals: *Sustainability*, *Journal of Urban Technology*, *Cities Journal* and *Cambridge Journal of Regional Economy and Society*. In turn, the articles on STD were published in 18 journals from 16 different countries, and the four journals that concentrate most of them are: *Sustainability*, *Current Issues in Tourism*, *Investigaciones Regionales-Journal of Regional Research* and *Tourism Planning & Development*. It therefore appears that the journal most used to share knowledge produced in both subjects is *Sustainability*,<sup>2</sup> an open access, interdisciplinary journal from Switzerland that publishes studies on sustainable development and environmental, cultural, economic and social sustainability.

Considering authorship and the respective institutions where SC research is done, the network comprises 72 organizations from 25 different countries. Two authors stand out for main authorship in more than one article: **Miltiadis D. Lytras**, professor and researcher at the School of Business & Economics, Deree College (Greece), with two studies, and **Rob Kitchin** of the National University of Ireland Maynooth (Ireland), also with two studies. In STD research, professor and researcher **Ulrike Gretzel** from the University of Southern California (USA) and **Mariana Brandão Cavalheiro** from Universidade Federal Fluminense (Brazil) published two studies each as main authors. After the analysis of both groups,

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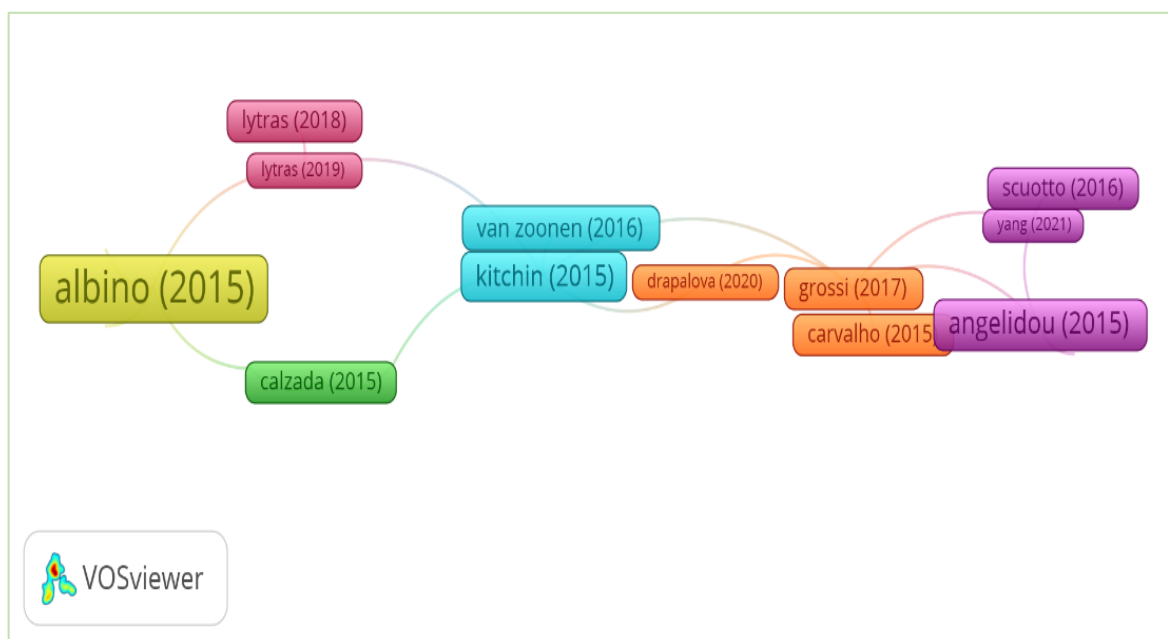
<sup>2</sup> *Sustainability*. Information available at <https://www.mdpi.com/journal/sustainability>.



it was concluded that no author in the sample publishes studies on both subjects.

Although the cited authors stand out for having more than one study in the sample, submission of the database to VOSviewer generated the domain network indicating the authors and documents that were most cited in the Web of Science articles, as well as the respective clusters to which the studies are linked by subject similarity. Thus, the results generated and presented in Figures 1 and 2 show the most influential studies in their respective research subjects.

Figure 1 shows the dynamics of the SC domain, formed by 12 authors distributed in six clusters and ten links between articles. The number of citations of each article is shown according to the size of the text box that contains the first author's last name and the year of publication. One notes that the grouping of articles reviewed in VoSviewer generated six clusters with significant similarity, but which contain a small number of authors. This indicates a domain with few links established between the articles and the respective cited authors.



**Figure 1.** Diagram of the **Smart Cities** domain network

Source: Authors, using VOSviewer version 1.6.14, 2022.



The **yellow cluster** is represented by the most cited study in the entire sample (**n=1001** citations). The article was written by Albino et al. (2015) and aims to conceptually define the meaning of “smart” in the specific context of cities. Like the yellow cluster, the **pink cluster** relates to articles that address conceptual discussions from the perspective of “intelligence.” The studies by Lytras et al. (2018) and Lytras et al. (2019) are the most relevant in this cluster, with **n=131** and **n=18** citations, respectively. It is interesting to note that the studies by Miltiadis D. Lytras are not only more numerous, but also relevant in terms of number of citations.

The **green cluster** is represented by subjects such as technological determinism, digital natives and citizenship. There is one single article, that by Calzada and Cobo (2015), that totals **n=93** citations. The authors address conceptual issues, besides undertaking a critical analysis of the deconstruction of positivism present in smart city research, and suggest that being digitally connected should not be viewed as a social capital gain.

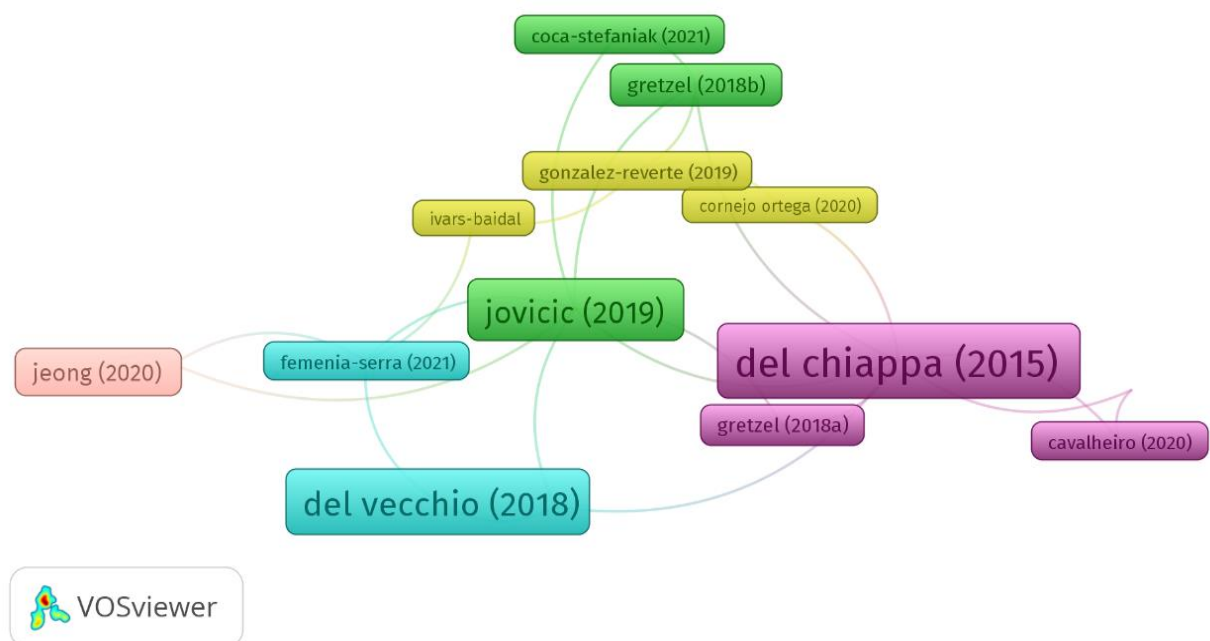
In the **blue cluster**, the studies address subjects such as information technology, especially related to large data volumes and issues of privacy and ethics in data use. The most relevant article in the cluster is written by Kitchin (2015), with **n=282** citations and deals with ethical issues related to instrumental rationality, privacy, data surveillance and geosurveillance in smart cities.

The most recurrent works of the **orange cluster**, in turn, address the subject of governance and the complexity required for a city to become “smart” in the face of social and technical issues. The most relevant study in this cluster is that by Grossi and Pianezzi (2017), which totals **n=104 citations** and shows issues related to management and the influence of neoliberal ideology in framing some problems that tend to favor business-driven technological solutions over long-term urban planning.



The **purple cluster** comprises studies that address the internet of things (IoT), open innovation (OI) modelling and services available in smart cities. In this cluster, the most cited study is that by Angelidou (2015) with **n=299** citations, which addresses discussions related to the recent history of smart cities, as an urban future, and to innovation and the knowledge economy, in addition to identifying the underlying principles that indicate what it means to be “smart” in an urban context.

With regard to the STD domain network, Figure 2 reveals a network formed by 12 authors distributed in five clusters and 21 links.



**Figure 2.** Diagram of the **Smart Tourism Destinations** domain network  
Source: Authors, using VOSviewer version 1.6.14, 2022.

Located on the right side of the map, the **purple cluster** represents the largest domain. The articles in this cluster address subjects such as **technology, urban planning and STD models**, in addition to studies that link the evolution of the concept of smart cities and tourism resilience with the approach of smart tourism destinations. Most prominent here is the study by Del Chiappa and Baggio (2015) with **n=138** citations according to Web of Science, which

addresses the importance of transferring knowledge and information in smart tourism destinations, aiming to enhance the scientific debate on the subject.

The **green cluster** is represented by a group of three studies that analyze STD from a perspective that goes beyond individual destinations, adopting a more systemic approach. These are studies that address the evolution of STD with the aim of providing research agendas to consider suitable strategies for a regional and integrative approach. The most representative study of the group is that by Jovicic (2019) with **n=89** citations. The article reviews the evolution of the main concepts of tourism destinations with the aim of emphasizing the changes in the understanding of the concept of “destination” in recent decades. Systemic emphasis is given to the concept of smart tourism destination that differs from the understanding of a traditional destination.

The **blue cluster** is represented by only two studies. One is by Femenia-Serra and Ivars-Baidal (2021), which investigates to what extent the efforts of smart destinations are actually improving tourist experiences and the configuration of destination management. The other is by Del Vecchio, Mele, Ndou and Secundo (2018), which stands out with a domain of **n=106** citations and aims to demonstrate how the enormous amount of data generated by tourists can drive the value creation process for a smart tourism destination. The article explores regional tourism experiences related to a southern European region to derive patterns and value creation opportunities generated by big data. It outlines discussions on improvement in decision-making, creation of marketing strategies with more personalized offers, transparency and trust in the dialogue with customers and stakeholders and the emergence of new business models.

The contextual dimension of cities is highlighted in the **yellow cluster**. The studies address subjects such as the urban use of technologies to improve economic growth, quality of life, resource management and sustainability. As the cluster with the lowest number of citations, the most representative article



is that by González-Reverté (2019) with **n=13** citations, which assesses the real effects of STD development on urban sustainability. In this study, the authors conclude that despite the effort to develop smart initiatives, the number of sustainability solutions proposed is still quite small.

The **pink cluster**, comprising the smallest number of studies, is represented by the article by Jeong and Shin (2020), which, despite being a recent study, has already accumulated **n=38** citations in Web of Science. This study assesses how tourists use technology and how it affects the overall travel experience and future visit intention. The authors address subjects such as tourist experiences and behavioral intentions in smart tourism destinations.

The overall analysis shows that there are no common authors to the two research domains, indicating that these are subjects that are developed in isolation and, despite being based on similar conceptual principles and objectives, have no network of researchers discussing both subjects together.

Regarding the citation per organization network, it is interesting to observe which institutions are at the forefront of research. As shown in Table 3, the citation per organization network includes 72 institutions for smart cities and 40 for smart tourism destinations. For this analysis, the minimum number of two documents per organization and three citations per document was established as a criterion.

Tracking on VOSviewer confirmed a fairly similar number of articles per educational institution. Seven institutions were found linked to the most cited authors in the smart cities database: American College of Greece (Greece), Aristotle University of Thessaloniki (Greece), Effat University (Saudi Arabia), Seoul National University (South Korea), University of Kentucky (USA), Erasmus University Rotterdam (the Netherlands) and Temple University (USA). The global distribution of the most cited institutions is concentrated mainly in Europe (three), Asia (two) and North America (two).



In turn, the main authors of the citation network for smart tourism destinations are concentrated in six institutions: Bocconi University (Italy), University of Sassari (Italy), Europa University of Greenwich (England), University of Southern California (USA), Universidad de Alicante (Spain) and Universidad de Malaga (Spain). The respective institutions confirm the centrality of the subjects of smart tourism destinations in the European continent with five universities and only one in the United States.

This confirms the notion that different groups of researchers study smart cities and smart tourism destinations. Besides being different authors, they are not linked to common educational institutions nor work in close geographic regions.

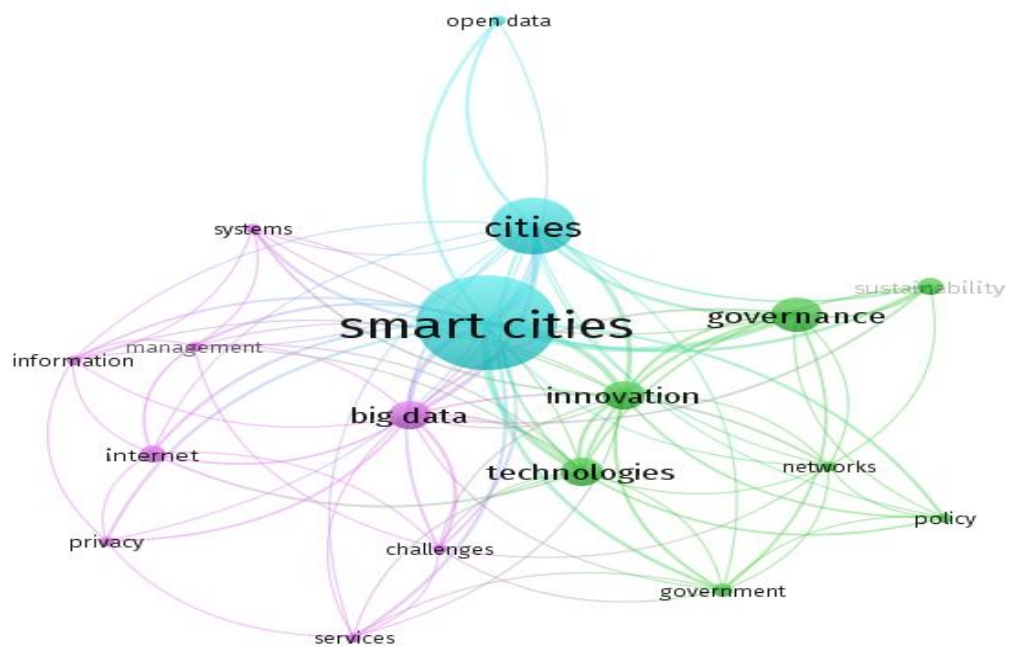
### **Synthesis of research agendas**

In this research, the synthesis of the mapped studies and of the systematic review makes it possible to confirm the theoretical framework, considering the global qualified scientific production published in the Web of Science journals. To this end, the keywords were firstly mapped in order to reveal the most recurrent themes in the articles, since “the greater the number of similar keywords, the greater the trend to express the existence of related themes, main subjects and concepts that constitute and structure the field of study” (Codato, Lorencetti & Bittencourt, 2019, p.13). Subsequently, a qualitative analysis of the sample summaries was performed, generating a summary table with the synthesis of the main research agendas for each subject.

The criterion chosen to map the network of studies present in the title, abstract and keywords of each article was at least three occurrences in a total of **n=233** most frequent words in the sample of articles on smart cities and of **n=189** in the sample on smart tourism destinations. Therefore, it is possible to visualize, through the co-occurrence clusters of the graphic representation,



how these words relate to each other in the articles (title, abstract, keywords) of the research on SC (Figure 3) and STD (Figure 4).



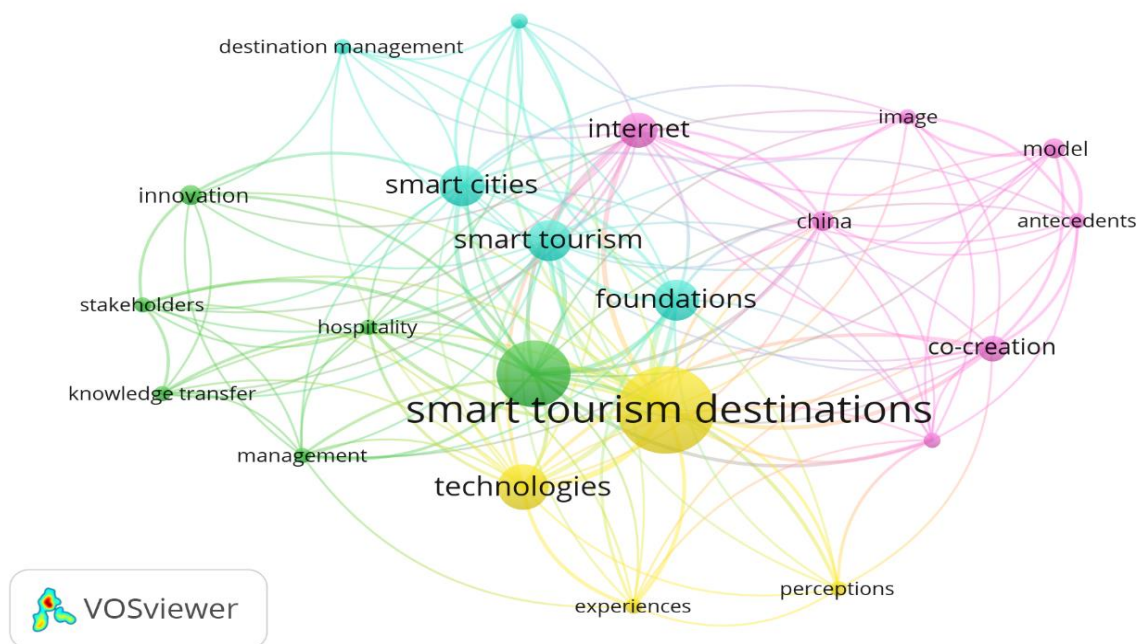
**Figure 3.** Diagram of the **Smart Cities** word co-occurrence network  
Source: Authors, using VOSviewer version 1.6.14, 2022.

As shown, only three clusters were identified for smart cities, which suggests a homogeneity of the terms used. The most representative and most intense subject is inserted in the **blue cluster** with emphasis on the term smart cities ( $n=34$ ), with a total of  $n=85$  links with other words. Such recurrence confirms the centrality of the subject and shows the strength of the total number of links established with other terms, especially those that are directly linked: cities ( $n=19$ ) and open data ( $n=3$ ).

The **green cluster** is led by studies on governance ( $n=11$ ), which directly groups innovation ( $n=9$ ) and technology ( $n=9$ ), and, with less recurrence, the terms sustainability ( $n=5$ ), government ( $n=4$ ), networks ( $n=3$ ) and politics ( $n=3$ ). In the **lilac cluster**, big data ( $n=9$ ) leads the connections and is directly linked to the word internet ( $n=5$ ) and to a lesser extent to the terms management ( $n=3$ ), systems ( $n=3$ ), challenges ( $n=3$ ), information ( $n=3$ ), services ( $n=3$ ) and

privacy ( $n=3$ ). Overall, three clusters present subjects that are interconnected through the links and are the core of discussions about smart cities.

In turn, the results of the bibliometric mapping of the smart tourist destinations database presented four clusters, which indicates a greater heterogeneity of terms compared to smart cities.



**Figure 4.** Diagram of the **Smart Tourism Destinations** word co-occurrence network

Source: Authors, based on Web fo Science and VOSviewer.

As shown in Figure 4, the most representative and intense grouping is the **yellow cluster**, which has the term smart tourism destinations ( $n=17$ ) in the center, confirming the centrality of the subject and showing the strength of the total number of links ( $n=63$ ) with other words. The term smart tourism destinations directly groups the words technology ( $n=9$ ), experience ( $n=3$ ) and perception ( $n=3$ ), but relates to all the other words in Figure 4, since it is the main subject of the study.

In turn, the **blue cluster** groups the words that refer to smart tourism ( $n=8$ ), which is a category that brings both cities and destinations to the heart of

studies and is related to subjects such as smart cities (**n=8**), foundation (**n=8**), destination management (**n=3**) and governance (**n=3**). The **green cluster** has the highest recurrence for the word cities (**n=13**), being directly related to innovation (**n=4**), stakeholders (**n=3**), hospitality (**n=3**), knowledge transfer (**n=3**) and management (n=3).

The **lilac cluster** shows internet (**n=7**) as the most cited word, followed by co-creation (**n=5**), model (**n=4**), China (**n=4**), image (**n=3**) and antecedents (**n=3**). In general, one notes that the four identified clusters present subjects that are common to the studies, such as **technology** and **internet**.

From the double mapping of keywords, it can be inferred that subjects such as **innovation, technology, management** and **governance** are recurrent and common to both fields of research. However, subjects such as **sustainability**, which is one of the theoretical premises of both smart cities and smart tourism destinations, is solely linked to the context of smart cities.

From the analysis of the domain diagram that diagnosed the research clusters, the co-occurrence of words and the qualitative analysis of the selected summaries, the results suggested five agendas that are frequent in each of the research fields, shown in Table 4 and 5.

The five smart city agendas are: **governance and management of smart cities; intelligence applied to urban contexts; social dimension and citizenship inclusion; big data and ethical data management; criticism of technological determinism.**



Table 4.  
**Synthesis of research agendas related to smart cities**

Agendas	Content	Frequent terms	Articles
<b>Governance and management of smart cities</b>	Studies showing the types of smart city governance. They address aspects of management and how neoliberal ideology influences the framing of some problems that tend to favor market-driven technological solutions over long-term urban planning.	Governance networks, cooperation, innovation, sustainability, government, politics.	Tachizawa et al. (2015); Grossi e Pianezzi (2017); Anand and Navio-arco (2018); Razaghi and Dedo (2018); Drapalova and Wegrich (2020); OOMS et al. (2020); Dameri et al. (2016); Yang et al. (2021).
<b>Intelligence applied to urban contexts</b>	Discussions related to the historical context of smart cities and directions in urban future, innovation and knowledge economy. Research that identifies the underlying principles of what it means to be "smart" and what dimensions are required to achieve such urban intelligence.	Internet of things (IoT), open innovation models, big data.	Angelidou (2015); Albino et al. (2015); Lytras et al. (2018); Lytras et al. (2019); Kumar et al. (2020).
<b>Social dimension and citizenship inclusion</b>	Studies that foster reflection on the social dimension of cities and the inclusion of citizens. They reflect "citizens' awareness of supposedly smart applications and solutions" and their ability to use such applications and solutions. Citizen perception and the type of citizenship enacted in smart cities.	Income inequality, well-being, citizen, citizenship.	Lytras et al. (2018); Joss et al. (2017); Burns and Andrucki (2021); Caragliu and Del Bo (2021); Georgiadis et al. (2021).
<b>Big data and ethical data management</b>	Articles that address the generation and spread of data as a means to optimize resources, maintain sustainability and improve people's quality of life. Nonetheless, the ethical impact of data management is a matter of concern in many studies.	ICT, open data, internet, internet of things, sensor network, information; privacy, data surveillance and geosurveillance in smart cities.	Kitchin (2015); Van Zoonem (2016); Ahad et al. (2020); Kitchin (2016); González-Reverté (2019).
<b>Criticism of technological determinism</b>	Research that criticizes smart cities as an expression of neoliberal ideology, aiming to deconstruct the concepts of universalism and technological determinism. Studies that show how disconnection can be beneficial for societies.	Technological determinism, digital natives, information overload, challenges, networks, Blockchain.	Calzada et al. (2015); Shelton et al. (2015); Laszlo (2016); Grossi and Pianezzi (2017).

Source: Authors, based on the articles in Web of Science.



The results for smart tourism destinations (Table 5) also suggested five agendas: **governance and management of smart tourism destinations; technology, innovation and co-creation of value; smart experience dimension; theoretical and methodological foundation of STD; critical perspective of the model.**

Table 5.  
**Synthesis of research agendas related to smart tourism destinations**

Agendas	Content	Frequent terms	Articles
<b>Governance and management of smart tourism destinations</b>	Studies that address the importance of coordinated management with integration between travel companies, government and host communities. Also studies that present STD management models with more holistic approaches and in a more integrative and regional perspective.	STD models, DMOs, stakeholders, integration, management, sustainability, resilience.	Della-Corte et al. (2017); Gretzel et al. (2018a); Gretzel et al. (2018b); Crespo et al. (2019); Mandic and Kenell (2021); Errichielo et al. (2021); Cavalheiro et al. (2021a).
<b>Technology, innovation and co-creation of value</b>	Studies that address how technology favors the spread of data and how big data can nurture the value creation process for a tourism destination.	Internet, blockchain, big data, chatbots, geosurveillance, virtual.	Baggio et al. (2020); Tyan et al. (2020); Del Vecchio et al. (2018); Orden-Mejia and Huertas (2021); Cavalheiro et al. (2021).
<b>Smart experience dimension</b>	Articles that address the degree of tourist perception about the importance, trust, security, independence and privacy in smart destinations. Also focused is technology and how it can favor the marketing and creation of experiences in destinations, making them more competitive.	Perception, behavior, satisfaction, loyalty, image, services.	Mendes et al. (2019); Azis et al. (2020); Jeong e Shin (2020); Correa and Gosling (2021).
<b>Theoretical and methodological foundation of STD</b>	Studies that focus on discussing the concepts, theories and methodology that structure the dialogue of smart tourism destinations, as well as the discourses that have shaped the narratives and research domains in STD.	Research, smart cities, concepts.	Jovicic (2019); Gelter et al. (2021).
<b>Critical perspective of the model</b>	Critical reflections of smart tourism, highlighting conceptual and structural gaps and inconsistencies. One-off discussions that view technology as an excluding tool and STD models as merely capitalist. Attention is also given to issues of privacy of data generated by tourists.	Technology, user, internet, open data, privacy.	Del Chiappa e Baggio (2015); Baggio et al. (2020); Femenia-Serra & Ivars-Baidal (2021).

Source: Authors, based on the articles in Web of Science.



A comparative analysis of the theoretical frameworks of the two fields based on their research agendas shows that they present similarities in their agendas and, in a less recurrent way, a few dissensions. The respective analyses afford the possibility of observing potential areas of interest for scientific advancement, as well as theoretical and methodological gaps.

Of the widely discussed topics, governance is the one that moves more easily between the two subjects, as it is a prerequisite for the smart management of both cities and destinations. The studies show clearly that anticipatory governance is an indispensable condition for the success of a smart city or destination (Kitchin, 2016).

The critical view is a current agenda in both research subjects. The potential of smart cities as a universal model of urban development is questioned, mainly due to the culture of technological determinism, since, as argued by Güell (2015), viewing the city from a purely technological perspective is not enough, as the mere incorporation of technologies in the urban fabric is insufficient to endow a city with “intelligence.” In research on STD, in turn, the critical perspective highlights the inconsistencies between what the STD models propose in theory and what is actually put into practice.

As the SC approach is aimed at improving urban processes for the resident citizens, ethical data management is one of the relevant and recurring themes. In STD, in turn, the issue of data volume is relativized; technology is positively viewed as a tool that can favor the process of co-creation of value and improvement of tourist experiences, benefiting the marketing and competitiveness of destinations. Complementarily, issues such as privacy, trust and security in the provision of data by citizens and tourists are also addressed in both fields.

The social dimension and citizenship inclusion versus the intelligent experience of tourists reveal the interest of the studies in both “target populations” of the smart context. The development of the smart experience is



understood through the interaction between travelers and other STD stakeholders and the use of technology before, during and after the trip, to share information and personalize experiences (Corrêia et al. 2021). In addition to these aspects, the studies addressing the smart experience also evaluate tourist perception on the importance, trust, security, independence and privacy in smart destinations, and how this experience can favor the marketing and enjoyment of destinations, making them more competitive (Corrêia et al. 2021).

As argued by Stimmel (2015), the urban environment of smart cities shows better economic, social and environmental performance through the massive use of ICT. Considering these aspects, the lack of applied studies measuring such performance in cities viewed as smart was evident. This perspective is also recognized in STD, since both types of territories converge in the search for the environmental, economic and social integrity of cities and tourism destinations, which are often urban areas. Thus, it must be said that the concepts are clear in theory, but practical approaches and empirical research are still scarce.

The analysis of the resulting agendas is in line with the specialized literature regarding the use of technology as a driver of intelligence and a tool for improving experiences and facilitating data management and governance, among other aspects. However, the subject of sustainability is considered to be neglected. In evaluating the true effects of the development of smart tourism destinations on urban sustainability, González-Reverté (2019) concludes that despite the remarkable effort to develop smart initiatives, sustainability solutions based on the use of technology are rarely proposed, which suggests the presence of cultural, managerial and technological barriers.

## Conclusions

The systematic review with the support of bibliometrics and Vosviewer and Raayan software proved conclusively to be an effective methodological approach to understand the scientific outlook on the two fields of study: smart



cities and smart tourism destinations. The generated data enabled some interpretations and reflections and made it possible to achieve the goal of mapping the studies on the two research subjects. The results indicate few similarities between the fields of study, as the groups of authors, the clusters of subjects studied and the origin of the authors are significantly different. However, it cannot be said that there are dissonances between the studies; they are merely different domains and lines of research, but with similar theoretical foundations in many respects.

The analyses reveal that subjects such as technology, innovation, governance and data management were evident in the field of smart cities and destinations, despite different research focuses and analysis methods. However, the subject of sustainability, which is a premise of the guiding models of both smart cities and smart tourism destinations, has been poorly studied. Furthermore, it is important to note that the process of conceptualizing and defining smart tourism destinations and how they work, as well as of differentiating them from smart cities, is still ongoing (Del Chiappa & Baggio 2015) and should be addressed in future studies.

This article aims to contribute to enhancing the scientific debate; however, some limitations must be acknowledged. Although Web of Science is one of the most representative research tools for social sciences, restricting the study to this database may have resulted in the exclusion of articles that are not indexed in this database, especially because the indexed production is largely written in English. To minimize this limitation, other studies were used in the literature review and in the discussion of results.

It is also understood that other resources could have been explored through VOSviewer, such as analysis of the bibliographic coupling network, which would reveal the core and periphery educational institutions that support research groups and make it possible to find new areas of research. This aspect did not compromise the results of the article, but could have added



new perspectives to the studies. Therefore, it serves as a base for the development of future complementary research carried out by researchers who are interested in articles on smart cities and destinations.

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