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Integrating smart cities and tourism systems: a critical review

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Abstract

Purpose – This study explores the relationship between Tourism Systems and Smart Cities, aiming to identify what prevents public managers from including these systems in Smart City strategies. This separation neglects that increasing tourism attractiveness may also impact city resources, infrastructures and inhabitants.

Design/methodology/approach – To this end, we developed a critical literature review consulting three databases: Scopus, Web of Science and EBSCOhost. A total of 73 articles were selected and analyzed through thematic analysis.

Findings – Through this critical review, we develop a framework of barriers to integrating a tourism system in Smart City strategies composed of four main barrier themes and 11 barrier factors. Findings show the need for innovative research and public managers to go beyond considerations related to technological challenges and instead focus on other barriers hindering integration, such as the lack of participatory governance and knowledge of tourism systems' current and future impact.

Originality/value – This study offers a critical identification of barriers impeding the inclusion of tourism systems in Smart City strategies, providing a useful guideline for public managers aiming to follow an innovative approach to smart development where tourism can still be a tool to enhance the attractiveness of the territory while considering its current and future impact on the city.

Keywords Smart cities, Tourism system, Barriers, Integration, Thematic analysis

Paper type Literature review

1. Introduction

Cities are shaped by internal and external socioeconomic and environmental forces (Yıldız *et al.*, 2020). These forces cause challenges threatening a city's livability (Kim and Hall, 2022). To address these challenges, integration among city systems is needed to provide information and resources to navigate across all systems; therefore, integration is essential to develop urban settings aiming to enhance their livability (Antognelli and Vizzari, 2017; Javidroozi *et al.*, 2015), and it represents a concept that lies at the heart of the notion of a Smart City (hereinafter SC) (Allam and Dhunny, 2019; Perboli and Rosano, 2020; Tomor, 2019).

A city becomes smart when investments in social capital and communication infrastructures fuel sustainable economic growth and a high quality of life guided by participatory management and governance (Criado and Gil-Garcia, 2019; Drapalova and Wegrich, 2020; Macke *et al.*, 2018; Margherita *et al.*, 2023; Meijer, 2018; Meijer and Bolívar, 2016; Yigitcanlar *et al.*, 2015). Indeed, social and environmental sustainability are strategic components of SCs (Angelidou *et al.*, 2018; Broccardo *et al.*, 2019).

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A SC approach addresses the challenges faced by urban environments and enhances citizens' quality of life through technological innovation (Johnson *et al.*, 2020). Yet, this approach often fails to include the Tourism System (hereinafter TS) of a city in its strategy (Gretzel and Koo, 2021; Pasquinelli and Trunfio, 2020) if not to enhance the city attractiveness, overlooking the tourism presence in city services and infrastructures and consequent impact (Gretzel, 2022; Gretzel and Koo, 2021; La Rocca, 2013, 2014; Mehraliyev *et al.*, 2020; O'Connor, 2023; Pasquinelli and Trunfio, 2020). This separation threatens the effectiveness of a SC strategy as a TS inadequately managed aggravates existing urban challenges such as overcrowdedness, waste management, damage to natural and cultural resources which may prevent a SC from achieving urban sustainability (Postma and Schmuecker, 2017; Tsaur *et al.*, 2018).

To this end, this study will explore the relationship between TSs and SCs and understand what hinders their integration due a TS importance for achieving urban sustainability. Indeed, TSs have the potential to act as a catalyst for social and economic development, positively contributing to enhancing the quality of life if the challenges related to TSs activity are adequately managed through a SC strategy (Capocchi *et al.*, 2019; Morrison and Coca-Stefaniak, 2020; Shafiee *et al.*, 2021; Fernández-Díaz *et al.*, 2023; O'Connor, 2023; Rucci and Porto, 2022).

Previous studies exploring the relationship between a TS and a SC discuss the phenomenon from different perspectives. Some papers explore this relationship by considering how using SC technologies in a TS can enhance the tourist experience (Choi *et al.*, 2021). Others investigate the sustainability impact of specific tourism attractions in SCs (He *et al.*, 2022). Fyall and Garrod (2020) and Zhu *et al.* (2022) explore this relationship from a perspective of destination evolution and response to crises, showing the value of TSs on urban development and the need for more research investigating the integration of a TS into the broader city system. Finally, Ivars-Baidal *et al.* (2023) study this relationship from the viewpoint of indicators that can track the sustainability progress of smartness, showing the need for research that presents a systemic understanding of urban spaces to break the city sylos between TSs and SCs (Ivars-Baidal *et al.*, 2023).

The uniqueness of our research relies on studying the phenomenon from the viewpoint of its separation.

Indeed, organizational studies suggest that barriers are crucial features that prevent achieving a system's objectives (Dorst *et al.*, 2022; Kaswan and Rathi, 2021). Therefore, the first step to understanding the reality of the challenging relationship between TS and SC that marks their separation is to identify barriers preventing their integration (Razmjoo *et al.*, 2021).

Little research has investigated barriers hindering the integration of a TS in SCs. Shafiee *et al.* (2021) conceptualize the components of a smart destination, and Pasquinelli and Trunfio (2020) use a SC approach that integrates SC drivers and dimensions of urban sustainable development to respond to issues of over-tourism without empirically investigating the integration of a TS into a SC. Huang *et al.* (2021) explore the barriers related to the development of SCs, whereas Marvin *et al.* (2022) discuss the role of technology related to AI in SCs with China as context without considering the presence of TSs.

Therefore, unlike previous studies, this paper focuses on the study of barriers hindering the integration of TSs in SCs with the development of a framework that can contribute to filling the current gap in the literature and provide public managers a guideline to follow in order to adopt an innovative approach to SC planning and a proactive approach to SC policies that integrates a TS and its impact. Accordingly, this study aims to answer the following research question: *what are the barriers to a Tourism System integration in Smart City strategies?*

To answer this question, we conduct a critical review to assess, analyze and synthesize existing literature in the context of smart urban development that will allow us to unveil the

main barriers hindering TS integration in SCs. The critical review process entails a thematic analysis of the literature where we identify themes and patterns in barriers to integration to address the study's research question.

The paper is structured as follows. Section 2 presents the research background. Section 3 presents the methodology. The results are in section 4. Section 5 presents the discussion, contribution for research and public managers and limitations of the study. Section 6 presents the conclusions.

2. Research background

In this section, we will provide some definitional clarity around the concept of SC, SC policy and the current role played by TSs in SCs.

2.1 SC definition and SC policy

A SC is an innovative urban setting that applies technologies to solve urban problems and enhance the quality of life (Margherita *et al.*, 2023). Therefore, a SC needs interagency collaboration and inclusiveness of all relevant stakeholders (Albino *et al.*, 2015). In developing a SC, public managers focus on critical issues supporting local policy objectives. These critical issues represent the problems that local areas face, such as congestion issues, overcrowdedness and waste management, which can also be referred to as urban challenges (Clement and Crutzen, 2021).

In the last decades, the increase in urban challenges brought public managers towards SC to manage these challenges (Clement and Crutzen, 2021). Therefore, a policy is considered a core element for a SC (Wathne and Haarstad, 2020).

2.2 TS in a SC

A TS is defined as a group of three interrelated elements: tourists, geographical elements (traveler generating region, tourist destination region and transit route region) and tourism industry; these elements together form a TS (Moreira *et al.*, 2020). Given its definition, a TS could overwhelm a community with negative social and environmental impacts that aggravate local challenges (McCool and Moisey, 2008). Cities are tourism spaces so tourists and day trippers often make use of city services, such as green spaces and public transport, engaging in activities that overlap with residents (Fernández-Díaz *et al.*, 2023; García *et al.*, 2017). In addition, tourist numbers also impact energy, sewage, transport, water infrastructure, especially in peak season, threatening the livability of a city and the effectiveness of SC efforts (La Rocca, 2013; Tsaur *et al.*, 2018). Despite its impact, TSs often remain separated from SC plans and are relegated to one SC dimension -Smart Living- neglecting its direct and indirect impact on all dimensions of a SC, namely, smart mobility, smart environment, smart people, smart governance and smart economy (La Rocca, 2014).

This is illustrated by La Rocca (2014) as the paradox of TSs having a marginal role in a SC approach yet strongly impacting city resources and infrastructures. Indeed, within the SC dimensions, TSs remain often underrepresented with the risk of compromising the effectiveness of a SC policy (La Rocca, 2014).

Therefore, this study explores this paradoxical phenomenon to understand the barriers hindering a TS's integration into a SC strategy.

3. Methodology

In order to conduct this review transparently and accurately, a systematic review method is essential. Afterwards, a thematic analysis is applied to achieve a narrative comprehension of the topic under investigation (Ritchie and Jiang, 2021; Zhang *et al.*, 2023).

We follow Zhang *et al.* (2023) and Ritchie and Jiang (2021) to answer the research question and unveil those barriers hindering the integration of a TS in SC strategies, which will allow us to gather in-depth data on the phenomenon and develop a framework that can guide a new research agenda as well as public managers on the integration of TSs in SCs. This review method will allow for synthesizing the findings associated with a research question and is replicable, transparent and conducted systematically (Zhang *et al.*, 2023).

3.1 Literature review protocol

We followed (PRISMA) protocol to identify all relevant publications (Moher *et al.*, 2015).

This study aims not to generalize, given the presence of a variety of qualitative studies and case studies, but to explore the data and obtain an understanding of a phenomenon (Dahan-Oliel *et al.*, 2012).

Following Ritchie and Jiang (2021), this research follows three review steps. Firstly, we set the basis of this review by developing the review question and protocol. Secondly, we identified the pool of literature by conducting a search of previous literature, applying the inclusion criteria and confirming the final number of articles considered for the review. Finally, we analyzed and synthesized findings through the extraction of data.

The PRISMA protocol provides clear guidelines for the review process and consists of four stages: identification, screening, eligibility, and inclusion (Moher *et al.*, 2015). It "provides complete, transparent and accurate reporting of the data selection process" (Zhang *et al.*, 2023).

The search was done in February 2023 and employed three databases SCOPUS, Web of Science and EBSCOhost. The choice of these databases is given by the broad range and quality of peer-reviewed journals provided (Souza-Neto *et al.*, 2022).

The identification phase entailed the use of a search string "("smart city") AND (tourism)" for all three databases. Given the miscellaneous nature of the study that aims to integrate various streams of research, no categories were excluded from the search. There were also no restrictions in terms of year of publication as the aim is to identify themes from a wide array of peer-reviewed articles.

The initial number of articles retrieved from all three databases was 1,166 articles (Table 1). Afterwards, we applied the following three inclusion criteria: we selected publications in the English language, peer-reviewed and full-text journal articles. After this first screening, we had a sample of 484 articles. At this point, we excluded duplicates employing Microsoft Excel formatting options, reaching a number of 401 articles. The next step of the screening process for publication selection was developed following the research question, "*What are the barriers to a Tourism System integration in Smart City strategies?*".

Articles were analyzed based on the relevancy of the targeted area for this review; hence, articles within the TS and SC context indicated the challenges encountered. In this regard, we also included articles discussing smart destinations and smart ecosystems that discussed the challenges of TS integration, as these are components of a TS.

A full-text reading of the articles was done to ensure the correct inclusion or exclusion of the papers, and when in doubt, consultations were done among the authors to establish the alignment of the article with the purpose of the review. Through a thorough screening of the 401 articles, we excluded 328 articles from the data sample that were not pertinent to our research scope, which is to identify impediments to integrating a TS in SC strategies, leading to a final data sample of 73 well-qualified articles for this review (Appendix 1 quantifies papers by year of publication).

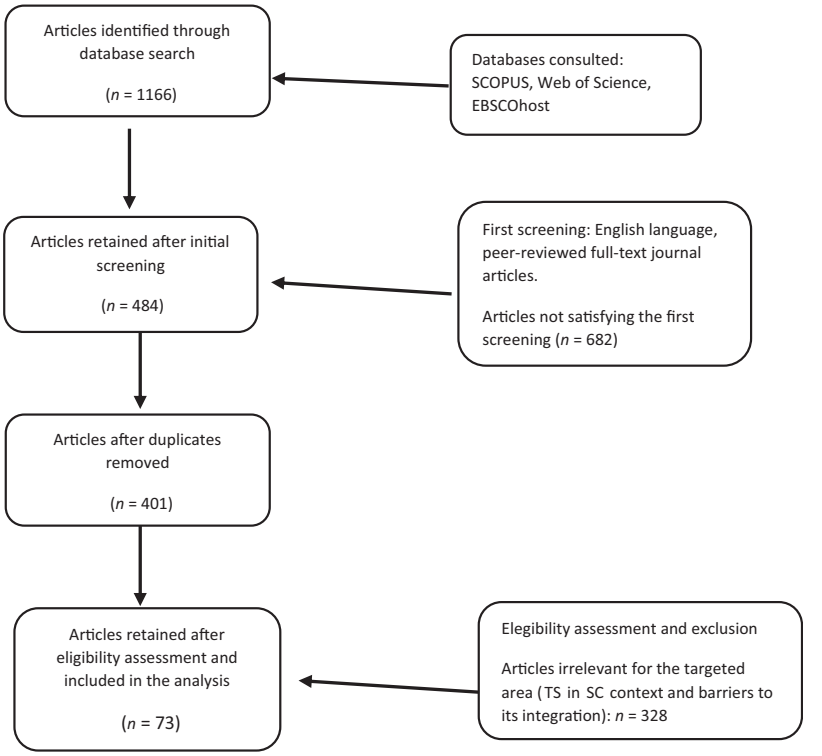


Table 1.
Flowchart based on PRISMA for the Article selection process

Source(s): Own elaboration

3.2 Thematic analysis

Thematic analysis is a search for themes that emerge as important to describe the phenomenon (Humble and Mozelius, 2022). It has been defined as a method to identify, analyze and report patterns (themes) within data (Vaismoradi *et al.*, 2013). The process involves the identification of themes through "careful reading and re-reading of the data" (Rice and Ezzy, 1999, p. 258) to recognize patterns within the data, where emerging themes become the categories for analysis (Jaspal, 2020). The thematic analysis reflects a qualitative methodology that is appropriate for literature reviews as it provides a qualitative synthesis of original qualitative, quantitative, and/or mixed-methods research studies through the extraction of themes and subthemes (Crowe and Sheppard, 2011). In this study, we use thematic analysis as it is appropriate to support deeper analysis compared to content analysis, which allows it to bring a deeper understanding of the phenomenon under investigation (Humble and Mozelius, 2022; Jaspal, 2020).

In our study, this method is used to develop a framework of barriers impeding the integration of a TS in SC strategies based on findings from prior studies. This method first led to the identification of 101 challenges impeding the integration of a TS into a SC strategy (see Appendix 2) through an inductive process that started from chunks of text, which were coded into second-order themes named *barrier factors*. Afterwards, barrier factors were coded into aggregated dimensions based on differences and similarities identified in the second-order

themes and named *barrier themes*. A total number of 11 barriers to integrating a TS in SC strategies were identified and underwent a detailed description. The relatively small number of articles allowed us to conduct the thematic analysis using MS Word (Zhang *et al.*, 2023).

4. Results

4.1 Paper characteristics

Among the selected literature for this review, there is a predominance of qualitative studies (41 articles) examining the integration phenomenon through city cases. The rest of the articles are divided into conceptual articles (17 articles), quantitative methodologies (12 articles) and mixed methodologies (3 articles).

The methodology distribution informs how the research on this phenomenon is still developing and evolving, with most papers aiming to understand the "how" and "why" and, therefore, qualitative in nature.

4.2 Results of the thematic analysis

This section explains the thematic analysis findings, which identified 11 barrier factors aggregated into four barrier themes (Table 2).

4.2.1 Governance and management barriers to include a TS at a city level. This barrier theme contains all impediments to integrating a TS in a SC connected with governance, from lack of stakeholder inclusion to lack of common long-term strategies and recognition of stakeholder influence ($N = 51$ articles).

By governance, we consider Agranoff (2006) definition, which refers to the administration, management and functioning of the public organization responsible for the city, including the SC mission, policy and strategy. Studies under this theme report the importance of governance when integrating a TS in SC.

Previous studies show that a lack of cooperation of key stakeholders in smart development planning prevents cohesive governance development (Errichiello and Micera, 2021; Lim *et al.*, 2018; Romão *et al.*, 2021). Strong governance is vital for a smart-oriented development plan in a city that has a TS together with a participatory management approach that considers feedback from a wide range of urban stakeholders (citizens, research centers, universities) including TS institutional bodies and stakeholders (Cavalheiro *et al.*, 2020; Chen, 2021; Gretzel, 2022).

Previous studies consider as a barrier to the integration of a TS in SC strategies also the lack of a tourism representative as a local decision maker with the need to recognize the role of a DMO as facilitator and catalyst of collaboration that can appropriately support public managers in the development of a SC strategy that includes a TS and its impact (Borseková *et al.*, 2017; Eichelberger *et al.*, 2020; Ivars-Baidal *et al.*, 2023).

Finally, a key barrier factor is unclear or inappropriate smart development strategies. For example, tourism projects focused on economic growth make sustainability less of a priority due to the presence of tourism stakeholders with a prevailing traditional view of economic growth (Borseková *et al.*, 2017; Cavalheiro *et al.*, 2020; Gretzel and Scarpino-Johns, 2018; Nientied and Toto, 2020). Indeed, contrasting strategic plans in terms of long-term vs short-term visions and economic growth vs sustainability focus hinder collaboration between stakeholders to develop common smart development strategies that integrate TSs (Mizrachi and Gretzel, 2020; Nientied and Toto, 2020; Samora-Arvela *et al.*, 2020).

4.2.2 Tourism information barriers. Studies under this theme ($N = 26$ articles) focus on barriers explicitly related to TSs and the information that the system lacks to provide to public managers concerning tourism impact and tourism spatial consumption and production, leading to the understanding that some key causes are rooted in the structural development of these systems.

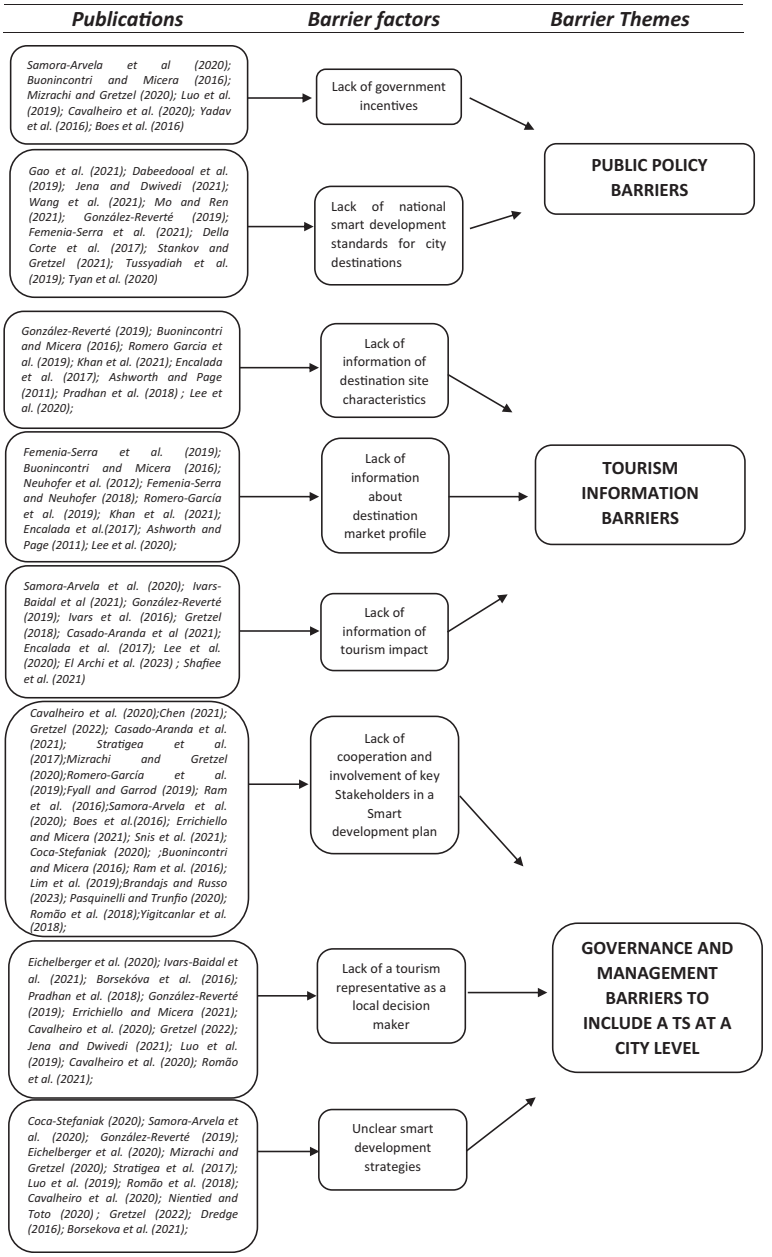
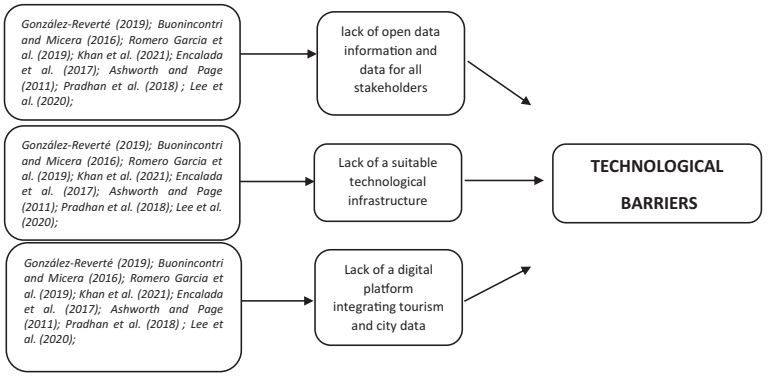


Table 2.
Results of the Thematic Analysis with the Barriers to the integration of a TS in a SC

(*continued*)



Source(s): Own elaboration

Table 2.

A key impediment to integration is identified with the lack of tourism data for city stakeholders. Indeed, often low levels of information on destination characteristics are an issue given that a TS as a multi-product and multi-market entity that requires extensive information for its effective long-term sustainable management (Coca-Stefaniak, 2020; González-Reverté, 2019; Romero-García *et al.*, 2019). Therefore, comprehensive coverage of tourism products (endowed or created) and services is necessary to understand the magnitude of services, infrastructures and resources needed to integrate a TS in a SC strategy (Femenia-Serra *et al.*, 2019).

Another key barrier identified by previous studies under this theme is related to constraints in the availability of tourism data related to market profile, key support infrastructure, and tourism impact to understand urban tourism spatial production and consumption around the city, which leads to public managers relatively uninvolved in the full cycle of tourism consumption (Encalada *et al.*, 2017; Pradhan *et al.*, 2018). Information sylos makes managing TS impact in SC strategies difficult and frequently creates a dissociation between TS and urban indicators (Casado-Aranda *et al.*, 2021; Gretzel, 2022; Lee *et al.*, 2020). Acknowledging the substantial impact of TS on cities is essential to analyze the positive and negative effects of a TS on a city's resources, to understand its influence on a city's quality of life and develop accordingly SC strategies able to respond to such impact (Casado-Aranda *et al.*, 2021; Ivars Baidal *et al.*, 2016; Shafiee *et al.*, 2021).

4.2.3 Technological barriers. This barrier theme includes studies (N = 36 articles) analyzing technological barriers hindering the integration of a TS in SCs, such as inadequate technological infrastructures and connectivity to integrate the urban system with the TS and the costs needed for technology implementation.

Studies suggest that public managers must build a TS infrastructure with reliable technological connectivity to boost integration (Ahad *et al.*, 2020; Encalada *et al.*, 2017; Khan *et al.*, 2017; Nesi *et al.*, 2018). According to Sharifi *et al.* (2021), solutions based on technologies such as big data help public managers identify the impacts of a TS and plan accordingly strategies that integrate a TS with other city systems (e.g. mobility), which will positively contribute to enhancing the sustainable development of an urban system (Sharifi *et al.*, 2021). With this regard, the presence of open data is considered crucial and can constitute a barrier if absent, as previous studies stress the importance of open data as a catalyst in a SC to create applications and develop a sustainable SC plan (González-Reverté, 2019; Lee *et al.*, 2020; Neuhofer *et al.*, 2012).

Finally, some studies find that the lack of a digital platform capable of integrating TSs and city data is a crucial barrier. Indeed, a digital platform collects, aggregates, visualizes data and avoids information silos and "archipelago" logic, i.e. unconnected "islands" of information urban systems (Belli *et al.*, 2020; Della Corte *et al.*, 2017; García-Fuentes *et al.*, 2017). However, such "archipelago" logic of specialization often appears dominant developing multiple applications rather than aiming towards integration under a unique platform (Wang, 2020).

4.2.4 Public policy barriers. Finally, the last barrier theme identified ($N = 17$ articles) includes those impediments to the integration of a TS in a SC encountered at a national and regional level in terms of lacking government regulations, guidelines, standards and insufficient financial resources needed for public managers to integrate a TS in a SC successfully.

The lack of a common understanding of smart tourism and the absence of national standards for both smart tourism and SCs represents an obstacle to the integration of a TS into a SC (González-Reverté, 2019; Jena and Dwivedi, 2021; Wang and Li, 2021).

Standards help solve concerns related, for example, to data management and privacy issues that represent a major concern for SC strategies (Femenia-Serra *et al.*, 2019; Stankov and Gretzel, 2021; Tyan *et al.*, 2020). Indeed, there are several concerns regarding what can be retrieved and collected from tourists and residents due to unclear privacy regulations. SCs may, therefore, face challenges in maintaining the anonymity of tourist identities, leading privacy issues to represent an important challenge in the process of integration (Stankov and Gretzel, 2021; Tyan *et al.*, 2020; Femenia-Serra *et al.*, 2019; Vandercruysse *et al.*, 2020).

Another barrier reported by previous studies is the lack of government incentives. Indeed, public managers need to consider that high implementation costs and insufficient public funding can be a crucial barrier when developing a support system for visitor management at a city level that can help tackle the impact of a TS (Boes *et al.*, 2016; Buonincontri and Micera, 2016; Luo *et al.*, 2019; Yadav *et al.*, 2019).

5. Discussion, contribution and limitations

This critical review paper answers the call for studies from Mehraliyev *et al.* (2020) to investigate the wicked relationship between SCs and TSs. We explore the array of impediments preventing their integration and that consequently defer from achieving the goals of a SC (Rucci and Porto, 2022; Tsaur *et al.*, 2018).

This allows us to advance knowledge on the relationship between TS and SCs by exploring the phenomenon from the viewpoint of their separation, identifying the underlying reasons for this separation, and providing a comprehensive framework of barriers that public managers must consider when attempting integration. Therefore, this research represents a critical review as it goes beyond the identified articles' descriptions, including an in-depth thematic analysis and conceptual innovation (Grant and Booth, 2009).

Previous critical reviews on SCs focused, for example, on citizens adoption of smart infrastructures for sustainable smart living (Han and Kim, 2021), building a more human-centric approach within a SC (Hatem, 2023), discussing the benefits and costs of SCs for climate change mitigation (Obringer and Nateghi, 2021), adaptation efforts and introducing new principles as references for the construction of SC evaluation frameworks (Shi and Shi, 2023). This is the first critical review that provides a comprehensive framework of barriers hindering the integration of TSs in SCs.

The framework of barriers developed in this research can be the starting point for a future research to focus on how SC policies overcome one or more of the barriers we outlined.

In addition, we contribute to the literature by showing that technological aspects of smart development shown in previous studies (Ali, 2022; Baggio *et al.*, 2020; Gretzel and

Scarpino-Johns, 2018) are only one of the many barriers to consider when developing SC policies that integrate TS impacts.

This research has implications for public managers as it shows public managers that in order to integrate a TS in a SC strategy, it is crucial to acquire knowledge of a TS that can be gained only by involving TS stakeholders in city governance so that there can be a strategy and vision alignment and an understanding of the benefits of a long-term sustainable development strategy. This will contribute to breaking information sylos and possible archipelago logic in smart infrastructure development with better funding optimization. Cities will be able to develop proactive policies that tackle present and future TS impacts and, at the same time, benefit from its economic and social opportunities. Hence, this framework can be valuable not only for cities that already have a developed TS but can be a beneficial resource for any city aspiring to formulate smarter and more inclusive strategies.

In addition, this study corroborates Lai *et al.* (2020) claims regarding the importance of standards to improve the quality of life in SCs as we show how the lack of standards could hinder the integration of TSs in SCs.

To this end, this framework of barriers represents a valuable tool for adopting an informed and innovative approach to SC planning by integrating a TS. Indeed, this framework provides the main barriers that public managers need to consider in the integration process.

This research comes with limitations. Further studies will need to validate and potentially expand the framework based on a broader sample of SC cases and experts, ideally including those studies from non-English language sources and, therefore, with a greater geographical spread of cases.

In addition, future studies could focus on identifying possible ways to solve these, and determine any potential order of priority to their overcoming. Finally, future research could investigate how the barriers presented in this study developed and the interrelations among them.

6. Conclusion

This study contributes to a lack of research on impediments hindering the integration of TSs in SC strategies. We aim to fill this gap by developing a critical review of previous studies integrated with an inductive thematic analysis that allows for a deeper understanding of the phenomenon and the development of a framework of barriers. Findings suggest that separating a TS from a SC strategy encompasses a wide range of barriers beyond technological challenges and rooted in the development of urban systems. Public managers need to overcome these barriers to avoid that TSs impact compromise the effectiveness of SC policies.

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Supplementary material

The supplementary material for this article can be found online.

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