

Article

# Building Sustainable Smart Destinations: An Approach Based on the Development of Spanish Smart Tourism Plans

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**Abstract:** The aim of this research is to assess the real effects of developing smart tourism destinations on urban sustainability. A content analysis method is used to analyze 994 initiatives contained in action-plan and strategy documents from different smart tourism pilot projects funded by Spanish tourism administration. The results indicate that, despite the noteworthy effort to develop smart initiatives, sustainability solutions based on the use of technology are scarcely proposed, suggesting that cultural, managerial and technological barriers do exist. Overall, smart tourism plans are mainly conceived as instruments designed to create new tourism products in a tourism-driven approach. Despite the institutional narrative promoting smart tourism destinations as a guarantee to transform destinations responding to residents' needs and improve sustainability, pilot projects undergo little interest in holistic sustainable initiatives, suggesting that destination management is focused on a rhetorical approach to sustainability.

**Keywords:** urban sustainability; smart destination; smart tourism plans; technology; Spain

## 1. Introduction

The smart concept as applied to cities implies the capacity to improve destinations' sustainability through efficient use of technology. In the field of tourism, the last decade has seen a dramatic rise of the concept of smart tourism destinations, as a development from smart cities. These destinations, at the cutting-edge of digitalising tourism services and integrating technology into the physical environment of tourism destinations, use a variety of technologies (such as cloud services, the Internet of Things (IoT) and online services for end users) [1] to boost competitiveness in tourism and the quality of life for residents. Such destinations aim to provide technological solutions to increase competitiveness in tourism through mechanisms that improve the tourism experience while also introducing measures to facilitate governance, transparency in information management and reductions in energy costs produced by tourism in the urban metabolism. The concepts of sustainability and smartness share many common elements and the former is implicit in the latter. Therefore, the development of smart tourism destinations deployment could contribute decisively to the improvement of sustainability [2]. There is a range of perspectives in research and academic papers on smart tourism destinations [1], yet empirical studies analysing the implementation and impact of actions on urban sustainability are still lacking. It is also unclear if the sustainability options offered by smart tourism destinations are truly supported by the strategic actions, or they are a green washing option that fuels the rhetoric of sustainability [3], as previously debated in the case of the role of sustainability in smart cities [4].

The main goal of this article is to analyze to what extent smart tourism pilot projects launched in Spain propose initiatives aimed at improving urban sustainability based on technological innovation applied to sustainability and to what extent these proposals have the potential to transform tourist

destinations. The initiatives are analyzed through a content analysis method, identifying and codifying the programmed actions according to different areas on urban sustainability identified in the academic literature.

The programmed actions analysis is a good instrument to measure sustainability as a real fact in smart tourism plans. Plans intended to offer technological solutions of social and environmental interest, proposing innovative governance systems that generate political opportunities and concern about global action are prone to be real transformation instruments toward sustainability, and vice versa. Thus, this study aims to fill that gap by providing information on smart tourism actions in Spanish tourist cities, thereby permitting a strategic interpretation of their possible impact on destinations' urban sustainability.

The role of technology in the development of sustainability has also received little attention among academics [5]. Smart tourism destinations are committed to integrating technology into the tourism ecosystem, but little is known about the potential synergies between smartness and urban sustainability. Therefore, our study analyses technology programmed actions as solutions addressed to foster urban sustainability which can create different urban models.

The article is structured in three parts. In the first one the theoretical foundations of the relation between sustainability and the intelligent tourism destinations are described. Second, and more specifically, our study analyses Spanish smart tourism plans implemented in 2016 in local and regional tourism destinations. The results provide an overview of smart tourism strategies and identify, for the first time, specific lines of action in urban sustainability arising from them. Finally, the role of smartness on sustainable tourism is discussed and a number of improvements are proposed for actors and administrators involved in implementing sustainable technology solutions for tourism destination management.

## 2. Literature Review

### *Smart Tourism Destinations and Sustainability*

The term smart city refers to the use of technologies and the Internet by actors in the city to improve economic growth and quality of life with efficient resource management and through a form of participative government [6,7]. Smart cities are the benchmark for smart tourism destinations, which are essentially urban areas. Despite a lack of consensus regarding the definition or conceptual approach to characterise smart cities, most authors consider the term to cover different urban systems and dimensions interconnected by information communication technologies (ICTs) to provide greater efficiency and better management and planning. Most authors agree that smart cities are characterised by the use of technology to improve levels of sustainability. Some of the literature on smart cities focuses essentially on technical and environmental aspects affecting urban efficiency [8]. From this perspective, the smart city concept involves urban innovations in which ICTs help strengthen physical and social infrastructure and natural and knowledge resources to regenerate the urban economy and environment and to improve the provision of public and social services. A second vision of the smart city stresses human capital rather than technology as the foundation for sustainability. The smart city is seen as a complex social system with specific requirements in different areas affecting people's quality of life, such as health, education, the media, dissemination of information, energy efficiency, environmental quality, safety and access to public services. Meeting these demands requires cities to build and maintain the necessary infrastructure as well as generate efficient and open participation or innovation processes [9]. The smart city is based on three pillars: Human capital, infrastructure and information. Thus, a city becomes smart when it is able to achieve sustainable economic growth and good quality of life through investment in human capital, high levels of participation in urban government and infrastructure that permit adequate spread of information throughout the city [10–12]. In addition, citizens play an essential role in smart cities, as they need to be fully informed of the costs and opportunities of life in cities to make the best decisions on how to use scarce resources. In other words, smart cities

directly involve their citizens in the co-creation of urban products and services. Thus there are two main defining visions of smart cities: A technology-based approach and a people-based approach. The former stresses strategies based on improving efficiency and hard infrastructure (transport, energy, waste, water, etc.), while the latter focuses strategies on soft infrastructure and people (human and social capital, knowledge, inclusion, social innovation, participation and equality) [12].

The conceptual benchmark for smart tourism destinations, in terms of technology, is so-called smart tourism, a concept deeply rooted in technology. Some authors see it as an evolution of the concept of e-tourism [13], the main difference being that in the former, smart technology facilitates greater levels of connectivity, including connection between different physical objects. In other words, whereas e-tourism permits networking for information exchange and connections between companies and consumers, smart tourism facilitates the integration of online and physical infrastructure at a destination. In short, e-tourism relates to digital connections, while smart tourism relates to connecting the physical and digital worlds [14].

To the extent that smart tourism destinations are also part of the techno-urban phenomenon affecting smart cities today, it is worth asking whether such cities are capable of generating sustainability “as a result of several intertwined social, urban, and technological shifts” [15]. According to a number of more pragmatic visions of incorporating sustainability into tourism destinations [16–18], smart destinations need to act with regard to transparency, commitment, planning, establishing growth limits and equality in their deployment and governance.

Smart tourism paradigm is based on a transversal use of sustainability, since a destination cannot be considered intelligent if it is not also sustainable. Therefore, the smartness measures applied in a tourist city must face the main problems of urban sustainability that aim to improve the quality of life of all its inhabitants while ensuring tourism competitiveness. If smart tourism destinations are to become sustainable, a tourism and leisure production and consumption system, coordinated through technology, is required that regulates three key dimensions in such destinations: 1) Social and economic equity and efficiency and reduction in energy consumption; 2) governance and information management; and 3) satisfying the tourism experience.

According to Fodness, some of the problems caused by tourism (biodiversity, fragility of ecosystems, waste disposal, water consumption, intensity of land use, physical impacts) are hard to solve using traditional approaches, schooled in a tradition of linear, specialized, predictable, deterministic and cause–effect science [19]. Thus smart tourism action plans should be evaluated considering if it is a successful alternative approach that develop effective problem solving methods and tools for problems in the complex domain. Weaver suggests that all tourism entails costs and that sustainability is associated with strategic management that strives to minimise the direct and indirect costs of a given activity whilst concurrently maximising the attendant benefits [20]. Recognising that identified costs and benefits are context-dependent, different solutions could be given in specific urban contexts, as smart tourism destinations. Thus, smart tourism destinations can be aligned either with strong or weak sustainability manifestations, according with Hunter’s idea of sustainability as an adaptative paradigm [21]. Therefore, it is necessary to take into account, to what extent the actions programmed are oriented towards the achievement of measures of efficiency, saving energy and environmental costs reduction and if those actions propose a strong or weak sustainability strategy.

Different authors have analysed the role of sustainability in the strategies of smart cities and have concluded that it is insufficiently developed and should be better integrated in smart city projects [4,10,12]. According to Perles and Ivars this handicap is still more evident in the field of tourist destinations because the evolution of destinations towards sustainability had still not been resolved before the paradigm of the smart destination arose and the integration of the two perspectives is not clear and favours rhetorical approaches and has few practical results [2].

According to Robinson, sustainability must be an integrative concept across fields, sectors and scales. What is need is a transdisciplinary thinking that focuses on the connections among fields as much as on the contents of that field; that involves the development of new concepts, methods and

tools that are integrative and that actively create synergy [22]. Similarly, Farrell and Twining-Ward suggest the need of a sustainability transition as an evolving and never-ending process that should be borne in mind when operationalizing sustainability [23]. Thus, programmed actions can transform the city into a sustainability option if contributing to generate long-term processes, integrating the different systems, and rethinking the tourist destination from a perspective of complexity, or, otherwise, they can be rhetorical if their concern is focused on short term scenarios and on proposing a partial and fragmentary approach to sustainability.

Approaching smart tourism through sustainability places destinations in the context of social relations characterised by the convergence of technology and the tourism experience [24]. The latter must be able to cover the expectations and to improve the satisfaction of new tourists, whose profile is that of a more experienced, sophisticated and demanding tourist with regard to satisfaction. The smart tourist is defined by being more knowledgeable of the destination, more demanding, better connected and more likely to share information, with a greater capacity for making recommendations and placing greater importance on user-generated content [25]. They differ from previous tourists, as they have become more dependent on information technology, self-service and reservation tools and they value easier access to technology, better value for their time and money, and greater variety, flexibility, personalization and safety. Smart experiences are facilitated by technology's ability to generate personalised elements, context-awareness and real-time monitoring [26]. Co-creation and active participation by tourists mean satisfaction constantly improves as tourists consume these experiences [27]. Smart tourism destinations also integrate a complex ecosystem of actors, businesses and organisations (the smart business dimension), which permits and facilitates the exchange of tourism resources and co-creation of experiences [28]. To develop this aspect in line with the principles of sustainability, it is crucial to promote the capacity for cooperation between public and private actors, boost participation in decision-making among local actors and generate transparency in governance based on open information and data for all stakeholders [13,29].

### 3. Materials and Methods

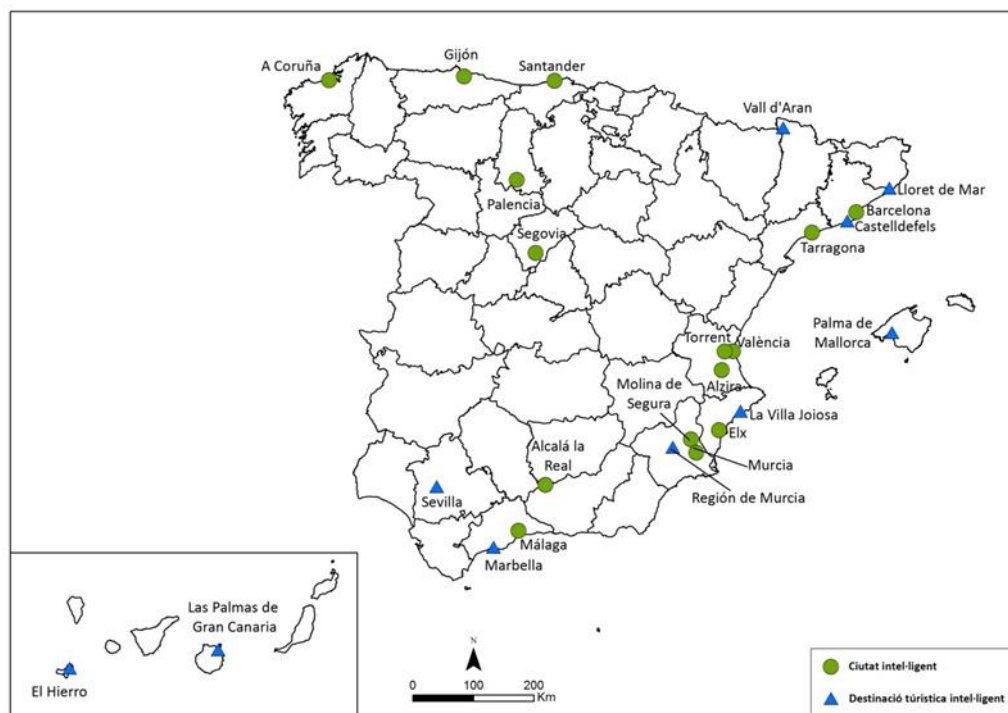
The study aims to characterize and classify Spanish tourism destinations according to their potential to promote technological solutions, in the field of tourism, applied to sustainability. Data has been provided by the analysis of the different smart tourism destination pilot projects and from other smart city projects developed by cities that belong to the network of Spanish intelligent cities and that include actions in tourism. Firstly, 980 programmed actions related with urban sustainability have been identified and coded according to seven urban and tourism sustainability areas identified in the academic literature. Secondly, smart tourism destinations and smart cities have been characterised according to programmed actions distribution, frequency and specialization indexes. Thirdly, a classification of cities has been carried out according to the number and type of programmed urban sustainability actions, the absence/presence of technology solutions applied to tourism and their hard or soft nature. The objective is to distinguish different sustainability city models. In addition, it is intended to detect whether or not the transformation process towards smart tourism destinations contributes to the improvement of urban sustainability. It is also intended to compare cities and tourism destinations' strategical approach, to detect inequalities and facilitate an urban classification method useful for tourism planning purposes and the construction of sustainability indicators for urban and tourist planning.

#### *The Spanish National Strategy in Smart Tourism Destinations*

A national strategy focused on smart tourism was first launched in the previous Tourism Spanish National Plan (Plan Turístico Español Horizonte 2020) and continued through the National Tourism Plan (Plan Nacional e Integral de Turismo-PNIT) as a way to stimulate a new tourism economy based in the integration of a strategic vision, technology adaptation, sustainability and innovation. The PNIT include the development of smart tourism destinations, coordinated by Segittur (the Spanish National

Society for Innovation and Tourism Technology Management) as a priority action through 11 pilot projects. Thus, the Spanish approach to smart tourism development was conceived on a local scale basis and smart initiatives were focused mainly in cities. The local level approach represents an attempt to overcome conventional planning schemes that had not ensured sustainability in development and an alternative to solve major problems and challenges in tourism destinations such as overtourism, environmental efficiency or the use of information for tourism management. Two key critical issues derive from this strategic approach in Spanish smart tourism development. First, the initiative is sectorial and heavily focused on tourism. Therefore, it has received some criticism as it is not clear that sustainability can be addressed from a single point of view, and because contributions to sustainability could be compiled in other sectorial planning areas [25]. Second, Spanish national smart tourism plans are mainly applied on a local urban scale, with which it is difficult to extend actions and results to urban areas or regions [30]. Finally, the nature of the smart tourism projects represents a handicap to their capacity to reach global or regional sustainability goals as they are not clearly linked to other regional or national development or planning documents, the scale of development and implementation is focused in the local administrative area, and stakeholders and managers are mainly locally coordinated.

The study includes 25 cases of tourist cities and municipalities in Spain that have implemented smart city and tourism strategies (see Figure 1).



**Figure 1.** Selected municipalities. Note: Circle-Smart City, Triangle: Smart Tourism Destination.

Three specific criteria were used to select the cities: Membership in the Spanish Network of Smart Cities (RECI); tourist destinations selected by SEGITUR (the Spanish Tourism Consortium for Innovation in Tourism) as pilot cases; or membership in regional smart city/destination projects in place in 2017 (the Valencian Community Smart Tourism Destination Project, calls for smart cities in the Digital Agenda for Spain or calls for smart islands). The working procedure consisted of an exhaustive search for documentation (reports, pilot projects, digital agendas, online information, etc.) on existing smart tourism/city projects.

In total, 112 cities that had initiated a smart plan in Spain have been detected. The plans that did not have a valid and publicly accessible document were initially discarded and a total of 48 localities were pre-selected. Besides, those plans that did not programme tourist actions, plans that were

not approved or were inactive were also discarded, and finally 25 valid cases were selected. The documents used to obtain data correspond to various publicly funded initiatives and, despite having different formats, all of them include programmed actions classified by planning strategy or planning goals. Most of the documents compiled propose a medium-term urban digitization strategy, which is associated with different specific actions in different subjects, the kind of data requested in our research question about the approach to sustainability in smart tourism plans.

Four types of documents were revised: Smart cities/tourism projects and director plans (Alcalá la Real, Barcelona, Málaga, Molina de Segura, Murcia, Palma de Mallorca, Santander, Sevilla and Torrent), action plans for smart tourism destinations (Alzira, Castelldefels, El Hierro, Lloret de Mar, Región de Murcia, Villajoyosa and Vall d'Aran), urban digital agendas (La Coruña and Marbella) and strategic plans or strategic roadmaps to smart cities (Elche, Gijón, Las Palmas de Gran Canaria, Palencia, Segovia, Tarragona and Valencia). All the documents selected had a clearly identifiable actions section, although the length, detail and information of the documents were diverse. In addition, all the documents had action sheets associated to a specific objective or strategy, with explanatory headings for each action developed. Thus, it was possible to homogenize information to codify it and to classify programmed actions into an area of urban sustainability.

In addition, documented information on all available cases was collected and a working dossier produced to encode all the actions found in the documentation ( $n = 980$ ). Specifically, information was compiled on the name, geographic scope, general characteristics and objectives of the projects, the actions carried out and their state of implementation (planned, initiated or completed) the budget for the actions and the agents taking part. After collecting the information, a file was sent to the project managers for them to validate, provide missing information and detect mistakes. While this procedure was essential to obtain accurate information, the response rate was very low and only four out of the 25 files were revised or corrected by managers. However, although the information could not be fully checked, it is considered of high enough quality for analysis given that it comes from official sources.

Most plans did not have information on the state of implementation of programmed actions as it was not present in the plan documents and managers did not respond to our information requirement. However, four cases include this information and were analysed as a case study.

Content analysis was selected as the method to collect data. The task was carried out for three months by two members of the research team. Coding was performed manually given the relatively low volume of existing data. First, all the actions contained in the plans were selected, codified and classified in an urban sustainability area, according to the description headings provided in the planning document.

Based on the review of existing literature on the role of sustainability in smart cities and tourism destinations, seven sustainability areas were considered [12,31–33]. Once all the actions were compiled, based on an inductive method, 62 different subtypes were identified. To determine the reliability of the classification results among coders, weekly control meetings were performed, where doubts were expressed and the classification criteria of each variable for sustainability areas were grouped according to similarity put into groups based on similarity.

In the field of tourism, actions were divided into those that included a technological solution (type 7) and those that did not (type 6). This division gives a more detailed picture of the role of technologies in smart tourism measures and thus helps detect whether they aim to go further than conventional actions found in other types of tourism development plans. Finally, actions were also classified by whether they were geared toward hard or soft resources. Dimensions assigned to hard or soft resources are taken from the literature and adapted to the actions in the plans analysed here [9,31,34]. In our case, we also included actions in tourism while excluding other areas (housing) in which no actions were available. Technology solutions and sustainability in smart tourism destinations

Actions based on the use of technology are a fundamental part of smart tourism destination strategies but little is known about their ability to transform destination management and collaboration processes (public–private cooperation, participation of local actors, promotion and marketing, etc.).

Perles and Ivars have developed a conceptual model that intends to connect sustainability and smartness establishing possible synergies between both concepts. Specifically, the model formulates six basic functions for sustainable tourism policy: Planning in a long-term perspective and scenario building; more efficient use of resources; monitoring system and real-time management; public–private cooperation and open innovation; greater transparency and participation and customization of tourist services. Programmed technological actions must be based on a governance framework that applies technology to those fundamental pillars if they want to be an efficient tool to contribute to sustainability [2].

The introduction of technology as a solution for urban problems offers smart tourism destinations a different route towards urban sustainability. The mass presence of ICTs in the smart cities that are connected to different urban areas mutually providing and exchanging information enables cities to become more sustainable and improve the quality of life for their citizens. When working with relational networks of urban actors that adopt a holistic, systemic vision of the city's problems, ICTs can be used to compile and provide essential information for making accurate urban forecasts that facilitate decision-making in sustainability [10]. For instance, one of the key challenges to sustainability in tourism is reducing energy consumption, which can be tackled by using technology to design efficient transport and access networks for the destination, avoid problems of traffic congestion, facilitate sustainable building and raise awareness among tourists and residents [29].

Information management is another key technological element for progress in the sustainable management and governance of the destination. As Buhalis and Amaranggana state, "bringing smartness into tourism destinations requires dynamically interconnected stakeholders through a technological platform on which information relating to tourism activities could be exchanged instantly" [28]. Thus, dissemination of information through different social agents is essential for activating co-creation mechanisms among them and obtaining feedback from consumers that can be used as knowledge to help the destination innovate in tourist products, services and experiences [35,36].

Our research examines actions in smart tourism plans approved by Spanish tourism destinations up to 2017 in terms of sustainability. The results should therefore be contextualised in relation to the ability to generate effective tools and instruments to improve sustainability for Spanish smart tourism destinations in their different ecosystems. In order to be able to go deeply into these discussions, it is necessary to provide new data to assess the ability of tourism destinations to enhance sustainability [3,22]. Ivars et al. propose a model that classifies strategic actions at three different levels [25]: The strategic-relational level, based on sustainability, innovation and appropriate governance that establishes a sustainable territorial and tourism model shared by the local society; the instrumental level, which supports and develop smart solutions (connectivity, sensing and information systems) adapted to the needs of the destination; and the applied level, where strategy formulation should be implemented and technology constitutes a fundamental support to transform theory into action on different fields (tourist information, experience enhancement, marketing, visitor and site management and destination intelligence). The aim of this research is to analyse the capacity of tourism destinations to influence urban sustainability through the design, deployment and implementation of smart actions.

More specifically, it examines if the focus and development of the actions programmed in the smart tourism plans shows whether tourism cities focus sustainability as a long-term process or obey a rhetorical discourse that continues to give relevance to growth. The path towards sustainability will occur insofar as the proposed actions foster urban sustainability at three levels. At a strategic-operational level, where destinations' management is supported by innovative governance; at an instrumental level that poses technological solutions aiming to a social and environmental scope; and at an applied level, where technological solutions can be implemented effectively and consensually among the different stakeholders.

#### 4. Results

In 2017, a total of 980 actions were designed and implemented in 25 Spanish destinations and cities with a smart city or a smart tourism plan. A total of 598 actions (61.1%) were initiated through plans to develop Spanish smart cities, while 382 actions (38.9%) were started through different smart tourism plans for tourism destinations (see data sources in Appendix A).

There is a considerable difference in the volume and field of actions when one differentiates between conventional cities and tourism destinations. As might be expected, tourism-related actions are more numerous in tourism destinations, while governance actions predominate in conventional cities. However, there are a similar number of actions associated with different aspects of sustainability (environmental, social and mobility) in the plans of both types of city (see Table 1).

**Table 1.** Total programmed actions by field and type of city (% of total for each type of city).

Total Actions per Type	1	2	3	4	5	6	7	Total
Smart Tourism Destinations	88	69	39	75	51	51	42	415
Smart Cities	116	70	43	111	74	106	45	565
Total	204	139	82	186	125	157	87	980
%	20.82	14.18	8.37	18.98	12.76	16.02	8.88	100
Average Actions per Municipality in Smart Tourism Destinations	11	8.6	4.9	9.4	6.4	6.4	5.3	51.9
Average Actions per Municipality in Smart Cities	6.8	4.1	2.5	6.5	4.4	6.2	2.6	33.2

Action 1: Governance; Action 2: Economy and innovation; Action 3: Mobility and transport; Action 4: Environmental and territorial sustainability; Action 5: Social sustainability and quality of life; Action 6: Tourism; Action 7: Smart tourism destination technology.

In most tourist cities, measures to increase sustainability are aimed to reduce negative externalities and the costs derived from mass tourism. For example, in Lloret de Mar (an international centre for sun and beach tourism), there is a special interest in solid urban waste collection actions. In the Vall d'Aran (a centre for mass snow and mountain tourism), some actions are proposed to incorporate the intelligent management of waste. These actions have in mind the purpose of improving the urban environment, but only to the extent that it affects tourist activity. For example, the solid waste plan of Lloret de Mar aims to implement measures to minimize the visual impact of garbage bags deposited in commercial streets where the presence of tourists is abundant.

Tourist municipalities place much more weight on tourism actions in their plans than do conventional cities. However, it is worth noting that there are also a large number of tourism actions carried out by conventional cities (10.03% of the total actions target this sector).

It is interesting to note that the political position in relation to tourism can influence the proposal of programmed actions in some cities. For example, in Barcelona, where residents' tourism concerns have received increasing attention from the local government [37], the measures are aimed at managing the tourist flows and reorienting the tourism activity in the city (for example, it is proposed to rationalize the parking sites of tourist buses or the creation of new products in peripheral districts to deconcentrate tourism). On the other hand, in Valencia, where the tourism strategy is aimed at the growth of the number of visitors and hotels, the programmed tourism actions have to do with interpretation and product marketing (apps for the "Fallas", digital guides of the main urban attractions) or the creation of online reservation systems. Another type of model corresponds to cities with moderate tourism activity, but which is not a priority in their urban development strategy. In the city of Tarragona (where cultural and heritage tourism has grown considerably in the last decade), tourism programmed activities are scarce. Essentially the smart city plan proposes the creation of a regional knowledge hub about the concept of smartness (based on the organization of conferences on smart cities, the creation of networks of smart cities, participation in conferences, workshops, dissemination forums on smartness, etc.).



One surprising note is the similar percentage of tourism technology actions in both types of city, where one would more logically expect tourism destinations to be more concerned with this field (8.64% of tourism destinations and 9.03% of conventional cities).

Examination of the subtype of actions in each field helps clarify the target for action. Thirteen action subtypes represent a little more than half (51.4% of the total), while most action subtypes represent less than 2% each. The general trend in smart cities and tourism destination plans is a focus on app creation, governance actions and basic elements for managing mobility, energy efficiency, image and tourism products (see Table 2).

**Table 2.** Most programmed actions (more than 2% of total actions) in Spanish smart plans.

	>2% of Total Actions
1.1	6.02
1.3	2.04
1.6	2.96
1.7	4.69
Total (1)	20.82
2.1	2.96
2.2	4.80
2.3	4.69
Total (2)	14.18
3.1	3.06
3.3	2.14
3.4	2.65
Total (3)	8.37
4.7	3.37
4.10	2.35
4.12	4.08
Total (4)	18.98
5.7	4.29
Total (5)	12.76
6.1	2.55
6.2	3.98
6.12	2.24
Total (6)	16.02
7.1	3.47
Total (7)	8.88
	100.00

Action 1: Governance; 1.1: e-Administration; 1.3: Open data government; 1.6: Citizen's participation; 1.7: General information apps and interactive systems; 1.8: Smart city project management bodies; Action 2: Economy and innovation; 2.1: Support service for business; 2.2: Innovation and research clusters and projects; 2.3: Participation in dissemination and city network initiatives; Action 3: Mobility and transport; 3.1: Sustainable mobility; 3.3: IoT/automation of sustainable mobility processes; 3.4: Apps and interactive systems for information on mobility; Action 4: Environmental and territorial sustainability; 4.7: Efficient energy management; 4.10: Pollution management; 4.12: Urban ecology; 4.13: Valuing natural heritage and raising environmental awareness; Action 5: Social sustainability and quality of life; 5.7: Digital accessibility; Action 6: Tourism; 6.1: Creation and improvement of tourism products; 6.2: Image, promotion and marketing; 6.12: Disabled access in tourism; 6.13: Valuing natural heritage and raising environmental awareness in tourist areas; Action 7: Smart tourism destination technology; 7.1: Apps and Quick Response codes (QR) for tourists.

This initial approach merely provides descriptive information without permitting close comparison between cities, as it is subject to bias in the different number of cases and volume of actions included for each type of city. However, presenting the information at a deeper level, by analysing structural differences between the two types of city with regard to smart actions, permits comparison. To do this, a coverage indicator was drawn up for each type and subtype of action and the specialisation for each type and subtype was determined using a location quotient:

$$QL = (A_{ij}/A_j) / A_i / A_t \quad (1)$$

where:

$A_{ij}$  = actions for spatial unit  $j$  in action type  $i$

$A_j$  = total actions in spatial unit  $j$

$A_i$  = total type  $i$  actions

$A_t$  = total actions

The actions of cities' programmes are used to characterize cities (see Tables 3 and 4). First of all, the location quotient expresses the specialisation of each type of city. Secondly, the distribution structure of the actions expresses the percentage of a particular type of action implemented. The location quotient indicates the areas of specialisation of the two types of city. The structural distribution complements this information and also indicates which action areas are lacking or over-represented in each type of city.

**Table 3.** Specialisation of cities in actions by field.

Action	Location Quotient Smart Cities	Location Quotient Smart Tourism Destinations
1	1.16	0.74
2	1.16	0.76
3	1.10	0.84
4	0.98	1.03
5	0.98	1.03
6	0.63	1.59
7	1.02	0.97
Total	1.00	1.00

Action 1: Governance; Action 2: Economy and innovation; Action 3: Mobility and transport; Action 4: Environmental and territorial sustainability; Action 5: Social sustainability and quality of life; Action 6: Tourism; Action 7: Smart tourism destination technology.

**Table 4.** Distribution of actions by field and subtype.

Action	Smart Cities	Smart Tourism Destinations	Total
1	71.08	28.92	100.00
2	70.50	0.76	100.00
3	67.07	32.93	100.00
4	59.68	40.32	100.00
5	60.00	40.00	100.00
6	38.22	61.78	100.00
7	62.07	37.93	100.00

Action 1: Governance; Action 2: Economy and innovation; Action 3: Mobility and transport; Action 4: Environmental and territorial sustainability; Action 5: Social sustainability and quality of life; Action 6: Tourism; Action 7: Smart tourism destination technology.

The results indicate, on the one hand, that the tourist destinations put forward the majority of measures to solve problems of obsolescence of the sector itself. On the other hand, a deficit of actions aimed at providing technological solutions for the improvement of urban sustainability is detected.

#### 4.1. Strategic Level Analysis

Programmed actions are assets with the capacity to generate new city models or transform them in the future through urban sustainability-based strategies. The presence of a particular type of action could thus be interpreted as indicating the urban model being sought. Factor analysis is used to identify urban models following a different approach towards urban sustainability. Factor analysis was performed to reduce the multiple proposed actions to a few sustainability-related dimensions. This identified key dimensions in sustainability and smart tourism among the actions proposed by the cities in the study. The factor analysis (see Table 5) identifies four dimensions, which can be associated with different urban sustainability strategies.

**Table 5.** Dimensions identified by the factor analysis.

Factors *	Component 1	Component 2	Component 3	Component 4
Creation and Improvement of Tourism Products	0.929			
Assessment of Tourism Experience	0.753			
Tourism Image, Promotion and Marketing	0.624			
Citizen Participation	0.741			
Sustainable Mobility	0.956			
Efficient Energy Management in the City	0.682			
Urban Ecology	0.962			
Training and Support for Tourism Companies		0.628		
Disabled Access in Tourism		0.921		
Wi-Fi and Improving Coverage in Tourist Areas		0.725		
Big-Data in Tourism		0.863		
Apps and QR Codes			0.811	
IoT and Automation of Efficient Energy Management Processes in Tourist Areas			0.723	
IoT and Automation of Efficient Water Management Processes in Tourist Areas			0.806	
Tourism Information Platform				0.793
Tourism Office 3.0				0.768
% of Variance (74,1%)	311%	21.5% 11.9%		9.6%
Kaiser Mayer Olkin Test (KMO)	0511			
Barlett Sphericity Test				
Square Chi	292.135			
Sig.	0.000			

\* Rotation method: Varimax.

The factor analysis used different variables corresponding to different types of actions. Specifically, these were actions relating to territorial and environmental sustainability, social sustainability and quality of life, mobility, tourism and technologies applied to tourism. The analysis used the principal component method with varimax rotation, on SPSS v.20 software (IBM). Factor weighting with correlations over 0.500 was used as the criterion for assigning variables to a factor. Different statistics were applied to ensure the adequacy. The Kaiser Mayer Olkin (KMO) sample adequacy test gave a result of 0.551, an acceptable value, while Barlett's test for sphericity gave a score of 292.135, with a significance level of 0.000. Both values suggest that the factor analysis is adequate for the study. Only

factors with an eigenvalue over 1 were selected, thus obtaining four factors representing 74.1% of the total variance. These four factors and their interpretation are given below.

#### 4.1.1. Model of Smart City Investing in Tourism

This dimension includes six variables that explain 31.1% of the variance. It identifies a model of city that invests in actions to promote sustainability in different fields of urban metabolism and management (mobility, efficient energy management, urban ecology, citizens' participation) and tourism actions based on product creation and meeting demand. The actions in this dimension can be assimilated into a city model that incorporates criteria of equality and efficiency in its management and seeks quality of life for its residents and accepts tourism as a sector of economic activity. This model corresponds to cities such as Santander or Gijón, which receive tourists, but are not strategically focused on tourism.

#### 4.1.2. Model of Tourist City Based on Improving the Tourism Sector

This dimension includes five variables that explain 21.5% of the variance. It is a model of city that mixes tourism technology actions (big data and improving digital covering in tourist areas through Wi-Fi) with support for business, improving access for disabled tourists and improving tourism-related image and marketing. It is an urban model where actions suggest solutions for the sector, marketing of the destination and improving services for tourists and visitors. This urban model corresponds to tourist cities (such as Marbella, Lloret de Mar or the Murcia Region) that, with different levels of technological intensity, are focused in the renewal of their tourism product.

#### 4.1.3. Model of Smart Tourism City Based on Efficient Use of Resources

This dimension includes three variables that explain 11.9% of the variance. It identifies a model of a tourist city that seeks to improve tourist satisfaction through apps and services and which invests in technology (especially the IoT) to improve sustainability by providing solutions for energy efficiency and efficient water management. It is an urban model closely associated with technology as an instrument for efficiency in resource management and concern for meeting tourists' needs. This urban model corresponds to tourist cities that develop technological solutions to reduce the negative externalities of tourism in the urban environment. This urban model is not dominant in any city, but significant measures are detected in tourist cities such as Torrent, Villajoyosa, Lloret de Mar, Palma de Mallorca or the Vall d'Aran.

#### 4.1.4. Model of Tourist City with Proposals for the Tourist Information System

This dimension includes two variables that explain 9.5% of the variance. It is a model of a tourist city in which actions are focused fully on improving information for tourists by creating tourist information platforms and tourist offices 3.0. In these cities, smart tourism actions clearly prioritise improvements to services for tourists and visitors. This urban model corresponds mainly to the cities (Valencia, Alcalá la Real, Las Palmas de Gran Canarias) focused on the improvement of the satisfaction of their visitors' tourist experience.

Cities were also typified by coverage of actions combining tourist and sustainability measures (governance, social and territorial sustainability). This classification aims to reveal the strategic orientation of each city. Different cities can be divided into three types, based on the coverage of their actions (see Table 6). Type I cities are mostly tourism destinations and gear their actions towards improving the tourist experience. Type II cities are a mix of tourism destinations and provincial capitals, which are characterised by actions geared towards governance. However the groups are not fully homogeneous, showing small differences, especially in the case of diversified cities (type II). Some cities, such as Barcelona, carry out few actions to improve the tourism experience, while others, such as El Hierro or Las Palmas de Gran Canarias, put much greater emphasis on this field in their actions.

Finally, the third type of city is basically medium-sized cities and provincial capitals that mainly target environmental sustainability and governance.

**Table 6.** Types of city by strategic orientation of their programmed actions.

City	Governance	Social Sustainability	Territory Sustainability	City Type
Alcalá la Real	85.7	14.3	0.0	I
Murcia, Region of	88.0	0.0	2.0	I
Lloret de Mar	71.1	13.2	7.9	I
Palma de Mallorca	24.6	21.3	26.2	I
Vall d'Aran	75.9	10.3	3.4	I
Vila Joiosa, La	80.0	0.0	0.0	I
Castelldefels	71.4	7.1	0.0	I
Santander	11.8	9.8	47.1	II
Segovia	11.1	11.1	77.8	II
Alzira	4.3	21.7	60.9	II
Barcelona	8.7	24.6	20.3	II
A Coruña	6.3	22.9	39.6	II
Gijón	4.5	22.7	59.1	II
Molina de Segura	4.2	12.5	41.7	II
Hierro, El	22.2	11.1	44.4	II
Palmas de Gran Canaria, Las	19.4	6.5	54.8	II
Palencia	0.0	27.3	72.7	III
Sevilla	15.5	44.8	27.6	III
Tarragona	8.1	29.0	8.1	III
Torrent	20.8	27.1	16.7	III
Valencia	11.8	29.4	25.5	III
Elx	30.8	26.9	3.8	III
Málaga	9.5	66.7	9.5	III
Murcia (city)	11.1	33.3	50.0	III
Marbella	18.4	38.9	13.5	III
<i>Smart cities (Total)</i>	18.6	25.1	27.4	-
<i>Smart Tourism Destinations (Total)</i>	33.5	25.4	17.3	-
Total	24.4	25.2	23.5	-

#### 4.2. Instrumental Level Analysis

Tourism programmed actions are now analysed from an instrumental point of view, to assess the importance of technological solutions aimed at improving sustainability. The synergetic model for smart and sustainable destinations proposed by Perles and Ivars [2] is used as an analytical framework (see Table 7). It can be stated that actions for the improvement of the tourism product are dominant, and only one-third of actions propose innovative actions in technology such as the application of augmented or virtual reality to the interpretation of tourist attractions, gamification applied to museums, the creation of virtual assistant tools or the creation of touch screens as tourist information points. However, the implementation of apps and QR codes for tourists and the deployment of Wi-Fi networks in tourist spaces are the most programmed actions among technological solutions. One-third of the actions do not incorporate the use of technology or it is irrelevant. These actions are mainly aimed at improving the experience of tourists, looking for new markets, valuing the cultural heritage or enhancing visitors' environmental awareness. The rest of the actions are destined to governance, planning and monitoring. Some of them propose the use of technological solutions applied to planning (systems and programs of tourist intelligence, use of big data to analyse visitors' patterns of behaviour) and certification of sustainability (e.g., biosphere) or smartness (e.g., Asociación Española de Normalización

y Certificación-AENOR-standard) and other actions are focused on destination monitoring (creation of Custom Relationship Management (CRM) systems or destination feedback systems, for example). Notably, two key elements for sustainability in tourist destinations such as efficiency in the use of resources and the participation of social agents have zero or very little representation among programmed actions.

**Table 7.** Tourism-based programmed actions in smart tourism destinations.

Type of Action	Number of Programmed Actions	%
Long Term Planning and Scenario Making	13	7.18
Efficient use of Resources and Saving Costs	5	2.76
Monitoring and Real Time	23	12.71
Cooperation and Open Innovation	25	13.81
Transparency and Participation	0	0.00
Tourism Products and Services (based on Innovative Technology Solutions)	57	31.49
Tourism Products and Services (not Innovative)	58	32.04
Total	181	100.00

Surprisingly, there are few programmed actions aimed towards smartness transformation through technological solutions in tourist cities. For example, only 1.5% of the actions propose the creation of open data or big data systems, and only 2.8% of the actions propose tools based on the Internet of Things.

Finally, the city actions were analyzed with regard to approaches based on hard resources or soft resources. This approach breaks down city investment on improving urban sustainability and tourism experience into widely varying strategic positions. Depending on the strategy, different challenges, limits and difficulties arise that need to be considered before developing specific planning actions. This analysis divided actions into four types. The first type was urban actions following hard resource-based strategies, such as creating infrastructure, energy management and mobility. These were further divided into those that did not involve technology and those that did. In the case of soft resources, the actions included fields such as education, knowledge and information, which were also divided into soft actions with or without the use of technology. The measure used to distinguish between soft and hard approaches was based on the location quotient applied to each action subtype (see Table 8).

The results show that the approach taken by tourism destinations is more often oriented to soft resources than in the other cities. The only hard actions that tourism destinations specialise in (efficient water and energy management) do not incorporate technology. The strategic approach for actions in tourism destinations focuses on people and factors that do not require extra technological infrastructure or large physical facilities. The approach is therefore sensitive to knowledge creation (education, training for companies in the sector, transparency, responsible purchasing policies, raising social awareness), although the criteria for developing the territory for tourism (making use of heritage, leisure and sports) and satisfying tourist markets (accessibility) are also included.

**Table 8.** Specialisation by type of city based on orientation of actions in terms of soft or hard resources.

<b>Hard Factors (Technological Approach)</b>	<b>3.2</b>	<b>3.3</b>	<b>3.4</b>	<b>4.2</b>	<b>4.3</b>	<b>4.5</b>	<b>4.6</b>	<b>4.8</b>	<b>4.9</b>	<b>4.11</b>	<b>5.1</b>
Smart cities	1.31	1.56	1.20	1.64	1.04	1.64	1.35	1.37	1.64	1.40	1.47
Smart tourism destinations	0.51	0.12	0.69	0.00	0.93	0.00	0.45	0.43	0.00	0.37	0.26
<b>Hard factors (non-technological approach)</b>	<b>4.1</b>	<b>4.4</b>	<b>4.7</b>	<b>4.10</b>	<b>5.4</b>						
Smart cities	1.09	0.41	0.94	1.14	0.66						
Smart tourism destinations	0.86	1.92	1.09	0.78	1.54						
<b>Soft factors (technological approach)</b>	<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>1.7</b>	<b>5.3</b>	<b>5.7</b>				
Smart cities	1.11	1.40	1.56	1.33	1.25	1.64	1.13				
Smart tourism destinations	0.83	0.37	0.13	0.48	0.61	0.00	0.79				
<b>Soft factors (non-technological approach)</b>	<b>1.5</b>	<b>1.6</b>	<b>1.9</b>	<b>4.13</b>	<b>5.2</b>	<b>5.6</b>	<b>5.8</b>	<b>5.9</b>			
Smart cities	0.82	1.07	0.74	0.47	0.00	0.35	0.76	0.82			
Smart tourism destinations	1.28	0.88	1.40	1.83	2.57	2.02	1.38	1.28			

Action 1: Governance; 1.1: e-administration; 1.2: Big data government; 1.3: Open data government; 1.4: Integrated city management centre; 1.5: Transparency; 1.6: Citizens' participation; 1.7: General information apps and interactive Systems; 1.9: Responsible innovative purchasing and service provision policy Action 3: Mobility and transport; 3.2: Big data-sustainable mobility; 3.3: IoT/automation of sustainable mobility processes; 3.4: Apps and interactive systems for information on mobility; Action 4: Environmental and territorial sustainability; 4.1: Efficient waste management; 4.2: Big data-waste management; 4.3: IoT/automation of waste management processes; 4.4: Efficient water management; 4.5: Big data—water management; 4.6: IoT/automation of efficient water management processes; 4.7: Efficient energy management; 4.8: IoT/automation of efficient energy management processes; 4.9: Big data—air quality; 4.10: Pollution management; 4.11: Big data—environment; 4.13: Valuing natural heritage and raising environmental awareness; Action 5: Social sustainability and quality of life; 5.1: e-health and e-social services; 5.2: Education and training; 5.3: New technologies in education; 5.4: Safety; 5.6: Disabled accessibility; 5.7: Digital accessibility; 5.8: Promoting health, sport and leisure; 5.9: Social support and awareness-raising.

#### 4.3. Applied Level Analysis

A case study section is provided to complete the results section. Case study selection obeys both analytical and operational purposes. The four selected cities were the only ones that provided the data required to analyze implementation state of programmed actions. Besides, they are very different in urban structure and dimension and geographical and cultural context, so it is possible to compare a sample of the diversity of Spanish cities and learn lessons about differences in the strategical practice in smart tourism and smart cities.

Only four cities (A Coruña, Marbella, Torrent and Valencia) have provided information on the state of implementation of the programmed actions. Given the interest of this information to evaluate the development of the plans and their representativeness (29.89% of total actions are compiled), data was considered to provide a case study. Programmed actions were classified according to whether they are planned (not yet initiated), started (not yet completed) or completed, and three analytical indicators were built. The real performance index indicates the percentage of actions that were fully developed at the time of collecting the information. The potential implementation index (completed actions/planned actions) indicates the potential capacity to develop actions. The efficiency index (completed actions/actions started) indicates the rate and rhythm of development of the actions. Only one out of four programmed actions has been developed; plans are moderately developed in relation to the expected planned actions and the rate of development is moderate (see Table 9). Environmental sustainability and tourism are the subtypes of actions with more acute development deficits, while tourism and mobility technology solutions have the best development indicators.

**Table 9.** Programmed and developed actions' indicators.

	n	Programmed (%)	Started (%)	Completed (%)
1	44	11.36	68.18	20.45
2	46	41.30	21.74	36.96
3	35	42.86	22.86	34.29
4	77	61.04	23.38	15.58
5	49	40.82	26.53	30.61
6	26	61.54	38.46	0.00
7	16	50.00	12.50	37.51
Potential Development Index	0.33			
Efficiency Development Index	0.62			
Completed Index	24.23			

Action 1: Governance; Action 2: Economy and innovation; Action 3: Mobility and transport; Action 4: Environmental and territorial sustainability; Action 5: Social sustainability and quality of life; Action 6: Tourism; Action 7: Smart tourism destination technology.

The low development rates can be explained by the fact that the plans are still in an initial phase. However, some other factors help to explain those results. The difficulties in organizing work teams and creating local smartness departments or the low level of cooperation among stakeholders are the most relevant factors. On the other hand, technological measures have better performance indicators. This can be explained both for strategical reasons (a tourism-approach strategy is followed in most plans) and practical reasons (the most programmed measures, such as Wi-Fi, QR codes or tourism apps, have relative low implementation costs).

## 5. Discussion

Spanish institutional support for smart tourism has taken shape through public investment in different smart tourism destination plans. Those plans are considered as a planning tool that fosters the competitiveness and sustainability of tourist destinations. The institutional interest was followed by the publication of various reports by public and private agencies in the tourism sector, where it is recommended to invest in smart tourism as a strategy for tourism differentiation [32,33]. The institutional discourse on smartness focuses on the need to provide technological solutions for sustainability, innovation in governance and the generation of political opportunities [4]. In our study we use these three elements as a framework when assessing the real capacity of the programmed actions to improve sustainability. It can be stated that technological solutions to sustainability are underrepresented in tourism cities, especially compared with actions aimed at revitalizing tourism destinations, such as the creation of new tourist products, marketing and commercialization or the improvement of urban environment

Programmed actions on sustainability in tourism cities are also characterized to be reactive. They are based on a tourism-driven approach to sustainability that is evidenced because the most abundant actions are aimed at solving problems that have been generated by tourism dynamics, and which represent a serious problem for the maintenance of the urban quality of the destination (mobility or waste production, for example). Thus, the programmed measures fit badly with planning processes with holistic approaches to sustainability [22,23].

Measures aimed at the transformation of the local governance model or defining spaces for cross-sectional dialogue between the different actors based on collaboration or participation (for example, shared information management through the introduction of open data systems) are very scarce. Besides, the political opportunities emerging from smart plans are particularly evident at the local scale since the actions proposed are adapted to the specific contexts and problems of the cities.



Thus, each city supports its smartness strategy on particular elements, for example, the Palma de Mallorca plan is focused on beach management and tourism infrastructure improvement; the Vall d'Aran focuses on accessible tourism; and Marbella focus on new tourist product creation.

However, urban sustainability is not articulated through common criteria or shared beliefs. Many authors have questioned the feasibility of sustainable tourism in practice [18,38–41] and this can be exemplified in Spanish smart tourism destinations. The lack of dialogue among smart tourism plans and the absence of a shared sustainable strategy can increase confusion over growth and sustainability and, in the end, spoil global sustainable goals. So it is not clear that smart tourism destination plans contribute as a policy tool to achieve sustainable tourism. The lack of a well-defined sustainability strategy for smart tourism destinations at the national level and the predominance of locally circumscribed proposals is an important handicap. Thus, the concept of sustainable tourism that is transferred from smart tourism plans is not a single unified perspective, but a concept which has come to mean many things to many different actors [3,21,42].

The analysis reveals the existence of different urban models with regard to sustainability. Different visions of urban sustainability in the smart city/destination plans suggest that the plans are seen as an instrument to provide tailored solutions for each city rather than a holistic route map towards urban sustainability.

Three out of the four city models correspond to tourist cities. The city tourism model based on improving the tourism sector corresponds to a city that is committed to a continuous process of urban revitalization and reorganization of the tourism product. This city model is strategically aimed to overcome decline and maturity problems, adopting the so called organic path to sustainability [20]. In essence, this approach is committed to developing an urban model where sustainability plays a weak role, since the programmed actions are destined basically to overcome tourism stagnation in an urban mature life cycle stage. In other words, they stress fields that improve tourism (product, image, marketing, etc.) rather than seeking increased urban efficiency through technology or information management through governance. This clashes with the idea of transforming the urban model, as tourism destinations seem more prone to adapting actions to a pre-existing urban model, rather than seeking a transformational alternative into a smart city.

The smart tourism city based on efficient use of resources is a very different model. The programmed actions aim to solve urban problems that tourism has previously created which, if not reversed, can severely affect the destination competitiveness. It is a reactive model, which focuses on the applied use of sustainability to solve urban problems that hinder tourism development, but that does not adopt measures in order to reverse tourism growth. Indeed, actions to improve sustainability programmed by this type of tourism destination are based on raising awareness, improving tourists' experience (mobility, accessibility, safety) and making savings in basic resources for tourism (water, energy, heritage), but making little use of technology. Besides strengthening the tourism experience, those smart tourism destinations plan acts to improve the quality of the environment and their inhabitants' quality of life. This is explained by the fact that many actions affect services and areas used by both tourists and residents and because the quality of the environment, which obviously has a positive impact on residents, is essential for attracting tourists. However, actions that require some form of collective organisation (such as governance or mobility) or involve mobilising a complex fabric of economic actors (innovation) are less abundant.

The model of a tourist information city with proposals for tourist information is exclusively based on improving the satisfaction of the tourist experience. The actions focused on the improvement of the quality of life of the inhabitants are minor as the plans are especially devoted to improving the tourist information systems.

Smart tourism plans represent an opportunity for tourism destinations to search for deeper technology solutions to problems of sustainability created by their activity. However, certain deficiencies and determining factors can be detected that direct actions towards industry aspects rather than a holistic vision of sustainability. Programmed actions point to the existence of two strategic orientations,

depending on the type of city. Conventional cities with smart city plans are more likely to adopt strategies based on hard infrastructure, while tourism destinations tend to stress knowledge creation (soft resources). In the short-term, the technological approach is not the most appropriate one for urban sustainability [10]. Investment in technological efficiency based on hard resources could limit the possibilities of sustainability if soft factors that also contribute to smart tourism destination sustainability are underestimated [9,11,34,43].

However, the lack of technological solutions proposed in tourist city plans is a clear symptom of their practical problems to achieve smartness rather than a planned intention towards a technological soft strategy. Limitations to the capacity of tourism destinations for finding technological solutions encourage this approach, although it might also be due to strategic or management factors that are not observable from an analysis of actions.

The search for technology solutions towards sustainability in smart tourism destinations is subject to certain inherent limitations in tourist activity and the strategic focus intended for technology. Firstly, it should be borne in mind that leisure consumption and production take on greater relevance in tourist areas. Management of mobility, the specific conditions of production, consumption and competition for scarce resources, a private sector orientation, and difficulties in controlling the activity, given the numerous agents involved, are other factors affecting the sustainability of tourist areas [42].

It may also influence the atomisation of the tourism sector and the role of trust in a context, inherent to tourist destinations, where the ease of copying innovations creates difficulties in collaborating and sharing information among stakeholders.

Finally, it is essential to decide what approach to take with the use of technology in smart tourism plans. Plans stressing the technical dimension will generally seek tailored technological solutions as “recipes” for improving conditions of sustainability; yet there is a risk of remaining only surface deep and failing to consider the cost–benefit balance or measure their true effectiveness. If plan directives consider technology a neutral element, implementation must be accompanied by discourse that guarantees sustainability policies are included [44,45].

The soft approach stresses the construction of social and human capital and knowledge generation. This is a human approach to technology that relies more on providing dynamics of collective creativity and intelligence than on creating technological infrastructure [34]. This strategic approach more closely resembles the idea of the knowledge destination [43] than a smart tourism destination. It facilitates aspects of human capital that improve governance (empowerment, participation, knowledge creation, etc.), technological inclusion and behavioural changes among the population. Actions programmed by tourism destinations clearly indicate investment in knowledge creation, but more work is required than just implementing these actions, as social change among inhabitants has to be strategically managed. In this context, it should be borne in mind that simply providing a large amount of data does not automatically translate into knowledge, that access to information is not the same as participation or commitment by the population, and that use of information can favour private interests and pressure groups.

Spanish smart tourism planning has differences and similitudes to other planning contexts. Similar to some Asian national smart tourism plans, Spanish smart tourism plans are conceived as top down proposals derived from a national plan, and are focused mainly in cities [46]. However, Spanish smart tourism plans differ from Asian plans in adopting less technological solutions and being more interested in tourism product development. The Spanish smart tourism planning model, which is based on solutions for mature resorts (resort upgrading, product innovation and diversification of markets) is also different from some European experiences, such as Italy’s, which defends the need to change the traditional tourist travel through supporting slowness and local identity [36], or Amsterdam and Helsinki’s, where human capital, knowledge and co-creation of innovation are put at the centre of the competitiveness strategy of the city [47].

## 6. Conclusions

The main contribution of this paper is to evaluate the capacity of the smart tourism plans to generate processes of urban sustainability in tourist cities. First, the programmed actions are proved to be unable fostering urban sustainability in the long term. Second, although different tourist city models coexist, all of them are focused on tourism competitiveness rather than sustainability.

Due to such statements, smart plans offer a vision of sustainability more rhetorical than real. Plans include some actions in order to improve sustainability but they are atomized and lacking a well-defined sustainability strategy background. For example, some of the actions propose the development of integrated tourist management systems, the improvement of tourism product interpretation through technology (using augmented or virtual reality, for example), the creation of big data and open data systems, the use of sensors for information monitoring or developing tools to facilitate accessible tourism, but they appear fragmented, decontextualized, lacking in a common strategy and focused on a local vision of sustainability.

Sustainability must be an integrative concept across fields, sectors and scales, and approaches based on the ecoefficiency of delivering goods and services, and corporate social responsibility are necessary steps towards a more sustainable world [22,40]. Smart tourism plans are an interesting tool to go beyond conceptual and marketing issues, towards practice. However, some of the steps for the promotion of sustainable tourism through strategic planning for smart tourism destinations are far from being met: Performance targets are not made explicit, there are not implicit and clear solutions for environmental protection or social and cultural assets and opportunities of influencing the behaviour of tourists are scarce.

As previously stated in other studies, although, in theory, smartness inevitably entails sustainability of the destination, in practice this relationship is ambiguous and does not guarantee effective progress towards sustainability [2].

Smart tourism plans are a consequence of its particular way of understanding and positioning in sustainability. Those plans have a tourism-driven approach, based on its interest in renewing the local tourism product and solving only urban sustainability problems that especially affect the tourism sector. Therefore, plans mainly depend on an organic path, rather than an induced one, leading to sustainability, and are reactive rather than proactive. While there can be found some interesting sustainability measures there is not a common global strategy on sustainability. Therefore, there is a loss of political opportunity to position the smart tourism plans beyond local problems and to become focused on global sustainability.

There are considerable differences in the approach to sustainability in the four detected urban models. It is suggested here that this is related to the so-called dilemma of cautious sustainability [48] since, as some cities have offensive positioning while other have a defensive positioning, it seems that they are not cooperating to advance jointly towards sustainability. Thus, it can be stated that tourist cities adopt different positions of power regarding sustainability. This situation can ultimately affect the competitiveness of tourist destinations that do not meet the sustainability goals that the rest will have assumed. Therefore, to avoid an imbalanced long-term scenario, it will be necessary, from a planning point of view, to foster an induced and collective path to sustainability in smart tourist destinations.

Future research needs to establish the role of economic management and lobbies in the destination on the choice and design of actions, the weight of the destinations' historic context in defining strategies for economic, urban and tourist development and the availability of human capital to meet the needs of technological actions to provide a better explanation of the gap between the definition of actions and urban sustainability strategies.

Another conclusion is that, in smart tourism destinations there is little use of technological solutions, which should be in the very DNA of cities looking to implement smart tourism plans. The deficiency in technological actions can be seen in all areas, so it is a general phenomenon. The fact that tourism destinations invest in knowledge creation as a strategy for sustainability and developing tourism helps explain the exclusion of technology from most of their actions. However, it is hoped that

future research will show whether the real cause is a voluntary strategic option or a lack of funds and human capital for generating technology-based solutions.

It can be assumed that smart tourism plans propose scarce technological solutions and, with some exceptions, they are irrelevant from a strategic point of view. While plans provide a branding narrative for smart destinations based on the use of technology (as is the case in Marbella) we have reasonable doubts about the ability of programmed technological measures to carry out well-defined actions oriented towards long-term sustainability processes. In other words, Spanish smart tourism plans reproduce the problems of traditional management logics applied to sustainability planning in tourism [19]. The lack of basic infrastructure (financial and human resources to create smart offices), the absence of bottom-up proposals and the lack of urban labs, as well as the difficulties in cooperating among stakeholders are deficits too rooted in Spanish tourism destinations to deal with a suitable sustainable planning.

Spanish tourism destinations that have adopted smart tourism destination plans address their actions towards some elements of urban sustainability, especially the quality of the environment and residents' lives, but tend to not go far enough. Actions to improve such a broad field as tourism could have the side effect of improving sustainability, but consolidation of such effects is unlikely if there is no clear, well-identified strategy for territorial and social sustainability. Smart tourism destinations attempt to establish the foundations for knowledge creation in the sector, but lack sufficient focus on citizens' participation and social inclusion. Destinations see smart tourism plans as an opportunity to improve competitiveness rather than a holistic strategy for improving urban sustainability. Actions point towards improving tourism experience and practice in a quality environment with little technological content. The overall impression is that plans are seen as a line of funding for urban and tourism restructuring, as was the case with previous product renewal plans in the 1990s, rather than a means of organising and consolidating the ecosystem of smart tourism destinations.

The review of action programmes in Spanish smart tourism plans raises doubts as to the capacity of tourism destinations to implement robust sustainability strategies rather than simply introduce measures to improve competitiveness. The results do not match the goal of the national smart tourism destination strategy of developing smart tourism through pilot plans to transform destinations in terms of both sustainability and use of technology. This mismatch suggests a number of recommendations and areas of improvement for the future. First of all, the objectives of the plan should be revised to put more emphasis on sustainability from a holistic point of view. Clearly each destination needs a plan tailored to its own particular characteristics and needs, yet in most cases the lack of a clear commitment to sustainability or technology use does not help progress towards smart tourism. Clearly, a national or regional plan for smart tourism destinations needs to be (re)defined to serve as a general guide for interested destinations. Different models of destinations show differences with regard to sustainability and the degree to which technology is used. Models that combine both factors could be considered as pilot plans and then, after assessing the impact of implemented actions, used as benchmarks for other tourism destinations.

It is especially necessary to assess to what extent some technological actions (for example, those promoting social networks or fostering the collaborative economy) impact on identity, lifestyles, patterns of consumption or tourists' behaviour [5]. To achieve tangible economic, social and urban development results, smart tourism destinations should be planned in a strategic way including technological impact. It will also be necessary a better understanding of smart tourists and how they are related to technology in the framework of the smart tourism destination [49]. Further research is then needed in this direction.

It is hoped that this paper provides a useful comparative framework for smart tourism destination development. However, some limitations should be noted. First, we used programmed action to measure the effects of planning smart destinations in urban sustainability, but data on implemented actions was not provided in most of the cases, so the difference between planning strategy and implemented strategy has not been highlighted. Future research should encompass that and, as a new

contribution, assess the degree of success, time passed and problems overcome until implementation. Second, gathered data about stakeholders who support actions was limited, so we were unable to assess whether the programmed actions were due to bottom-up or top-down strategies. To fill those gaps it is necessary to add future empirical research to obtain a deeper analysis about the influence of smart tourism strategies and sustainability in urban and tourist areas.

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## Appendix A. Data Sources from Smart Tourism and Smart City Projects

City.	Source	Year	Website
Alcalá la Real	Proyecto Alcalá la Real Ciudad y Destino Inteligente. Primera convocatoria de ciudades inteligentes de la Agenda Digital para España	2015	
Alzira	Segunda Revisión del Plan de Mejora e Innovación: Proyecto Alzira Inteligente (Proyecto Smart City 2014-2019)	2013	<a href="http://www.alzira.es/alzira_vpm/index.php/val/plans-de-millora-i-innovacio">http://www.alzira.es/alzira_vpm/index.php/val/plans-de-millora-i-innovacio</a>
Barcelona	Portal web del projecte Smart City Barcelona	2016	<a href="http://smartcity.bcn.cat/es/">http://smartcity.bcn.cat/es/</a>
	Barcelona ciutat intel·ligent	2014	<a href="http://www.gencat.cat/salut/botss/pdf/411smart.pdf">http://www.gencat.cat/salut/botss/pdf/411smart.pdf</a>
Castelldefels	Plan de acción para la transformación de Castelldefels en Destino Inteligente	2013	
Coruña	Agenda Digital de Coruña. Documento Provisional.	2012	
Elx	Documento de Hoja de Ruta Estrategia Elche Smart City	2014	<a href="http://es.slideshare.net/PabloSanchezChillon/hoja-de-ruta-resumen-estrategia-smart-city">http://es.slideshare.net/PabloSanchezChillon/hoja-de-ruta-resumen-estrategia-smart-city</a>
Gijón	Gijón-In ciudad innovadora, inteligente e integradora	2015	
Hierro, El		2016	
Lloret de Mar	Conclusions Informe Diagnòstic i Pla d’Acció Lloret de Mar	2016	
Málaga	Proyecto de Ciudad Inteligente de Málaga (presentació)	2013	<a href="http://www.respuestaeficaz.ulpgc.es/index.php/contenido/documentacion/doc_download/9-mario-cortes-carballo-concej-al-delegado-de-nntt-del-ayto-de-malaga">http://www.respuestaeficaz.ulpgc.es/index.php/contenido/documentacion/doc_download/9-mario-cortes-carballo-concej-al-delegado-de-nntt-del-ayto-de-malaga</a>

City.	Source	Year	Website
Marbella	Plan Estratégico Marbella-San Pedro 2022	2015	<a href="http://www.marbella.es/estrategia/docuteca/documentos-del-plan/item/103-documento-final-del-plan-estrategico-de-marbella.html">http://www.marbella.es/estrategia/docuteca/documentos-del-plan/item/103-documento-final-del-plan-estrategico-de-marbella.html</a>
	Agenda Digital Marbella-Smart City	2016	<a href="http://www.marbella.es/ayuntamiento/delegaciones/innovacion-y-administracion-electronica/agenda-digital-de-marbella.html">http://www.marbella.es/ayuntamiento/delegaciones/innovacion-y-administracion-electronica/agenda-digital-de-marbella.html</a>
Molina de Segura	Molina de Segura Smart City. Plan Director 2014–2020	2014	<a href="http://portal.molinadesegura.es/images/nntt/SmartCity.pdf">http://portal.molinadesegura.es/images/nntt/SmartCity.pdf</a>
Murcia (ciutat)	Ficha mejores prácticas del proyect URBELAC-3	2016	
Murcia, Región de	Diagnóstico y Plan de Acción del Destino Turístico (Región de Murcia) de cara a su conversión en Destino Turístico Inteligente (DTI)	2014	
Palencia	Proyecto Palencia Digital “DigiPal”	2015	
Palma de Mallorca	Plan director Palma de Mallorca Smart City/Smart Destination	2013	<a href="http://smartoffice.palma.cat/portal/PALMA/smartoffice/contenedor1.jsp?seccion=s_fdes_d4_v1.jsp&amp;codbusqueda=2568&amp;language=ca&amp;codResi=1&amp;codMenu=2481">http://smartoffice.palma.cat/portal/PALMA/smartoffice/contenedor1.jsp?seccion=s_fdes_d4_v1.jsp&amp;codbusqueda=2568&amp;language=ca&amp;codResi=1&amp;codMenu=2481</a>
Palmas de Gran Canaria, Las	LPA_GC: Modelo de ciudad inteligente	2013	<a href="http://www.laspalmasgc.es/es/areas-tematicas/innovacion/lpa_gc-modelo-de-ciudad-inteligente/">http://www.laspalmasgc.es/es/areas-tematicas/innovacion/lpa_gc-modelo-de-ciudad-inteligente/</a>
Santander	Santander Smart City. Plan Director de Innovación	2011	<a href="http://santander.es/servicios-ciudadano/areas-tematicas/innovacion/plan-director-de-innovacion">http://santander.es/servicios-ciudadano/areas-tematicas/innovacion/plan-director-de-innovacion</a>
Segovia	Smart Digital Segovia	2015	<a href="http://www.segovia.es/index.php/mod.pags/mem.detalle/id.13428">http://www.segovia.es/index.php/mod.pags/mem.detalle/id.13428</a>
Sevilla	Sevilla Smart City. Plan Director de Innovación	2014	<a href="http://www.sevilla.org/ayuntamiento/competencias-areas/alcaldia/ITAS/plan-director">http://www.sevilla.org/ayuntamiento/competencias-areas/alcaldia/ITAS/plan-director</a>
Tarragona	Memòria d’activitats 2013. Tarragona 2017 Smart Mediterranean City	2013	<a href="http://www.tarragonasmart.cat/mediterranean-city/administracio/memories/">http://www.tarragonasmart.cat/mediterranean-city/administracio/memories/</a>
	Memòria anual 2014. Tarragona 2017 Smart Mediterranean City	2014	
	Memòria anual Fundació Tarragona Smart Mediterranean City-2015	2015	
Torrent	Torrent Smart City. Pla Director 2015–2020	2015	<a href="http://www.torrent.es/torrentPublic/inicio/serveis/modernitzacio.html">http://www.torrent.es/torrentPublic/inicio/serveis/modernitzacio.html</a>
Valencia	Valencia Ciudad Inteligente	2014	<a href="http://vlci.inndeavalencia.com/">http://vlci.inndeavalencia.com/</a>
Vall d’Aran	Informe Diagnóstico y Plan de Acción Valle de Arán	2015	
Villajoiosa	Análisis, Diagnóstico y Plan de Acción de Villajoiosa de cara a su conversión en Destino Turístico Inteligente	2013	

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