

# Towards an ICT Roadmap for Smart Tourism Destinations Based on Prospective Analysis

Josep Ivars Baidal<sup>a</sup>,  
Marco Celdrán Bernabeu<sup>a</sup>,  
José Mazón López<sup>a</sup>, and  
Ángel Perles Ivars<sup>b</sup>

<sup>a</sup>Tourism Research Institute  
Alicante University, Spain  
[josep.ivars@ua.es](mailto:josep.ivars@ua.es), [ma.celdran@ua.es](mailto:ma.celdran@ua.es),  
[jnmazon@dlsi.ua.es](mailto:jnmazon@dlsi.ua.es)

<sup>b</sup> Itaca Institute  
Polytechnic University of Valencia, Spain  
[aperles@disca.upv.es](mailto:aperles@disca.upv.es)

## Abstract

This research note analyses the impact of ICTs on tourism from the perspective of smart destinations. Using the e-Delphi technique, a prospective study was performed with the aim of clarifying the future scenario for destination management favoured by ICTs and assessing the extent to which smart destinations can become the new paradigm for the management and marketing of tourism destinations. The initial ICT roadmap outlined in this paper reveals interesting opportunities for the destinations, at the same time as stringent requirements for the achievement of a new governance of tourism, which goes beyond the mere application of technologies that do not truly transform the scope of management of the destination.

**Keywords:** ICT; smart destinations; prospective; marketing; management

## 1 Introduction

Derived from the concept of smart city, the smart focus is particularly interesting for the management of tourism destinations owing to the high penetration of ICTs in tourism services, their impact on the behaviour of the demand and on the generation of new business models (Online Travel Agencies, peer to peer services, etc.) as well as the fundamental role played by ICTs in the improvement of the competitiveness and innovation of companies and tourism destinations (Sheldon, 1997; Buhalis, 2003; Buhalis & Law, 2008; Sigala et al., 2012; Benckendorff et al., 2014). This interest has led to institutional initiatives to boost smart destinations in Asia (China and South Korea, essentially), Europe (with actions deriving from smart city projects, as well as specific tourism programmes in countries such as Spain) and Australia (more focused on smart governance) (Gretzel et al., 2015).

However, the smart destination is not built exclusively via the application of technologies. Based on the work carried out in smart cities and the smart destination projects, Ivars et al. (2016) propose a model of smart destination with a structure based on three interrelated levels: the strategic-relational level, the foundation of which is governance, based on public-private cooperation to guarantee the sustainability of the destination and an open and collaborative environment of

innovation; the instrumental level, based on digital connectivity and sensing to configure a destination information system that is essential in decision-making; and, lastly, the applied level, which enables the development of smart solutions for the marketing of the supply, greater efficiency in communication actions and an improvement in the tourism experience (Neuhofner et al., 2014). Thus, technology applications and ICTs are enablers (Boes et al., 2015), but nobody can fail to be aware their central role in the development of smart destinations. Therefore, despite the technological bias of the concept of smart destination, it can be affirmed that technology is a necessary condition but not sufficient to configure a true smart destination.

In this research note, a prospective analysis of ICTs and tourism has been conducted in order to propose an initial roadmap for smart destinations. This is the first step towards a more complete and detailed analysis that aims to get more insights about the development of smart destinations.

## **2 Objectives and Methodology**

The main objectives of this research note are to identify the ICTs that may favour the development of smart tourism destinations and to perform a prospective evaluation, by means of experts, of the ICTs that will have the greatest impact on tourism. These objectives seek to clarify the new scenario of destination management favoured by ICTs and to assess the concept of smart destination as a future paradigm for the marketing and management of tourism destinations.

The method used is the Delphi method, in its e-Delphi variant, since internet-based Delphi research has been carried out. This is a technique, used in both academic and professional fields since the nineteen-sixties (Landeta et al., 2011), that seeks to obtain a reliable consensus of a panel of experts with a high level of knowledge of the subject under analysis (Okoli & Pawloski, 2004), a method well-suited for forecasting uncertain factors (Cole et al., 2013), as is the case of the impact of the evolution of ICTs on tourism.

The profile of the expert selected responds to an academic, specialised in tourism and ICT, who has had work published in journals with an international impact or has participated in international congresses on this subject, or a professional with ICT skills within tourism companies of a global scale. With these criteria, 45 participants were selected of whom a total of 22 finally responded to the two rounds of the questionnaire. Most of the experts are from the academic field (16), although many of them cooperate with tourism companies and destinations. The geographical distribution is very varied, an advantage of the e-Delphi method, since 8 experts perform their activity in Spain, 5 in the United Kingdom, 2 in Australia and 1 in Portugal, India, Finland, Poland, the United States, Brazil and Italy. The sending of the first and second rounds of the questionnaires took place between October 2015 and June 2016. For the analysis of the results, instead of using statistical variables of average and distribution, the use of response percentages was preferred, using as a reference 70% of the responses as a high degree of consensus in the estimation of the impact of the technologies.

### **3 Results of the ICT Prospective and the Smart Destination Approach**

Despite the difficulty in estimating a complex and uncertain future, the prospective is considered a key tool in strategic thinking. In this case, forecasting the impact of technologies in tourism contributes to a better knowledge of the new possibilities for managing and marketing of the destinations, while at the same time comparing the convenience and viability of the smart focus. However, the limitations are evident since the tourism sector functions through the interplay of multiple technologies which are co-dependant (Kelly, 2016) within a process of technological, socio-economic and institutional coevolution. Furthermore, as Hjalager (2015) points out, much innovative power in tourism does not originate from tourism itself and nearly all the fields of science and technology contain some foundations for the future of tourism.

The technologies analysed have been divided into six groups: connectivity; wearables; identity, payments and security; sensorial experiences; other technologies; and data management. The experts were consulted regarding their opinion on the impact of the selected technologies on tourism. This analysis allows the identification of the unequal importance of the technologies for tourism and a knowledge of the spheres in which it is more foreseeable that the application of the technologies will affect tourism management. For this purpose, the experts have assigned three levels of impact for each technology: low, medium and high.

From the point of view of connectivity, the internet of things (IoT) receives the assessment of the highest impact. This high level of consensus is in tune with the relevance given to the IoT in smart cities (Kominos, 2015) and in smart destinations, to the extent that it allows the connection of physical with digital, and differentiates smart tourism from e-tourism, based on digital connections (Gretzel et al., 2015). In second place, local connectivity, via public Wi-Fi or Li-Fi, presents a high level of impact, despite the fact that data roaming costs tend to decrease. Portable Wi-Fi and 5G mobile connectivity also obtain assessments of high impact, close to 70%.

The wearables group, despite the extensive attention received in the media, has a majority assessment of medium, although if the high impact response is aggregated, around 80% assign a medium-high impact to these technologies. In the following group biometric technologies, traditionally announced as a mechanism to facilitate travel and tourism, do not exceed a medium assessment, whilst a high impact is assigned to payment via mobile telephone. Near-field communication (NFC) technology, as a means of payment or data transfer, is also forecast to have a relatively high impact. Among the sensorial experiences, there is a higher level of consensus for augmented reality (high impact) and ambient intelligence (medium impact). In other technologies, the greatest impact is assigned to autonomous vehicles and robots, ahead of drones.

Lastly, among the data management technologies, the following stand out with a high perceived impact: big data, real-time databases, the tourism intelligence platform, open data, the semantic web and opinion mining. These are technologies with a clear interrelation that lay the foundations for data-driven decisions both in cities and in

smart destinations. The forecast impact in this group of technologies, according to the experts, illustrates two key points, which are (i) there is a clear perception of smart destinations as big data generators, and (ii) a high impact is considered for the technologies that help to process and understand these data, generating knowledge and better supporting decision making processes at the destination. It is not just that the destination generates data (big data) and that these are made public (open data) but that it is capable of processing these data in real time and exploiting them to the full, owing to which the concurrence of semantic web technologies and applications that generate knowledge such as opinion mining is important.

However, the lower impact of technologies related with open data such as Web Mashups suggests that the changes glimpsed in the management of tourism companies and destinations are based on new approaches to the management of information and knowledge, giving priority to a component of internal use of the data by the destination for decision-making, to the detriment of an approach where entrepreneurs propose innovative business models based on the development of services and applications that make intensive use of data (such as, for example, Moovit - <http://moovitapp.com/>). On the other hand, the database technology expected to have the most impact is real-time whilst others such as graph or document databases have not been perceived as being so relevant, which highlights the importance of the smart destination as a generator of data in real time via various sensors and the need for adequate processing of the data. In this section, the high impact forecast for the tourism intelligence platform is symptomatic, in consonance with the fundamental nature granted to it in the theoretical models of the smart destination (Buhalis & Amaranggana, 2013; Gretzel et al., 2015).

#### **4 Conclusions**

The forecasts of the impact of the technological evolution on tourism in forthcoming years configure a new management scenario for tourism destinations that could favour development of true smart destinations. This requires better knowledge of the technological evolution and its impact on tourism in order to adapt the management of the destinations to this new scenario. However, “smart city solutions are currently more vendor push than city government pull based” (Komninos, 2015: 47), a situation that tends to be reproduced in the smart destination initiatives.

The prospective study carried out indicates that we are evolving towards a technology-driven management of destinations for which, in all likelihood, tourism destinations are not currently prepared, in view of the complexity of the technologies that must be applied and managed. The mirage of individual initiatives based on one technology or another that have no continuity does not configure a smart destination, although it may be valuable as a concept test or a demonstrating effect. A smart destination project with a truly transforming scope must be guided by an adequate tourism governance, with a well-defined strategy, high levels of public-private cooperation and an efficient coordination between different authorities and public organisations. Without doubt, ICTs are instrumental in nature, but they are essential in order to be able to speak of smart destinations in the twenty-first century.

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