

## ORIGINAL RESEARCH ARTICLE

# Disruptive tourism: Smart tourism routes

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### ABSTRACT

The present research aims to support the possible utilization of tourist routes and circuits in a smart way, for this purpose it is proposed to consolidate the usefulness of smart tourism territory, data visualization, data access in connectivity and sensorization infrastructures within a Smart Tourism Destination model. The objective is to understand the evolution of Information and Communication Technologies within a given space that generates information in real time of the natural and cultural tourist attractions, the accesses to them and the facilities at the time of leisure and recreation activities. The proposed route model considers transcending in the current reality of the tourism sector, which is open to work in a multidisciplinary way with other sectors that propitiate the sustainable use of cultural and natural resources through the Internet of Things.

**Keywords:** smart territory; routes; circuits; data visualization; Smart Tourism Destinations

## 1. Introduction

A tourist route is defined as the physical space of the geography that contains different natural and cultural tourist attractions, which by means of accesses and facilities serve for the realization of different activities of tourist and/or recreational type, for the enjoyment of tourists and/or visitors in a place. In the words of López-Guzmán and Sánchez, it is the set of activities and attractions throughout an area or one or several territories, and should include various tourist elements and the facilities for accessing them.

This approach serves as a basis for recognizing as an example one of the most emblematic routes and Cultural Heritage of Humanity, the road to San-

tiago de Compostela<sup>[1]</sup>. The primary and main conditioning factor for defining and delimiting a route is the physical geographic space, which can be understood in various ways from the point of view of the structuring of the tourist space, which can be homogeneous or heterogeneous<sup>[2]</sup>.

The first routes that are remembered and associated with the activity of tourism are those used in the holy wars at the time of the crusades, since they were determined spaces according to the needs of the visitors who came on pilgrimage.

The road to Santiago de Compostela is recognized as a sacred place of pilgrimage from a chronological scope with origins that go back to the times of the first diffusion of Christianity in the peninsula during the Roman domination. The history of the

#### ARTICLE INFO

Received: September 2, 2021 | Accepted: October 5, 2021 | Available online: October 21, 2021

#### CITATION

Pulla Pesantez SP, Ortega Echeverria AL, Castro Pacheco KP. Disruptive tourism: Smart tourism routes. *Smart Tourism* 2021; 2(2): 8 pages.

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road to Compostela dates back to the XI and XII centuries with the rural and agricultural axis, favoring the growth of trade and industry of the inhabitants near it.

In 1124, the Peace of God was decreed between the territories of France, Roussillon, Catalonia and Braga, thus the relationship between the pilgrimage and the movements of renewal of social and political life of the time changed to become the climate of peace and security. It should be noted that the pilgrim had information about the conditions of the journey. There began the main text known, in this regard as the Pilgrim's Guide attributed to America Picard written in 1160, with these considerations can be set the example of an itinerary used in a religious route.

In the current changing, intelligent territories, of technology in the daily and normal life of the human being, by the use of mobile devices and digital applications that determine the actions to follow in a delimited time and space, as is the use of GPS (Geographical Positional System) which is an instrument of daily use to cover and cover different points to connect through the use of means of locomotion such as cars, motorcycles, bicycles and by the human being.

The circumstances of dynamic environments and are configuring the so-called "capacity of use".

It is important to highlight that this publication is part of the research project Disruptive Tourism: Intelligent Tourist Routes, developed through funding from the South American Institute of Technology as a contribution to the promotion of tourism as an economic activity par excellence in Ecuador.

## **2. Development**

### **Intelligent territories**

The development at the level of Information and Communication Technologies (ICT) has allowed people to access an infinite amount of digital content in addition to the emergence of portable

devices where an infinite number of applications and content such as culture, leisure, tourism, education, health, etc., converge<sup>[3]</sup>; the evolution of technology represents an important factor that has transformed consumer behavior, which has forced companies to adapt to this evolution, and the tourism industry is no stranger to this fact.

ICT generate advantages in terms of competitiveness, process automation, reduction of errors, etc., the importance of fast communication, cost savings and time reduction in the processes is essential in the tourism activity, reliable processes that allow the promotion and purchase of products and services within the industry, images, videos, the transmission of emotions are the basis for generating motivation in the consumer seeking leisure<sup>[4]</sup>.

From the transformation of senses and emotions in the human being, the creation of the concept of an intelligent territory is established, which in its broad process is consolidated in the so-called smart cities or  $\alpha$  Smart cities, a term that begins to be used approximately in the year 2008, as an ideal of incorporation of digital technologies within the city, where only a small group of pioneering companies had begun to use this term; it is also said that in parallel some proposals to apply technology to urban models of sustainable development were emerging.

According to Boyd Cohen:

The first city, Smart City arises from the need to orient life towards sustainability and sustainability, thus emphasizing the innovation of technologies to improve lifestyle and actions to preserve natural and cultural assets for the future, reducing harmful emissions.

The evolution of the idea of a smart city leads to the concept of  $\alpha$  smart destination, however, a series of structural transformations in the tourism sector, justify this need for a change in management; the concept of an  $\alpha$  smart destination, according to SE-GITTUR.

An innovative tourist destination, consolidated

on a state-of-the-art technological infrastructure, that guarantees the sustainable development of the tourist territory, that promotes universal accessibility, that facilitates the interaction and integration of the visitor with the environment and increases the quality of their experience in the destination and improves the quality of life of the residents.

The tourism market and the dynamism in terms of demand trends generated by tourists, which change consumption habits as time goes by, and propitiate the generation of different products, from this is born a proposal to generate a route model, which responds to this new need and could be called as an intelligent tourist route.

In recent years, the concept of intelligent territory has had a growing impact among experts and agents dedicated to the study of sustainable development. From the perspective of urban planning and architecture, the definition made by Alfonso Vergara and Juan Luis de las Rivas stands out, who are the authors who, in a more explicit way, cradle the concept of smart territory in the following terms:

Smart territories are those innovative territories, capable of building their own competitive advantages in relation to their environment, within the framework of a complex, global and interrelated world. Likewise, smart territories pursue a balance between the aspects of economic competitiveness, social cohesion and sustainability.

In short, smart territories are those capable of developing city projects, achieving the right balance, discovering their uniqueness and building their own competitive advantages in a global framework. Any territory, regardless of its size and level of infrastructure, can be a smart territory.

It should be emphasized that the definition of intelligent territory, being a new meaning, emerges as a new theoretical concept from the confluence of different related scientific disciplines, mainly in urban planning, architecture, cultural heritage, environment, innovation economics and regional development, but above all it applies the approach of

multidisciplinary of diverse sciences, which generate various synergies with the purpose of consolidating for the tourist activity a model that should be exploited in the current circumstances such as that of the Smart Tourist Destinations, which are the present in the world<sup>[5]</sup>.

This multidisciplinary capacity and at the same time of integration of different areas, focused from the analysis of the development of infrastructures in connectivity and sensitization, the idea of the intelligent territory takes special relevance if we take into account that, until now, the field of study of the economic and social development is approached from different perspectives of analysis which makes necessary to rethink the current way of approaching the economy, which must be considered in an intelligent way within a holistic system that unites attractions, accesses and facilities, with local management, the availability of a price and of course having quality; This would confirm the conception of the product in a destination, where routes and circuits are part of the activity.

### ***Data visualization as a tool for consolidating smart routes***

The most important example is the work done on data visualization of the inventory of tourist attractions, which generates a real alternative of conceptualization of the activity from the perspective of technological innovation and change in the traditional approach to the concept of tourism<sup>[6]</sup>.

One of the ways to consolidate and generate tourism science is through the union and fusion of various disciplines, with the idea of generating positive synergies. This is the case of the research that encompasses the registration and evaluation of the elements of the tourist heritage (PT), linked to the visualization of data (open data) that are created by computer graphics, which generate skills that refer to the most advanced technological use, thus allowing a sensory interpretation, through the representation, modeling and perception of solid elements, of large surfaces, properties in 2 and 3D animations. These computer applications (databases, graphics and word

processors, among others) are not applied to tourism, so there is no further information to compare and validate in a documented manner, applied to two areas: rural and urban.

Data visualization is a transversal discipline that uses the immense communication power of images to explain in an understandable way the relationships of meaning, cause and dependence that can be found between the large abstract masses of information generated by scientific and social processes. It can be said that in the field of tourism it has not been fully explored, since there are no major applications, thus it becomes a scientific technological experimentation within tourism planning and management, due to its form and the arrangement of natural and cultural attractions; where they are applied with the idea of being able to determine their possible uses<sup>[7]</sup>.

The inventory, hierarchization and categorization of tourist attractions are the most important steps in the process of evaluating the tourist potential of a region, therefore, they determine in a particular way the real tourist vocation of the territory in which it will intervene; depending on the scope of its application, it becomes the basis for the structuring of the tourist space of a region, country, zone, department, municipality or community. Hence the importance of considering the tourist inventory to generate routes and circuits.

Therefore, it can be understood, that the only way to confirm that a territory is tourist or not, and that it justifies certain investments with the risks of being bad, is through a rigorous evaluation that takes into account the attractions of the territory, the supply, the demand, the competition and the tendencies of the market, in this way the precise evaluation of the territory constitutes an excellent base of adoption of decisions for the organisms of development.

Valuing the tourist territory involves three fundamental phases:

(1) Analysis of the existing tourism situation,

a phase in which resources, supply, demand, competition and market trends are examined;

- (2) Diagnosis which, by comparing the results of the situation analysis, will make it possible to identify the strengths and weaknesses of the territory, opportunities and risks;
- (3) Strategies: if the potential exists, define the strategy to be followed for tourism development in the territory.

These three cycles involve the collection, processing and analysis of internal and external information about the territory with strong characteristics to provide a tourist offer.

### ***Implementation of augmented reality***

The emergence of the Internet has caused a revolution in the world, in companies, in the population and in tourism, it has generated a change in the consumer and in the sales channels, this way of marketing reduces the participation of third parties in the process and improves competitiveness, as well as the emergence of a type of consumer linked to the digital world who has his own smartphone and who decides exactly what he wants. The agents of the tourism sector have had to adapt to new technologies, innovation and transformation of their traditional products. The adaptation of these technological advances gives greater value to products by provoking sensations, emotions and experiences<sup>[8]</sup>.

Success in the management of a tourist destination lies in the ability to detect and recognize all the changes occurring in the environment, their direction and the way they affect it<sup>[9]</sup>. The quality of the tourist offers and the ease of adequately promoting a destination where all the information is integrated in a system, is one of the reasons why the adaptation to new technologies is necessary within the activity.

The emergence of the new type of tourist, who is in search of recent experiences, makes both him

and the destination use recent tools that facilitate the selection procedure of what he is looking for, for this the perception of graphic and textual information available on cell phones is almost essential, as well as the possibility of reading the opinions of other people in which he is reflected, the options for accessing such information are becoming more numerous, one of them being augmented reality which is booming<sup>[8]</sup>.

The foreign tourist has an average age of 36 years old, male, single and with higher education, to plan his trip he mostly uses the Internet, since he has spent much of his life in an era in which he is surrounded by technology, requires adequate and personalized services, and also likes to be informed about the destination he arrives; therefore the tourist who visits Ecuador is no stranger to the need to generate proposals that facilitate access to information and provide a desirable experience for the tourist.

As for experiences, augmented reality is an innovation tool that aims to merge the real world with the virtual world, in other words, it shows content in real time through a device, the difference between augmented reality and virtual reality should be considered, the latter shows elements incorporated virtually, while augmented reality shows real elements within a space.

Although it is a technology that has been worked on since the 90's, it is only in recent years that it has been possible to adapt this technology to a mobile device; the incorporation of this type of technology to the tourist activity is not only useful for the previous promotion of the destination, but also during the visit, because multimedia information can be included to complement the tourist's visit in real time.

The use of augmented reality incorporated to the tourist routes is a technology that allows obtaining information from the web, it is easy to access and use, so also the possibilities of information for the tourist are endless, this translates as a process of improvement and a step towards the intelligence of a

destination<sup>[8]</sup>.

### ***Application of the Smart Tourism Destination management model***

The Smart Tourism Destination concept cannot be thought of solely as the application of the Smart City paradigm to the tourism sector, as has usually been the case. A series of structural changes in the tourism sector, which converge with the consolidation of the smart city paradigm, justify the need for new approaches in the management of tourism destinations<sup>[10]</sup>.

Therefore, it is necessary to review some definitions of the concept; among them, according to the Spanish Council of Ministers<sup>[11]</sup>. "The DTI, is an innovative space, accessible to all, consolidated on cutting-edge technology, which guarantees the sustainable development of the territory, facilitates the interaction and integration of the visitor with the environment and increases the quality of his visit in the destination". This definition is based on the fact that innovation is an important space and works as the central axis of all the proposals.

In the words of SEGITTUR<sup>[12]</sup> establishes as smart destinations the innovative spaces, which use cutting-edge technologies to boost sustainable development in the efficient management of the resource. This approach consolidates the previous proposal on a cutting-edge technological infrastructure of the tourist territory, accessible to all, facilitates the interaction and integration of the visitor with the environment and increases the quality of their experience. The idea is to use ICTs to promote efficient management, reduce costs and improve the quality of life of citizens.

For its part, the White Paper on Smart Tourism Destinations<sup>[12]</sup>, highlights innovation and development of ICTs as the basis for new mechanisms to boost ITDs. The idea is to create differential and highly competitive services, gaining in suitability and profitability, generate actions that reconvert threats into opportunities and allow differentiating the product, fighting seasonality, boosting diversification and consolidating success.

Based on these authors, it is possible to formulate some conceptions of what an ITD is. The definition of SEGITTUR stands out, due to its transcendence in tourism activity (the UNWTO used this definition in the promotion of the 1<sup>st</sup> UNWTO World Congress on Smart Destination): “From the holistic approach, the DTI implies new business management models, new forms of communication, the search for customer welfare in a broad sense”<sup>[12]</sup>.

They are innovative spaces that use ICT to boost the sustainable development of the tourist territory, encourages innovation for efficient resource management, accessible to all, facilitates the interaction and integration of the visitor with the environment and its products, reduces spending and improves the quality of life of citizens<sup>[13]</sup>.

The creation of an ITD must respond to the needs of each destination and the benefits it can bring, since the mere acquisition and application of technology to a destination does not make it an ITD, in that sense, it must be accompanied by a process of change at all levels (tourism strategy, mentality, business culture, capacity to absorb innovation, generation of new business models, etc.).

It can't be considered an ITD whether it uses the available tools for the benefit of satisfying the market, since technology is a means not an end, so it does not fail to consider issues related to sustaina-

bility, innovation or accessibility. Buhalis and Amarranggana<sup>[14]</sup>, review the notion of ITD as a generic framework that is composed of concepts inherited from Smart Cities and incorporate elements such as competitiveness, sustainability and inclusion to its basis. In this way, they aim to provide a holistic framework for smart destinations. It is not about doing the same with new technological applications, but about revolutionizing tourism management according to technological possibilities and local capacity for action<sup>[5]</sup>.

### Smart routes with the adaptation of tools

From the analysis of the different formats indicated in this research, the possibility arises that by joining them in a disciplinary way, a tool is established that consolidates the tourist activity and transcends from a non-digital system to an intelligent system that is strengthened by the different aspects to generate consistency and strengths in the face of the infinite capacity to manage and work in a virtual way.

As can be seen in **Figure 1**, the route being explored is from Cuenca to Azogues, and there is the capacity to generate it in an intelligent way to consolidate the intelligent tourism territory, in a broad, holistic and integral way, which generates the use of synergies and focus capacities of action in order to propose a tourism product and to be managed as a final tourist destination.

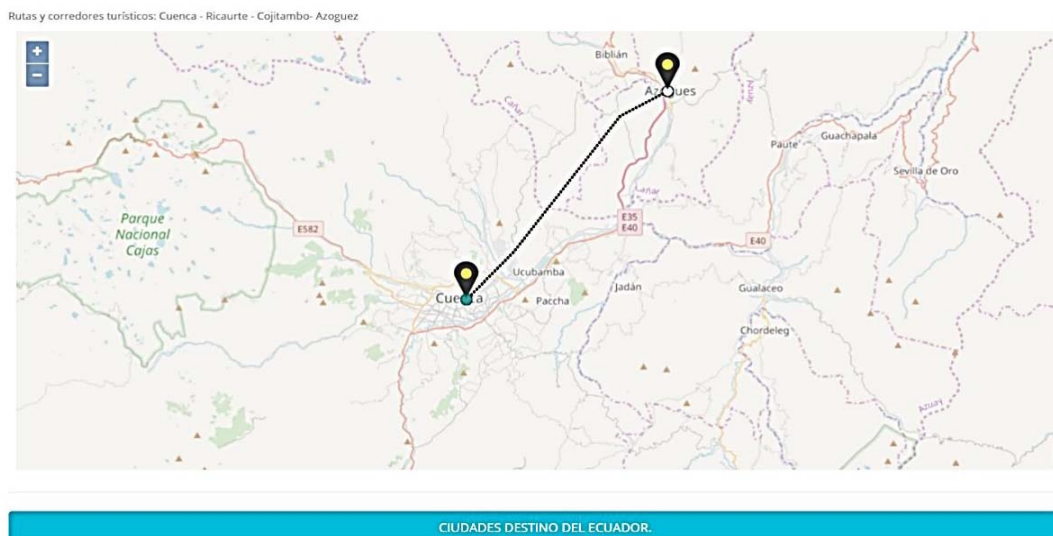


Figure 1. Tourist routes and corridors.

The procedure to collect information will be done in the following activities:

- (1) Survey of the active tourism inventory (ITA) of natural and cultural tourist attractions: It is important to define the real capacities and hierarchy to determine the quality of the tourist experience<sup>[15]</sup>.
- (2) Analysis of accesses: Different roads and paths connecting attractions, products and destinations.
- (3) Analysis of facilities: Installed capacity for tourist or visitor activities along the route.
- (4) Generation of routes according to tourist attractions: rural tourism, cultural tourism, religious tourism, archaeological tourism, picturesque towns and roads, gastronomic tourism, etc<sup>[16]</sup>.
- (5) Local management of the activity: Application of the Smart Tourist Destination management model in an integrated manner, using data visualization, resource management, management indicators, smart tourism territory, among other possibilities.
- (6) Promotion and digital marketing: Application of the integral digital marketing program.

This work requires the use of the system of Active Tourist Inventories (natural and cultural) that in a space are united with the so-called accesses (of all types and nature) so that together with the facilities (facilities of the space to make the stay of the tourist or visitor more pleasant the trip or displacement) the tourist route or circuit is effective.

This approach is very decisive and important to consolidate this proposal, which, in the current circumstances, makes necessary the spatial analysis and the use of applications that generate an intelligent economy that, based on supply and demand, build a market of exchange of goods or services, which consolidates the transformation of

tourism in the current circumstances.

### 3. Conclusions

It highlights the infinite possibilities of working in this integral approach that brings together several disciplines to consolidate the multi and transdisciplinary idea of the same, based on a delimited action of action and functionality, covering several real possibilities of argument from the design, ICT, multimedia, tourism, economics and others.

The application of this type of tools is supported from the consolidation of the intelligent territory which happens to be visualized and managed in an intelligent way by the different instances. It is therefore important to move to local action to consolidate the proposal of the management model of the Smart Tourist Destination<sup>[17,18]</sup>.

This research aims to systematize and homogenize the collection of information on tourist attractions in the area of estuary, in this sense, to propose that it be used in the elaboration of sustainable tourism development plans, planning and tourism projects, as well as by all persons and public and private institutions, as a way to support technological innovation and its use in tourism.

### Conflict of interest

The authors declare no conflict of interest.

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