



XXXIII CONGRESSO  
GEOGRAFICO ITALIANO



**GEOGRAFIE IN MOVIMENTO**  
Padova 8-13 settembre 2021

VOLUME QUINTO

# **STRUMENTI, TECNOLOGIE, DATI**

## **Gis, luoghi, sensori, attori**

a cura di

**Massimo De Marchi   Silvia Piovan   Salvatore Eugenio Pappalardo**

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## GIS of Place, GIS of People. Mobility, Tourism and Interactivity of map (app)

Giovanna Zavettieri, Monica Morazzoni<sup>1</sup>

### 1. Literature review

In order to improve the competitiveness of tourist destinations and territory management, increasingly innovative tools are required (Volchek e altri, 2019). In this regard, ICT plays a crucial role in the expansion of the tourism sector as they create smart tourism initiatives, dynamize emerging economies and provide strategic opportunities for socio-economic growth and the redistribution of wealth (Jovanović, 2016, p. 262). The use of ICT in an urban environment is already a consolidated practice and many cities are now defined as smart cities (Sánchez-Corcuera e altri, 2019) with various initiatives to convert new and old tourist destinations into a Smart Tourist Destination – STD –<sup>2</sup>.

STDs «can be perceived as places that use the tools and technological techniques available to allow demand and supply to co-create value, pleasure and experiences for the tourist and wealth, profits and benefits for organizations and the destination» (Boes e altri, 2015, p. 394). To this end, ICT allows tourists to fully experience the visited territory, and tourist attractions can attract a specific subset of visitors to the destination (Buhalis, Amaranggana, 2015). The perception of the tourist destination, together with travel motivations, determines the choice of «resources» to visit (Volchek e altri, 2019). It should be noted that tourists usually do not have sufficient prior knowledge to complete all travel arrangements. Therefore, to support decision making and shape expectations of future experiences, additional information about tourist attractions is needed, including their attributes, alternative options, and other contextual factors (Gretzel e altri, 2006; Xiang e altri, 2015). The technological platforms facilitate the sharing of information, provide a vast «info-structure» (Gretzel e altri, 2006) and filter the data that become value propositions for the tourist's choice. Lopez de Avila (2015) defines the STD as an innovative destination based on a technological infrastructure that guarantees the sustainable development of the tourist area, accessible to all, and which facilitates the interaction and integration of visitors with its environment. The goal of an STD is in fact to improve the quality of the tourist experience of destinations and at the same time the quality of life of residents and tourists themselves. Therefore an STD

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Although this contribution was jointly conceptualized by the two authors, paragraphs 2 and 4 were drafted by Giovanna Zavettieri and paragraphs 1, 3 and 5 by Monica Morazzoni.

<sup>2</sup> For further information on smart tourism destinations see Boes K. e altri, *The Acceptance of NFC Smart Posters in Tourism*, in Tussyadiah I., Inversini A. (a cura di), *Information and Communication Technologies in Tourism*, Heidelberg, Springer, 2015, pp. 435-448; Boes K. e altri, *Conceptualising Smart Tourism Destination Dimensions*, in Tussyadiah I., Inversini A. (a cura di), *Information and Communication Technologies in Tourism*, Heidelberg, Springer, 2015, pp. 391-403; Gretzel U. e altri, *Conceptual Foundations for Understanding Smart Tourism Ecosystems*, in «Computers in Human Behavior», settembre 2015, 50, pp. 558-563; Neuhofer e altri, *Smart Technologies for Personalized Experiences: a Case Study in the Hospitality Domain*, in «Electronic Markets», 2015, 25, pp. 243-254; Sigala M., *From Demand Elasticity to Market Plasticity: A market Approach for Developing Revenue Management Strategies in Tourism*, in «Journal of Travel and Tourism Marketing», 2015, 7, 32, pp. 812-834; Egger I. e altri (a cura di), *Open Tourism – Open Innovation, Crowdsourcing and Collaborative Consumption challenging the tourism industry*, Heidelberg, Springer Verlag, 2015.

needs both technological innovation and human and social capital as well as institutions integrated in a flexible, open access and multisectoral network (Nam, Pardo, 2011; Albino e altri, 2015).

The approach to the growth of a smart destination must necessarily include a strategic policy that not only gives identity to the tourist destination itself, but also implements highly innovative actions and creates awareness of the destination itself from a local perspective. Digital technologies therefore have a strategic role as they activate tourism products, select tourism markets and create digital geo-stories. The network, due to the sharing of information and the participation of communities, in essence becomes a co-developer of tourism products and relational content (Lazzeroni e altri, 2019).

Multimedia and multi-channel interaction – or the joint and integrated use of Internet «products» – communities, blogs, forums, social channels – and the mobile app sector – are the most popular ways to create content in real time and to establish relationships between user and territory. In particular, tourism apps are highly flexible within the destination, both from a service provider's perspective and from an interactional perspective. Above all, *interactivity* gives added value to the app, as it concretizes the extension of user control over various aspects such as content, display format etc.

According to the study conducted by Gretzel – see footprint 2 – analyzing tourist apps generally in use, their spendability can be identified on the basis of two theoretical perspectives identified as important dimensions of mobile travel apps. The first uses a customer-centric value chain perspective to classify apps according to the services provided. It is thus a functional perspective focused on the added value that can be derived from using these apps. The second uses *interactivity* as the classification criterion and therefore adopts an interactional perspective. The taxonomy for user interactivity involves seven main areas, namely «personal preferences», «location», «security», «through the web», «content addition», «aesthetic changes», and finally those applications that remain the «same for everyone».

Tourists are faced with great and potentially confusing differences in the way information is presented on various websites and applications. The solution to this issue is to use maps to present information effectively. Maps are a natural way to index and present information related to tourism. Travelers use maps to navigate during their travels and to prepare their routes. In addition, maps take advantage of the two-dimensional capabilities of human vision and present information in a compact and easy-to-read way.

This lays the foundation for a tourist app that not only includes a vast amount of information widely available also on the internet, but would also allow the ability to generate ad hoc itineraries based on specific filters set by the user and related to a series of items, including personal tastes and logistical preferences. This is because, with the availability of massive tourist data, destinations should offer personalized services to each type of tourist in order to exceed their previous expectations and subsequently improve their tourist experience (Buhalis, Amaranggana, 2015).

## 2. Methodology

Given the importance of interactive tourism apps, a team composed of the authors of this contribution and of some researchers and professors of the Sultan Qaboos University – SQU – started a project for the realization of an app whose reference area is the Governorate of Muscat, in Oman. The project was realized in RSGIS – Remote Sensing and Geography Information System – Center of the SQU, in Muscat, from February to September 2020 (Zavettieri, 2021).

This project aims to create an app for travelers who want to get to know Oman at 360 degrees<sup>3</sup>.

The new app created in the RSGIS Center proposes to get to know the Governorate of Muscat in Oman through a method of continuous interaction with the territory, the local community, and natural and cultural

<sup>3</sup> By carrying out online reconnaissance on the territory of Oman, it can be seen that some dedicated tourist apps are already in use. In particular, the following are of note: the TourOman app developed by NCSI – National Centre for Statistics & Information –; the Oman app developed by Triposo; Oman Beach-Inspector app. These are apps that are also interactive as they allow the booking of tours and hotels and give explanations about the route to take through the maps. However, these apps are mainly aimed at booking tours, hotels and consulting specific tourist maps.

resources. The methodology adopted for the creation of the app envisaged both a desk analysis and a field analysis: on the one hand to collect materials already processed by RSGIS, the Ministry of Tourism, public bodies, maps, information on the cultural and environmental aspects of the country, essays and scientific volumes dedicated to Oman; and on the other hand, to assess the degree of accessibility of some natural resources, to map the resources to be included in the paths by drone and suitable tools available to the center, and to test the feasibility of those paths.

The phases of the work included:

1. a preliminary study of the current regional tourism in the Governorate of Muscat and geographical locations of particular tourist interest or popularity;
2. a preliminary study of the significant clusters of tourist preferences;
3. an in-depth analysis of the areas of tourist interest, assessed on the basis of the presence and distribution of tourists, taking into account the preferences expressed in the choice of resources and the socio-economic variables that affect the type of trip chosen;
4. an analysis of the tourism models in the Governorate of Muscat on the basis of specific geographical variables such as, for example, types of resources, level of tourism-territory sustainability, types of hotel and non-hotel accommodation facilities, infrastructural equipment, public-private management of the territory, level of maturity of the tourist area, degree of access to the localities, free Wi-Fi coverage, 4G coverage, technological progress of the tourist area;
5. the data collection of tourist and non-tourist resources and services to be applied with ArcGIS – via CSV and Excel sheets – for the creation of multilevel maps; and
6. programming, technical development and app design.

These analyses made it possible to trace trends in the tourist locations of the Governorate of Muscat, thus identifying the strengths and gaps of the sector policies aimed at tourism. This has also favored the identification of the areas most appreciated by tourists, those best equipped for tourism, those with the greatest strategic value, and those with limitations in terms of services, infrastructures, resources, and territorial organization.

The adopted methodology was necessary to create an app that responds to the question of a tourist prosumer who wishes to be the architect of their trip, to choose structures, itineraries, and proposals with new awareness, to have tools and services similar to those habitually used in their daily life. Ultimately, the mission of this project was to capture the tourist essence of the Governorate of Muscat to provide, through the app, interaction tools capable of creating a communication channel between the user/consumer and local area/community, and – in the future – to trigger a viral process of sharing – for example, through social networks, see Morazzoni, Zavettieri, in press – of one's experience in Oman to attract new potential tourists.

The approach towards an intelligent and sustainable growth model must envisage an integrated destination management process through a strategy that provides awareness of the destination from a local perspective, creates identity of the destination, proposes pilot or highly innovative initiatives and consolidates the virtual identity of the tourist place. The extensive and efficient use of digital technologies certainly has a strategic role in the sharing and retaining of memory by the local community that promotes its territory in telling its story, in the selection of markets, and in the creation of tourism products – fig. 1 –.



Figure 1. Oman's Tourism Sustainability model. Source: Oman Tourism Strategy, Executive Summary, p. 38.

### 3. The tourist context of Oman

In the tourist landscape of the Governorate of Muscat, the capital city is currently the catalyst for tourist flows. Muscat, a city that in recent years has been redefining its urban structure, is situated on a length of coast about 50 kilometers long and bound in its hinterland by a mountain range. Within this territory, three settlement areas of historical-cultural, recreational and naturalistic interest are identified:

- the district of Muttrah with the souq and ancient port area, the Royal Palace – al Alam –, ancient Portuguese fortifications, the National Museum of Oman, Bait Al Zubair Museum, Muscat Gate Museum, Muttrah Corniche;
- the city of new urbanization, extending from the airport for about 20 kilometers to the residential district of Qurum – which also includes the corniche of Shatti al Qurum –, with the Royal Opera House and the emerging convention and exhibition district as well as a collection of beaches and hotel infrastructures that are proposed for tourist recreation;
- the area of South Muscat, with unspoiled nature, beaches, international hotel chains and islets.

These three areas contain the tourism offer of the Governorate, which responds to a complex and articulated demand that can be summarized in cultural – creative museum – tourism, seaside tourism, business tourism, and leisure tourism. In this tourist-urban context, residents are also central to the current and future tourism development process as there is a strong relational dimension of Omani society with the tourist. Creativity, culture and environmental sustainability, therefore, comprise the strategic assets of tourism in the Governorate of Muscat, which in the pre-Covid 19 phase had a tourist flow equal to almost 4 million tourists (figure for 2019, WorldData.info). Internationally, Europe represents an important tourism market, with four main partners: Great Britain, France, Germany and Italy. It is a diverse clientele: individual, leisure, business and cultural, but also families, top spenders, outdoors and nature-loving millennials who travel alone or in medium/high profile groups.

This is joined by travelers who practice sports activities and find in the Governorate a calendar of international events that ranges from sailing to kite-surfing and trail riding.

### 4. Final product

During the design phase, it was decided that the app should cover the full range of tourist activities, from visits to places of cultural interest to sites of natural importance in the Governorate of Muscat, taking into account both seasonality and related issues as well as the sensitivity of the local culture.

In general, from case studies and existing literature, it can be asserted that the value of the tourist experience is not created exclusively by service providers. Experiences can also be determined by contingent processes not controlled by a company. Therefore, destination marketers need to focus on the entire tourism experience instead of examining only the main service providers. Tourist experiences are in fact of a multidimensional nature and various involvements and factors along the journey – before, during and after – could also influence the overall tourist experience (Buhalis, Amaranggana, 2015, p. 380). The app, therefore, must act as a mediator of the tourist experience (*ibidem*, p. 381), in order to enable the experiential journey within the real physical environment.

Starting from these assumptions, the app concept envisaged the offer of personalized services for each type of tourist in order to meet their expectations and improve their travel experience in Oman.

The prototype of the app (Zavettieri, 2021) is a dynamic platform, mediated by ICT and GIS<sup>4</sup> technologies to support the exchange of information on tourism activities through information filtering which improves the

<sup>4</sup> Through GIS technology, the app was able to: acquire geographical maps covering the country or region, digitize paper maps, create topology to establish the relationship between map features, transform into real world coordinates, expand the traditional level model with tourism levels such as hotels, restaurants and further infrastructure levels – combination of tourism attributes, such as object type, object name, hotel category etc. with geographic criteria such as proximity, distance, location or object located within a selected map region, compile and add text information to characterize positions in tables. Finally, the development and editing of images and images on text labels as well as the hot – linking images to their respective function positions was completed.



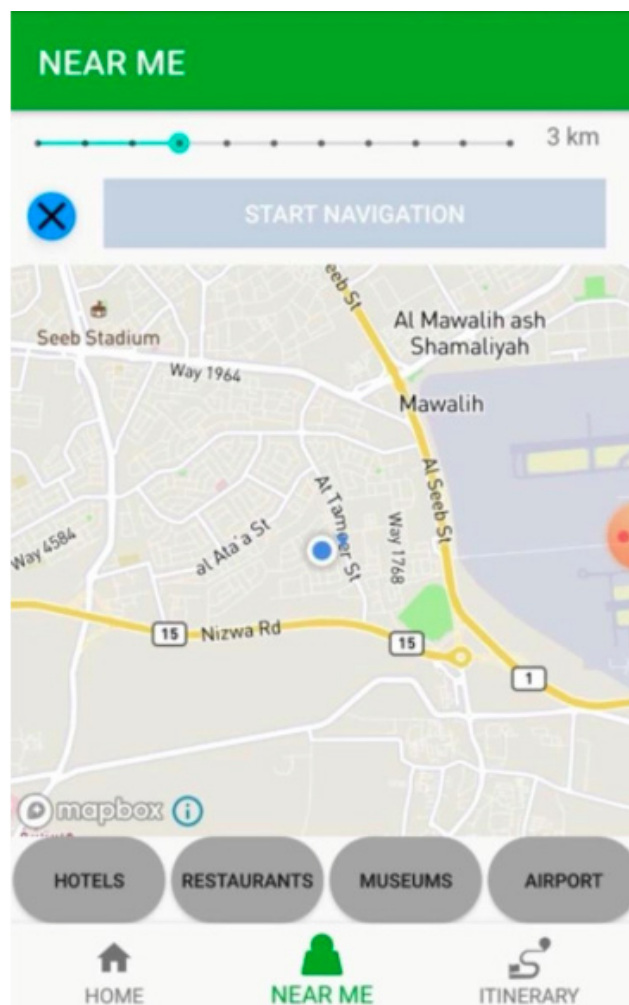


Figure 2. Near Me app section. Source: screenshot of the application prototype developed by the authors.

decision-making process. An important task of the app is to provide information to identify problems and offer customized potential solutions (*ibidem*, p. 379). This is done both by providing the location and numbers of emergency services – hospitals, ambulances, law enforcement agencies – and by explaining what the tourist needs to take with them during the itinerary to avoid being unprepared. It also guides them with navigation during the journey and offers feedback left by other users. Uncommon destinations such as Oman – at least to large tourist areas such as the European one – and their transport systems can represent a challenge even for the most adventurous travelers. These factors combine and create a tension between the desire to explore and the frustrations of moving (*ibidem*, p. 384).

In addition, the app presents updated information regarding geographical locations – of the user and sites of tourist interest –, reviews of services – restaurants, hotels, cafes –, types of room, and prices and information on surrounding events *before* the arrival of the tourist. Tourists looking for a personalized welcome message before the trip will be able to access different lists of what to do and what to see at their destination (*ibidem*, p. 384). In summary, the digital tourism ecosystem allows tourists to extend its benefits beyond the tourism supply chain with presumably positive economic and social effects on the territory.

Finally, the social aspect must also be considered, as tourists want to share their experience via social networks through checking-in and posting images, as well as communicating with their network and having the desire to meet new people during their trip. During the actual visit, tourists seek more real-time access to information related to their favorite attraction – length of queues, provision of alternative attractions should bad weather arise, navigation, working hours, as well as access to emergency services –.

The app is divided into two main sections. The first is Near Me – fig. 2 –, a section that follows the very simple logic of the user's geolocation within the Governorate of Muscat to show them which tourist attractions are



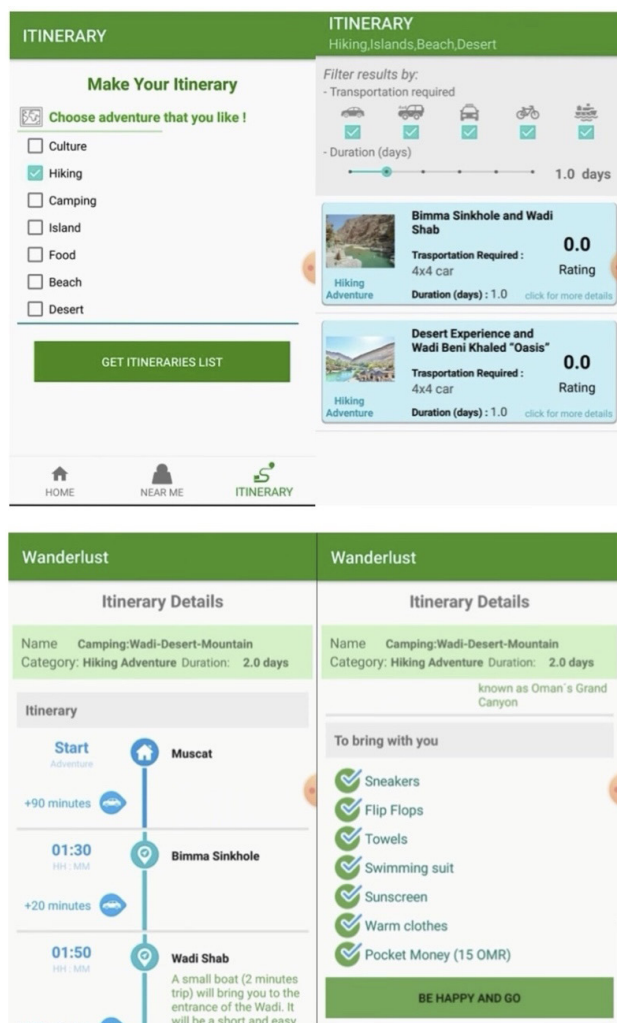


Figure 3. Itinerary app section. Source: set of screenshots of the application prototype developed by the authors.

closest to him and giving him the possibility to filter the distance from a min. of 1 km to a max. of 50 km. The attractions on the map are: Hotel, Restaurants, Museums, Airport, Archeological Sites, Beaches, Cinema, Convention Centers, Sand Dunes, Fuel Stations, Health Centers, Hospitals, Islands, Souq, Mosques, Parks, Police Stations, Shopping Malls, Fun Zones, Theatres, Tour Operators.

It is possible to choose the categories shown on the interactive map and, if the tourist wants basic operations information or navigation advice, the indicator that signals the presence of the site on the map can be clicked. Each action is interactively initiated directly through the app.

The second section is Itineraries – fig. 3 – that allow the tourist to personalize their trip and at the same time to interact with the territory. For the prototype of the app, different types of routes have been loaded: cultural, sporting, recreational, naturalistic, gastronomic, and adventure. The user interacts with the application by choosing 3 elements: type of route, type of transportation and duration of the trip. The user, having chosen the filters, obtains a list of itineraries that match his preferences. After choosing a route, navigation will begin. Each stage of the route is accompanied by a brief description of the natural, cultural and recreational elements that the user encounters along the way. In the itinerary, both the temporal distance – in Itinerary details – and the spatial distance – during navigation – are indicated.

Maps are the cornerstone of the operation of the app and crucial to fully understanding the territory of the Governorate of Muscat. «The practice of digitization processes applied to cartography merges with the strengthening and acquisition of good levels of smartness. The use of sensing location and augmented reality in support of tourism and the enhancement of urban resources certainly proceeds in this direction» (Mangano, Ugolini, 2017, p. 8).

## 5. Conclusions

This project started from the consideration that travel for today's tourists is also an opportunity to express their values of belonging and their passions. From a «tourism of objects» we have passed to a «tourism of meanings», therefore of a motivational type that requires planning the tourist offer in a creative way (Goetz, 2016, in Del Vecchio e altri, 2018, p. 69). The tourist experience takes shape from the interaction of multiple components: the tourist, the suppliers of the tourism supply chain, the host community and the territory, also known as the «setting» where the history and culture of those who live there is represented (Carbone, 2019) and, at the same time, the «container of services» to support the involvement of the tourist-user. From the territory and its singularities, we must begin to create an «experience-scape» with tourists (Mossberg, 2007, pp. 59-74).

In the project, the setting – represented by the territory of the Governorate of Muscat in Oman with its mix of attractiveness factors – plays an important role in creating the entertainment experience whereby the consumer-tourist becomes «the hero of history» and the local community, with its own places of reference, is the «narrative universe» within which nature, traditions, customs and habits are told.

The app is a real «magnetic device» in that it attracts the user's attention while facilitating the cognitive processing of the destination. At the same time, it allows the elements of the territorial offer and the actors involved to be framed in a holistic perspective, and it initiates a process of co-value creation with the Governorate of Muscat.

We move within a bottom-up process: the app introduces the user to the territory and, in turn, the user can subsequently become the author of promotional campaigns for the destination of Oman by posting images or selfies in online social environments. Online and offline word of mouth promotes the image of the place, helping to create an emotional connection with the Other and the Elsewhere and promoting the offer.

The app uses its own setting in a continuous process of co-creation of territorial identity, nature, culture, and landscape to become the subjects of memorable tourist experiences to be told, suggested and preserved. A bridge is created between the context that is visited with the support of the app and the interiority of those who narrate the journey at the end of their experience, a narrative that can become a tourism digital marketing tool on the one hand and loyalty and respect for the place on the other.

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