The OCTANE Ecosystem and Platform for Cross-Border Heritage-Based Tourism Development

Ioannis Karydis[1], Elissavet Kosta[2], Emmanouil Magkos[1], Stavros Vlizos[2], Dimitris Provatas[1], Aggeliki Tsohou[1]

[1] *Department of Informatics, Ionian University, Corfu, 49100, Greece, {karydis,emagos,p15prov,atsohou}@ionio.gr*
[2] *Department of Archives, Library Science and Museology, Ionian University, Corfu, 49100, Greece, {elsakosta,vlizosst}@ionio.gr*

Abstract

The wide adoption and diffusion of Information and Communication Technologies (ICT) designed to enhance travel experience have rapidly altered tourism and hospitality services. The OCTANE project primarily aims at supporting touristic infrastructure by: a) Establishing cross-border synergies between the regional authorities and the university institutions of Ionian Islands and Puglia, whose partnership will create a list of sightings, places/points and routes of interest (POIs) in both communities; and b) Providing a complementary distribution channel for cultural and natural heritage POIs that uses advanced ICT and mobile devices while at the same time enhancing the experience of on-the-move tourists. To support the aims of the project, in this paper we present the architecture of the OCTANE platform, which will enhance visitors' experience by developing and diffusing a mobile application that allows visitors to walk around the cities as if they were an open museum. The platform will enable the visitors to discover POIs as far as history, architecture, culture, everyday locations and other places a visitor will experience in the cities of Ionian and Puglia regions. Accordingly, one of the key characteristics of OCTANE will be the capacity to seamlessly present the cross-border historical, architectural, cultural and everyday location assets, between Ionian and Puglia regions, thus promoting synergy and touristic development.

Keywords: *ICT and Cultural Heritage, ICT in Tourism, Cross-border synergies in tourism development, Web & mobile applications, Informational system ecosystems*

JEL Classification: Z320 Tourism and Development

1   Introduction

Cultural tourism consists of a mosaic of history, traditions, art forms, habits and customs that define an area. In this way visitors can achieve better knowledge through their trip's history, arts, sightseeing, cultural events and the monuments of the places they visit (Richards, 2018). Nowadays, culture is associated with the local agendas of development. Regions and cities are recognized by the Europe 2020 strategy as engines that can provide smart, sustainable and inclusive growth by establishing some transnational networks (Cassalia, 2016). One of the four targeted macro-regions in the framework of the Europe 2020 strategy is the Adriatic and Ionian Region which can be taken as an environmental, social and economic interdependence of multilevel governance in the Mediterranean (Cassalia, 2016).

Tourism represents one of the major economic forces in Puglia and Ionian regions who have strong historical, cultural and geographical ties. However, tourism enterprises in both regions suffer from the credit crunch entailed by the fiscal crisis. On the other hand, the wide adoption and diffusion of Information and Communication Technologies (ICT) that are designed to enhance travel experience have rapidly altered tourism and hospitality services as well as cultural heritage preservation and enhancement. More specifically, ICT technologies have been proposed in the research field of *Cultural Heritage* (CH), as one of the main tools to: promote the maintenance/preservation of CH artifacts (Meyer et al, 2007); play an important role in promoting disciplines such as archeology, education, history research (Addison, 2000), art (Alvarado, 2014)); simulating, portraying, reconstructing and representing the past (Cameron & Kenderine, 2007), focusing on natural, sociological and cultural pasts (Stone and Ojika, 2000); facilitating learning of cultural heritage through education (Rizvic et al, 2019). On a vertical level, there is a need for tourist industries in both areas to be restructured through novel business models whose economic viability is mainly based on adopting innovative ideas from the sphere of ICT, mobile and Internet technologies.

The idea behind the development of the partnership in the Open City TechNology Enabler (OCTANE) project was that synergy in areas of common concern between local communities, authorities and tourism stakeholders, at both adjacent sides of the Greece-Italy border, would certainly contribute to socio-cultural and touristic cohesion as well as to economically and socially sustainable development. Existing methods / approaches are (1) location focused and thus not holistic in addressing the continuum of Points / Places of Interests (POIs) and services provided by the adjacent regions, (2) focused on Return on Investment (ROI) and thus almost always include monetization schemes that hamper the unencumbered flow of high quality information to the ICT users, and (3) provide methods for use of the collected information by third parties, provoking thus the local innovation hubs to come-up with new ideas supporting the local economies.

Our Contribution. In this paper we present a methodology and the architecture of a platform for providing a complementary distribution channel for cultural and natural heritage POIs in cities of Ionian Islands and Puglia. More specifically, we present criteria for gathering cultural and historic places of interest, recording and documenting cultural and natural resources like museums, archaeological sites monuments, traditions, historic events and natural landscapes into a digital repository. Furthermore, the project aims to enhance the visitor's experience by developing and diffusing a mobile application that allows the visitor to walk around specific cultural areas as if it was an open museum. To this end, we present the architecture of the OCTANE platform, which will allow visitors to discover interesting cultural and natural sites that match their interests, while on the other hand it will enable visitor's smart navigation in the city. The visitor will have the opportunity to learn about the city's architecture, culture and history, as well as the daily routine of the habitants. The platform is expected to enhance visitor's experience, awareness of the city's natural and cultural heritage, as well as reduce the regional and local expenditures on hospitality and cultural promotion.

Structure of the paper. The rest of this paper is organized as follows: In Section 2, the Open City Museum concept is presented. Section 3 discusses the strategy for POI selection followed in the OCTANE project, while Section 4 presents the architecture and system details of the OCTANE platform. Section 5 discusses the strategy for sustainability, while Section 6 concludes this paper.

2   The Octane Ecosystem: Concept and Expected Results

2.1   The OCTANE Concept

To achieve the objectives of the OCTANE project, a cross-border approach has being adopted that is mainly based upon a cultural network established and realized via a web & mobile application that will turn visitors' walks through cities of Ionian Islands and Puglia, into a museum-like visit by providing historical and cultural information, in different languages, about cities' monuments, landscapes and less-known buildings. This way a walk in the city will be virtually transformed into an open museum visit unbounded from language, physical presence or temporal boundaries.

The key characteristic of the mobile application is the inextricable connection among visitor's navigation, visual contact with the point of interest and information provision. The visitor will download and install the application using Wi-Fi hotspots established in the city's airports and harbors, or even prior to their visit at the cities, *i.e.*, at home. The application will incorporate on the city map all POIs that had been selected by local authorities as most interesting cultural and natural sites. The application will encourage the visitor to check the map and select the points that they find interesting, and it will not require Internet connection after the application is installed and POIs are selected. The application will calculate the optimal route for the visitor to follow, taking into account her age and any accessibility difficulty factors (*e.g.*, uphill streets, steep roads, stairs, etc.). Upon arrival to a point of interest the visitor will be notified by the application based on the GPS transmission that they had reached a certain site. The visitor will be encouraged to receive respective site information by accessing the associated Quick Response (QR) Code that is properly located and displayed physically close to the site. Moreover, given the traditionally small sized screen of smart devices running the application, OCTANE will also design and develop a web-portal presenting the same information shown in the application, leaving aside location-based services, with the ease & clarity of a laptop's or desktop's, significantly larger, screen. Finally, the project will also develop an interface allowing the regional administrators to configure the city/cities, the places/points of interest, and the difficulty factors included for the calculation of optimal navigation. The project is expected to enhance visitors' experience, navigation in the city, awareness of the city's natural and cultural heritage, as well as to reduce the regional and local expenditures on hospitality and cultural promotion.

2.2 Expected Results

OCTANE shall market the cities of Ionian Islands and Puglia as a borderless destination. It will establish contacts, strategic objectives and common practices for an inter-authority cooperation and knowledge flow network, on a tourism policy's level, between regional and local authorities, but also between public and private actors. Furthermore, it will establish the front and back-end infrastructures of OCTANE, where: (a) public and private stakeholders, particularly SMEs, will be able to promote their products, jointly create virtual paths and routes between similar products and services; and (b) visitors will receive personalized information but also contribute local and cross-border travel experiences' feedback to the community and the respective authorities, allowing thus for their amelioration.

3 Cultural Offer and Points of Interest for Involved Territories

One of the aims of the OCTANE project which concerns a part of the Adriatic-Ionian Region is to gather cultural and historic places of interest (about 200 in number) from the following islands: Corfu (1), Lefkada (2), Ithaka (3), Kefalonia (4), Zakynthos (5) (Figure 1). The Criteria for Selection were the following: diachronic human and natural development, cultural tradition, living traditions and multiculturalism. The places of interest include archaeological sites, museums, historic monuments, traditional human, public and private life benchmarks. More specifically, through the development of this application, every interested person will have the opportunity to organize her own visit according to her interests, her preferences and the time she can spend at the islands of Corfu, Lefkada, Ithaka, Kefalonia and Zakynthos.

Figure 1.
Islands with cultural and historic places of interest

3.1   Strategy for the Analysis and Innovation of Cultural Offer

The cultural wealth includes the legacy of each nation and helps people to connect the present with the past (Lenos, 2003). The maintenance and the correct administration of the cultural and natural environment is of utmost importance for every country. It is a fact that cultural heritage possesses a dynamic role in the development of a region (Kyrkos, 2008). The international trend is for the cultural heritage to be considered as an element of the viable development and the standard of living, creating some prospects of inclusion in protection programs and extensive cooperation (Sakellariadi, 2012).

Many European countries integrated culture into urban strategies with the aim of strengthening the image of their cities within international networks (Council of Europe, 2015), as culture is constantly been converted into a predominant economic activity in order to advance the competitiveness of these cities (Boukouvalas, 2018). The definition of cultural commodity includes three categories: monuments, groups and locations. However, this definition has been further developed during the past years and includes, nowadays, more categories such as historical neighborhoods, the centers of historic cities, landscapes etc. In this context cultural routes succeed in interconnecting cultural goods in a single way, integrating them into a common frame and enhancing the definition of different categories of cultural goods (Avgerinou, 2009; Campoloa, 2016).

On the other hand, national and international tourism comprises one of the most important sectors of cultural interchange concerning history, traditions, opinions and the way of life (Robinson, 2006; Sabi, 2019). Tourism presents some major challenges and opportunities, for the citizens of the tourist areas as well as comprising a complex phenomenon with financial, social, cultural and educational dimensions (Majdoub, 2010; Robinson, 2006; ICOMOS).

The history of the Ionian Islands was always a unique case in Greece. Having a rich natural environment, good climatic conditions and historic interactions it helped in the creation of a special social structure and also in the making of a unique cultural identity of the Ionian Islands civilization. They were named Ionian Islands as they are mainly located in the Ionian Sea and Eptanisa because the biggest islands Corfu, Paxoi, Lefkada, Ithaka, Kefalonia, Zakynthos and Kythira complete the number seven. The Ionian history and civilization with their different sites in various sectors of education, music, literature, painting and architecture comprised a special mixture of elements of the recent Hellenism (Kokkou, 1999). The Ionian Islands, as years passed by, affected historic evolution either by welcoming Cretan fugitives, or by communing with Italy and the rest western Europe (Pylarinos, 2007).

In the framework of this project cultural and natural resources like museums, archaeological sites monuments, traditions, historic events and natural landscapes are recorded in a digital repository under the following selection criteria: diachronic value, meaning of cultural heritage, traditions, multiculturalism as well

as the projection of POI's that are not so much popular with visitors. The recording of every place of interest includes the following elements: title of POI, location, description with historical data and interrelation with other objects. In the digital repository an initial selection of the category that every POI belongs to is optional.

3.2 Strategy for developing Cultural and Historical POIs for Ionian Region

Cultural routes are those who achieve, in a unique way, to connect the cultural goods and in parallel to integrate them in a common scientific frame, enhancing the importance of each category of cultural goods (Avgerinou, 2009). Another very important fact for Greece is that visitors can be attracted by the cultural routes because of the variety of combinations they can offer in culture, knowledge, ecology and gastronomy (Severo, 2018; Smith, 2003). In this context, the scope of the present project is to record and project POI's from the Ionian Islands with the aim of promoting the information to visitors as well as to the inhabitants of these areas, through an application on a smart device. To achieve this, the following steps are required:

- Recording of the historic sites that will be included in the routes
- Scientific documentation, full interpretation and informing of the historic POI's
- Organizing and administering of each POI's information
- Planning of route/routes
- Design of proposed cultural routes and experiences for every city target
- Definition of the public that this act is addressed to
- Evaluation of the first results during the pilot implementation of the act.

The application will provide the opportunity to the visitors to discover an area through some suggested routes. It will include visits to cultural attractions as well as a series of touristic and supplementary services. This facility is oriented towards interconnection of cultural goods and, additionally, the linking with the modern social and natural environment in order to provide the visitor the opportunity to understand the cultural and historic elements of a place. In the course of a cultural and environmental route, tourism is closely connected to the local production of goods and services of the primary sector, such as clothing industry, touristic corporations and the local cultural production with the objective of having a balanced growth and enhancing the local economy. This sector includes, for example, the Ionian Academy and the Spaniada square in Corfu or some Byzantine monasterial complexes in Zakynthos. For instance, the island of Corfu became the interest of many conquerors through the centuries due to its strategic position in the Mediterranean. The old town of Corfu is today a world heritage monument of UNESCO with its historic buildings, the dire straits and its inhabitance since ancient times. Walking around the straits of the city center gives the impression that you move around an open-type museum that in co-operation with the actions of the local community reminds that the old part of the city is still active and alive. It is a fact though that some monuments although already included in the touristic activity as individual stations are not integrated in a widely organized way as just mentioned.

3.3 Strategy for storytelling and innovation of narrative and guide models

The project aims to enhance the visitor's experience by developing and diffusing a mobile application that allows the visitor to walk around specific cultural areas. In this context digital storytelling provides some positive points: Enrichment of tourist destinations and attractions, preservation and exploration of the local culture and it also shows that cultural tourism is an authentic experience (Clarizia et al., 2017). Storytelling is a tool that improves the reputation of some places which compete for economic development through the digital age. Storytelling and its value should be recognized as a main tool to communicate the experiential value of a place (Bassano et al., 2019).

The cultural itineraries in the Ionian Islands will include:

i. Sightseeing routes and relevant infrastructure: monuments, touring places and supporting infrastructures, and even museums provided they belong to the central theme of the route.

ii. Information for the infrastructure connection of the spots and the touring, including the road network, walking paths, landscapes and transportation.

iii. The application of this project can suggest individual itineraries which will take into account different factors such as the interests, the starting point and the available time.

More specifically, through the development of this application, every interested person will have the opportunity to organize his own visit according to his interests, his preferences and the available time he will have to visit the islands Corfu, Lefkada, Ithaka, Kefalonia and Zakynthos. Consequently, there will be no preselected routes as usual, which forces the visitor to follow the choices of the creator of the route. The access of every POI will be easy for every visitor as the application will include documented information, maps and general information, so as not to make the presence of expert personnel necessary for the tour of the visitor.

4   The OCTANE Information System

### 4.1   The Architecture of the OCTANE Platform

Open City Museum (OCTANE) is an ecosystem of interconnected ICT applications that aim at providing visitors of a registered city with touristic services (see Figure 2). In addition, the ecosystem also allows the visitors to discover places of interest as far as history, architecture, culture, everyday locations and other places a visitor will experience in the city.

The ecosystem comprises of:

1. An application for mobile platforms with android & iOS operating systems (smartphones & tablets)
2. The Web portal https://octane.di.ionio.gr
3. The server's software

Figure 2.
The Architecture of the OCTANE Platform
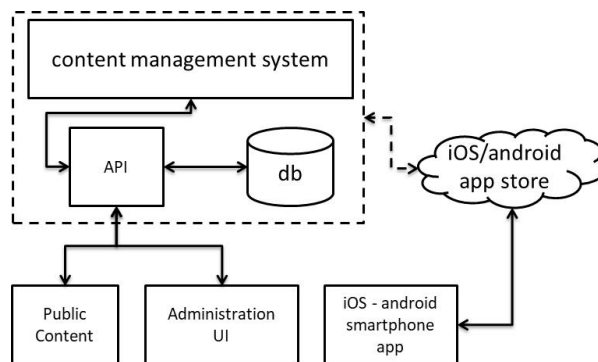
The OCTANE ecosystem. The ecosystem focuses on places of interest and events happening in the city, under the following characteristics:

- Access to its functionality and content are provided completely free of charge,
- Inclusion of information in six languages,
- Execution in two modes:
  - The standard that does not require data through either the GSM pro-vider or Wi-Fi,
  - The advanced that uses data through either the GSM provider or Wi-Fi in order to provide extra services.
- Inclusion of a sub-system that reads QR codes for the identification of places of interest in a fast and hassle-free method,

- Disclosing information (places of interest, paths, etc.) as layers on top of geo-referenced maps,
- Featuring services that allow users to define their age group,
- Disclosing information on the physical characteristics of the paths within the city (e.g., places with stairs, steps, etc)
- Featuring messages/updates service, which allows users to set-up reminders of events in order to be on-time and not miss these events (e.g., cultural events),
- Containing geo-reference information that are used (in cooperation with the geo-location of the mobile platform) in order to answer to questions of type:
  - "Where am I?",
  - "How do I go to …?",
  - "What cultural events are on today?",
  - "What is the difficulty of this path?"
- Automatically updating with all the related events, as these are posted by their respective sources (via RSS, ATOM, API calls, etc.),
- Including recorded places of interest (historical, cultural, of natural beauty, architectural, of everyday life, etc.), while for each of these it includes (depending on the type of the place of interest availability and information channel):
  - Audio and text content,
  - Geo-location,
  - Historical facts,
  - General description,
  - Contact details,
  - Access details (time, cost, etc.),
  - Mean duration of visit,
  - Bluetooth beacon identifier (only in the advanced version).
- Including predefined routes based on the total duration, the difficulty of the path, the thematic/category of the places of interest, the events happing in the city, etc.
- Featuring a system for the real-time Web-based push of information/messages of the ecosystem's administrator to the end users aiming at immediate and accurate information of the end users,
- Capability of enhancing the location identification of the mobile platform using a network of Bluetooth beacons,
- Including a main body of information that is manually curated by experts and is thus of high quality and error-free.

Parts of the aforementioned information and functionality will be available to the end-users through the mobile platform application as well as the portal, according to the specifications of each distribution / communication channel.

The OCTANE Web portal. The portal https://octane.di.ionio.gr/ supports the ecosystem by presenting similar to the mobile platform application content. Naturally, the webpage does not provide the user-customized and sensor-enhanced information presented in the mobile platform application (e.g., real-time location identification using GPS and the compass service, etc.).

Technical characteristics. The ecosystem is a cutting edge ICT system for the promotion of tourism for a city and utilizes state-of-the-art technologies such as:

- Html5, css3, object-oriented PHP, javascript
- Responsive webpage layout,
- Content-distribution network,
- Geo-information,

- Integration of information from mobile platform sensors,
- High performance open-source database,
- Adaptable offline caching and online updates of information for the mobile platform.

Server software (back-end). The back-end provides the aforementioned information and functionality to the mobile platform and the portal. The server's software is provided as a "Software as a Service" that allows for hosting of multiple cities' information while providing the same functionality. Thus, the back-end includes an interface for the administrator and curators and allows to:

1. Create, read, update and delete of ALL the content (and its interrelated information) of the ecosystem,
2. Push related to the theme of the ecosystem messages/live updates towards the end-users,
3. Provide feedback from the mobile platform to the administrator related with the statistical use of the mobile platform whenever the users allows it,
4. Disseminate content & functionality of the ecosystem with open and documented methodologies (open data, API, etc) in order to allow for accredited third party software developers to use the content in their software augmenting thus further the dissemination and penetration process.

4.2   Database & Content Management System

The database utilized in OCTANE is based on the MySQL community edition relational database management system. It handles object-oriented data of generic, geographical & temporal data types. The database feeds the ecosystem's application and portal with information and acts as a central repository for the API.
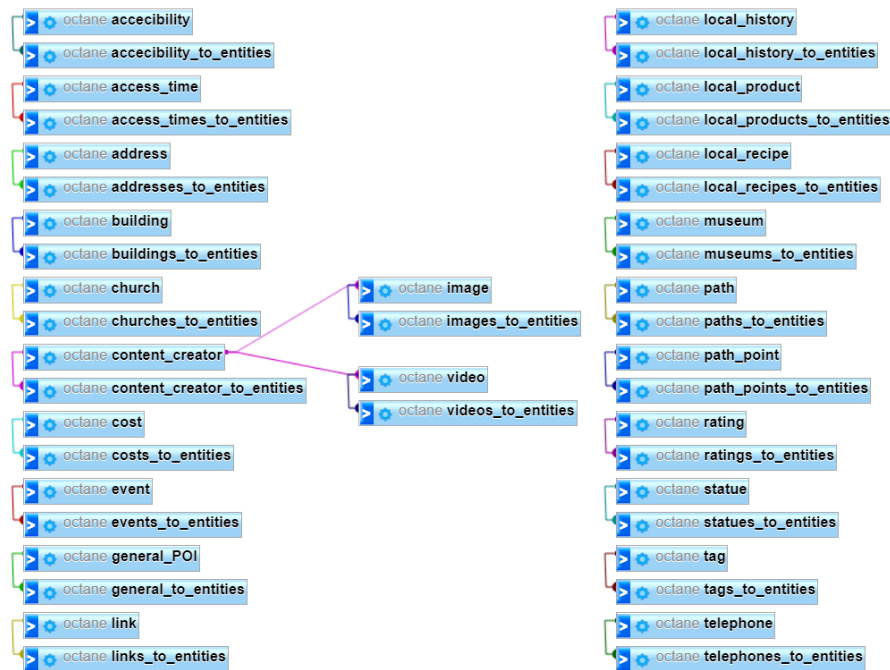
Figure 3.
Entity Relation Diagram of the platform's data
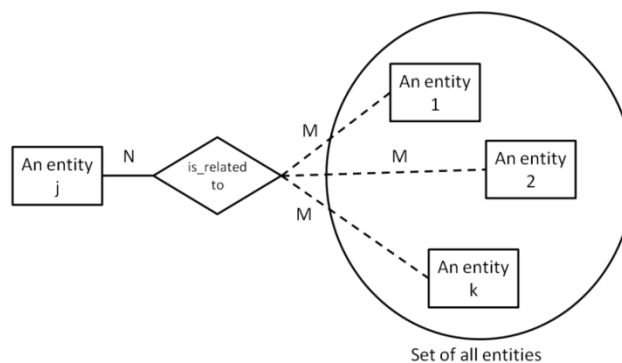
The information stored in the database of the platform is organized following a loosely-coupled methodology. According to this methodology, entities are ad-hoc interrelated to other entities by use of a many-to-many interrelation for each entity. This allows for very easy extension of the database, by sole addition of an interrelation to all existing entities, for each new entity, without requiring a database re-organization at the cost of allowing irrelevant interrelations to occur as well as conveying the burden of managing foreign keys by the ecosystem's business logic. These costs are off-set by the flexibility it introduces wherein new interrelations can formulate post database design and thus allow for adaptive contextualization of the data stored.

Figure 4.
The Relational Diagram of the platform's data

Thus, the generic (*i.e.*, for each potential entity) Entity Relation Diagram of the platform's data follows a non-conventional schema, as shown in Figure 3, for entities 1 to k where 1≤j≤k Moreover, the entity "tag" is a special entity as its instances are meant to organize relations by use of free-text, again post database design, from the content managers. The Relational Diagram of the platform's data is shown in Figure 4. It should be noted that the "<entity>_to_entities" relations follow a non-explicit declaration of interrelation to the entities (except for the "<entity>" that is explicitly interrelated using as foreign keys) by use of fields that declare the entities' title and the entities' instance primary key.

The Content Management System (CMS) is a fully customized solution for the purposes of OCTANE aiming at hiding the complexity of the database's management and thus making easy to interconnect entities for non-IT savvy users. The CMS al-lows management of content in arbitrarily multiple languages and is furnished through a Web-based interface using accreditation. Moreover, the CMS allows for multiple account roles in order to address the requirements of content's creators, editors and translators. Finally, the CMS performs automated necessary back-end security measures such as back-ups and is based on technologies such as PHP, JavaScript, and CSS3.

4.3   Smartphone application

The smartphone application (app) features a plethora of important characteristics in order to address the requirements of the project, as described in Section 2.1. On a technical lever, all the information presented in the app is included in downloaded from the app-store file and thus no Internet connection is further required for the full usage of the app. This was mostly done in order to ensure the app is fully functional in scenarios where users are in roaming mode. The app has a single role, which means it serves only the purpose of spreading information to the wide - public. Use of geolocation within the app allows showing the user's position on the map and a compass to support directions to the POIs. The application also supports the definition of preferred (liked) entities (POIs or Paths) for later view or use.

Figure 5.
The interface of the smartphone application: landing page, list of buildings with favorite selection, and POI selection with distance from landmark
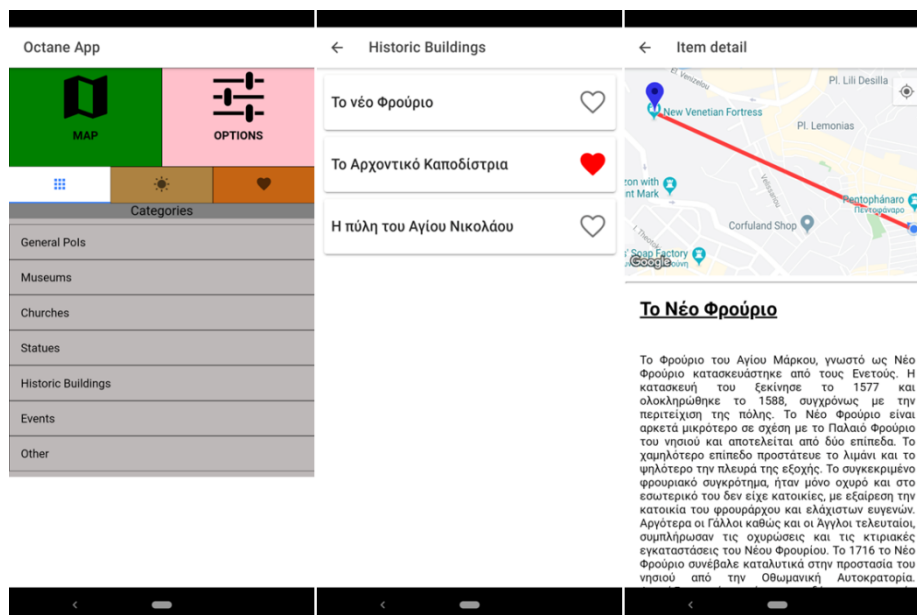
The application provides the user with all the information collected by the project. All the data are presented in an easy to navigate way and are organized in categories (Figure 5). Each POI's presentation is accompanied by a map that shows (i) the location of the POI and its relation between the location of the user, (ii) a general description of it, and (iii) all the gathered historic or interesting facts about it.

The app is programmed in the framework Angular Ionic[1] in order to expedite its development and make it readily available for both key operating systems of the smartphones, iOS and Android, as well as have the option to convert it to Web-application. The inclusion of the database of the project into a portable format for the app was performed by conversion of the MySQL (Section 4.2) into SQLite that required the transformation of the geo-features of MySQL into native features of SQLite. Accordingly, all information of type point (or complex entities featuring more than one point) where converted to sets of float that described the latitude and longitude of the point or each point of the complex entity. For the creation of the offline maps, the open source tool for creating custom maps Tilemill[2] was used. The offline map's tiles were collected from OpenStreetMap[3], by selection of the appropriate set of tiles required to be used, in order to keep the application's install size small. Accordingly, all necessary tiles were exported in PNG format to preserve image quality and, using the open-source library Leaflet[4], the interface of native maps in an offline format was created.

4.4   The Portal

The portal's public web interface is available at https://octane.di.ionio.gr (Figures 6, 7) and is aimed at providing the same functionality with the smartphone app, except for the location-based services. The portal offers the additional advantage of presenting content that cannot be efficiently stored in an off-line smartphone app, as the one designed for the project. Moreover, the portal offers the additional advantage of presenting the information available in adaptive presentation aimed at both smaller size screens (e.g. tablets) as well as larger ones such as desktops' and laptops'.

Accordingly, the public website additionally provides multimedia content (such as images and videos) that will not be available in the application due to file size and connectivity limitations. The design of the public
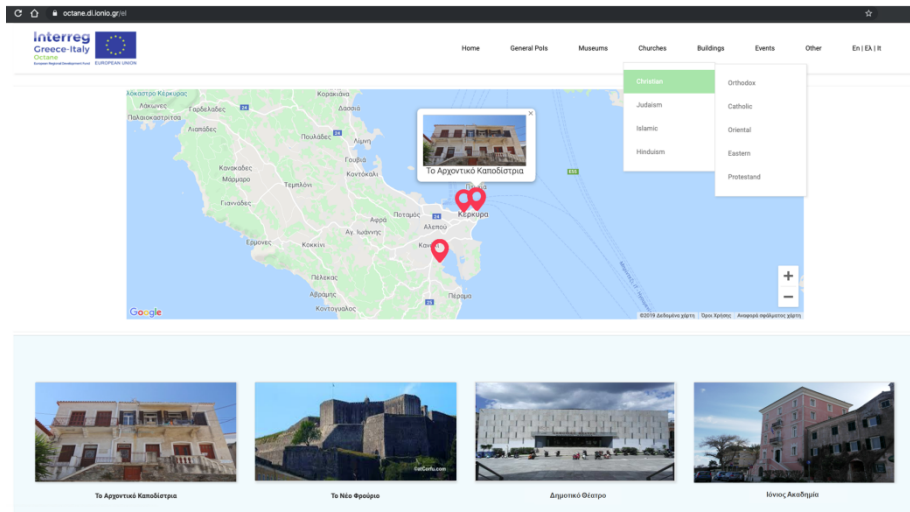
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[1] https://angular.io/, https://ionicframework.com/
[2] https://tilemill-project.github.io/tilemill/
[3] https://www.openstreetmap.org/
[4] https://leafletjs.com/

website is based on responsiveness in order to be clearly presented in all sizes (be these large desktop screens or small factor smartphones / tablets).

Figure 6.
Octane's Web Portal initial page

On the top of every page of the portal, there is a navigation bar, presenting all the categories available. Each category is clickable for a general outline of the related entities, but many have sub-categories, also clickable, providing a more narrowed down search. Below the navigation is a map wherein points / pins correspond to the 8 random featured suggestions presented just below the map (all clickable). On click of a map's pin, a pop up appears with the image and title of the chosen point. Those can be clicked as well, redirecting the user to the corresponding page. On the bottom of every page are images of the related entities on the project, as well as the "HELPDESK" button. Each and every image is clickable and opens in a new tab presenting the content of each entity. Clicking on a category from the navigation menu, users get redirected to a new page with all the related items for the specific category. Again, all the presentation elements (e.g. images and names) are clickable and redirect to the corresponding item pages. Once a category's item is chosen, users get redirected to the item's page. On the top of each such page, there is a map with the location of the item. The presentation mode of an item is based on 2 columns with the details of the item. On the left column are the text and other information while on the right all the media available (e.g. photographs and videos). The images are on a carousel allowing the user to navigate through these with either the arrows on the sides of the images or the dots below them.

Figure 7.
The index page of the portal
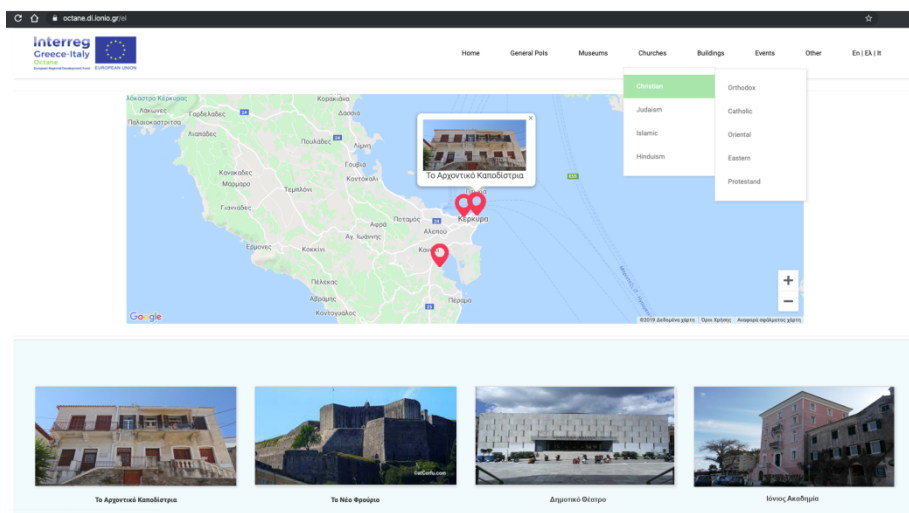
5   OCTANE Sustainability Strategy

Cultural and historical sites of equal importance (e.g., as those indicated by the UNESCO) across the participating cities will be promoted and become more attractive to future visitors. The cross-border cooperation of the project will be demonstrated via the development and deployment of tools and applications that will be common for the participant countries so as to foster their mutual long-term growth and exchange of visitors.

Partnership in OCTANE is two-fold: On the vertical level, partnership between tourism stakeholders and the local/regional authorities on both sides to create a list of sightings, places/points and routes of interest, categorizing similar spots & provide the necessary information to the ICT provider. Activities at this layer will not compete but will complement existing structures/activities already in place. On the horizontal level, sustainable partnership between partners from both sides will be achieved through (a) new policies (e.g., relaxed regulations for cross-border transportation, synergies for on-demand movement of groups of visitors, measures for the next programming period and help in answering to the EU provisions about efficient and effective modern cross-border tourism program), (b) establishment of information flow channels (e.g., joint tourism cross-border routes of similar POIs). A number of indicators will be used to quantify the project's effect on improving the partnership's structures of Ionian Islands and Puglia, as well as to evaluate the increase of local and cross-border viability/visitability in both regions.

The durability of the project's achievements, the sustainability, and transferability of main outputs delivered in the project will also be ensured by means of (a) creating an information portal bringing together touristic and/or cultural Points of Interest and routes, (b) providing an innovative mobile device application presenting this information, and (c) creating and supporting a set of policies and interventions enhancing the operational efficiency of the tourism in Greece and Italy. Experts of the administrative authorities' partners will join forces on developing and implementing policies that foster cooperation and transfer know-how among the participating countries and may be generalized to address the entire Adriatic and Ionian Region. Our ambition is the capitalization of project's outputs to be almost instantaneous: outputs will be immediately available, used & applied, according to different competences, by local community members, authorities (regions & municipalities, Tourism Ministry, etc.), academia, wide public. After project's completion, knowledge & experience gained will be diffused by means of seminars & training activities by personnel of the project's

partners. With the realization of the ICT systems the administrative authorities will be able to easily monitor, manage & run intervention activities on all touristic matters while having a knowledge-base for improving their everyday commitments. Thus, all administrative authorities will be committed to adopt and keep running the ICT tools & knowledge-base after project's ending. Moreover, maintenance costs are exiguous and will be covered by internal resources. At local level the concrete pilot actions & the awareness raising actions will improve stakeholder's involvement and consequently the economic sustainability of interventions on the managed areas/seasons.

6   Conclusions and Future Work

In this paper we presented a methodology and the architecture of a platform for providing a complementary distribution channel for cultural and natural heritage POIs in cities of Ionian Islands and Puglia. More specifically, we presented criteria for gathering cultural and historic places of interest, recording and documenting cultural and natural resources like museums, archaeological sites monuments, traditions, historic events and natural landscapes into in a digital repository. Under the auspices of the OCTANE project, such methods and tools aim to enhance the visitor's experience by developing and diffusing a mobile application that allows the visitor to walk around specific cultural areas as if it was an open museum. The visitor will have the opportunity to learn about the city's architecture, culture and history, as well as the daily routine of the habitants. The platform is expected to enhance visitor's experience, awareness of the city's natural and cultural heritage, as well as reduce the regional and local expenditures on hospitality and cultural promotion.

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