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Handbook of Research on Technological Developments for Cultural Heritage and eTourism Applications

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Foreword

Culture matters in sustainable economic development. A symbiotic relationship between culture and tourism should ensure that powerful drivers such as the economy, creativity, innovation, knowledge, take full advantage of the and information and communication technologies (ICTs). ICTs are established as a critical factor for sustainable competitiveness. Technology supports tangible and intangible cultural heritage to play an important role in enhancing authenticity and conservation efforts. It can reinforce engagement with prospective and actual visitors, support community values and identity as well as stakeholder participation.

A range of technologies have been used historically to support tourism (Buhalis, 2003; Egger & Buhalis, 2008; Buhalis & Law, 2008). Technology has supported consumers and the tourism demand, such as enabling tourists to plan visits to destinations more easily and allowing a progressive enrichment of tourists' experiences and knowledge. This has resulted in higher satisfaction levels among these travelers as well as in their engagement through social media and contribution to the image of the destination (Leung et al., 2013; Fotis et al., 2011; Williams et al., 2017; Hays et al., 2012; Neuhofer et al., 2014). ICTs have highlighted tourists, residents, and professionals' roles, enabling a better understanding of how their part in planning, managing, and marketing processes can produce top-quality, long-lasting tourism products.

ICT applications are widely used industry, tourism boards, and regional tourism associations. ICTs are also now applied in cultural and culture-related institutions (e.g., museums, libraries, and archives). This has resulted in significant outputs that have facilitated building the cultural identity and image of host countries, places, and attractions and have enhanced the communication of relevant content. The ever-increasing competition within the travel, tourism, cultural, and creative sectors has made it vital for destinations to address their target groups' needs by redefining marketing policies through these technologies.

Given the increased, widespread impact of new technologies on cultural tourism (Tscheu & Buhalis, 2016), this book seeks to offer a comprehensive discussion of research trends in the study of contemporary ICT systems and applications in cultural heritage and tourism. The chapters enclosed were written by international experts on the design, evaluation, implementation, and use of innovative technologies in this field. This volume's contents combine the different perspectives of cultural tourism management and technological uses in this industry and examine the role of ICTs in enhancing the value of heritage. Each chapter, therefore, connects technological developments with cultural heritage, linking and exploring the relationships between four main topics: (a) ICTs, (b) cultural heritage, (c) eTourism, and (d) tourism and assistive technologies and accessibility.

In this context, this book presents germane discussions exploring the use of ICTs such as augmented reality, multi-dimensional virtual objects, virtual reality, and a mobile system to accurately model and/or reconstruct and visualize real environments. Other applications covered are Wi-Fi information systems, building information modelling, mobile instant messaging, GISs, online community reviews, cloud computing, social media, recommendation systems, intelligent interfaces, and marketing intelligence. Further chapters discuss gamification, tangible user interfaces, 3D printing, beacons, multi-touch, and mobile and cloud computing.

Overall, this volume highlights how ICTs can be adapted to enhance cultural attractions or facilities, including not only monuments, archaeological sites, and museums but also cultural and gastronomic or cultural and religious routes, among other tourism attractions. To highlight the varied ways that cultural heritage can be interconnected with ICTs, many types of tourism are explored, namely, heritage, religious, dark, gastronomic, smart, and rural tourism. Finally, the enclosed chapters highlight the importance of companies such as hotels and restaurants to the travel and tourism industry, as well as emphasizing the role of management boards.

Cultural tourism is a growing tourism segment and experts now recognize its deep interconnection with ICTs. By enhancing the value of regional culture and history, these technologies help their preservation and dissemination, as well as promoting accessibility and reducing social and physical barriers.

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Dimitrios Buhalis *is Head of Department Tourism and Hospitality, Director of the eTourism Lab and Deputy Director of the International Centre for Tourism and Hospitality Research, at Bournemouth University in England. He is a Strategic Management and Marketing expert with specialisation in Information Communication Technology applications in the Tourism, Travel, Hospitality and Leisure industries. His research area is cutting across a number of disciplines and is looking into adoption of innovations for creating value for both consumers and organisations. Current research focus includes Smart Tourism, SoCoMo Marketing (Social media Context and Mobile Marketing), Augmented Reality, Experience management and Personalisation, Reputation and Social Media Strategies, Accessible and Special Diet (Alergens) Tourism. Close collaboration with industry, governments and international organisations from around the world ensures that results have relevance and impact in the real world whilst constantly pushing the boundaries of knowledge and academic excellence. Dimitrios is also the immediate past President of the International Federation for Information Technologies in Travel and Tourism (IFITT). Dimitrios is researching, lecturing, advising and facilitating progress in organisations globally, whilst his books and publications are studied widely by both students and professionals around the world. He is frequently delivering keynote presentations, speeches, seminars and workshops in both academic and professional conferences globally.*

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Preface

INTRODUCTION

Computational devices capable of connecting to the Internet, such as personal computers, smartphones or tablets, are currently available to almost everyone. Those computational devices are used in the most ordinary activities, including recreation, education or travelling, bringing information, culture and visiting experiences to a different level, while possibly helping in the accessibility improvement as well as in the info-exclusion mitigation. Upstream to the referred activities are the Information and Communications Technologies (ICT), often used as an extended synonym for Information Technologies. ICT is a more extensive term that stresses the role of unified communications, enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

On the other hand, touristic experiences, and in particular Cultural Tourism experiences, can only be understood in a dynamic and evolutionary framework, considering the complexity of the culture conceptualization as well as its role in a sustainable development. Therefore, culture can be considered as a key tourism resource, which contributes and inspires millions of tourists to travel and visit new destinations, several times a year. Cultural Tourism can be a considerable strength for the promotion and safeguarding of the tangible and intangible heritage it relies on, if it is managed and developed in a sustainable manner, while promoting and encouraging the development of creative activities associated to this heritage and the enhancement of the destination profile.

Marrying ICT and Cultural Tourism experiences concepts will enhance touristic destination profiles, providing innovation through the interconnection between culture, knowledge and technologies. The correct conjugation of those will also grant an enduring sustainable development. The profile enhancement creates a main drive for the development of a region where the authenticity, conservation, community, cultural values, and stakeholder's participation play the main role.

This reflection leads us to the Cultural Heritage perspective which should be understood as an expression of the ways of living developed by a community and passed on from generation to generation, including customs, practices, places, objects, artistic expressions, and values. Cultural Heritage is also often expressed as either tangible culture, which includes e.g., buildings, monuments, landscapes, books, works of art, and artefacts, or intangible culture, which includes e.g., folklore, dance, traditions, language, and knowledge. Nevertheless, it can also include natural heritage, such as culturally significant landscapes and biodiversity. In this context, the main assumption is that Cultural Heritage should consider the cultural values of the heritage, processes, community concerns, and administrative practices, conjugated in a way that contributes to a participation in socio-economic benefits for the stakeholders.

Therefore, considering the importance of culture in a sustainable development, it is relevant the role of ICT promoting a balanced approach between the needs, to potentiate the growth of cultural tourism market and better tourism experiences on one side, and the preservation of artifacts, historical sites, and local traditions on the other. A memorable cultural tourism experience should be based on uniqueness, authenticity and differentiation. Having in mind a growing emphasis on creativity, the basis to a more future-oriented creative tourism that values culture, contemporary creativity, technological platforms and contents, innovation, and networks is achievable, financing not only public but also private partnerships.

Associated with the Cultural Heritage experiences, is the eTourism ("electronic travel" or "electronic tourism") which can be defined as the analysis, design, implementation and application of IT and e-commerce solutions in the travel and tourism industry, as well as the analysis of the respective economic processes and market structures and customer relationship management.

Handbook of Research on Technological Developments for Cultural Heritage and eTourism Applications addresses the contemporary ICT technology applied to the disclosure of cultural and natural heritage, including tangible and intangible culture. In parallel, the book aims to reflect on the contemporary ICT relationship between tourism and history, based on the touristic use of the human cultural heritage. Likewise, the book addresses the interconnection with the called smart destinations, as the innovative tourist destination built on an infrastructure of state-of-the-art technology, which guarantees the sustainable development of tourist areas, facilitates the visitor's interaction with the surroundings, increasing the quality of the experience at the destination, but also in the improvements on residents' quality of life. The integration of this technology as special cases of smart cities, will also be an important point of interest.

Essentially, this book unites and explores the relations between three main topics: (a) Information and Communications Technology, (b) Cultural Heritage, and (c) eTourism. The objective of the book is to bring together a comprehensive collection of research trends on contemporary ICT systems and application in Cultural Heritage and Tourism from a set of international experts on the design, evaluation, implementation and use of innovative technologies on the field. In summary, the book emphasizes the connection between contemporary information and communications technologies with cultural heritage and tourism and eTourism.

Policy makers, academicians, researchers, advanced-level students, technology developers or simple curious, that are interested in the new trends in ICT systems and application to Cultural Heritage and Tourism are the target Audience. The book focuses on several different systems and applications, from mobile to "desktop" (three-dimensional) interfaces based on different natural interactions, to augmented reality solutions, and educational applications. Applications dedicate to different ways/types of accessibilities and applications where the Internet-of-Things is the interconnection of uniquely identifiable embedded computing devices, are also presented. All these, are centered in the main subject of Cultural Heritage and eTourism. All actors in this huge area will find this text useful in furthering their research exposure to pertinent topics and assisting in furthering their own research efforts in this field.

ORGANIZATION OF BOOK

The book is organized as follows:

Chapter 1 proposes a methodological framework for the development of a recommendation system associated with the Religious Tourism Experience Model, with the objective of identifying and select-

ing consumer preferences for the dissemination of cultural heritage in general, and religious heritage in particular.

Chapter 2 discusses the actual panorama of interactive technologies used in museums exhibitions and how these institutions are designing digital installations and utilizing virtual media to enhance the visitors' experience.

In Chapter 3, the authors present a concept of augmented reality, the different aspects of it from other similar concepts, the infrastructure requirements, and analyze the applications examples in the tourism industry in the world especially within the content of destination marketing.

Chapter 4 reviews the state of the art of different techniques to deal with multi-dimensional acquisition of cultural heritage tangible assets. The authors also discuss some representation (e.g., visual, sonic, etc.) and interaction approaches to enhance the value of cultural heritage by means of the technologies of virtual reality and augmented reality, considering also the application of these techniques to tourism. Finally, they also point out some current needs and technological barriers that need to be tackled by the research community regarding the acquisition and dissemination of heritage.

Chapter 5 presents a framework to develop a mobile five human senses augmented reality museum system. This is to be used as a guide in cultural, historical and museum events, complementing or replacing the traditional orientation given by tour guides, directional signs, or maps. The system consists of a smartphone/phablet application and a hardware device to be integrated with smartphones/phablets, in order to explore the five human senses: sight, hearing, touch, smell, and taste.

Chapter 6 focuses on an Interactive Guide of the Portuguese Way of St. James (Camino de Santiago) created by using an Augmented Reality application. The Guide has the geo-information needed for the Pilgrim, in the passage by the municipality of Barcelos to Santiago, and can be accessed through a smartphone.

In Chapter 7, the authors begin with an introduction to the process of virtual reconstruction of archaeological sites, where the several stages that should take place to obtain a faithful virtual representation of an archaeological site and its artifacts are identified. Moreover, each stage is characterized and its main methods and techniques are identified. The chapter ends with the authors' vision about future trends for this field and unveils what could be their contributions to this vision.

Chapter 8 offers an in-depth analysis of archaeological sites and the value they represent to the field of cultural tourism. Specifically, it discusses the suitable means of studying and managing archaeological sites. In order to illustrate this line of research, this analysis will focus on one archaeological site in particular, namely the Archaeological Park of Segóbriga in the province of Cuenca, Spain.

In Chapter 9, the authors mention the problem associated to the accessibility of monuments and archaeological sites by disabled persons and persons with restricted mobility in general, which constitutes a social, financial and political demand. To overcome this problem, the authors presents the project "PROSPELASIS" to counter this challenge by focusing on creating a methodology for facing monuments' accessibility and perceptibility problems for people with disabilities and testing its application at Byzantine monuments of Thessaloniki.

Chapter 10 presents an approach for the preservation and exploration of the archaeological-historical information using the most modern methods of building information modelling together with virtual and augmented reality adapted to archaeology. This three-dimensional model is used to virtually reconstruct the Milreu archeological site, bringing this ancient Roman villa to life again, and supports the virtual reality platform and augmented reality for mobile devices.

Chapter 11 presents an essay involving the relations between the tourist appropriation of an historical architectural attraction – namely Jesuitic Mission of São Miguel – Brazil (legacy of the Guaraní Jesuit Missions - South America) – and the use of digital technology tools.

Chapter 12 discusses the information and communication technology potential to implement a smart approach on mass events. A known music festival was used as an exploratory evidence to support the main idea of the chapter, allowing to present some recommendations for mass event managers.

In Chapter 13, the authors present an exploratory study with the discussion of how creative experiences are being consumed through cultural mediation made possible by technological developments. In addition, the study is complemented with analysis of the creative tourism network website in the light of postmodern cultural mediation and capital construction.

Chapter 14 aims at measuring the image of the tourism brand "España Verde" by using the social media platform Facebook. The ever-increasing competition within the tourism industry makes it vital for destinations to address their target group by tailored marketing measures. Furthermore, social media channels are changing the interaction between Destination Management Organizations and customers. With the aim of exploring España Verde's image, a three components approach: cognitive, affective and conative was applied. Related to the measurement of the cognitive component, the study also focuses on España Verde's touristic potential ranging from a rich and diverse culture as well as a unique natural heritage to a suitable infrastructure for touristic purposes.

In Chapter 15, the cultural tourism consumers are analyzed in a way to understand their decision making process, when use the mobile instant messaging as a communication channel to choice a restaurant, in a social media platform. To achieve the objective was conducted a questionnaire to identify which channels are most used by consumers, when they intend to receive gastronomic recommendations. In the study, the conclusions identified that the channel use is determined by its instantaneousness and permanent information availability and due to a lack of knowledge about the area where the users is.

Chapter 16 analyzes the relationship between mycological tourism and Geographic Information Systems as a tool for tourism planning in rural areas. All this from a participatory approach in which traditional ecological knowledge serves as a source of information and a point of reference to guide policies for economic restructuring of rural areas.

Chapter 17 presents an essay that aims to explain the phenomenon and effect on tourism of the Balinese cemetery in the village of Trunyan, where the dead are not buried. It is a narrative enquiry combined with critical theory largely grounded in the scholarship of dark tourism and communication theory, coupled with content analysis of the online community's reviews from the TripAdvisor website.

In Chapter 18, the adoption of cloud computing in companies in general and in enterprises of the tourism sector in particular is addressed. The chapter includes a literature review to establish the conceptual framework of the technology and of the new economic model that underlies its adoption.

Chapter 19 describes some of the major issues around the cultural semantic web, including issues and range of choices institutions are facing to make data available on the web. Also introduced was Index Rerum, an inventory system based on an object-oriented model, as an example of managing collections and publishing data using the linked open data principles.

Last but not the least, for the book conclusion, one of the main topics that should always be in the center of any technological development and/or travel, the ecological footprint. In this case the minimization of energy consumption and the use of renewable energy. Chapter 20 describes the challenges involved in developing of a decision support platform to help hoteliers monitor their energy consumption, identify which points are consuming more than expected, decide which investments are more cost effective, and

manage their equipment in an optimum way. In this sense, the chapter covers several research fields, including internet of things networks, smart grids, renewable energy, and energy efficiency.

As a final point, it is important to reinforce, that the major contribution of the book, it is the "book as a whole". The "all" is bigger than the sum of the "parts", once the sum of the chapters created a book expected to interest to everyone that works or studies ICT applied to Cultural Heritage and Tourism. Nevertheless, each chapter brings to its respective sub-area the state of the art, showing applications, most of them not yet developed, except by the authors.

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Information and Communication Technologies (ICT) have established a growing and deeper interconnection alliance with the tourism sector. Few solutions have contributed to the dissemination of cultural and religious heritage of the regions, as a means of promoting it, making known and enriching the culture of its visitors and residents. The development of an intelligent application that allows the dissemination of cultural and religious heritage can bring new experiences and sensations for tourists and for residents in general, and for those with accessibility problems in particular. The present chapter proposes a methodological framework for the development of a recommendation system associated with the Religious Tourism Experience Model (RTEM), with the objective of identifying and selecting consumer preferences for the dissemination of cultural heritage in general, and religious heritage in particular.

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With the constant development of digital means of entertainment – that are easily made available to people and, in most cases, can be used anywhere – nowadays, a visit to a museum have to surround publics with unexpected and interactive experiences, in order to capture their attention and make them

want to go to these places, in addition to continue to communicate their collections and promote society education. In this regard, it was discussed in this chapter the actual panorama of interactive technologies used in museums exhibitions worldwide, and there are discussed how these institutions are designing digital installations and utilizing virtual media to enhance the visitors' experience, promoting positive relations between them and their publics. The main conclusion and reflection of the chapter is based on how this new era of technology is allowing increasing physical, cognitive and sensory accessibility, and transforms this kind of experience for disabled publics.

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Erkan Özdemir, Uludağ University, Turkey
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Technological advances have had an impact on many industries as well as the tourism industry. Augmented reality applications, one of the emerging new technologies in recent years, have also started to be used in our daily lives. Augmented Reality (AR) is a technology that allows its users to see the real world together with an additional virtual world that is added in real time to the same field of view. The augmented reality applications contribute to the enrichment of tourists' tourism experiences, especially during their visit and result in augmented satisfaction levels. Furthermore, it is one of the effective tools that can be used against the wear and tear of cultural heritage sites caused by overcrowding. In this chapter, the application fields of the augmented reality in the field of tourism have been discussed under the subtitles. As a result of our study, recommendations for the development of AR applications both for the literature and real-life application have been presented.

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The acquisition, digital representation and interaction of cultural heritage (CH) assets is of high interest for an accurate documentation of our cultural legacy. Detailed studies demand more information on the assets apart from the mere visual appearance or even shape of objects. In this regards, some research works can be found that combine shape with other kind of data, such as radiometric (e.g., IR, thermal radiation, etc.) or semantic information, leading to multi-Dimensional (mD) virtual objects. In this chapter, we review the state of the art of different techniques to deal with mD acquisition of CH tangible assets. We also discuss some representation (e.g., visual, sonic, etc.) and interaction approaches to enhance the value of CH by means of the technologies of virtual reality (VR) and augmented reality (AR), considering also the application of these techniques to tourism. Finally, we also point out some current needs and technological barriers that need to be tackled by the research community regarding the acquisition and dissemination of heritage.

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The Mobile Five Senses Augmented Reality System for Museums (M5SAR) project aims to development an Augmented Reality mobile system for museums. Museums are amazing places, where it is important to sensorial augment as much as possible the visits, permitting to see, ear, touch, smell, and taste all the interesting objects there exist. Also fundamental is that visitors with different profiles (child, adult, expert, etc.) can have different experiences when visiting the same object. In the M5SAR system, the visitor uses its smartphone to select the object(s) to explore, and the user interface adapts on-the-fly to the object(s) and user's profile. Simultaneously, when integrated, a paired hardware device allows the extension of the augmented reality system to the human five senses, complementing the visual and auditory information about the objects. This chapter presents the initial framework to develop a five senses mobile adaptive museum system.

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José Cotos, University of Santiago de Compostela, Spain
Paula Cristina Remoaldo, Minho University, Portugal

This chapter focuses on an Interactive Guide of the Portuguese Way of St. James (Camino de Santiago) created by using an Augmented Reality application. This application was developed specifically for the section of the Portuguese Route to Santiago that crosses the municipality of Barcelos (Northwest of Portugal). The Guide has the geo-information needed for the Pilgrim, in the passage by the municipality of Barcelos to Santiago, and can be accessed through a smartphone. The pilgrim will have at his or her disposal a set of interactive geo-information about Barcelos. At the level of interactivity with the user, each of these points of interest in the Guide will be signaled by a portrait done by a painter from Barcelos (monuments) and universal graphic icons (other geo-information).

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Accurate modeling/reconstruction and visualization of real environments, particularly archaeological sites, is both a major challenge and a crucial task. This work will address the entire process of the virtual reconstruction of archaeological sites, since the construction of the virtual model until its visualization. The chapter begins with an introduction to the process of virtual reconstruction of archaeological sites, where the several stages that should take place to obtain a faithful virtual representation of an archaeological site and its artifacts are identified. Moreover, each stage is characterized and its main methods and techniques are identified, in dedicated sections. The authors' contribution for the state of the art will be highlighted in each stage. The chapter ends with the authors' vision about future trends for this field and unveils what could be their contributions to this vision.

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María Pilar Martínez-Ruiz, University of Castilla-La Mancha, Spain
Víctor Raúl López-Ruiz, University of Castilla-La Mancha, Spain

This chapter offers an in-depth analysis of archaeological sites and the value they represent to the field of cultural tourism. Specifically, this chapter discusses the suitable means of studying and managing archaeological sites, which represent tangible examples of cultural tourism. Managed properly, such sites may attract a larger number of visitors and thereby contribute to the region's socioeconomic development. In order to illustrate this line of research, this analysis will focus on one archaeological site in particular, namely the Archaeological Park of Segóbriga in the province of Cuenca, Spain. More specifically, the chapter reviews survey data collected over several years by related public institutions. The findings lend support to several measures that may improve the management of such sites in the context of cultural tourism. The most important of these is the dissemination and promotion of information about the site through WOM and eWOM.

Chapter 9
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Aristotelis Naniopoulos, Aristotle University of Thessaloniki, Greece
Panagiotis Tsalis, Aristotle University of Thessaloniki, Greece

The accessibility of monuments and archaeological sites by disabled persons and persons with restricted mobility in general, constitutes a social, financial and political demand. The project "PROSPELASIS" attempted to counter this problem by focusing on creating a methodology for facing monuments' accessibility and perceptibility problems for people with disabilities and testing its application at Byzantine monuments of Thessaloniki. In six major monuments included in UNESCO's World Heritage List,

significant accessibility improvements were realized. A Wi-Fi information system was installed in all of them via which an audio and visual information system was created with audio information in three languages, description of visual information, text information, information in Greek and International Sign Language. Additionally, in Rotunda and Heptapyrgion monuments three dimensional models were developed. The successful validation of the proposed methodology constitute the results of this project not only pertinent to Thessaloniki or Greece, but worthy of a wider application.

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This chapter presents an approach for the preservation and exploration of the archaeological-historical information using the most modern methods of Building Information Modelling (BIM) together with virtual and augmented reality adapted to archaeology. It was made a survey of the archaeological site using an unmanned aerial vehicle (UAV) and laser scan to obtain accurate information of existing structures which is stored in a BIM model. By using BIM methodologies, all existing information is organized in one place, shared and preserved for future memory. This 3D model is used to virtually reconstruct the Milreu archeological site, bringing this ancient Roman villa to life again, and supports the virtual reality platform and augmented reality tourism application for mobile devices, used for the promotion of the archaeological site, in an innovative way, in order to ensure a high degree of satisfaction to regular visitors and attract new public, looking for the visits to the archaeological-historical site to become a memorable experience.

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The contemporaneity demands a better relation between the object and the subject. In this article, it is expected to understand how has been developed this bond of Jesuit architecture and its understanding by the visitor. In this way, it is searched to explore the touristic technological means in Missões Guaraníticas. It questions the use of technology to a better extent of dissemination of local and cultural legacy - existing architecture. The methodology presents an exploratory research of technological platforms of information. It is noticed that its use increases tourism, favoring the culture and history of the region, besides promoting accessibility, reducing the social and physical barriers. The technology helps to preserve and disseminate the historical importance of the site. New information media has influenced and has increased the tourism, stimulating the local trade, and also it encourages the preservation of historical heritage. The approach of historical study of the region / country has great potential for increasing interest in historical architecture and culture.

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The trend of information and communication technologies (ICT) employment to enhance transactions and to deliver better experience to visitors of mass events has been growing increasingly popular over the years. The emergence of "smart tourism" agenda which highlights new, more sustainable ways of business management, experience enhancement and destination management also creates new opportunities for ICT employment in mass event. Thus, this chapter discusses existing ICT holding potential for smart approach employment on mass events. An additional case of Exit festival was used as an exploratory evidence to support the main idea of the chapter. Based on comprehensive literary review and additional information on visitors' familiarity with ICT gained from the Exit festival, recommendations for mass event managers are presented.

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Rui Miguel Ferreira Carvalho, University of Aveiro, Portugal
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Ana Maria Alves Pedro Ferreira, University of Évora, Portugal

Creative tourism has been a proficuous ground for the implementation of ICT's (Information and Communications Technology) strategies and the so-called creative industries. New cultural mediators are changing tourism consumption. Postmodern consumers have brought new perceptions to cocreation processes through user-generated content, eWOM (Electronic Word of Mouth), peer-to-peer exchange, collaborative economy, SoLoMo (social-local-mobile) tourists, among others. Booktubers and music fans/consumers in Chile constitute examples of diverse consumption through virtual and physical mediation, as capital construction enables social practices. In this exploratory study, the authors discuss how creative experiences are being consumed through cultural mediation made possible by technological developments. The creative tourism network website is analysed in the light of postmodern cultural mediation and capital construction.

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"España Verde": Tourism Destination Image among German Facebook Users 284
Till Maximilian Schuh, University of Algarve, Portugal
Dora Agapito, University of Algarve, Portugal
Patrícia Pinto, University of Algarve, Portugal

This study aims at measuring the image of the tourism brand "España Verde" by using the social media platform Facebook. The ever-increasing competition within the tourism industry makes it vital for destinations to address their target group by tailored marketing measures. Furthermore social media channels are changing the interaction between Destination Management Organizations (DMOs) and

customers. With the aim of exploring España Verde's image, a three components approach—cognitive, affective and conative was applied. Related to the measurement of the cognitive component, the study also focuses on España Verde's touristic potential ranging from a rich and diverse culture as well as a unique natural heritage to a suitable infrastructure for touristic purposes. Although the supply side seems to fit the target group's desires when choosing a vacation destination, the exploratory results reveal that there is currently only little awareness for España Verde on the German market.

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Gastronomy in Cultural Tourism: Use of Mobile Instant Messaging to Look for Gastronomic Recommendations 312
Maria Romero-Charneco, Universidad de Málaga, Spain
Ana-María Casado-Molina, Universidad de Málaga, Spain
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Cultural tourism consumers seek advice and recommendations from others before making buying decisions. The mobile instant messaging (MIM) boom could create a channel not only for social communication but also for information about cultural tourism and specifically the choice of restaurant. In this research we study which channels are most used by consumers when asking for gastronomic recommendations and, in particular, the factors behind the use of MIM as the preferred channels when obtaining tourist information. For this, an online survey was carried out with a sample of 393 individuals in Spain and descriptive statistical techniques were applied to the processing and analysis of the data. The results obtained show that: (1) its use is determined by its instantaneousness and permanent availability; and (2) people use it due to a lack of knowledge about the area.

Chapter 16
Information Mycological Systems and Traditional Ecological Knowledge: The Case of Mycological Tourism in Central Mexico 338
Humberto Thomé-Ortiz, Universidad Autónoma del Estado de México, Mexico

Wild edible fungi are non-timber forest products that have great relevance for forest communities in central Mexico. Texcaltitlán is a rural community known for its traditional ecological knowledge on the use and identification of wild edible mushrooms. The aim of this work is to link Geographic Information Systems and Traditional Ecological Knowledge, in order to generate Mycological Information Systems. This is a qualitative, quantitative and exploratory research, which seeks to determine the usefulness of Geographic Information Systems (GIS) to systematize and locate mycological resources for use as a tourist attraction. The results show the existence of a wide variety of edible mushrooms in the region, along with a wide mycological traditional knowledge. Both aspects reflect the existence of unique natural and cultural features that can be the basis to build a unique tourism product in central Mexico. It is concluded that GIS are useful tools to build a multifunctional vision of mushrooms.

Chapter 17
Isle of the Dead: A Study of Trunyan Cemetery (Bali) 354
Bintang Handayani, President University, Indonesia
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This essay aims to explain the phenomenon and effect on tourism of the Balinese cemetery in the village of Trunyan, where the dead are not buried. It is a narrative enquiry combined with critical theory largely grounded in the scholarship of dark tourism and communication theory, coupled with content

analysis of the online community's reviews from the TripAdvisor website. The study indicates that (1) connectedness to death suggests the existence of spirituality needed by people, at the same time indicating understanding of mortality; (2) social connections developed as a result of visiting Trunyan cemetery not only bring self-awareness and awareness of others, revolving around intrapersonal communication about spirituality and interpersonal communication among members of the online community, but also illustrate the development of dark tourism and conceptualise the role of tourists in building authentic experience as the essence of a death site's brand image.

Chapter 18

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Pedro R. Palos-Sanchez, University of Extremadura, Spain

Marisol B. Correia, ESGHT, University of Algarve, Portugal & CEG-IST, Universidade de Lisboa, Portugal

This chapter aims to expose the current situation of the adoption of cloud computing in companies in general and in enterprises of the tourism sector in particular. For this, a review of the literature has been carried out to establish the conceptual framework of technology and of the new economic model that underlies its adoption. Cloud computing is one of the technologies less known to many organizations and especially users, as it is a new technology based on the Internet, through which information is stored on servers, is provided as a service and on clients' demand. Therefore, the main theories of adoption that have been used to explain the different adoption models are presented, as well as, the different solutions that are being used in the tourist industry.

Chapter 19

Semantic Transformation and Use of Cultural Data: Record Once and Publish Many..... 401

Feliz Ribeiro Gouveia, Universidade Fernando Pessoa, Portugal

Sérgio Lira, Green Lines Institute for Sustainable Development, Portugal

Cultural content and cultural assets are increasingly seen as invaluable drivers for education, entertainment, tourism, knowledge, and shared memory initiatives. As such, cultural information, as stored in cultural institutions such as museums, archives, and specialized libraries is increasingly demanded by several actors, from public policy, tourism, app developers and software companies, schools and the citizen at large. To satisfy the needs of such a large spectrum of consumers and end users, the information must be format independent, multi-lingual, multi-purpose, and make use of standards, norms and national and international recommendations. In this is paper we describe our past and current efforts to develop cultural information systems that can satisfy those requirements and those of the specialized public, such as scientists and curators. We describe an inventory and content management system and the conceptual and architectural choices that were made to allow its evolution, standards' compliance and multi-purpose use.

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Tourists today are more likely to be concerned with the environment and greener lifestyle choices. In this context, a green flagship of some hotels can be an important selection criteria at the time of selecting one. In the near future, buildings should become nearly zero energy, consuming as low as possible and producing almost all the energy they need, using renewable energy sources. To achieve this goal, hotel buildings need to pass through a transformation process that will make them more efficient. In this process, a decision support platform would be important to help hoteliers monitor their energy consumption, identify which points are consuming more than expected, decide which investments are more cost effective and manage their equipment in an optimum way. This chapter describes the challenges involved in developing such a platform, covering several research and development fields, including Internet of Things networks, ICT, Smart Grids, Renewable Energy, Energy efficiency, as well as algorithms for machine learning and optimization.

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Chapter 1
Religious Tourism Experience Model (RTEM): A Recommendation Model for Dissemination of Cultural and Religious Heritage

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ABSTRACT

Information and Communication Technologies (ICT) have established a growing and deeper interconnection alliance with the tourism sector. Few solutions have contributed to the dissemination of cultural and religious heritage of the regions, as a means of promoting it, making known and enriching the culture of its visitors and residents. The development of an intelligent application that allows the dissemination of cultural and religious heritage can bring new experiences and sensations for tourists and for residents in general, and for those with accessibility problems in particular. The present chapter proposes a methodological framework for the development of a recommendation system associated with the Religious Tourism Experience Model (RTEM), with the objective of identifying and selecting consumer preferences for the dissemination of cultural heritage in general, and religious heritage in particular.

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INTRODUCTION

At present, cultural consumption has become increasingly important, constituting a way of experiencing tourist experiences that are different from the daily routine of individuals (Urry, 2002). Richards (1996) and Russo and Borg (2002), have shown that cultural tourism is the main source of income for tourism (Urry, 2002).

Al Subhi, Bell and Lashmar (2015) point out that technologies are needed to enhance / increase the experiences of visitors so as to increase revenues and increase audiences (new visitors). They further note that the cultural heritage sector recognizes the value of presenting different content and different styles of personalization for different types of people (Falk, 2009), and that services can be customized to the different needs and preferences of children, parents and teachers.

In addition, Al Subhi et al. (2015) note that the existing literature on heritage and mobile technology is virtually focused on museums, and that there is a large gap in the use of devices, furniture and technology in large heritage sites such as monuments. Most studies have been carried out on tourist towns, and little attention has been given to integrated solutions for heritage sites and technology that enhance the socio-economic benefits of regions and cities. Lastly, it is beneficial to consider user-centered solutions that allow for a substantial collection of information by non-professional users, in order to create experiences and different values for visitors seeking a cultural aspect.

The structuring of cultural (religious) products for tourist purposes should be based on knowledge of trends in consumer behavior and major tourist market niches. At the same time, it should be "to facilitate knowledge and assist in co-designing sustainable tourism development" (Center for Tourism, Innovation and Culture [TIC], 2015).

The acquisition of knowledge of religious heritage by tourists, residents, and in particular those who have access difficulties (i.e., physical and mental disabilities) is enhanced when it is associated with technological innovations, especially once it is possible to offer new experiences and sensations to all visitors, including ones who have accessibility problems. One of the most important features is the possibility for a tourist to have access to the same information, regardless of their physical limitations. Another relevant potentiality is to reduce the negative impacts of tourism by reducing overcrowding of visitors attempting to access threatened or protected places.

ICT is excellent for contributing to the communication and acquisition of the cultural heritage of a region (Inversini & Cantoni, 2011) and for allowing the development of innovative solutions that meet the interests of economic and touristic partners. In parallel (Falk, 2009), the cultural heritage sector recognizes the value of presenting different content and different styles for different types of people where services can be tailored to the different needs and preferences of children, parents and teachers.

An innovative solution to meet this need is the development of a pioneering mobile smart application to disseminate tourism, cultural and religious heritage content in order to improve the tourist experience, as well as residents' learning.

The development of applications for mobile devices applied to the tourism sector is not new, since there are several prototypes developed in the academic world that combine tourism with Artificial Intelligence (AI) in a recommendation system to the tourist.

In this chapter the authors proposes a framework for the development of a recommendation system in order to identify and select consumer preferences, which can be classified according to the target market, forms of recommendation, use of knowledge or algorithms implementation, with the aim of

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Chapter 2
Interactive Technologies in Museums:
How Digital Installations and Media Are Enhancing the Visitors' Experience

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ABSTRACT

With the constant development of digital means of entertainment – that are easily made available to people and, in most cases, can be used anywhere – nowadays, a visit to a museum have to surround publics with unexpected and interactive experiences, in order to capture their attention and make them want to go to these places, in addition to continue to communicate their collections and promote society education. In this regard, it was discussed in this chapter the actual panorama of interactive technologies used in museums exhibitions worldwide, and there are discussed how these institutions are designing digital installations and utilizing virtual media to enhance the visitors' experience, promoting positive relations between them and their publics. The main conclusion and reflection of the chapter is based on how this new era of technology is allowing increasing physical, cognitive and sensory accessibility, and transforms this kind of experience for disabled publics.

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INTRODUCTION

Because one lives in an era where people spend the most part of their time in front of screens and connected to the internet, museum professionals have to think about how to make collections and exhibitions still relevant nowadays, and how to compete with all the available entertainment ways and technological developments, in order to capture the visitor's attention and encourage their visit to these spaces.

Once this chapter focuses on exploiting digital ways of interactivity in museums, it is crucial, first of all, to understand their role in contemporary: "A Museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment" (Desvallées & Mairesse, 2010, p. 57). Based on this professional definition, widely recognized and disseminated by ICOM – International Council of Museums – since 2007, it is clear that museums must provide to society the access to education, offering moments of study and leisure, in order to cooperate for its development, committing itself to safeguard and communicate their collections to the public (Desvallées & Mairesse, 2010).

As institutions are increasingly interested in providing outstanding informal learning experiences, there has been an effort to meet the visitor's aspirations, through the adaptation of innovative technology to communicate and encourage the visit to these spaces (Chelini, 2012). As pointed out by Sree Sreenivasan – the Metropolitan Museum of Art's chief digital officer, until June of 2016 – on an interview to Gilbert (2016), museums no longer need to compete with each other, because they are losing their visitors to the omnipresent technologies, games and social media consumed by the modern society; instead, those institutions have to find out ways to embrace the fact that smartphones, tablets, smartwatches and other digital devices are everywhere, and take advantage of the fact that people use them no matter when or where: "People ask me what our biggest competition is (…) It's not the Guggenheim; it's not the Museum of Natural History. It's Netflix. It's Candy Crush" (p. 32) and most recently, Pokémon Go (McCluskey, 2016). Taking these facts into account, it is self-explained why museums are committed, more than ever, in providing new scenarios of interaction and contact with their exhibitions.

On the other hand, it is important to make clear that the use of digital resources would not even be an option to communicate and to interact with the exhibitions if their use offers no contribution to what is being presented: in some cases, technological solutions are seen as essential for facilitating the reproduction of stories and intangible processes, like sound recordings, music, videos and other non-physical heritage; in other instances, they contribute to expand information about what cannot be exposed, like no longer existing artefacts and places, giving access to reconstructions and digital replicas (Chanda, 2013).

About the exhibition of physical samples, the use of digital resources proves to be beneficial because it enables visitors to have a better understanding of objects and ideas – since it allows offering complementary information in a more attractive way for visitors, without overloading the exhibitions environment with excess of information – and allows to increase accessibility and enable opportunities for disabled persons (Freeman et al., 2016; Israel, 2011).

However, professionals should be aware that technology must be used as a medium and not as an end, according to Israel (2011), McMullan (2015) and Olesen (2016), where, ideally, the museum themes should be harmoniously combined with digital content to communicate effectively the exhibitions and, at the same time, provide an incredible experience to visitors while using them: "given the increased emphasis on user experience, it is no longer sufficient to ensure that a system is merely usable" (O'Brien & Toms, 2008, p. 939).

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Chapter 3
Augmented Reality:
Applications and Implications for Tourism

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ABSTRACT

Technological advances have had an impact on many industries as well as the tourism industry. Augmented reality applications, one of the emerging new technologies in recent years, have also started to be used in our daily lives. Augmented Reality (AR) is a technology that allows its users to see the real world together with an additional virtual world that is added in real time to the same field of view. The augmented reality applications contribute to the enrichment of tourists' tourism experiences, especially during their visit and result in augmented satisfaction levels. Furthermore, it is one of the effective tools that can be used against the wear and tear of cultural heritage sites caused by overcrowding. In this chapter, the application fields of the augmented reality in the field of tourism have been discussed under the subtitles. As a result of our study, recommendations for the development of AR applications both for the literature and real-life application have been presented.

INTRODUCTION

Today, as it is the case in many industries, there has been an intense competition in the tourism industry as well. In the face of this competition, the organizations in the tourism industry have used new technologies to stay competitive and develop marketing campaigns in various forms (Jung & Han, 2014). One of the techniques developed in this challenging competition is Augmented Reality (AR) applications. The AR technology is a new technology that can offer many opportunities that are difficult to be presented and met by the other technologies (Alkhamisi & Monowar, 2013).

In recent years, there have been many augmented reality applications used in different industries in the world. The augmented reality applications are used in many fields such as industry and military,

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training and education, travel and tourism, medicine and health care, and retail and marketing (Martínez, Skournetou, Hyppölä, Laukkanen, & Heikkilä, 2014). The tourism industry is also one of the industries where augmented reality applications have a comprehensive area of implementation. The tourism industry is an area in which especially the AR applications have higher potential of use. The availability of the AR applications, especially in mobile devices, causes these applications in the tourism industry to become even more widespread.

Today, the question of protecting cultural heritage has become very important. In addition to natural degradation, due to the negative effects caused by development activities and overcrowding, inheritance conservation efforts are vital in ensuring the sustainability of heritage sites. Just at this point, the advances in digital technologies such as virtual reality (VR) and augmented reality (AR) are the applications that can be valuable in preserving the heritage. These technologies will minimize the impact of overcrowding in the threatened heritage sites, but at the same time they will increase the overall experience of the visitors (Ab Aziz & Siang, 2014). The purpose of this kind of synergy between reality and virtual is to develop and consolidate the place-based economic development, culture, quality and the integration of local resources by preserving their historical identities. The tourism products are developed to include more cultural offerings among the various participating institutional actors, with a balanced dose of competition, co-operation and coordination (Garau, 2014). Augmented reality applications in the tourism industry are dealt with within the scope of smart tourism (Buhalis & Amaranggana, 2013; Koo, Shin, Kim, Kim, & Chung, 2013).

The aim of this chapter is to explicate the concept of augmented reality, the different aspects of it from other similar concepts, the infrastructure requirements, and analyze the applications examples in the tourism industry in the world especially within the content of destination marketing. Hence, in the background section, firstly the relationship between the concept of augmented reality and virtual reality, and the hardware and software infrastructure of the augmented reality is discussed. Afterwards, augmented reality applications in the tourism industry are discussed together with relevant examples. In the conclusion section, technical and social problems of the augmented reality applications are discussed and proposed solutions are presented.

BACKGROUND SECTION

Augmented Reality

AR is a combination of real-object and computer-generated data where the virtual object has been collated with the real world. This means that it is visible to the user that the virtual field and the real object co-exist in the same place (Azuma, 1997). The AR technology proposes that the real and virtual objects coexist in the same place (Linaza, Gutierrez, & García, 2014, p.498). Today, especially the rapid development of the latest generation of mobile devices now allows anyone with a computer or just a smartphone to be able to make connections in real time and get information from the virtual world as a result of augmented reality through the overlap of information layers (Garau, 2014). The rapid development in the use of smartphones and mobile applications create new ways of connecting with the visitors in many sectors as well as in the tourism industry (Kennedy-Eden & Gretzel, 2012).

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Chapter 4
Multi-Dimensional Acquisition, Representation, and Interaction of Cultural Heritage Tangible Assets:
An Insight on Tourism Applications

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ABSTRACT

The acquisition, digital representation and interaction of cultural heritage (CH) assets is of high interest for an accurate documentation of our cultural legacy. Detailed studies demand more information on the assets apart from the mere visual appearance or even shape of objects. In this regards, some research works can be found that combine shape with other kind of data, such as radiometric (e.g., IR, thermal radiation, etc.) or semantic information, leading to multi-Dimensional (mD) virtual objects. In this chapter, we review the state of the art of different techniques to deal with mD acquisition of CH tangible assets. We also discuss some representation (e.g., visual, sonic, etc.) and interaction approaches to enhance the value of CH by means of the technologies of virtual reality (VR) and augmented reality (AR), considering also the application of these techniques to tourism. Finally, we also point out some current needs and technological barriers that need to be tackled by the research community regarding the acquisition and dissemination of heritage.

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INTRODUCTION

Cultural Heritage (CH) is a fundamental expression of the richness and diversity of our culture and therefore, its conservation, documentation and dissemination is considered of the utmost importance. Beyond the well-established methods that have been traditionally employed in the field of CH up to the present moment, technological tools have become increasingly popular for the heritage enhancement, tourism experience development and dissemination. This is because they have the ability to engender fascination far beyond a tourist brochure or any other printed material.

The digital documentation and dissemination of CH tangible assets through current technologies usually involves several steps, such as the visual appearance and shape (or three-dimensional, 3D) acquisition of the assets, their virtual reconstruction, storage (e.g. repositories), digital representation or reproduction (mainly visual), and interaction techniques, among others. This chapter focuses on the acquisition, representation and interaction techniques with emphasis in multi-Dimensional (mD) data.

The acquisition step is fundamental, as it deals directly with digitizing the real characteristics of the assets. Thus, it plays an important role in the accurate documentation and safeguard of our cultural legacy. However, not all the acquisition technologies have been exploited in depth so far for the CH sector. In this regards, some research works can be found that combine shape with other kind of data, such as radiometric (e.g. IR, thermal radiation, etc.) or semantic information, leading to the mD virtual objects and opening the avenues for new dissemination and understanding of heritage. One of the aims of this chapter is to provide a review of these acquisition technologies, in order to point out the benefits that they might have for CH and to discuss current needs, technological barriers and/or new trends that might be of interest for the sector.

Additionally, this chapter also aims to give a review on the current representation (not only visual, but also sonic, haptic, etc.) and interaction solutions related to touristic applications, focusing on the technologies of virtual and augmented reality that are increasingly being used in museums, exhibitions, heritage sites, etc., being a vehicle for the access and dissemination of CH to a number of stakeholders and the wide public. Indeed, the dissemination of CH is essential to promote its conservation, so communicating the values and the significance of our heritage, especially to the general public, is a key issue for rising awareness. The thematic interpretation is the main tool to achieve proactive behaviours in general public towards conservation, and it is based upon the following sequence: "Through interpretation, understanding; through understanding, appreciation; through appreciation, protection" (Tilden, 1957, p. 38). The scientific literature regarding the role of new technologies in the dissemination of heritage is extensive. However, there is nothing from the methodological point of view in relation to the specific techniques analysed in this work. Therefore, to evidence this type of applications linked to the dissemination of heritage, various examples developed by the authors are provided through the chapter.

This chapter is organized as follows. In a first section, a review on the state of the art of different available techniques and the related methodologies to deal with mD acquisition for the virtual reconstruction of CH tangible assets are presented and discussed through different examples. In the next section, a review on various visualization and interaction approaches (based on virtual and augmented reality) to enhance the value of CH by means of these virtually reconstructed objects is given. Finally, the discussion section points out some current needs and technological barriers that need to be tackled by the research community in order to further advance on the given topic, which might be relevant for the CH sector, as argumented in the previous sections.

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Chapter 5
An Initial Framework to Develop a Mobile Five Human Senses Augmented Reality System for Museums

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ABSTRACT

The Mobile Five Senses Augmented Reality System for Museums (M5SAR) project aims to development an Augmented Reality mobile system for museums. Museums are amazing places, where it is important to sensorial augment as much as possible the visits, permitting to see, ear, touch, smell, and taste all the interesting objects there exist. Also fundamental is that visitors with different profiles (child, adult, expert, etc.) can have different experiences when visiting the same object. In the M5SAR system, the visitor uses its smartphone to select the object(s) to explore, and the user interface adapts on-the-fly to the object(s) and user's profile. Simultaneously, when integrated, a paired hardware device allows the extension of the augmented reality system to the human five senses, complementing the visual and auditory information about the objects. This chapter presents the initial framework to develop a five senses mobile adaptive museum system.

INTRODUCTION

The Mobile Five Senses Augmented Reality System for Museums (M5SAR) project aims at the development of an enhanced Augmented Reality (AR) system, to be a guide in cultural, historical and museum events, complementing or replacing the traditional orientation given by tour guides, directional signs, or maps. The system consists of a (i) smartphone/phablet application (APP) and a (ii) hardware device (referenced as HDevice) to be integrated with smartphones/phablets, in order to explore the five human senses: sight, hearing, touch, smell, and taste. Both components, (i) and (ii), can work in stand-alone or integrated fashion.

Nowadays, many personal and context-aware tourism and cultural experiences are constructed based on mobile APPs (Jung, Chung, & Leue, 2015), including the ones that use AR. Those APPs are increasing in number due to the popularity of built-in cameras, global positioning systems, and with the massive availability of Internet connections. On the other hand, most of the present User Interfaces (UI) still traditionally follow a one-size-fits-all model, typically ignoring the needs, abilities, and preferences of individual users. However, past research pointed out that visualization performance could be improved by adapting some of its aspects to the individual user (Steichen, Conati & Carenini, 2014). Conati, Carenini, Toker, and Lallé (2015) state that intelligent adaptive user interfaces (AUI) and/or visualizations, that can adapt on-the-fly to the specific needs and abilities of each individual user, are a long-term research goal. This is due to two main difficulties: (a) the extraction of information about the users' needs and abilities and (b) the implementation of UIs that can adapt/change "themselves" on-the-fly.

Reinecke and Bernstein (2013) refer that a modular UI that allows a flexible composition of various interface elements increases the number of variations of the interface element to the power of the number of adaptable elements. Thus, instead of designing each interface from scratch, a modular user interface approach is possibly a better solution, once it allows achieving many more versions with less design effort. Therefore, the requirement changes to the creation of different designs for all those parts of the interface that are subject to user or cultural preferences. Equal importance should be given to the UI adaptation to users with different impairments. Unfortunately, because of the great variety of existing impairments, it is expectable that manually and, probably, modular designing interfaces, for each one of those impairments, is impractical and not scalable (Gajos, Wobbrock, & Weld, 2008; Rodrigues, Lessa, Gregório, Ramos, & Cardoso, 2016). Nevertheless, the modular and/or adaptive generation of

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Applying an Augmented Reality Tool to the Camino de Santiago in Portugal

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ABSTRACT

This chapter focuses on an Interactive Guide of the Portuguese Way of St. James (Camino de Santiago) created by using an Augmented Reality application. This application was developed specifically for the section of the Portuguese Route to Santiago that crosses the municipality of Barcelos (Northwest of Portugal). The Guide has the geo-information needed for the Pilgrim, in the passage by the municipality of Barcelos to Santiago, and can be accessed through a smartphone. The pilgrim will have at his or her disposal a set of interactive geo-information about Barcelos. At the level of interactivity with the user, each of these points of interest in the Guide will be signaled by a portrait done by a painter from Barcelos (monuments) and universal graphic icons (other geo-information).

INTRODUCTION

In global world where speed and availability of information are increasingly important values, new technologies play a key role. This scenario is due to the significant growth in the number of inventions that have emerged throughout our most recent history, from the invention of the telephone, radio, tele-

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vision to the Internet. Information must become a global asset of rapid spread and low cost of access. Geographic information is a particular case that is worth studying.

The new trends present a perfect integration between geographic information and virtual reality. In its turn, the usage of Virtual Reality in tourism is also currently increasing (Butler, 2016; Graham, 2016). Presently, the usage of geographic information tools that use Virtual Reality have become more common, more specifically one of its variations - the Augmented Reality (Milgram et al., 1994; Azuma, 1997; Ajanki et al., 2010; Charara, 2016).

Tourism and its value chain, as well as the territories themselves, undergo constant changes as a result of the technological advances, some of them being perceived in real time. According to recent data from the World Tourism Organization (UNWTO, 2014), approximately 60% of current tourists consult and decide their holiday destinations through the Internet, of which around 40% make their reservations via the Internet. These facts lead us to conclude that an important change in the habits of the tourists has happened. Increasingly, travel agencies (intermediaries in the tourism value chain) are losing importance, since the tourist directly book their flight through the reservation center of an airline and their accommodation through the reservation center of any hotel chain. Thus, we are in a new era, the one that Manuel Castells (2002) calls "informationalism", which in turn, originates to what he also calls a new form of capitalism, "informational capitalism."

However, in a postmodern and transforming society, where technology and distance communication prevails, the concept of travel has also undergone transformations. Therefore, the journey began to be made by many from the Internet, in real time, often transcending geographical boundaries, social distances and the very concept of physical travel (Dennis & Urry, 2009).

Based on these assumptions, we chose to develop a research between 2010 and 2014 focused on the following objectives: to explore the topic of Augmented Reality and its importance in territorial marketing, promotion, dissemination and access to tourism; and create a guide for mobile devices. The latter is an interactive guide with Augmented Reality, which supports the pilgrim during his or her visit to the municipality of Barcelos.

The intention was to relate the tools and new technologies accessible to individuals and institutions with the availability, sharing and usage of tourism information. Also demonstrate how to promote a territory, using new technologies in a simple and objective way, trying to attract new tourists and new investments, and contributing to improve the quality of the visit. It's a matter of integrating and making available to the citizen and institutions all the tourist information of a territory in an interactive and accessible way.

The selected territory corresponded to the municipality of Barcelos located in the Northwest of Continental Portugal. It's a territory linked to the Jacobean Pilgrimages, from the beginnings of the Middle Ages. The Legend of the Rooster is the ultimate exponent of this secular connection. The Portuguese Way of Santiago crosses the municipality of Barcelos in a direction of south to north, in an extension of 32 kilometers. It is estimated that about 17,500 pilgrims pass through Barcelos every year, and in Holy Years they can exceed 25,000 pilgrims (Barcelos Tourist Office, 2014).

In order to reach the objectives considered, after collecting the data and the field work carried out including meetings with all stakeholders and agents of the territory, a Geographic Information System applied to municipal tourism planning and management was created and also an interactive guide on The Portuguese Way of Santiago in Barcelos.

This application was the first author application made in Portugal about the Portuguese Way of Santiago in Barcelos. Worldwide it was the second to be implemented, since in 2010 Banco Bilbao Viscaya sponsored and published a guide of the French Way of Santiago, during the last Holy Year.

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Chapter 7
Reconstructing the Past:
Providing an Enhanced Perceptual Experience

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ABSTRACT

Accurate modeling/reconstruction and visualization of real environments, particularly archaeological sites, is both a major challenge and a crucial task. This work will address the entire process of the virtual reconstruction of archaeological sites, since the construction of the virtual model until its visualization. The chapter begins with an introduction to the process of virtual reconstruction of archaeological sites, where the several stages that should take place to obtain a faithful virtual representation of an archaeological site and its artifacts are identified. Moreover, each stage is characterized and its main methods and techniques are identified, in dedicated sections. The authors' contribution for the state of the art will be highlighted in each stage. The chapter ends with the authors' vision about future trends for this field and unveils what could be their contributions to this vision.

INTRODUCTION

Accurate modeling/reconstruction and visualization of real environments, particularly archaeological sites, is simultaneously a major challenge and a crucial task. It allows the digital preservation and the visualization of not only current cultural assets, but also of those who no longer exist, resulting in a true glimpse of the past. This enables experts to study and to interact with their objects of interest, while allowing the general public to visualize such virtual environments, fostering cultural, social and scientific participation. By using mobile devices, such as smartphones or tablets, virtual models can be visualized

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in loco, giving the experts a better understanding of how objects of interest integrate in their original environment and providing the general public an enhanced perceptual experience.

Despite sometimes being used as synonyms, in the context of this chapter "modeling" and "reconstruction" are considered as similar concepts, but with different working objects. The modeling task aims to build a model of an existent object while the reconstruction task is concerned with building models of no longer existent objects or model (reconstruct) the original shape of damaged objects, based on some information.

Highly accurate modeling/reconstruction is a very complex and time consuming task. To achieve a faithful representation of the object of interest all stages of the reconstruction and visualization processes must be carefully executed. These stages include constructing the object's virtual model, mimic the ancient original illumination conditions, to render and visualize the model, under the correct context.

This work will address the entire process of the virtual reconstruction of archaeological sites, since the construction of the virtual model until its visualization. The chapter begins with an introduction to the process of virtual reconstruction of archaeological sites, where the several stages that should take place to obtain a faithful virtual representation of an archaeological site and its artifacts are identified. Moreover, each stage is characterized and its main methods and techniques are identified, in dedicated sections. The authors' contribution for the state of the art will be highlighted in each stage. The chapter ends with the authors' vision about future trends for this field and unveils what could be their contributions to this vision.

VIRTUAL RECONSTRUCTION PROCESS

The use of computers in Archaeology dates back to the late 1950s and early 1960s, essentially for the statistical treatment of information collected during excavations (Reilly & Rahtz, 1992). At that time, the use of computers was confined to a very limited set of archaeologists. In the early 1970s, a group of enthusiasts and experts in the use of computers in Archaeology joined in and started a cycle of international conferences designated as "Computer Applications in Archaeology", which still takes place with the title "Computer Applications and Quantitative Methods in Archaeology". In the following years, the use of computers in Archaeology has evolved to the use of computer aided design (CAD) systems, database management systems (DBMS) and geographic information systems (GIS). The first, besides allowing to digitally store the topographic survey carried out during the field work also enabled, based on the acquired data, some earlier works on the 3D reconstruction of both the terrain and the archaeological site's existing structures. While both DBMS and GIS allowed storing data acquired during the excavation, GIS enabled storing, manipulating and visualizing data with a spatial nature. The term "Virtual Archaeology" as a reference to the use of Virtual Reality in Archaeology was first mentioned by Reilly (1990), but the creation of virtual reconstructions in the field of archaeology began in the 1980s.

Since then, the use of computers, particularly the virtual reconstruction as a support to research and promotion of cultural heritage, has gained an increasing interest. Presently there are several international conferences dedicated to this topic. In the last years there has been a significant increase in the number of projects involving some sort of historical reconstruction as well as its web promotion, which causes a greater impact and consequently affects more people. This increase can be related to two factors: (i) the technological development, which allows to obtain these reconstructions more easily; (ii) the increased

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Chapter 8
Assessing the Use of Archaeological Sites as Cultural Tourism Resources:
The Case of Segóbriga (Spain)

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ABSTRACT

This chapter offers an in-depth analysis of archaeological sites and the value they represent to the field of cultural tourism. Specifically, this chapter discusses the suitable means of studying and managing archaeological sites, which represent tangible examples of cultural tourism. Managed properly, such sites may attract a larger number of visitors and thereby contribute to the region's socioeconomic development. In order to illustrate this line of research, this analysis will focus on one archaeological site in particular, namely the Archaeological Park of Segóbriga in the province of Cuenca, Spain. More specifically, the chapter reviews survey data collected over several years by related public institutions. The findings lend support to several measures that may improve the management of such sites in the context of cultural tourism. The most important of these is the dissemination and promotion of information about the site through WOM and eWOM.

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INTRODUCTION

As one of the main economic activities in the world, tourism has become an important source of income for many countries (Su & Lin, 2014), as well as a creator of jobs in various service industries (Yang, Lin, & Han, 2010). This is particularly true in Spain, which has become one of the world's most important tourism powers—placing third just behind France and the United States (World Tourism Organization, 2016). Spain not only possesses many attractions, but also rivals China and Italy in terms of the number of goods it produces (UNESCO, 2015). Meanwhile, Spain's position on the World Heritage list (a marketing tool used by national tourism campaigns to attract a large number of visitors; Li, Wu, & Cai, 2008) speaks to the richness of its historical and archaeological heritage (Boto, 2016). As cultural tourism has gradually become pivotal to a destination's attractiveness (McKercher, Ho, & Du Cros, 2005), Spain has outpaced many other countries in leveraging its cultural resources, becoming the second-most important country for this type of tourism (Santos & Meléndez, 2016). Case in point: In 2015, the total volume of visitors to Spain exceeded 68 million foreigners, a year-on-year increase of 4.9% (INE, 2016).

In short, culture constitutes an important part of tourism, as it increases the attractiveness and competitiveness of tourist destinations (Hennessey, Yun, & MacDonald, 2014; Pal, 2015). Indeed, several studies have shown that tourists are particularly drawn to destinations with a richer cultural or natural heritage (e.g., Bille & Schulze, 2006; Cooke & Lazzaretti, 2008; Su & Lin, 2014; Yang et al., 2010). Through cultural tourism, visitors gain insight into the history, culture and way of life of other regions of the world (Pal, 2015). As cultural tourism gains ever more importance (Chen & Chen, 2010), it is worth noting that the fastest-growing places are those that offer tourists a glimpse into both the tangible and intangible sides of cultural experience(Datta et al., 2015).

Considering the above, this work places special emphasis on a cultural destination – Segóbriga – that possesses a unique archaeological heritage. Located in the province of Cuenca, Segóbriga is one of the five archaeological parks of Castilla - La Mancha. Having ascended as a cultural destination in recent years, this area serves as a useful case study in how tourism management can leverage archaeological sites as tangible cultural resources. Through proper management, such sites may attract more visitors and thereby contribute to the socio-economic development of the areas involved. In order to illustrate this line of research, this chapter will explore how the archaeological park of Segóbriga can act as an important historical resource for cultural tourism in that area.

BACKGROUND

In order to accomplish the above goal, we need to first establish some conceptual distinctions regarding cultural tourism and, more specifically, archaeological heritage.

Cultural tourism emerged in the early 1990s, originally for the benefit of elite clientele, but was eventually generalized as an alternative to mass tourism that values the culture of the visited community (Jovicic, 2016). Silberberg (1995) offered one of the first and most enduring definitions of cultural tourism: namely, as "visits by people outside the host community motivated in their entirety or partly by interest in the historical, artistic, scientific or lifestyle offerings, heritage of a community, region, group or institution" (p. 361). Similarly, Wall and Mathieson (2006) defined cultural tourism in terms of "tourists who experience and have contact with a host population and its cultural expressions, experiencing the uniqueness of culture, Heritage and the characters of its place and people" (p. 261; see also Lynch

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Chapter 9
Accessibility Improvement Interventions at Byzantine Monuments:
Use of Technology for Facilitating Accessibility of Visitors With Sensory Disabilities

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ABSTRACT

The accessibility of monuments and archaeological sites by disabled persons and persons with restricted mobility in general, constitutes a social, financial and political demand. The project "PROSPELASIS" attempted to counter this problem by focusing on creating a methodology for facing monuments' accessibility and perceptibility problems for people with disabilities and testing its application at Byzantine monuments of Thessaloniki. In six major monuments included in UNESCO's World Heritage List, significant accessibility improvements were realized. A Wi-Fi information system was installed in all of them via which an audio and visual information system was created with audio information in three languages, description of visual information, text information, information in Greek and International Sign Language. Additionally, in Rotunda and Heptapyrgion monuments three dimensional models were developed. The successful validation of the proposed methodology constitute the results of this project not only pertinent to Thessaloniki or Greece, but worthy of a wider application.

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INTRODUCTION

A visit to an archaeological site or monument is a unique experience that also constitutes a main tourist attraction. A visit to a monument allows the composition of all stimuli into a unique experience, consisting of the following:

- **Visual Stimuli:** Shapes, colours, textures, images, sense of the real scale of the site.
- **Tactile Stimuli:** The floor's texture and the way in which it is perceived (e.g. gravel or stone) or the texture of the seats (e.g. wood, marble, metal).
- **Auditory Stimuli:** The soundscape of the surrounding area, either natural or artificial, the sound of interaction between man and the environment, walking, the swish of plants when walking through them.
- **Olfactory Stimuli:** Natural scents (depending on the season, time, weather) and artificial scents (e.g. scents of diverse materials or deliberately diffused scents and incenses).
- **Gustatory Stimuli:** Tastes referring to the site and underlining its uniqueness, such as fruits from the trees of a garden, the water of a fountain, the treat in a monastery.

In Thessaloniki, a city with rich heritage, monuments constitute isolated "islets", with the modern cityscape "drowning" them, allowing no visual connection between them, making their identification, their understanding, and physical access to them difficult for visitors in general and persons with restricted mobility in particular. This problem is exacerbated by the fact that the current city's ground level is often four to five meters above the level, where the entrance to the monuments is. Thus, any attempt to "socialize" the cultural heritage of the city has to pursue the following two objectives: a) to provide easy access to monuments for all visitors, including persons with disability and restricted mobility, and b) to help visitors through the provision of adequate information and the indication of ways of moving from one monument to another, connecting the" pieces of the puzzle" (Naniopoulos et al., 2011b.).

The present chapter describes the process of improvement of accessibility in selected Byzantine monuments of Thessaloniki using a methodology created in the frame of the "PROSPELASIS" project, financed by a grant from Iceland, Liechtenstein and Norway through the EEA Financial Mechanism 2004 – 2009 (50%) and from the public investments programme of the Hellenic Republic (50%). The project was realized by the cooperation of the Aristotle University of Thessaloniki (project leader) and the 9th Ephorate of Byzantine Antiquities. The chapter describes the background and the needs that lead to the development of the methodology, the methodology itself, its implementation and the accessibility improvement interventions carried out at selected Byzantine monuments of Thessaloniki. The authors aspire that the adoption of the proposed methodology can lead to further actions that will improve monuments' and archaeological sites' accessibility at national and international level.

BACKGROUND

Addressing, at an international level, the problems of protection, conservation, restoration and management of historical centres, archaeological sites, architectural aggregations, monuments and works of art, has been a major issue. Nowadays, we are not only interested in the monuments' past; we are also interested in their preservation, restoration and role in direct relation to their present and future environ-

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Chapter 10
A Framework Supported by Modeling and Virtual/Augmented Reality for the Preservation and Dynamization of Archeological-Historical Sites

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ABSTRACT

This chapter presents an approach for the preservation and exploration of the archaeological-historical information using the most modern methods of Building Information Modelling (BIM) together with virtual and augmented reality adapted to archaeology. It was made a survey of the archaeological site using an unmanned aerial vehicle (UAV) and laser scan to obtain accurate information of existing structures which is stored in a BIM model. By using BIM methodologies, all existing information is organized in one place, shared and preserved for future memory. This 3D model is used to virtually reconstruct the Milreu archeological site, bringing this ancient Roman villa to life again, and supports the virtual reality platform and augmented reality tourism application for mobile devices, used for the promotion of the archaeological site, in an innovative way, in order to ensure a high degree of satisfaction to regular visitors and attract new public, looking for the visits to the archaeological-historical site to become a memorable experience.

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INTRODUCTION

The ruins of Milreu are a good example of a Roman villa of great archaeological importance (Santos, 1972), that is not immediately visible to the visitor without professional or specialized knowledge to directly get a correct idea of what that place would be like at the time.

This chapter presents an approach that enhances the preservation of information in a centralized system that allows exploration and valorization of all archaeological information.

This approach is supported by Building Information Modeling (BIM) methodologies allowing the integration of different types of archaeological information into a shared database, constituting a source of 2D and 3D information that is shared and exploited by visitors and / or specialists.

An unmanned aerial vehicle (UAV) conducts a topographical survey of the ruins of Milreu and thus obtain accurate information of the existing constructions, which is the basis that will allow the recording of all the existing information about Milreu. Such records include information about the interventions, interpretations and models of the different epochs.

Virtual and augmented reality technologies are integrated in the tourism application is used to improve the interpretation and the understanding of Milreu to the visitors, using mobile devices as an artifact mediator in the discovery of this archaeological site. Virtual 3D models of some spaces where historical-archaeological information exists were built to support the virtual and augmented reality platform for mobile devices. In this way, the visitor is able to explore a three-dimensional virtual environment on the web and on a smartphone or a tablet that helps him to interpret the archaeological site.

The creation of the virtual space of Milreu allows the visitor the interactive and immersive exploration in a 2D / 3D environment presenting the history not visible directly from the archaeological site. In this way, the three-dimensional virtual reconstruction of the archaeological heritage reveals the importance of these places at the time to the general public by allowing, in an easy and interactive way, the visualization, understanding and exploration of these spaces through Internet.

On the other hand, when using augmented reality, the visitor obtains information superimposed on reality, when he is physically visiting the ruins of Milreu. Which helps him to read and interpret the different spaces, vestiges, objects and existing buildings and, in this way, to transform the visit into a memorable experience.

MILREU

The ruins of Milreu, located in Estoi, 7 Km from Faro, correspond to a Roman villa with a long period of occupation between the 1st century and 5th century, being one of the largest and best preserved Roman villa in the southwest of the Iberian Peninsula. It is classified as a national monument since 1910, after the excavations of the 19th century, carried out by archaeologist Estácio da Veiga, have revealed the archaeological importance of the site (Santos, 1972). From then, becomes a reference among the Portuguese archaeological sites, beginning a wide-ranging programme of excavations from de1971, coordinated by Theodor Hauschild. It is then that is definitely in sight the residential and richest part of the villa, the *pars urbana*, which was acquired by the State and is valued and converted into a visitable archaeological site. In this part, are to highlight the mosaics with marine motifs, the temple, the baths and the residential area organized around a peristyle and an atrium (Hauschild & Teichner, 2002; Lancha & Oliveira, 2013). The *pars rustica*, i.e. the part corresponding to the agricultural dependencies, stables

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Chapter 11
Architecture, Tourism, and Technological Innovation in the Jesuit Mission of São Miguel, Brazil

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ABSTRACT

The contemporaneity demands a better relation between the object and the subject. In this article, it is expected to understand how has been developed this bond of Jesuit architecture and its understanding by the visitor. In this way, it is searched to explore the touristic technological means in Missões Guaraníticas. It questions the use of technology to a better extent of dissemination of local and cultural legacy - existing architecture. The methodology presents an exploratory research of technological platforms of information. It is noticed that its use increases tourism, favoring the culture and history of the region, besides promoting accessibility, reducing the social and physical barriers. The technology helps to preserve and disseminate the historical importance of the site. New information media has influenced and has increased the tourism, stimulating the local trade, and also it encourages the preservation of historical heritage. The approach of historical study of the region / country has great potential for increasing interest in historical architecture and culture.

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INTRODUCTION

Before presenting some determinants results of the relationship between technology and tourism as a feature of the architectural tourist attraction, an overview is introduced of this current environment. In it, ideas of a society as a holder of a traditional modernity has been surpassed by diverse values that conditions to a new world context. The subjects, men and women, distinctly, have transformed technological props in support of their daily lives.

Another aspect of this activity portrays Lash and Urry (1998, p.16) when referring to mobility. These social scientists are directed to the capitalist economy in postmodernity, characterizing its currently striking aspects. In this condition, this social factor is determined as the structure of objects and subjects. This value not only configures the recognition of products that are formed by movements between project, components and ideas which overcome local and national physical barriers, from its origin to the final use (consumption); but also of subjects who are increasingly in different transits and forming global networks of flows of people.

In this issue, points are established with more interest in being accessed, which in Critical Geography can be denominated as luminous points of world capitalism (Santos, 2008). It is known that for various interests often they stand out for having their appeal associated with major world themes, reworking values, such as cultural, by structures based on information and communication. "Thus, places are redefined: as points of interest of long and short-haul, global and locals, manifested by a range of classifications that are expanding and changing" (Santos, 2008, p.18).

The present moment, called by Lash and Urry (1998) of disorganized capitalism, presupposes "a predominance of the culture, global, local and a concern for the environment, all aspects that characterize the trip and the hospitality in contemporary era" (Lash & Urry, 1998, p.348). Previously these displacements were directed to instructions of specialized guides, diverse printed matter and with little universal access. Nowadays, the traveler hopes to absorb an enormous amount of artifact and information, cultures and sense systems (Lash & Urry, 1998, p.345). In this condition, he (the traveler) uses various technologies. Corroborates in this context, the positioning of the localities, often predetermined as a place of tourist interest, not by determinism but by capitalist reproduction's logic, and in many ways are positioned, like those qualified as a World Heritage Site by Unesco, offering a landscape among other expectations to the future visitor.

It is also important to note that "the study of the relationship between the digital and the social tends to be characterized by technological determinism or by indeterminacy" (Sassen, 2010, p.192). In these conditions, the use of technology can be seen in several ways, as an independent relationship to a performance relationship. However,

The digital and the social can shape and condition each other, but each one is, and remains, specific and distinct. And this interaction can occur in short or long chains, where a social result contributes with a new technical element and so on (Sassen, 2010, p.192).

It is also observed that the digital space confronts the dominant idea previously referred to it. Not always, necessarily, but in it adds an imminent value of contradiction in the places' affirmation. This panorama can be easily observed with the reading of Augé (1994). This anthropologist and researcher highlight the necessity to determine a status of the concept of non-place by associating it with various connotations.

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Chapter 12
Should Festival Be Smarter?
ICT on Mass Events – The Case of the Exit Festival (Novi Sad, Serbia)

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ABSTRACT

The trend of information and communication technologies (ICT) employment to enhance transactions and to deliver better experience to visitors of mass events has been growing increasingly popular over the years. The emergence of "smart tourism" agenda which highlights new, more sustainable ways of business management, experience enhancement and destination management also creates new opportunities for ICT employment in mass event. Thus, this chapter discusses existing ICT holding potential for smart approach employment on mass events. An additional case of Exit festival was used as an exploratory evidence to support the main idea of the chapter. Based on comprehensive literary review and additional information on visitors' familiarity with ICT gained from the Exit festival, recommendations for mass event managers are presented.

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INTRODUCTION

Various mass events are becoming increasingly prolific as communities and destinations attempt to differentiate themselves from others and appeal to visitors. With increased competition for visitors, mass events are constantly striving for innovation by diversifying their programming. A wide range of information and communication technologies (ICT) can be used to enhance the event experience (Halpenny, Salenieks, Song, Van Winkle, & MacKay, 2013). Research in event tourism is fundamentally changing due to an explosive growth of ICTs (Rubinstein, 2015; Lee, Boshnakova, & Goldblatt, 2016). The event industry is also being transformed by digital proliferation and business innovations where ICT plays a crucial role enhancing tourist experiences on the mass events and prove more opportunities for their management. In this chapter, the use of ICTs on mass events is examined to help planners, managers and operators understand the current state of technology employment. Particularly, event organizers, with their constrained budgets and limited human resources capacity, must make choices about embracing these technologies smartly. The emergence of "smart tourism" agenda which highlights new, more sustainable ways of business management, experience enhancement and destination management (Cannon Hunter, Chung, Gretzel, & Koo, 2015) also creates new opportunities for ICT employment in mass event. These choices must be made with full knowledge of what each event is about, who their audience is, and what resources are required to support the implementation of ICT (Halpenny, Salenieks, Song, Van Winkle, & MacKay, 2013).

Thus, the purpose of this chapter is to review the current state of ICT implementation on the mass events and to advocate for the smart tourism approach employment. The proof-a-concept approach of this paper is based on an extensive literary review. To gain access to users' familiarity with ICT, the chapter examines the additional representative study of Exit festival, one of the leading music festivals in Europe and in the world. Based on the comprehensive literary review and results of the exploratory case, basic recommendations for smart approach employment for mass event organizers are given.

The chapter is structured as follows. Section one points to basic characteristics of smart approach in ICT design with the focus on travel industry that, among first disciplines, openly employed this concept. Section two examines some of the existing and forthcoming examples of ICT on mass events. Section three presents the exploratory case of Exit festival. The final section identifies main recommendations, contribution and limitations of presented research.

ICT ON MASS EVENTS: TOWARDS SMART TOURISM APPROACH

The review of the relevant literature showed that all ICT applications in this field can be roughly distinguished to two basic types according to its main purpose – visitors-centric applications and managerial ones (Catherwood & Van Kirk, 1992; Lee, Boshnakova, & Goldblatt, 2016). Visitor-centric applications are usually intended to serve various pre- and on-festival experiences enabling visitors' easier interaction, identification, transaction and enhancing the experience thought co-creation. For example, Tomorrowland's (Boom, Belgium) tickets come in the form of radio-frequency identification (RFID) wristbands that employ personal ticket information and facilitate a "cashless" environment. At the same time, wristbands allow wearers to connect with one another on social media sites and embedded LED lights can be remotely triggered by the festival, producing light shows from the crowd (Rubinstein, 2015). Managerial applications are usually concerned with visitors' management in the preparation phase, event

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Chapter 13
New Cultural Mediators, Cocreation, and the Cultural Consumption of Creative Tourism Experiences

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ABSTRACT

Creative tourism has been a proficuous ground for the implementation of ICT's (Information and Communications Technology) strategies and the so-called creative industries. New cultural mediators are changing tourism consumption. Postmodern consumers have brought new perceptions to cocreation processes through user-generated content, eWOM (Electronic Word of Mouth), peer-to-peer exchange, collaborative economy, SoLoMo (social-local-mobile) tourists, among others. Booktubers and music fans/consumers in Chile constitute examples of diverse consumption through virtual and physical mediation, as capital construction enables social practices. In this exploratory study, the authors discuss how creative experiences are being consumed through cultural mediation made possible by technological developments. The creative tourism network website is analysed in the light of postmodern cultural mediation and capital construction.

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INTRODUCTION

Creative tourism can be understood as a postmodern type of tourism (Molina, 2016) where tourists engage with locals directly and are given the chance to develop their cultural capital (Bourdieu, 1984, 1986, 2010). ICT's and new technologies play an important role where new consumers act as cultural mediators influencing cultural and tourism consumption. New cultural mediators (Arriagada & Cruz, 2014; Jeffman, 2014), present themselves as being part of a specialized group of consumers which proactively influence consumption choices in several fields. In this exploratory study, two examples are analyzed in order to connect new approaches to cultural mediation in the sociology of culture and tourism. Booktubers and music consumer fans represent two important examples where cultural mediation exceeds virtual purposes. New ways of cultural capital creation are present as the establishment of new virtual and physical networks crucial for tourism and culture fruition, boosts social phenomena. The aim of this chapter is to discuss how creative tourism experiences are being consumed by a new cultural mediation made possible by technological developments. The creative tourism network website is analyzed (http://www.creativetourismnetwork.org) using content analysis (Carvalho, Costa, & Ferreira, 2015; Ratz, 2016). This exploratory research seeks to perceive how cultural mediation occurs in relation to this special niche tourism (Richards, 2016), how the website allows for social engagement and how creative destinations are been promoted in terms of cultural mediation processes. The chapter is organized in several sections. The Background is divided in three theoretical areas in which the paper is based. In the next section the main focus of the chapter treats in detail the creative tourism network website, followed by future research directions and conclusions sections.

BACKGROUND

Specialised Cultural Consumption in Postmodern Tourism

I am someone who can adapt to any cultural way-of-life, any fashion style, or any cultural good as I flexibly accumulate a broad range of diverse experiences. (Thompson, 2000, p. 130)

The statement above made by Thompson (2000), illustrates the versatile character of postmodern consumers where cultural fruition, mediation and symbolic capital are present. Postmodernism consists of the dissolution of borders, not only between high and low culture, but also between different cultural forms, such as tourism, art, education, photography, television, music, sports, shopping and architecture (Urry, 2002). "Architecture, the representational arts, and all branches of the humanities and the social fields have been energized (…) by the turn to things postmodern" (Thompson, 2000, p. 118). In short, the mass communication era has transformed the tourist gaze and many of the features of "postmodernity" have already prefigured in part on existing tourism practices (Urry, 2002). This also influences tourism outcomes as the new tourist is motivated by higher-level motivations, driven by post-materialistic values and consciously seeks the experiences important for him (McLeod, 2006).

The concept and its meaning has been discussed in different ways, for example for Giddens, (2002) the word "post-modernity" is often used as a synonym for "postmodernism" or post-industrial society". For the author, postmodernism is appropriated to refer to styles or movements in literature, painting and

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Chapter 14
"España Verde": Tourism Destination Image among German Facebook Users

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ABSTRACT

This study aims at measuring the image of the tourism brand "España Verde" by using the social media platform Facebook. The ever-increasing competition within the tourism industry makes it vital for destinations to address their target group by tailored marketing measures. Furthermore social media channels are changing the interaction between Destination Management Organizations (DMOs) and customers. With the aim of exploring España Verde's image, a three components approach—cognitive, affective and conative was applied. Related to the measurement of the cognitive component, the study also focuses on España Verde's touristic potential ranging from a rich and diverse culture as well as a unique natural heritage to a suitable infrastructure for touristic purposes. Although the supply side seems to fit the target group's desires when choosing a vacation destination, the exploratory results reveal that there is currently only little awareness for España Verde on the German market.

INTRODUCTION

The tourism brand España Verde was founded in 1989 and unites four Spanish autonomous communities - Galicia, Asturias, Cantabria and the Basque Country. The area ranges from the French border, along the northern Spanish coast until the western end of the Iberian Peninsula. The destination is characterized by a broad touristic supply and represents an alternative to the typical "sun and beach" vacations. The brand was founded in order to establish a strong brand image which clearly represents the characteristics

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of the participating communities (Cano Fuentes, 2006). These autonomous communities consider tourism as an industry that supports mutually the economic development as well as the natural and cultural heritage of the region (Ivars Baidal, 2004).

Tourism destinations like España Verde are competing in an environment where it is vital to be differentiated from competition and to focus on unique selling points (Echtner & Ritchie, 1991). It is of increasing importance to attract the tourist's attention in order to be considered as a possible holiday location (Gartner, 1993). Hence, the destination image held by target markets is essential in order to build and manage a strong tourism brand (Bigné, Sánchez & Blas, 2009; Martín & Bosque, 2008). Additionally, new Information and Communication Technologies (ICTs) are deeply affecting the tourism industry and changing the interaction between destinations and tourists (Buhalis & Law, 2008). New ICTs, as for instance Social Media, provide a broad range of possibilities for destinations such as countries, regions and cities to address customers and to influence their decision - making - process by tailored marketing measures (Stepaniuk, 2015).

In the annual journal "España Hoy" (Spain Today) – published by the Ministry of Presidency – the Spanish State Secretariat for Communication gives a current overview of Spain including descriptions of the measures and decisions undertaken by the government such as the new policy for promoting tourism abroad as committed by the Spanish General Secretariat of Tourism TURESPAÑA. In Spain Today's version of 2015, the first measure of this policy aims to apply new ICTs as well as Social Media, due to the technological advances, which are also affecting the tourism industry. The policy regarding mature markets, as for instance Germany, is to increase the tourist's loyalty and to attract new demand segments demanding products towards art and culture, urban tourism, local gastronomy and nature (Ministry of the Presidency, 2015).

According to the ranking of international tourist arrivals by country of residence, as presented by the National Institute of Statistics (Instituto Nacional de Estadística, 2016), the incoming tourism from Germany to entire Spain amounts to 10,293,964 arrivals or about 15% of the total inbound tourism in 2015. Considering those numbers, Germany is ranked on the third position. Hence, the German market can be considered as a mature market. In view of the tourism supply of España Verde, as outlined at a later stage of this chapter, it becomes evident that its supply side is suitable for the attraction of new demand segments and the diversification of the array of products. Statistics, achieved from the tourism promotion board of Cantabria (CanTur – Sociedad Regional Cántabra de Promoción Turística) show that Germany was ranked on the fourth position regarding the number of tourists who visited España Verde in 2015 between January and September (IET Instituto de Estudios Turísticos, 2015)[1], and can, therefore, be considered as a strategic market for this Spanish destination.

This study aims at analyzing the destination image of the tourism brand España Verde amongst the German market by using a Social Media channel. The results provide the groundwork for the development and application of suitable marketing measures for connecting the destination with its target audience.

This chapter follows the following structure: a) in the background section, a literature review on the destination image construct and related concepts is provided, as well as on the relationship between destination image and social media, which is followed by a summarized presentation of the tourism supply of España Verde; b) the section related to the methodology, presents the objectives and the research questions, followed by the design of the questionnaire, the process for data collection, and the summary of instruments for data analysis; c) in the section data analysis, the results for each of the research questions are depicted ; d) in the discussion and conclusion section, the findings are discussed and the main contributions of this scientific work are presented.

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Chapter 15
Gastronomy in Cultural Tourism:
Use of Mobile Instant Messaging to Look for Gastronomic Recommendations

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ABSTRACT

Cultural tourism consumers seek advice and recommendations from others before making buying decisions. The mobile instant messaging (MIM) boom could create a channel not only for social communication but also for information about cultural tourism and specifically the choice of restaurant. In this research we study which channels are most used by consumers when asking for gastronomic recommendations and, in particular, the factors behind the use of MIM as the preferred channels when obtaining tourist information. For this, an online survey was carried out with a sample of 393 individuals in Spain and descriptive statistical techniques were applied to the processing and analysis of the data. The results obtained show that: (1) its use is determined by its instantaneousness and permanent availability; and (2) people use it due to a lack of knowledge about the area.

INTRODUCTION

Tourism is undergoing major changes. One of these changes is that tourists are seeking destinations that allow them to enjoy different experiences (De la Rosa, 2003; Cracolici & Nijkamp, 2008). At the same time, cultural tourism has been transformed, adapting to the new demands of travellers (Guzmán-López & Jesús, 2011). This has resulted in it undergoing an evolution influenced by the conceptual changes

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that have taken place in the area of cultural heritage, social changes and consequently by changes in demand, looking for new forms of cultural consumption (Ibarra, 2001).

Cultural tourism can still be defined as that which includes all aspects of the trip, allowing the tourist to learn about the history, heritage or current ways of living and thinking (Richards, 2001). However, the way this is experienced has changed. Cultural tourism had always prioritised the visual sense over the rest of the senses, turning the tourist into a mere observer of reality, a passive tourist. However, tourists have evolved, changing from a mere collector of photos to wanting to seek out experiences. This search by the tourist for trips offering new experiences entails the greater involvement of the other senses in order to understand the customs of the place (McCabe, 2014; Ricky & Scott, 2017).

Thus, today's traveller wants to have a full sensory experience and this includes taste. Through food, the cultural tourist obtains a greater understanding of the place they are visiting, beyond the simple observation mentioned previously (Cohen & Avieli 2004; Kivela & Crotts, 2006; Molz, 2007; Mak et al., 2012; Oliveira, 2007). In addition, it should be noted that gastronomy forms part of the cultural, social, environmental and economic history of places and their inhabitants, reflecting a particular lifestyle and being deeply rooted in the culture and tradition (Mitchell & Hall, 2006). In fact, one of the elements of cultural tourism is gastronomy, with strong cultural links between gastronomy and tourism (Ritzer, 1995; Richards, 2002; Roden, 2003; Dos Santos & Antonini, 2004; López-Guzmán & Sánchez-Cañizares, 2008; Sánchez-Cañizares & López-Guzmán, 2011). In addition, it is a factor that has traditionally been used by destinations to improve their image and create a differentiated positioning (Hjalager, 2010).

It is in this context that wine tourism, culinary tourism and olive oil tourism are becoming more important, with the gastronomic factor being either the main motivation or a key part of the cultural trip, rather than simply a necessary activity at the destination (Flavián & Fandos, 2011).

Therefore, gastronomy and culture are closely related. When tourists travel they do not just go to restaurants to satisfy their need for food. Fields (2002) identifies four types of gastronomic motivation: physical, cultural, interpersonal, and status and prestige. In this study we focus on cultural motivations. In these, the importance of food in the culture of a country is taken into account. According to Vinha (2004), food has always been a key element of the culture of each society and tourists increasingly perceive gastronomy as an important factor in better understanding the culture of a place. In this sense, gastronomic tourism is understood not only as the act of going to a restaurant and tasting the typical dishes, but also being aware of the rituals and habits associated with the local gastronomy and of the option to visit museums and other attractions on this topic.

In cultural tourism, and specifically in gastronomic tourism, the Internet plays a very important role (O'Connor 2011). In the Web 2.0 environment, users become the main channels for the dissemination of online information, generated in turn by them and allowing for electronic word of mouth dissemination, or e-word of mouth as it is known (*e-WOM).* This type of information is called User-Generated Content (UGC) (Burgess et al., 2009).

In addition, the buying decisions of tourists are influenced by the ratings and comments made by other gastronomic tourism consumers. Several authors (Borja et al., 2002; Borja & Gomis, 2009; O'Connor, 2011) argue that this type of tourist in particular is influenced during the pre-purchase stage, purchase stage and post-purchase stage, not only by offline recommendations from friends/family and traditional channels but also by the online environment: *word of mouth* of the blogs, websites such as *TripAdvisor* or social networks like *Facebook*. So when it comes to making a decision, the recommendations taken from the social media become a key element influencing the evaluation of the information on the tour-

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Chapter 16
Information Mycological Systems and Traditional Ecological Knowledge:
The Case of Mycological Tourism in Central Mexico

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ABSTRACT

Wild edible fungi are non-timber forest products that have great relevance for forest communities in central Mexico. Texcaltitlán is a rural community known for its traditional ecological knowledge on the use and identification of wild edible mushrooms. The aim of this work is to link Geographic Information Systems and Traditional Ecological Knowledge, in order to generate Mycological Information Systems. This is a qualitative, quantitative and exploratory research, which seeks to determine the usefulness of Geographic Information Systems (GIS) to systematize and locate mycological resources for use as a tourist attraction. The results show the existence of a wide variety of edible mushrooms in the region, along with a wide mycological traditional knowledge. Both aspects reflect the existence of unique natural and cultural features that can be the basis to build a unique tourism product in central Mexico. It is concluded that GIS are useful tools to build a multifunctional vision of mushrooms.

INTRODUCTION

This chapter is part of a basic scientific research entitled "Evaluation of the recreational dimension of wild edible mushrooms, their socioeconomic interest and their perspectives of rural development", supported by the National Council of Science and Technology of Mexico. This project contains three central components: (i) a participatory approach integrating local stakeholders as promoters of mycological tourism; (ii) generating mycological information systems based on traditional ecological knowledge

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and scientific knowledge; and (iii) proposing a strategy for the tourism management of mycological resources in the central Mexican plateau.

Mycological tourism consists of experimenting with the natural and cultural dimensions of wild edible mushrooms, through an articulated offer of goods and services that allow a recreational experience to be lived. Its main activities are the identification, harvesting and tasting of the mushrooms in close contact with the nature and mushroom picking communities. This tourist modality is part of the new trends in rural tourism that are characterized by their high specialization, focused on a product anchored to the territory.

Mycological tourism is an example of the valorization of forests as a tourist resource in contemporary societies. The growing importance of forest spaces as tourist scenarios is associated with the specific characteristics of these ecosystems. This value can be increased by modifying forest management practices; For example, by maintaining the abundance of certain local resources of special interest (Bostedt & Mattsson, 1995). However, tourism exploitation of forests also generates environmental, social and cultural risks (Kuvan, 2005). Aspect by which planning is a central theme.

In the case of Geographic Information Systems, the interconnections between tourism and new technologies not only reveal the location of tourist attractions in a specific territory. Rather, they allow the mobilization of local resources, converted into cultural goods, as a distinctive sign of contemporary tourist leisure (Hannam, Butler & Morris, 2014).

The objective of this chapter is to analyze the relationship between mycological tourism and Geographic Information Systems as a tool for tourism planning in rural areas. All this from a participatory approach in which traditional ecological knowledge serves as a source of information and a point of reference to guide policies for economic restructuring of rural areas.

For this the text is divided into six parts. After this introductory section the relationship between Geographic Information Systems and Mycological Tourism is presented. Later, the use of GIS in the planning of mycological tourism is explored as a tool for generating data that can be analyzed from an integral and participatory perspective for the determination of the tourist potential of the territory and its adequate spatial projection. Later, the case study in a forest community in central Mexico is presented, where the characteristics of the observation unit and the methodological design of the research are discussed. Next, the application of the Mycological Information System is presented, through the evaluation of local mycological resources and a proposal of paths for mycological tourism. Finally, the conclusions and some considerations for the future of the research are presented.

BACKGROUND

Geographic Information Systems Applied to Tourism

The use of local resources for tourism can produce the opportunity to generate processes of socio-economic transformation that help to improve the quality of life of rural inhabitants. However, the introduction of new non-agricultural rural activities such as tourism requires the development of systematized information platforms for the success of development strategies.

In the case of nature-based tourism, many of the resources in which the activity is focused can be documented through spatial information sources that indicate the quantity and characteristics of tourism resources, as well as the socio-economic impacts that can derive from their use as tourist capital.

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Chapter 17
Isle of the Dead:
A Study of Trunyan Cemetery (Bali)

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ABSTRACT

This essay aims to explain the phenomenon and effect on tourism of the Balinese cemetery in the village of Trunyan, where the dead are not buried. It is a narrative enquiry combined with critical theory largely grounded in the scholarship of dark tourism and communication theory, coupled with content analysis of the online community's reviews from the TripAdvisor website. The study indicates that (1) connectedness to death suggests the existence of spirituality needed by people, at the same time indicating understanding of mortality; (2) social connections developed as a result of visiting Trunyan cemetery not only bring self-awareness and awareness of others, revolving around intrapersonal communication about spirituality and interpersonal communication among members of the online community, but also illustrate the development of dark tourism and conceptualise the role of tourists in building authentic experience as the essence of a death site's brand image.

INTRODUCTION

The expression "Lonely in a crowd" indicates how the quality of relationships matters, and signifies a much deeper existence from postmodern perspectives where people seek for feelings shared by others. This aspect represents the roots of reciprocity as it was studied by ethnographers in non-western cultures (Malinowski, 1926). In this context, feeling of this calibre are driven by the so called dark tourism sites (Biran, Poria, & Oren, 2011; Stone & Sharpley, 2008). Although gaining in popularity, dark sites wake up a profound ethical discussion in public opinion (Tzanelli 2016). While a family of theories understand that dark sites express an emotional arousal which links community with pastime, addressing some of the existential questions of human existence (Lennon & Foley 2000; Raine 2013, Biran & Hyde, 2013; Cohen 2011; Podoshen 2013; Stone 2011); others claim beyond the quest for death, underlies a

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sentiment of morbid voyeurism which is politically manipulated to perpetuate the legitimacy of elite, even in contexts of disasters and trauma (Bowman & Pezzullo, 2009; Hartmann 2014; Tzanelli 2016; Korstanje 2016). Likely, the Trunyan cemetery in Bali offers a fertile ground to overcome the limitations dark tourism literature shows. Despite this cemetery attracts both types of segments, overseas and domestic tourists, it is difficult to frame this space into the model of Seaton and Lennon (2004). As P. Stone (2006) puts it, dark tourism takes a wider spectrum which oscillates from battlefronts memorials which draws much attention from media, to cemeteries, where any intrusion is seen as a clear violation to private life. In this respect, B. Heidelberg (2015) dissects the case of Amityville US to understand many factors are involved at time of adopting dark tourism as the first option. Many communities, even, are far from the needs of reminding the event, and opted to silence it in the dust of oblivion. Korstanje has gathered substantial evidence during his fieldwork in Cromañón, Buenos Aires (Argentina) to confirm some communities see in tourism as an activity that very well may corrupt their memory of deads (Korstanje 2015), while in other cases, dark sites include the colloquially named perilous places, houses of horror, fields of fatality, tours of torment, and themed Thanatos, are theoretically on the dark tourism spectrum (Sharpley & Stone, 2009; Stone, 2006; Bowman & Pezzullo, 2009). Death tourism, which is defined as activities visiting unique and macabre sites such as cemeteries, appears not only to encourage human contemplation on death of the self (Stone, 2012; Korstanje and George, 2015), but also to revolve around how the death sites (those visited by tourists) serve as a distraction from one's own mortality (Korstanje & George, 2015). Coupled with the conversation on social media (Sigala, Christou & Gretzel, 2012; Nikiforova, 2013) from a postmodern perspective, i.e. the phenomenon of an online community generating e-comments and e-word of mouth (e-WOM) (e.g. see Gretzel & Yoo, 2008; Yoo & Gretzel, 2008, 2010, 2011; Xiang and Gretzel, 2010),this phenomenon of death sites in particular and the surprisingly popular dark tourism in general, leads to question whether it is tourist-demand or attraction-driven (Stone, 2006; Wilkinson, 2010).

As this backdrop, the online comments into death sites in the online community not only indicate how the role of tourists in building shared values may (or may *not*) shape the brand image of death sites, but also signifies the intertwined relationships of spirituality and specific tourist typology from the postmodern perspective. This strengthens the conceptualisation of "secular tourists" that Korstanje and George (2015) coined in their study on philosophical issues in dark tourism. The secular tourist is considered as one who may seek for authentic life experience of social connectedness and the need for otherness, which in other domains of study is identified as human needs of spirituality (e.g. Krentzman, 2013). It also indicates the magnitude of good relationships which revolve around human interactions with death and lead to contemplation of self-awareness (i.e. to intrapersonal communication) and how the conversation about death in the online community (i.e. interpersonal communication) validate the sense of spirituality and its philosophical perspectives. For example, Krentzman (2013) examines the intertwined relationship of spirituality and religion, leading to how attributes such as belief, comfort, reflection, ethics, and awe fuel the content of the shared values under discussion. Arguably, it keeps people alive and gives validation to their lives, as well as serving self-awareness (e.g. Krentzman, 2013; Holt-Lunstad, Smith & Layton, 2010).

The structure of this essay is as follows. First, the literature of dark tourism, from the tourist's and postmodern perspectives, and the purpose of life revolving around spirituality and religion are reviewed. Next, the research gap, the research methodology and an overview of the study context are outlined. The findings of the content analysis revolve around the presentation of death and its communication patterns; and how the presentation of death and religiosity emerge as commodification and affect tour-

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Chapter 18
Perspectives of the Adoption of Cloud Computing in the Tourism Sector

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ABSTRACT

This chapter aims to expose the current situation of the adoption of cloud computing in companies in general and in enterprises of the tourism sector in particular. For this, a review of the literature has been carried out to establish the conceptual framework of technology and of the new economic model that underlies its adoption. Cloud computing is one of the technologies less known to many organizations and especially users, as it is a new technology based on the Internet, through which information is stored on servers, is provided as a service and on clients' demand. Therefore, the main theories of adoption that have been used to explain the different adoption models are presented, as well as, the different solutions that are being used in the tourist industry.

INTRODUCTION

Information and Communication Technologies, also known as Information Technology (IT) have been widely adopted by the society, but especially by the enterprises. These technologies have been widely adopted under the concept of solutions that are provided through IT services. This solution provides effective low-cost communication tools for customers (Tan & Teo, 1998). This is something to be considered for the small and medium-sized enterprise (SME), which adopts IT in a gradual and precise way, not having the need to make large investments, distributing the effort for years.

The adoption of Internet-based IT has made it possible to develop the paradigm of everything as a service, where the user pays only for the use made of the service. These services can range from software applications (Application Service Provider or ASP and Software as a Services or SaaS) to systems

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infrastructure (Infrastructure as a Service or IaaS). This formula is intuited as a good solution for small and medium enterprises SME, in the line of jumping the barriers that prevented them to take advantage of IT. In the following section, as well as throughout the whole chapter, this concept will be expanded.

Heart and Pliskin (2002) defined this concept as "eRent" of Information Systems (IS), made through the Internet and thanks to an ASP. They say that for SMEs, the IS through "eRental" could be an attractive solution to the expensive and complex acquisitions and implementations of traditional IT.

Johansson (2004) also states that the main reason for SMEs to adopt IT by contracting an ASP is that they allow full control cost and a lower cost when adopting and maintaining them. In spite of this, it assures that if this decision is examined in detail, it is observed that the customers do not emphasize these reasons, and it induces to think that the perspective of the cost is secondary for the SME.

In this way it identifies the three main reasons why ASP clients hire their services. The main reason is that the company is looking to outsource everything that is not basic competencies of its business, which most usually meet the IS. The other two reasons are the lack of qualified personnel and the overall strategy of the organization.

The adoption of IT in the tourism sector is evolving with changes of habits of the travelers, driven by the adaptation of IT as the Internet of Things (IoT), which consists of an automated connection through the Internet of the information generated by the devices and systems. IoT can be defined as a set of interconnected things over the Internet, which have the ability to measure, communicate and act all over the world. The key idea of the IoT is to obtain information about the environment to understand and control and act on it (Díaz, Martín, & Rubio, 2016). According to these authors, the cloud computing and IoT integration, known as Cloud of Things, solves such problems as IoT's limitations, data access, computing, data analysis, and can create new opportunities.

Another adoption of IT in the tourism sector is SoLoMo (Social, Local and Mobile), which reflects consumers' preferences for sharing content and habits through the social web (social purchase, recommendations, etc.), only to say some examples (Junta de Andalucía, 2012).

Thus, travelers or tourists increasingly use different devices connected to the internet to find information, locate offers, book all services related to travel or make purchases at destination, which has resulted in the explosion of travel agencies (Online Travel Agencies), internet portals that intermediate in the booking of tourism products at worldwide level, the sale of second-hand travel through Internet, offering huge discounts through online outlet portals, or the emergence of new typologies of solutions to optimize the management of these channels and the presence based on solutions such as the Central Reservation System, Channel Managers (Channel Manager System) or online communication systems (Online Reputation, Social Networks, etc.).

The aim of this chapter is to present the different models of adoption of cloud computing by companies and organizations and, in particular, by enterprises of the tourism sector. The description and features of cloud computing, the benefits and obstacles for the companies, the added value for adopting the cloud, as well as, some examples of open source solutions are presented. Finally, the characteristics of the solutions adopted by the enterprises of the tourism sector are explained and discussed.

This chapter is structured as follows. After this introduction, a brief review of the state of the art of the literature of cloud computing is developed in Section Theoretical Background. Then, in Section Cloud and Enterprise, the basic principles of adoption of cloud computing by enterprises in general are presented, while in Section Smart Tourism Destinations and Cloud Computing in the Tourism Sector, the adoption of cloud computing by the different subsectors of activity of the tourism sector is explained.

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Chapter 19
Semantic Transformation and Use of Cultural Data:
Record Once and Publish Many

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ABSTRACT

Cultural content and cultural assets are increasingly seen as invaluable drivers for education, entertainment, tourism, knowledge, and shared memory initiatives. As such, cultural information, as stored in cultural institutions such as museums, archives, and specialized libraries is increasingly demanded by several actors, from public policy, tourism, app developers and software companies, schools and the citizen at large. To satisfy the needs of such a large spectrum of consumers and end users, the information must be format independent, multi-lingual, multi-purpose, and make use of standards, norms and national and international recommendations. In this is paper we describe our past and current efforts to develop cultural information systems that can satisfy those requirements and those of the specialized public, such as scientists and curators. We describe an inventory and content management system and the conceptual and architectural choices that were made to allow its evolution, standards' compliance and multi-purpose use.

INTRODUCTION

Cultural content and cultural assets are increasingly seen as invaluable drivers for education, entertainment, tourism, knowledge, and shared memory initiatives. As such, cultural information, as stored in cultural institutions such as museums, archives, and specialized libraries is increasingly demanded by several actors, from public policy, tourism, mobile app developers and software companies, schools and the citizen at large. To satisfy the needs of such a large spectrum of consumers and end users, the information must, as much as possible, be format independent, multi-lingual, multi-purpose, and make

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use of standards, norms and national and international recommendations. As Libraries, Archives and Museums are arguably the oldest examples of knowledge based organization (Hedstrom & King, 2003) it is natural that they are at the forefront of the web evolution. Cultural institutions have been using several inventory management systems, and investing in cleaning, formatting and adapting data to be shown on public portals and mobile applications. Some institutions have been exporting their data, encoded in some metadata format, to aggregators with national or international dimension such as Europeana.

After data is published on the web there is a growing need for linking it from different places, themes, languages, and culture so that it can be part of the linked open data world, and be used to its full extent. It becomes virtually impossible for an institution to cope with so many requests for information, in different formats, encoding standards, languages and level of detail. Requests can come under the form of sharing in social networking sites, supplying data to content aggregators, providing programming interfaces to app developers and other end users, participating in joint portals, and virtual exhibits, for example. Additionally, published data should be correctly found by search engines, and made accessible to the general public. The use of right metadata, together with search engine optimization techniques can help disseminate a cultural institution's content. The web is an interlinked collection of resources, identified by what is called a URI (Uniform Resource Identifier). A kind of URI is what people generally type in a web browser to access a given site. To be able to make available their data so that it is found, either by searching or by looking from other data, institutions need to take a systematic approach to web publishing by providing as much context information as possible.

The so called semantic web is a web with context information, organized in a way to make search and navigation easy and accurate by providing only relevant information. The semantic web is designed to make search and discovery more efficient, and to navigate from one resource to the other as one would normally do in a web page. For example, when searching for the painter Picasso there would be irrelevant results, like those related to a car model with that same name, software packages or generic pages mentioning Picasso. Discovery is also an important behavior, as people would normally move from one page to the other by following links. The semantic web should keep and encourage that same behavior, mainly if computer programs are browsing the data as this is the only way they can move from one page to another.

The linked data movement proposed the Resource Description Framework (RDF) syntax to represent information to be exchanged (Bizer, Heath & Berners-Lee, 2009; W3C, 2014). There were several RDF vocabularies available then, and their number and availability continues to increase. Anyone can define and publish a RDF vocabulary, making it available such that other people can reuse it (see for example http://lov.okfn.org/dataset/lov/ for a database of more than 600 available RDF vocabularies).

Tim Berners-Lee (2006) summarized and defined the following characteristics for the semantic web, a web of linked data:

- Use URIs as names for things.
- Use HTTP URIs so that people can look up those names.
- When someone looks up a URI, provide useful information, using the standards (RDF, SPARQL).
- Include links to other URIs so that they can discover more things.

In 2010, Berners-Lee updated the semantic web document and defined a 5 star system to rate linked open data (LOD) projects on the web. Linked data is defined as above, and open means open license (Berners-Lee, 2006; http://5stardata.info/en/); item numbering is the number of stars:

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Chapter 20
A Platform for the Promotion of Energy Efficiency and Monitoring in Hotel Units

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ABSTRACT

Tourists today are more likely to be concerned with the environment and greener lifestyle choices. In this context, a green flagship of some hotels can be an important selection criteria at the time of selecting one. In the near future, buildings should become nearly zero energy, consuming as low as possible

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and producing almost all the energy they need, using renewable energy sources. To achieve this goal, hotel buildings need to pass through a transformation process that will make them more efficient. In this process, a decision support platform would be important to help hoteliers monitor their energy consumption, identify which points are consuming more than expected, decide which investments are more cost effective and manage their equipment in an optimum way. This chapter describes the challenges involved in developing such a platform, covering several research and development fields, including Internet of Things networks, ICT, Smart Grids, Renewable Energy, Energy efficiency, as well as algorithms for machine learning and optimization.

INTRODUCTION

There has been a gradual shift in the expectations and demands of tourists, regarding hotels. Today's typical hotel guests are more likely to be concerned about environmental issues comprising greener lifestyle choices, such as recycling, fuel-efficient vehicles or organic food. While the location of hotels is still one of the most important features to select them, it is also common to find many hotels in the same region or area. In these cases, the green flagship of some of these hotels can be an important differentiating factor that make them more attractive to some tourists.

To achieve that green flagship, a better energy efficiency of hotels is required. In this field, the Directive 2010/31 of the European Union (European Parliament, council on the energy performance of buildings, 2010) makes mandatory for all new public buildings after January 2020 and all other new buildings from January 2021 onward to become nearly zero energy. This means that, they will have to consume as low as possible and at the same time will have to produce almost all the energy they need, in their own building or in their vicinity.

As tourism is one of the priorities for the economic activities of several European regions, the implications of the European Directive 2010/31 are of high importance for touristic companies and in particular for hotel units, affecting their competitiveness and image. Monitoring energy consumption to achieve the zero energy goal also helps to accomplish the sustainability of the region where the hotel is. By conveying the achievements obtained with these measures in future eTourism Applications, the image of the region as a whole can be improved.

In order for them to achieve the goals of zero energy building, a complete set of decision support tools is required that, besides monitoring consumption, could support the development of innovative methods to improve energy efficiency. Their aim is to give hoteliers and technicians a set of tools that include recommendations on building insulation, amount of renewable energy needed, automated detection and identification of excessive consumption levels, and management of consuming devices.

In some cases, as for instance in the detection and automatic identification of abnormal consumption levels, machine learning algorithms are required to compare the current level of consumption with the expected one, obtained from the consumption history of the building and weighted by several factors such as occupancy levels and environmental variables. Machine learning algorithms are thus used to perform a real time and continuous analysis, selecting the relevant information between huge amounts of data generated, e.g., by a network of IoT (Internet of Things) sensors and SCADA (Supervisory Control and Data Acquisition) devices.

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* * *

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