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The Impact of Information and Communication Technology on the Tourism Sector

Nikoli G.[*]
Lazakidou A.[†]
University of Peloponnese (Greece)

ABSTRACT

Information and Communication Technology (ICT) has changed the global businesses environment by a wide range of tools, methodologies and functions, facilitating the strategic management and supporting firms to achieve a long term competitive advantage. The aim of this paper is to provide an overview of the new applications of Information Communication Technology in tourism industry, the contribution of ICT to the promotion of the tourist product, as well as the potential to the tourism management and the process of decision-making. One important tool, which helps in making decisions in the field of tourism economy, is the Geographic Information System (GIS), which provides a comprehensible representation of the statistical figures of the tourism economy by facilitating decision-making on tourism policy. In this paper is presented some tourist financial figures and their visualization through graphs by Geographic Information System.

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Keywords: Information Communication Technology; Decision-making; Geographic Information System (GIS); Tourism Industry; Promotion of Tourism

Introduction

Tourism is a fast-growing industry and is one of the largest and most dynamic central contributors to socioeconomic progress. With its broad social, cultural, political and economic impact, tourism is a valuable contributor to global challenge. Investments in

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[*] E-mail address: genikol@hotmail.com
[†] E-mail address: lazakid@uop.gr

tourism have been growing from destinations from all over the world, as tourism is a key factor in development and increase of the prosperity for a large part of the population at local and regional level. It contributes to the employment through the creation of jobs and to the competitiveness of enterprises with a significant positive impact on the economy of a country. Tourism rates third largest export sector after chemicals and fuels and ahead of automotive products and food (UNWTO 2017; SETE 2017).

Since tourism is a major industry in world's economy, many destinations are competing to attract prospective tourists through all of communication medium. As Information Communication Technology has transformed the touristic sector globally, tourism organizations should rely on it and take advantage of the variety of new opportunities through innovative technological tools for their development. Web applications have revolutionized the tourism sector during the last decade, providing to prospective tourists communication and information access and allowing them to participate in vacation planning. Since we are living in a digitalized world, the Internet is a necessary fast growing tool of international communication that has played a boosting role in the tourism industry (Moutinho, 2011; Tsartas et al., 2006).

1. Promotion of Tourism through Information and Communication Technology

The spread of new IT technologies offers new opportunities in developing tourism activities and in approaching potential customers in a dynamic and fluid market. E-commerce is one of the most important technological applications for the sale and purchase of goods through the use of the Internet (Christou et al., 2007; Tsartas et al., 2006). According to Buhalis (2003), E-tourism is the digitization of all processes and value chains in the tourism that enable organizations to maximize their efficiency and involves all business' operations from e-marketing, e-commerce and e-finance to e-procurement, e-accounting and e-HRM (Buhalis, 2003).

The development of ICT has altered the contemporary global market place allowing business to reach a global audience, to export a wider range of goods and services and to improve their internal efficiency. Moreover, ICT has conducted electronic business transactions and deeply altered the traditional view of marketing, shopping and retailing media (Farkhondehzadeh et al., 2013). ICT has a great impact on turning enterprises from local into global, improving their position in the market, gaining a competitive advantage, improving productivity and facilitating new ways of management. It is necessary that tourism organizations develop further these applications in order to ensure sustainable global tourism development, promote less developed and remote areas as well as the cultural wealth of each country (Aramendia Muneta & Ollo López, 2013). Taking into consideration that the new generation of tourists and tourism employees is very different from the previous ones and the main difference is related to technology, adoption of new technologies by tourist destinations is essential as they provide high qualities of their products and services and would also contribute to image and brand improvement of destinations. Tourism enterprises have to adopt the set of values that characterizes the new generation of tourists, in order to support their long-term competitiveness (Gruescu et al., 2009).

ICT contributes to marketing, sales, distribution and enhancement of customer service which increases the efficiency and effectiveness at a microeconomic (tourism firm/organization) as well as a macro-economic level (tourism destination). Web services for tourism enable suppliers to provide mass customization services, interactive design of products and distribute information. Furthermore, they analyze competitive destinations and guests complaints, forecast tourism demand and communicate tourism statistical information. E-business applications empower suppliers to create, communicate, inform and deliver value to customers, reducing the cultural, geographical, political and communication boundaries. The progress in new technological developments and their implications has revolutionized the tourism industry, restructured the management practices, reservations, call center and interfaces such as Internet and Booking Engines (Christou et al., 2007).

Constant innovations of technological advancements have an indirect intangible positive impact on a firm's financial performance and firm's profitability as well as enable them to offer differentiated, qualified and value-added products, helping them to stay competitive on the tourism markets. The implementation of ICT has strong positive potential for firm performance as it is a tool for rapid and cost-effective communication of contacts between business, partners and final customers (Mihalič & Buhalis, 2013).

The adoption and use of information technologies in tourism is recognized as the driving force of innovation contributing to healthy competition between businesses. Interest in tourism service providers focuses on the way in which the services offered serve the need for diversity and enhance the differentiation of the tourism product so that they can meet a wide range of special needs to attract more customers. New technologies that have been steadily developing over the last few years have brought about changes in the tourism industry contributing to the elimination mediators and the introduction of new forms of mediation. A key factor in increasing the competitiveness and performance of small and medium-sized tourism enterprises in a global environment is the ability to adopt flexible, efficient structures and exploit innovative practices through Information and Communication Applications that will be a key factor for their growth and prosperity (Rerres & Kafeza, 2009; Tsartas et al., 2006).

The continuous development of ICTs during the last decade has brought radical change of the travel marketplace and customer behavior. Web applications have been welcomed by both sides of service providers and by tourism market travellers. For the satisfaction of demand are being developed new ways that facilitate the decision making process of the users as they have access to wide range of information and offers, easier / faster service, interaction with other tourists regarding their experience, they can also compare among several tourism suppliers and finally choose and buy the most interest product online, by direct service booking. For the companies the benefits are faster and simpler tourism production, access to a wider market place, understand the needs of consumers, improve their tourism services, products and image, build trust relationships with their customers, better cooperation and interchange of resources and information between companies and stakeholders. Moreover, it enables the destinations to be highlighted and developed internationally (places and cultures) and no longer dependent on tour operators (Buhalis, 2003).

The ICT revolution offers a wide spectrum of solutions influencing the entire tourism industry as a whole including tourism, travel, transport, leisure, hospitality and increases the efficiency level of economic processes in the tourism sector (Gruescu, 2009).

1.1 Customer Relationship Management (CRM)

Customer Relationship Management (CRM), is a comprehensive approach system for identifying and maintaining a closer relationship with customers, aiming at sales, service and marketing functions. For the integrated customer relationship management system, a customer purchasing habits database is essential so that companies can customize their marketing messages so that there is consistency between customer preferences and products. CRM enables firms to interact with customers, through e-mail, telephone and personal contact and offer special offers to encourage old customers to buy back and visit the site. Loyalty is very important for a business and it can be achieved when the firms provide incentives to their customers, better quality, greater satisfaction through personalized services and process control. From the enterprise side, there is an Intranet access for reorganizing internal processes and extranet access for developing transactions with business partners, stakeholders and customers. Therefore, firms are benefited from less expenses on market research, better customer information, customer loyalty, market segmentation and increase money efficiency as services are tailored to customer needs (Christou et al., 2007; Tsartas et al., 2006).

Before purchasing tourism products and services, tourists seek timely and accurate information in order to constantly facilitate the decision-making process. The adoption of an effective online strategy enables the firms to reorganize business strategies and to attract customers by discovering new ways to expand their market share. In order to achieve competitive advantages, organizations should incorporate systems to deliver tourism products, provide personalize services and communicate information regarding client's needs and habits (Tsartas et al., 2006).

1.2 Destination Management System (DMS)

Destinations are amalgams of tangible products by many different stakeholders, situated in a specific area, with specific physical and geographical coordinates, but also intangible services and socio-cultural entity, mainly represented by the people, traditions, lifestyle, culture, image as well as experience which exist in the visitors' minds and souls. Different types of complementary, interdependent and sometimes competing tourism firms that comprise a tourist destination have different needs, views and values. DMS provides the infrastructure and functionality to collaborate and meet the divergent interests of stakeholders, in order to increase the economic, socio-cultural and environmental development of a destination. Tourist destinations definitely are forced to follow the only path of innovative social, economic and technological context, collaborative web platforms and all types of business intelligence tools based on new technologies in order to attract the fast changing

tourism demand and ensure the sustainability of the destination (Iunius et al., 2015; Sigala, 2011).

Destination Management System (DMS) is a product, business and visitor database which provides a complete set of tools aiding the tourism management, marketing, distribution and sales. Small and medium independent providers of tourism services as well as tourism destinations can be supported by the development of DMS, in order to survive and enhance their competitiveness. An integrated destination management system is a powerful tool that enables destinations to expand their activities in the geographical, marketing and operational sense and reduce their dependencies on tour operators and other intermediaries. It contributes significantly to the improvement of the operation and performance of tourist units by providing personalized pre-trip and post-arrival information and services to the user according to their preferences about all aspects of their holiday including accommodation, attractions and events. This system collect the information only once and then entered into a central database, allows potential customers to see the room details, prices and availability and also allows the firm to update the availability and prices and automatically seen by visitors to the websites that is the advertisement. In other words, such a system includes achievement of sales through an inter-organizational system that allows reservations and purchases, modification and enrichment of the data, manages relationship with customers, creates tailored packages to specialized needs and provides tourist information before and during the visitor's journey (Christou et al., 2007).

1.3 Utilization of Internet Services

Some of the most popular commercial applications such as dynamic digital maps with images and videos, virtual tours, e-books and the virtual reality applications represent three-dimensional and interactive environments has altered the tourism marketing system and its environment. Internet is an effective and efficient communication medium, introducing transparency, competitiveness, flexibility, speed of information transfer, convenience and variety of alternatives to the suppliers of tourism products whereas facilitates the immediate distribution of products through modern and new distribution channels (Argyropoulou et al., 2011).

The widespread deployment of the internet has influenced purchasing power, the way tourists become aware of destinations, choose, buy and experience destinations and tourism services. New digital technologies have impacted the tourism sector over the past 5-10 years enhancing the processes of travel, the information wealth and increasing visitors' enjoyment. The new generation of tourists has gained direct access to information requiring quality information, contact with suppliers and better service. The tourist currently prefers individualized travel packages, plans his journey last moment, contributes with interactive communication by publishing material on the internet and shares with other visitors his experience on discussion forums (Tsartas et al., 2006).

The internet offers substantial advantages over traditional means of communication as it enhances the trading volume so as businesses and tourists can purchase products and services that may were unable to purchase before. Internet in comparison with conventional media enables companies to save commissions, diminish distribution

costs, to customize and tailor their product to customer's needs. An important component of internet is that the customer has an active role and greater control of choosing and processing information about a firm. Also, with an effective web site, a company can have a global exposure and interactive communication with customers without any restrictions in place and time. In international dynamic trade, the firm's ability to improve the service quality on all aspects of tourist activities i.e. pre-sale, during and post-sale, to offer their products in favorable terms and to attract and sell to the consumers directly across different time zones, is vital in order to create competitive advantages in a digitized age (Gruescu et al., 2009; Zhenhua, 2000).

1.4 Social Media

Through different channels and platforms which provide photos, graphics or video clips, tourists have a comprehensive picture of a destination touristic product and a tangible image of attractions, as well as the ability to perform search and booking in real time (Valčić & Domšić, 2011). New Web 2.0 applications help users to control and plan their journey by changing the way of creation, exchange and use of information. The goal is through social networks to facilitate users' access to knowledge and information by answering their questions, giving them power, encouraging them to create their own material on the internet and share their own experience with others. The Web and specifically Web 2.0 features are now used as means of social interaction through social networking sites, facebook, blogs, wikis, podcasts, interactive maps, youtube, twitter, etc. with the basic principles of transparency, personalization and experience. In this innovation context, that allows users to contribute, update, alter existing content, companies can learn more about their customers' purchasing habits and preferences (Rerres & Kafeza, 2009).
Social media acts as a connective bond among tourism firms and prospective customers. Social networking helps websites to become more interactive and more efficient customer targeting as it is usually formed on the basis of mutual interests. Therefore, companies can send marketing messages through social media, in order to increase the numbers of customers and revenues. Virtual communities and social networks enable users to participate and interact with the information and provide visitors the opportunity to create and share their content and may affect positively their decision making. People exchange information, images, views and reviews on the web. Some of those media services allow the users to interact in various ways by blogging, chat rooms RSS, widgets, messaging, discussion groups, podcasts, video, photo and file sharing (Argyropoulou et al., 2011; Aramendia Muneta & Ollo López, 2013).

1.5 Mobile Applications

In order to plan their vacation, tourists have to spend a lot of time collecting information about the desired destination, services and the points of attraction they are going to visit. As a result, designing beforehand the desired tourism package via travel applications is a time-saving task and effort for tourists. "Web based decision support applications" for mobile devices are excellent aids enabling the users to reach

travel information of interest, location-based services, roam in unfamiliar environments, navigating themselves by GPS functionalities, to book air tickets, hotel rooms etc timely and flexible and safe (Iunius et al., 2015).

Nowadays, a mobile platform technology is one of the most important technological developments as more and more tourists seek information through a wide range of mobiles applications anytime, anywhere. The impact of technological transformation is evident in all industries and especially in tourism, so it is necessity for any business to be active on mobile applications. (Yovcheva et al., 2012).

1.6 Mobile Augmented Reality

Mobile communications in tourism collect, analyze real-time information regarding the tourists' behavior and preferences and provide geographically tailored products, services about events and places of interest and practical recommendations that match their needs. Besides, regional electronic guide system that is developed for smartphones provide virtual tour of various tourist attractions, using a diverse range of presentation formats – text, video, high quality images, enhancing the consumer's experience and travel. This technology of augmented reality offers to users an interactive, simulated environment that helps them improving their knowledge and offers increased levels of entertainment regarding a city, sights, a museum, a thematic park etc. Travel apps use the travel history, preferences and feedback of a user and suggest custom-made travel routes according their time, budget and means of transport. Augmented reality tourist guide has been applied in many cities such as Tuscany and Basel which operates like a digital tourist guide, is available in many languages and the users can retrieve valuable information about accommodation, restaurants, museums, sightseeing etc. Other similar applications are the Urban Sleuth in which users try to solve a mystery while travelling in the city. The Street Museum application for the museum of London gives the chance to the visitors through their mobile phone's camera to see historical view of today streets and to discover the city's history. Travel companies are now paying more attention to specific needs and demand of their customers and are designing travel packages accordingly. The smartphone applications have become one of the most vital platforms for the travel and tourism industry to enhance the business productivity and visibility. Today online business promotion and internet marketing have become one of the most fundamental tools for both visitors and providers as it contributes to the provision of personalized services, market research, product promotion and active participation of visitors through mobile devices (Kounavis et al., 2012).

1.7 Dynamic Packaging Application

These portals offer the ability of Dynamic Packaging that is differentiated from static packaging in the following characteristics: choice, customization, flexibility, security and real-time. Unlike the traditional static packages, Dynamic Packaging application enables the tourist to take advantage of a fast search, flexible times, controlled selection of widest range products and the flexibility to customize dynamically his holiday. Dynamic package design technologies give the ability to customers to schedule

their trip online putting together unique component/services from various suppliers, make a complete set of flights, accommodation, car rental, food and activity/ entertainment providers and finally complete the process in real time. Travel companies can package several travel services in real time and distribute them in a single transaction together as a single tour or vacation package. On the other hand, wholesalers through Dynamic packaging can increase their market share, decrease their overhead costs, hide price of each service and make adjustments in prices at any time according the changing market conditions, supply and demand. Combining vast selection of multiple travel components, with one complete single price for all the bookings, travel organizations have a great flexibility to meet the specific expectations of the market they activate in (Al-Dmour et al., 2016; Ayazlar, 2014).

1.8 Web Marketing

The rapid development of internet has affected not only the tourism business globally but also has greater influence to the marketing. Web marketing is the most effective and convenient means of marketing which improve the positioning of the tourism products and also making them more accessible. Companies have to use right and effective tourism Internet marketing strategies in order to have competitive advantage even though they have the best products and services. Web marketing tools are used by small firms until large companies through their websites to increase online exposure and communication and delivery of value to customers. Furthermore, the web marketing also plays an essential role in destination promotion, creating a global brand name. Good marketing policies are the most important mean of promotion, transaction, effective flow of information and distribution in the tourism market in this information age (Iunius et al., 2015).

There are many successful techniques for web marketing such as email marketing, banner advertising, newsletters search engines, directories and the Search Engine Optimization (SEO) which ensures that a website is accessible and highly relevant in the results of search engines. The objective is making the site to be ranked highly for the target terms when the users input a key word to search engines and the closer to the top a link is, the more likely people are to click on it. Search Engine Marketing (SEM) is a kind of paid advertisement through a set of individual marketing methods that are used to promote websites, increase their visibility and ultimately achieve a high position in search engine results pages. This method is aimed at increasing traffic to a Web site when the user submits searches related to the subject of the advertisement. This medium is so effective and such a powerful cost-effective way to grow a company as it offers advertisers the opportunity to put their ads in front of motivated users who are ready to buy at the precise moment. These techniques of advertisements improve the flexibility, interactivity, efficiency and competitiveness (Tsartas et al., 2006). In general, E-marketing is the use of information technology that contributes to measurement marketing efficiency, reduction of third-party dependence, booking process automation, flexible pricing policy and encouragement the cooperative relations between tourism businesses in ways that benefit the organization and its stakeholders (Christou et al., 2007).

1.9 Geographic Information System (GIS)

Another innovative tool is the Geographic Information System (GIS), which has many applications in tourism, either at the tourism business or at the administration and management of a tourist destination. Many companies have incorporated GIS into their pages to be easily found by their customers, support them planning their vacation plans and being navigated during their journeys. The use of new technologies such as Geographic Information System (GIS) by Greek tourism companies and tour operators helps them to collect, process and store data in order to manage and present information for the support and incensement of the efficiency and effectiveness of daily business processes and functions. Through GIS, tourism organizations and destinations can benefit from the development of partnerships and networks between different tourism operators, giving economies of scale, contributing to be modernized and offering quality upgrade and diversification of existing tourist products and services. It also lead to increase the visibility, promotion and distribution of the tourist product on a global scale at low cost, releasing to a large extent the dependence of businesses on travel agents abroad (Moutinho, 2011).

Geographic Information System offers ideal platforms for the convergence of tourist information and geographic data analysis. It has advantages for both tourists and tourist authorities. For travellers, it presents information and functions related to their geographical situation by interactive maps with audiovisual material, such as a database of transportation, highways, railways, service (e.g., restaurants, accommodation, medical facilities etc.) attraction (i.e., cultural, beaches, museums etc.). Moreover, it enables to select the path of "shortest distance," "fastest route," to inform about the geographical conditions, humidity, altitude, the population of a place, photo, connection to web pages of a business etc. It helps tourists enhance their experience and provides information about their trip defining a query by choosing a geographic area based on geographic criterions like nearness, distance, location etc. (Jovanovic & Njegus, 2008; Farkhondehzadeh et al., 2013).

At the same time, the private and public entities are able to have information in real time, as this system acts as a data base for spatial and attribute data analysis, design of new sites, measurement of the sustainability of a tourism product and impacts of tourism development (Farkhondehzadeh et al., 2013).

Dashboard of ArcGIS is designed to display a view of multiple geographic information that helps a user to monitor events or activities on a single screen. It offers a comprehensive view of the data someone needs to be informed or make decisions, ensure that all the colleagues are focused on the same goal through viewing and using the same data and create a personalized view of a larger set of data. It contains charts, gauges, maps and other visual elements to reflect the status and performance of people, services, assets and events, so someone can quickly visualize and understand the impacts of design decisions in real time. The dashboard displays qualitative and quantitative information and as soon as the user adds, updates and deletes features, the dashboard automatically updates and provides with immediate feedback on the impacts of the design decisions about incidents, events and other activities. In addition, it can be shared to everyone or only with people in one organization (Esri ArcGIS, Esri ArcGIS Enterprise).

The Survey123 tool of ArcGIS is an application for mobile devices integrated in the Geographic Information System's platform, compatible with other GIS applications for mobiles. Through this application, someone can easily design a questionnaire in a simplified friendly environment for the user that can be completed by the customer when departing from the site via mobile phones or tablets. Data is then sent directly to a safe GIS environment for analysis and extraction of the results. The data, an organization can collect from its customers, is helpful for extracting useful conclusions, such as measuring demographic characteristics, satisfaction, motivation, behavior, and the expected benefits. The capabilities of this application for collecting geospatial information through research, in conjunction with the simplicity of the structure of the questionnaire, the shipment directly to the Geodatabase and the presentation of the results in charts within a map, provide added value in decision-making (Esri; Law, 2017).

The Story Map application of ArcGIS is an innovative platform that absorbs the readers throughout a history through the visual nature of maps incorporating mixed media. This application presents embedded maps in a pleasant, narrative and natural way, offering new possibilities for communicating specific topics in which the geographic element plays a key role. Each map unfolds in stages or frames each of which appears with a brief explanation. Story Maps contain digital map which can contains titles, pop-ups, multimedia graphics, charts, analytics and statistical tools with images, videos, narrative text, locations and geospatial data that allow the user to retrieve additional information about a topic or region. It is a comprehensible tool for public's participation because it presents geospatial data for the presentation of a destination or event for users who have no GIS experience. Story Map serves as an excellent imaging tool for communicating, advertising and promoting tourist products and destinations to the general public (Graves, 2015; Esri, 2016). The maps presented in a narrative framework are designed to be attractive, easy to use, open and accessible to any potential user so as to increase customer satisfaction and fulfill modern tourism demand (Esri, 2012).

1.10 Sentiment Analysis

Today, the increase of internet shopping, the big growth of social media, Wikipedia, blogs has led to a vast amount of information that the user needs in order to make a decision. The process of large amounts of data has become very complex, so it is necessary to develop Big Data-based approaches such as sentiment analysis which can become an important tool in tourism where the customer experience is crucial for its growth and reputation. Sentiment analysis is the process of extracting sentiments, opinions, attitudes, emotions, perceptions and characteristics of groups that comes from online sources. It determines whether the text is positive, negative or neutral. Sentiment analysis comprises a multi-step process: a) data retrieval, b) data extraction and selection, c) data pre-processing, d) feature extraction, e) topic detection, and f) data mining process. Data mining is used to analyze huge amount of data in order to identify patterns through data analysis. These applications allow enterprises to predict future trends, to apply an efficient marketing program to meet customer demands, to

increase service quality and to improve the relations with customers. (Alaei, et al. 2017; Devika, et al. 2016; Somabhai, et al. 2015; Urgessa, et al. 2017)

A case study was carried out by Dave et al, where three categories of places are being analyzed i.e. Amusement park, Pilgrimage place and Holly place. They have taken reviews of one place from each three categories as a sample. They used 3 labels for classifying the reviews namely positive, negative and neutral and 4 emotions related to the sentiment of tourist, namely joy, surprise, angerand and unknown. The resulting models were tested, had the value of accuracy, precision and the algorithm Naïve Bayes obtained accuracy of 83.00% while other place obtained 50% accuracy rate. (Dave, et al. 2017)

1.11 Loyalty Applications

Loyalty programs have been integrated into mobile applications to attract and retain and make the users to make and a purchase by personalized quality content based on their personal needs. Businesses, on the other hand, can find new customers and provide services based on the specific needs of the existing ones, which leads to long-term loyalty. Kelić et al at 2017, made a primary survey to 161 people regarding the preferences of mobile application. The survey results indicate that the majority of respondents (57.8%) expect personalized content, which is the current trend in an effective content marketing strategy. 56.5% of respondents expect to be provided with additional content after registration, while 47.2% expect points on their loyalty cards. The least expected benefits, as reported by 37.9% of respondents, are discounts. The results indicate that users recognize the importance of mobile applications for finding information for a tourist destination and are willing to share their personal information and to participate in loyalty programs on smart mobile devices, but in return they want personalized content and a customized reward program. (Kelić, et al. 2017)

1.12 Tourist Assistant application

Smirnov et al., created the "TAIS" Tourist Assistant application based on the "Travel Guide" category that provides information on tourist locations in close distance based on tourists' preferences. It provides information, transportation options and a travel guide. The tourist can see pictures, maps, time, sights and can interact with the pictures by tapping "I like" or "I do not like". The routing service that is responsible for calculating attractions reaching path provides the tourist the possibility to build pedestrian path, find fellow travelers who go to the same direction and find public transport to reach chosen attraction. The differences from existing applications are the provision of information from different Internet sources that does not oblige the visitor to download the application before the route. Experiments have shown that the time it takes for the application to show sightseeing is 3 seconds for 50 nearby attractions and for 1,000 tourists the duration of the response was 0.3 seconds. (Smirnov, et al. 2014)

1.13 Self-Service Technology

Self-Service Technology is now applied at the airports, hotels, restaurants and in many other areas of service industry. Self-service technology (SST) can be defined as the technological interface that allows users to produce a service which is independent of direct service employee involvement. The state of art regarding air travel services include self-check-in, while the passenger enters at the terminal the application issues electronic boarding pass and luggage tags for collection. Also it can notify the passenger about the boarding time, gate information etc. Mobile applications communicate with the airline and the status of the passenger is updated when he checks in. Also, additional fees of luggage can be paid through this app. Many airport applications provide maps, navigation tools, Wifi facilities and systems which can recharge passenger's devices wirelessly. (Benckendorff, et al. 2019; Dzia-Uddin, et al. 2018)

1.14 Internet of Things

The Internet of Things (IoT) has changed almost every industry and tourism is certainly no exception. IoT, is the technology that connect Internet or cloud service into physical devices and everyday objects by fitting the sensors into machines, can communicate, interact with others, gather and disseminate data and make the analysis easier, accurate and in real-time. An example of emerging hotel technology trends is the use of the smartphones which can be used for the access to guest rooms. The Electronic KeyCards is sent by the hotel on the mobile phone without wasting the time in the reception of hotel, to access the room directly, to adjust lighting, temperature, to order room service etc. (Benckendorff, et al. 2019) The upcoming smart rooms of Marriot hotels are going to be equipped with ultra-facilities of IoT, the mirror can act as a screen that can adjust the water temperature of the shower as per the requirements of guests, also it will be smart parking, swimming pool remote control, vent balancing between the rooms etc. The next generation Airbus airplanes (A380 Neo) will has 10,000 sensors on its wing. The Panasonic technology supplier to several airlines is planning to outfit ten thousands of airlines in upcoming decades with the advancement of IoT (in-flight communication, four-dimensional weather forecast, Aircraft tracking service, etc.). (Verma and Shukla, 2019)

1.15 Guest Service Technology

The latest trend in the hospitality industry is applied in many hotels, can ease the room maintenance, reduce the costs and maximize the customer's satisfaction levels by facilitating efficient and effective service delivery. An example of this technology application is the provision of food and drink from the refrigerator of the guest room. These refrigerators contain a sensor below each item and a microprocessor to store price. When an item is removed, the system notifies the item consumed, sends charges directly to the guest and tracks the inventory in order the item to be replaced efficiently. Also the technology for the room service is improved as the guest can order through the mobile service directly, especially useful for those who doesn't speak the local language. Moreover, the smart room service cart alerts housekeepers to collect

the used food tray which is placed outside the room immediately. (Benckendorff, et al. 2019)

1.16 Wearable Devices

Hospitality industry is currently increasing relying on technology such as the wearable technology which is defined to describe technological devices that are worn on the user's body. It is the new form of interaction between the human and the computer. Wearable Devices include smart watches, smart glasses, smart headband etc. Smart watches, are used at Westin hotel chain for tracking of guests' sleeping patterns and wake them through gentle vibrations. At some airports travelers who wear smart watches can receive real-time flight alerts, gate changes, traffic delays on the way to the airport, location of luggage and check-in, easing the stress of travelers and increasing efficiency in language translations. Smart glasses are used commonly at museums, galleries, theme parks and aquariums, to activate digital contents such as video, games, photos, etc. on the glass display screen by looking at the item, to enjoy it in an intimate, interactive and modern manner. San Francisco's de Young Museum allows guests to participate in an exhibit featuring Google Glass. Decimal Labs at the MaRS Discovery District Centre uses the Muse headband brain-sensing wearable technology, which senses the feeling of the user about a painting and then selects the next piece of the collection based on the emotion of various paintings. For example, at the bottom of the screen is the word "happy" for most of the paintings since the paintings are selected by the curator to make you smile. Disney Resorts are using wrist bands instead of hotel room keys. Starwood Hotels' SPG app can provide the guest who uses smart glasses with directions to the hotel in real-time using their voice, with a digital wallet or mobile payment system. In addition, guests are able to access their room reservations, be informed for the upcoming events and explore and share the image of the hotel with friends. (Atembe, 2015; Conyette, 2015)

1.17 Smart Cities

The tourism industry has been exploiting the development of smart cities with integrated technological systems to offer more efficient and improved services/solutions and holistic experiences to tourists. Several examples of smart cities, such as Amsterdam, Barcelona, Brisbane, Dubai, and Seoul illustrate characteristics that include state-of-art (ICT), co-creative platforms engaging key stakeholders, and effective use of data. (Nam et al., 2019) Smart parking and intelligently synced traffic signals on many cities, are reducing the driving time and the real-time navigation alerts will lead to the reduced fuel consumption. Consequently the city can develop smooth traffic and better predictability allowing the tourist and tour companies to choose this smart destination. Moscow is an example of these cities which has implemented the intelligent traffic management tool and after addition of several thousand cars in the city, travel speed is still 13 percent better. (Verma and Shukla, 2019)

1.18 Group Recommender Systems

Group Recommender Systems support a group of people to make decisions by giving recommendations that fit to the user's preferences. This system identifies the individual needs of all the members of the group, then find a compromise that is accepted by all the group members and offers a recommendation. The group may seek a restaurant, or vacations for the whole family which is complicated, as some times the interests are conflicting. (García, et al. 2009) Nguyen and Ricci (2017), proposed a novel mobile group recommender system that records the user's preferences while a group discusses solutions in a group chat environment, helping them to come up with a final decision. More specifically, the system allows the member of a group to take part in a discussion and supports them during the decision process when asking for information, making comparisons etc. This new model unlike the previous which aggregate individual preferences acquired before the decision, exploits preferences that arise when the users are member of the group during the group interaction. The results of this system were a high usability score, good user-perceived recommendation quality and choice satisfaction. (Nguyen and Ricci, 2017)

2. Decision Making of Tourism

Tourist enterprises are significantly using E-tourism applications for contributing to the operational efficiency, strategic competitiveness and support of the electronic representation of marketing purposes of small and medium tourism enterprises. For the smooth operation of the tourism sector, a valid update and synchronization of supply and demand is required. The new information management systems is a useful tool at the disposal of the Tourism Promotion and Development Organizations as contribute to the exchange of information and economic data resources of the tourist circuit (Christou et al., 2007; Avramović, 2010).

The introduction of innovative information technologies have brought revolutionary changes in tourism industry as provides a platform and info structure which collect, analyse and store information between organizations and suppliers maximizing the effectiveness of interaction, collaboration, transactions and economies of scale and scope. Internal management applications support strategic management and marketing of tourism business by offering opportunities for expanding market share and reaching prospective travellers in efficient and effective way. They enable firms to offer value for time and money to customers through a direct communication and interaction with them and customize the final product according to the consumer desires (Samanta 2011; Moutinho, 2011).

A wide category of ICT applications incorporates knowledge from all sections of industries providing assistance to managers of small medium firms and tourism organizations to empower their internal business processes and the offline business transactions in order to make the appropriate decisions in management and marketing process and ameliorate the decision-making procedures and to react efficiently to environmental changes and consumer behavior trends. The use of advanced technology offers to firm the advantage of cost effective use, reducing the cost of customers and suppliers, production and distribution cost, by designing and delivering a product at the time required. It allows organizations to improve the managerial processes, have quality, quality sales control to ensure and adjust products and prices

according to the customer's needs and requirements as well as to initiate promotional campaigns. As today there is a need for flexibility and pressure to increase the speed of the decision process, timely, accurate, and highly reliable information is vital, in order to eliminate higher levels of uncertainty. Hence various information systems have been used in the field of tourism, catering, travel and they are used for the sales and marketing, finance, accounting, procurement, research and development, for using information as a basis for business decisions, develop alternative solutions and predict situations. The penetration of information systems in tourism industry has today become a necessity for the enterprises imposing for making investments and fundamentally reconstruction and redesign of all the organizational functions such as management systems, planning, sales, finance, accounting, marketing, human resource management, procurement, research, development, and production (Pilepić & Šimunić, 2009; Buhalis, 2003; Gruescu et al., 2009).

A distinctive characteristic of GIS is that incorporates some proportion of spatial data and statistical methods to manage, analyze complex attribute and geographic information and answer spatial question. GIS is a computerized, integrated system of hardware and software tools with dynamic data as new data become available and GIS can turn out many maps representing the data from millions of records at a minimum amount of time. Over the last decade they have flourished in the private and public sectors and have several applications such as search and statistical analysis, data capture, data management, data manipulation and analysis and the presentation of results with the advantages of visual visualization, digital format and the geographical analysis offered by the maps (Gopi et al., 2008).

GIS is a strategic resource that contributes to the planning of tourism policy and decision making with the appropriate use of natural, cultural and economic resources for the tourism and economic development of an area. It is a technological tool that combines geography, computer science, statistics, mathematics, surveying, mapping and management into one. An information integrated environment possesses functions of data collection, input, storage, management, procession, edition, analysis, transformation and finally transforms data into information. As tourism requires special data collecting, GIS is powerful tool in tourism management which through the interactive visualization, spatial comprehensive data analysis, dynamic capabilities and planning information flow, facilitates communication between disciplines and individuals as well as gives opportunities for problem solving efficiency, effectiveness and reduction of risk (Wei, 2011; Da Cruz Albuquerque et al., 2016).

GIS is considered a decision support system, for decision makers as it is supporting the process of evaluating spatial decision problems, capable of generating many scenarios based on the spatial relationship principles of connectivity, contiguity, proximity and the overlay methods. It combines database management systems, graphical display and analytical modeling capabilities to support effective decision making (Mlisa et al., 2008).

Digital techniques offer services for geographic research data analysis, evaluation, forecast and organization of geographically referenced data that enable leaders to make meaningful decisions. It displays the information in a clear and compelling fashion supporting the effective management decision-making, identifies the conflicting interests and model relationships, makes space analysis of the human and

natural landscape, explores and examines the suitability of locations for proposed developments. GIS brings new challenges to the traditional tourism management as due to its efficient data presenting in a comprehensive thematic map, allows the decision makers to take into consideration not only economic factors but also ecological and cultural such as evaluating tourism impacts in the environment, urban planning, climate, topography, disaster prevention and real estate development. Meanwhile, a digital map that includes all tourism elements, such as terrain, roads, services, facilities, transportation, tourist attractions and so on, can be used by tourism planning departments for further development and forecasting of the tourist attractions. Considerable travel technology with gathering and storage capabilities, information analysis with a geographic approach is the most compelling reasons that enterprises use GIS in supporting decision making (Valčić & Domšić, 2011; Pilepić & Šimunić, 2009).

In order to highlight the usefulness of the system, some case studies of the application of GIS in tourism sector are cited below.

GIS can be used to manage the visitor flows of a tourism attraction. For example, the Peruvian Ministry of Culture has conducted a survey regarding the number of people who could safely visit the archaeological site "Machu Picchu" without endangering the archaeological site or reducing their experience. Combined with the observation of the visitors, the 3D model, the network analysis and the GIS, the Peruvian Ministry of Culture managed to record the number of visitors, the transition from specific routes and the time they spend there. Using the collector tool via smart phones, they recorded on a map in real-time, how congested was each point they had set. So tour guides and visitors have the opportunity to organize their visit better according to crowded points and to organize alternative routes (ArcNews, 2016).

Another field that GIS can be essential is to find and give priority to appropriate zones for tourist development or the creation of new tourism products. For example Asadzadeh et al. in 2015 made a research for locating the appropriate zone for the development of hydrotherapeutic tourism with emphasis on the hot sources of Kerman province in Iran. They have exploited Geographic Information System (GIS) not only to identify the appropriate location for tourism development but also to provide solutions for the development of selected areas for investment in tourism hydrotherapy. They mapped the thermal springs from topographical point of view using different layers such as soil morphology (slope and altitude), vegetation, and climate to find the most advantageous spa source in terms of investment (Asadzadeh et al., 2015).

GIS can be used also in order to measure the tourism impacts in a specific zone. A survey was carried out regarding the impact of climate change on tourism through the Geographic Information System for the Greek island Syros. Based on tourist historical data (arrivals and nights), historical climate data and climate projections, the results showed that the mobility of tourists can be differentiated by the climatic conditions, showing greater distribution of arrivals in the tourist season and that the best climatic conditions will be from May to October, reducing the tourist season by one month (Arampatzis et al., 2011).

Furthermore, GIS can contribute to the tourism administration and future tourism planning of a destination. For example Abomeh et al., mapped the tourist interests of the island Victoria Lagos such as museums, restaurants, hotels, beaches etc., so as to

delimit areas where nearby services can be identified such as a fire station, hospitals, police station etc., for maximum coverage and efficiency (Abomeh et al., 2013).

Kyriakou et al., 2017 utilized the GIS application for assessing the carrying capacity in Greek island Rhodes. The survey showed that the seasonal population density index is almost double during the summer months, which shows tourist saturation in certain areas of the island. The contribution of GIS was important as it was used as a tool for researching tourist factors and the display of results in maps helped in an easier and more effective way of studying (Kyriakou et al., 2017).

Geographical Information System has also statistical analysis functions and can be either nonspatial (tabular) or spatial (containing location). Charts and graphs, histogram, table statistics, raster statistics, etc., can help a user extracting additional information from GIS data that might not be obvious simply by looking at a map, for example how attribute values are distributed in an area or whether there are spatial trends in the data (Esri ArcGIS).

Some of the statistics of the tourist economy such as arrivals, overnight stays, receipts and data were recorded by the author in a database (excel), linked to dynamic map of Europe in the environment of Geographic Information System and presented through the charts, providing useful information in a comprehensive way to support the decision making of an organization (Fig.1 Change in Receipts % among the years 2011-2014 of Croatia, Cyprus, Greece, Italy, Portugal and Spain – Fig. 2 Share in International Tourist Arrivals in Greece for 2014 of United Kingdom, Italy, Germany and France) (Panousi, et. al, 2016; Institute for Tourism Research and Forecasts-Hellenic Chamber of Hotels, 2015).
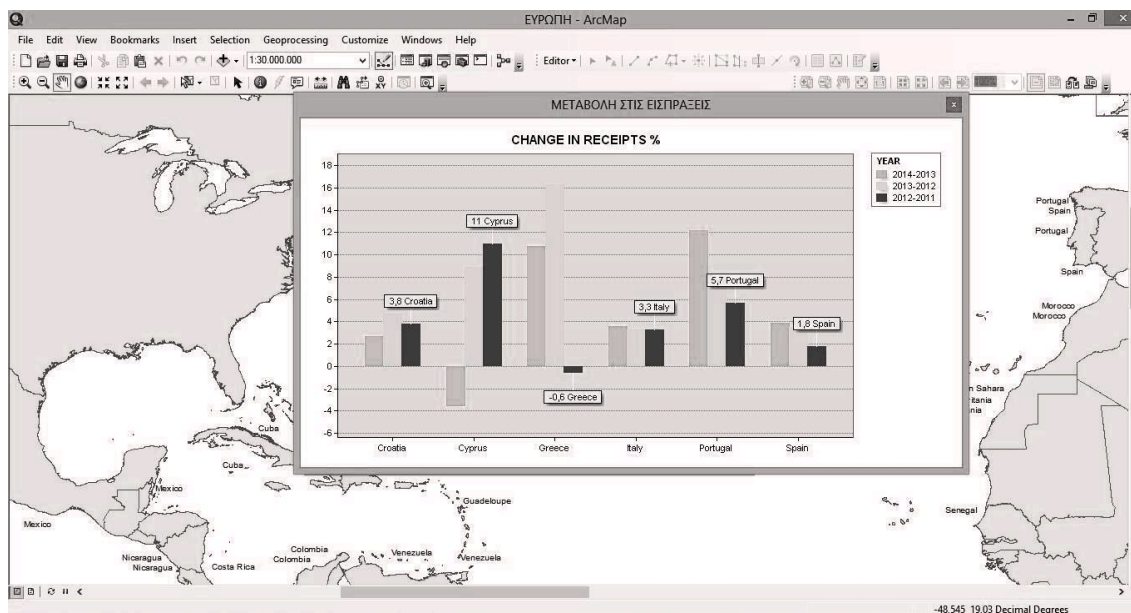

Figure 1: Change in Receipts % among the years 2011-2014 of Croatia, Cyprus, Greece, Italy, Portugal and Spain

Source: Panousi, et. al, 2016; Institute for Tourism Research and Forecasts-Hellenic Chamber of Hotels, 2015
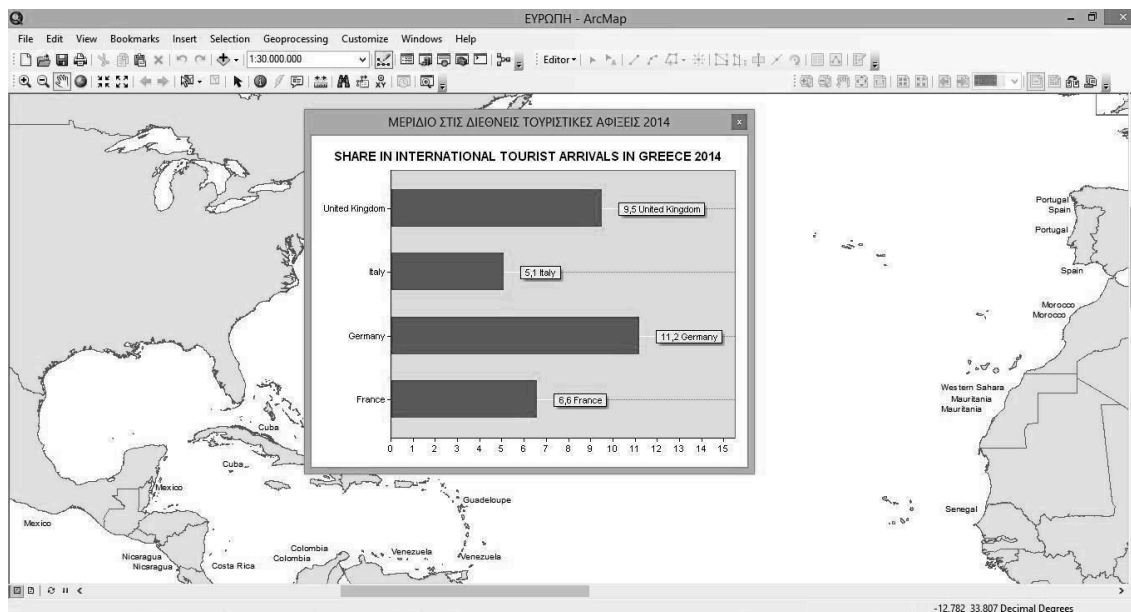
Figure 2: Share in International Tourist Arrivals in Greece for 2014 of United Kingdom, Italy, Germany and France
Source: Panousi, et. al, 2016; Institute for Tourism Research and Forecasts-Hellenic Chamber of Hotels, 2015

Conclusions

Today information technology is a fundamental infrastructure that combines digital maps, widgets, multimedia content, virtual techniques, mobile and wearable tech devices through which travel marketers have devised multiple ways to enrich and enhance the customer experience. One of the most substantial contributions in the use of ICT in tourism is that visitors can tailor their own travel package from all over the world fast and easy. Internet travel sites and Internet Distribution System (IDS) are providing intelligent tools for travelers to book hotel rooms, rental cars, airline tickets etc. ICT is a vital potentiality also for small enterprises to gain global presence, to promote their services and provide a higher standard of efficient, effective and flexible services (Buhalis, 2003; Verma & Shukla, 2019; Conyette, 2015).

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