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# 13 eTourism: Critical Information and Communication Technologies for Tourism Destinations

Dimitrios Buhalis, Daniel Leung and Rob Law

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## Introduction

Rapid technological progress and dynamic tourism developments have been going hand in hand for years (Poon, 1993; Sheldon, 1997). Since the 1980s, information communication technologies (ICTs) have been transforming tourism globally, creating applications and solutions that are often termed 'eTourism'. Developments in ICTs have undoubtedly changed both business practices and strategies, as well as industry structures (Porter, 2001). The establishments of computer reservations systems (CRSs) in the 1970s and of global distribution systems (GDSs) in the late 1980s, followed by the development of the Internet in the late 1990s, have transformed best operational and strategic practices in the industry dramatically (O'Connor, 1999; Buhalis, 2003; eBusiness W@tch, 2006). If the past 20 years have seen an emphasis on technology, then since the year 2000 we have been witnessing the truly transformational effect of ICTs and the Internet in particular.

Tourism as an international industry and as the biggest provider of jobs on the planet boasts a greater array of heterogeneous stakeholders than many other industries. The accelerating and synergistic interaction between technology and tourism in recent times has transformed the nature of tourism products, processes, businesses and competition.

Tourism organizations that have failed to master the right information technology (IT) systems would find it difficult to direct and manage their information-intensive businesses without damaging their competitiveness (Law and Jogaratnam, 2005). More strategically, ICTs are reshaping the fundamental structure of the industry and society (Buhalis, 1998, 2003). The significance of crossing the new information threshold of ubiquitous communication access has brought the entire tourism industry to the new levels of interactivity. Developments in search engines, and in the carrying capacity and speed of networks, have influenced the number of travelers around the world that use technologies for planning and experiencing their travels. The Internet is rapidly becoming the number one information source for travel and tourism. ICTs have also radically changed the efficiency and effectiveness of tourism organizations, the way that businesses are conducted in the marketplace and how consumers interact with organizations (Buhalis, 2003).

Tourism and hospitality are social phenomena, and the industries associated with them are largely application oriented. ICTs thus play a critical role in the competitiveness of tourism organizations and destinations as well as in the entire industry as a whole (WTO, 2001). Not only do ICTs support consumer centricity, with consumers being

able to identify, customize and purchase tourism products, they also support the globalization of the industry by providing effective tools for suppliers to develop, manage and distribute their offerings worldwide (Buhalis, 1998; Niininen *et al.*, 2007). As investment in and the adoption of ICTs are now an indispensable component of tourism and hospitality business, researchers increasingly seek to understand and communicate the significance of the new technologies, investigate and interpret developments in eTourism, and attempt to forecast the way ahead for both industry and technological development. More and more, destination management organizations (DMOs) use ICTs in order to facilitate the tourist experience before, during and after the visit, as well as for coordinating all partners involved in the production and delivery of tourism (Buhalis, 1997). Thus, DMOs not only attempt to provide information and accept reservations for local enterprises and coordinate their facilities, they also utilize ICTs to promote their tourism policy, coordinate their operational functions, increase the expenditure of tourists and boost the multiplier effects in the local economy (Buhalis and Spada, 2000). Destination management systems (DMSs) facilitate this function by administering a wide range of requests and by providing information on an ever-increasing supply of tourism products, in an efficient and appropriate way. DMSs are employed by many national and regional governments to facilitate the management of DMOs, as well as for the coordination of local suppliers at the destination level. Increasingly the sophistication of DMSs makes them a critical tool for the marketing and communication of DMOs (WTO, 2001; UNWTO, 2008).

Three main themes are identified as the main axes of eTourism research: consumer and demand dimensions, technological innovation and industry functions. These are discussed in the next three sections of this chapter.

### Consumer and Demand Dimensions

eTourism enables prospective travellers to access a much greater wealth of reliable and accurate information provided by tourism

organizations, private enterprises and, more and more, by other users/consumers. Ever more new, experienced, sophisticated and demanding travellers require interaction with suppliers to satisfy their own specific needs and wishes. eTourism empowers travellers to undertake reservations in a fraction of the time, cost and inconvenience required by conventional methods (O'Connor, 1999). From information search to destination/product consumption and post-experience engagement, ICTs offer a wide range of tools to facilitate and improve the process so that customers are able to search for travel-related information, and make online air ticket bookings, online room reservations and other online purchases themselves instead of relying on travel agencies to undertake this process for them (Morrison *et al.*, 2001). Owing to the popularity of Internet applications, most tourism organizations – such as hotels, airlines and travel agencies – have embraced Internet technologies as part of their marketing and communication strategies and have already generated significant proportions of their business online. ICTs place users in the middle of this functionality and product delivery, and so the Internet has changed tourism consumer behaviour dramatically (Mills and Law, 2004).

According to Kotler *et al.* (1999), no matter whether a purchase is conducted online or offline, consumers will go through the five stages in the buyers' decision-making process before any purchase is made. These five stages include need recognition, information search, evaluation of alternatives, purchase decision and post-purchase behaviour. The following five subsections show how ICTs play an important role in each of these stages of the buyers' decision making process, and that eTourism is in the centre of consumer processes for purchasing tourism products.

#### Need recognition

A contemporary/connected consumer is far less willing to wait or put up with delays, to the point where patience is a disappearing virtue. The key to success lies in the quick identification of consumer needs and in

reaching potential clients with comprehensive, personalized and up-to-date products and services that satisfy those needs. Understanding consumer behaviour, and especially information search behaviour, can help industrial managers to develop, optimize (as regards search engine function therein) and customize their web sites to meet the needs of their customers. In this digital era, the Internet has become one of the most important sources of consumer information (Zins, 2007), especially for young and better educated consumers (Beritelli *et al.*, 2007).

However, mature and senior travellers still prefer printed brochures as their major information source (Lin, 2005), and many travellers use the Internet in conjunction with offline information to plan a trip (Lee *et al.*, 2007). With the popularity of use of the Internet as a medium for searching travel information, most, if not all, tourism organizations have established web sites to publicize their offerings as well as to collect consumers' data. The proliferation of social networking also increases inspirational messages and the ability of consumers to identify suitable products and services through their networks. Lin *et al.* (2006) used an online survey to examine the perceptions of members of the online community of specific destinations.

### Information search

Information search is a significant part of the purchase decision process, and can reduce uncertainty and perceived risks, and enhance the quality of trips (Fodness and Murray, 1997). A well-informed consumer is able to interact better with local resources and cultures, to find products and services that meet his/her requirements and to take advantage of special offers and reduced prices. eTourism has also changed travellers' behaviour. Previous research showed that tourists who searched on the Internet tended to spend more at their destinations than those who consulted other information sources (Luo *et al.*, 2004). The more research undertaken on a trip and more information being found, the better customer needs can be met and served.

Consumers of different gender, age, nationality, educational background and lifestyle display different search patterns (Hallab and Gursoy, 2006). Gursoy and McCleary (2004) developed a comprehensive theoretical model that integrated all psychological/motivational, economic and processing approaches into a cohesive whole for understanding tourists' information-seeking behaviour. Kozak (2007) analysed travellers from different countries to Turkey and concluded that different nationalities require different information sources. Travellers also required different information from the Internet at different stages of travel. For instance, before departure, the availability of information can affect travel planning, while later on they may seek reassurance from review sites that they have selected the right products (Lehto *et al.*, 2006).

According to Snepenger *et al.* (1990), the four major factors that influence information search in the tourism context are: (i) the composition of vacation groups, (ii) the presence of families and friends at the destination, (iii) earlier visits to the destination, and (iv) the degree of novelty associated with the destination. Buhalis (1998) stated that potential tourists have become more independent and sophisticated in using a wide range of tools to arrange for their trips. These include reservation systems and online travel agencies (such as Expedia), search engines and meta search engines (such as Google and Kayak, respectively), DMSs (such as visitbritain.com), social networking and Web 2.0 portals (such as TripAdvisor), price comparison sites (such as Kelkoo), and the sites of individual suppliers and intermediaries. In the Internet era, search engines play an important role in information searching (Ho and Liu, 2005), and the Google search engine in particular is perceived to be the most important tool (Law and Huang, 2006). In addition, information search is moving to online social networks where people interact freely and exchange information (Chung and Buhalis, 2008). To better understand the search patterns of customers using a search engine, researchers have analysed search query formulas (Pan *et al.*, 2007) and keywords. When searching for holiday destinations, tourist planning can

be deconstructed into a series of episodes and chapters reflecting the specific problem being addressed (Pan and Fesenmaier, 2006).

Among all types of travel information, pricing is a major issue in eTourism as many organizations use ICTs to communicate directly to consumers on web-only fares and rates, passing on discounts that are generated from saved commissions and distribution charges made in a short value chain. Prior research shows that search costs decrease in electronic markets owing to the diminishing cost of data exchange (Bakos, 1997, 1998). Previous studies found substantial price dispersion for domestic airline tickets offered by online travel agents in the USA, where the average price was lower than that offered by traditional travel agents (Clemons *et al.*, 2002). For customers searching on the Internet for the lowest room rates, the web sites of travel agents and reservation agents are likely to be the best choice (Law *et al.*, 2007). However, although tourists can locate travel information on the Internet, Litvin *et al.* (2005) reported that only 3% of tourists surveyed ate at a restaurant that they had found on the Internet.

### Evaluation of alternatives

The emergence of ICTs has dramatically increased the number of choices for consumers. Until the emergence of the Internet, consumers could only access major brand names and also those organizations in their immediate vicinity. Travellers can now use the Internet extensively to evaluate alternative opportunities and to compare and contrast offerings. The choice available varies from single products to the dynamical packaging of holidays. Using meta search engines, such as Kayak and Kelkoo, potential travellers can identify and evaluate products according to their preferences, filters and requirements (Buhalis and O'Connor, 2005). For example, with the fast expansion of no-frills airlines such as easyJet and Ryanair, as well as with the availability of holiday packages and hotel rooms discounted at the last minute, travellers can enjoy low-cost travel. Oorni and

Klein (2003), however, found that low-cost airlines have high online booking ratios because they offer simple products and are pursuing a direct sales strategy. Other airlines with complicated yield-management strategies simply obstruct consumers in searching for flights efficiently without expert assistance. Leading global online travel agents, such as Expedia, Orbitz, Lastminute, Opodo and Travelocity, are mainly successful for their provision of a platform for one-stop shopping with significant improvement in usability and interaction design (Klein, 2002). Also, the Internet has enabled consumers to engage directly with suppliers and challenge the role of intermediaries. It has also allowed consumers to interact dynamically with suppliers and destinations and often make requests that will enable them to customize their products. It is critical, therefore, for tourism organizations and destinations to manage their online reputation and to project a desirable image throughout all the different aspects of their online presence (Inversini *et al.*, 2010).

Despite the existence of the ample choices available on the Internet, online shopping motivation differs according to the complexity of the web site, with variation depending on the Internet skill levels of users (Beldona *et al.*, 2005). Besides these variations in skill, psychological barriers often prevent consumers from completing transactions online, resulting in 'lookers' purchasing products offline. According to the findings of Wolfe *et al.* (2004), the reasons for consumers not purchasing travel products online are the lack of personal service, security issues, lack of experience and the fact that online purchasing is time consuming. Weber and Roehl (1999) found that people who purchase travel products online are more likely to have had online experience of 4 years or more, and trust can be built between customers and online businesses through positive experience of past transactions (Bai *et al.*, 2004; Bieger *et al.*, 2005). Web-site owners should, therefore, pay more attention to making customers feel comfortable and secure in completing their reservations and to increasing trust in the online environment (Chen, 2006).

### Purchase decision

Depending on where consumers are located in the digital inclusion index (Minghetti and Buhalis, 2010), more customers now purchase tourism products through web sites, and perceive that a web site's image and usability directly affect their purchase intentions (Chiang and Jang, 2006). As such, understanding customer perceptions and their online behaviour are crucial to the development of a successful web site (Benckendorff, 2006). When novice web users search for travel information, they tend to browse through multiple web sites. This is often the result of starting to seek information in a generic search engine such as Google. A recommender (destination recommendation) system is of use here; this provides assistance in the social process of indicating – or receiving indications – about what options are better suited in a specific case for specific individuals (Gretzel *et al.*, 2004). Ricci (2002) further stated that a recommender system can provide valuable information to assist in the consumer decision-making process. Furthermore, a recommender system can support travellers in a complex decision-making process by identifying better customer requirements and by correlating those with the requirements of other consumers and their preferences (Ricci and Werthner, 2002, 2006). Kaplanidou and Vogt (2006) demonstrated that web-site usefulness was a significant predictor of intent to travel to the destination. The motivating visuals factor was also a significant direct predictor of intentions to travel to the destination, whereas trip information functionality had an indirect influence on intentions through web-site usefulness.

With rapid data transmission on the Internet, the expected response time from organizations to customers has been greatly reduced. The reaction to online inquiries can thus influence customer satisfaction and booking behaviour. As a result, response behaviour becomes an essential factor for the success of small and medium-sized tourism enterprises (Main, 2001). Understanding different consumers' online behaviour could increase the possibility of online transaction completion (Lee *et al.*, 2007). In view of this,

the characteristics of travellers' online purchase behaviour have been examined by tourism researchers. Among the findings were that Chinese customers were less likely to rely on hotel branding when making online reservations, focusing instead on electronic word-of-mouth (WOM) information and online security if they were more experienced Internet users (Kim *et al.*, 2006).

### Post-purchase behaviour

After travellers have returned home, they often like to share and exchange their travel experience. In this context, ICTs also provide a very effective mechanism for consumers to air complaints. In the past, fewer than 5% of customers who were dissatisfied actually voiced out their complaints (Albrecht and Zemke, 1985). In order to provide a channel for customers to leave feedback and complaints, tourism organizations should have an e-complaint handling section on their web sites so that there is a proper channel of communication between management and unsatisfied customers. However, with the rapid development of the Internet, users at present can easily spread their complaints which, in turn, can significantly affect a company's image. TripAdvisor is leading the way as a review site for hotels and destinations (Au *et al.*, 2010). Electronic WOM is a useful tool to disseminate complaints about brands via web sites, chat rooms and consumer forums (Gelb and Sundaram, 2002). Shea *et al.* (2004) illustrated a real case 'Yours is a very bad Hotel' that made at least seven newspapers and magazines report the unpleasant experience. The influential power of the Internet, 'complaint forum' and chat room were clearly shown in this study. Moreover, in the Internet era, even individuals have sufficient power to take on powerful organizations such as airlines (Buhalis, 2004). To prevent the widespread of e-complaints, tourism managers should locate these complaint forums and try to handle them professionally.

In addition to the review sites, virtual communities are gradually becoming incredibly

influential in tourism as consumers increasingly trust better their peers, rather than marketing messages. The most cited definition of a virtual community was firstly given by Rheingold (1993, p. 58) who stated that 'a virtual community is a group of people who may or may not meet one another face-to-face, and who exchange words and ideas through the mediation of computer bulletin boards and networks'. A virtual travel community (VTC) makes it easier for people to obtain information, maintain connections, develop relationships, and eventually make travel-related decisions (Stepchenkova *et al.*, 2007). Vogt and Fesenmaier (1998) stated that participation and attitude are the primary dimensions of consumer behaviour in these virtual communities. Because many travellers like to share their travel experiences and recommendations with others, VTCs have become one of their favourite areas to post their travel dairies. Additionally, online travellers are enthusiastic to meet other travellers who have similar attitudes, interests and way of life (Wang *et al.*, 2002). As such, better understanding of VTC users' behaviours and motivation can assist tourism practitioners and policy makers to establish, operate and maintain VTCs in a more efficient way. This, in turn, facilitates consumer-centric marketing or relationship marketing (Niinenen *et al.*, 2006). VTCs, however, may be at risk of losing members if their members are not satisfied with the content, design, security policies and repercussions of non-compliance with community rules (Allison *et al.*, 2005; Chung and Buhalis, 2008). The emergence of Web 2.0 or Travel 2.0 brings together the concept of social networking/virtual communities and applies it to the tourism industry. By analysing the content of VTCs, travel organizations can understand their customers' satisfaction and behaviours, and undertake corrective actions to improve their offerings. They can also increase brand awareness and strengthen brand association through the assistance of VTCs. However, despite the large potential impact of VTCs on the tourism industry, Preece (2000) stated that research on the topic is still at an infancy stage when compared with other geographical and physical communities.

### Risk management

As payment is the most important item in eCommerce, consumers are always concerned about payment security. Such concerns are a possible outcome of computer crimes, which are one of the primary factors that prevent consumers from providing credit card information. Mills *et al.* (2002) listed several cybercrimes, such as auction fraud, vacation fraud, gaming fraud, spamming and identity theft. Business organizations must therefore pay more attention to protect themselves and their customers from losses due to cybercrimes. These crimes, however, are not likely to be completely prevented or easily detected by law enforcement alone (Mills *et al.*, 2002). Furthermore, as the travel industry gradually relies more heavily on IT, there is also an increasing concern among consumers about privacy (Brown *et al.*, 2007), although consumers do gradually accept that they will have to sacrifice privacy for better customer service. Research findings have shown that privacy issues also play a significant role in inhibiting the purchase of travel-related products online (Kolsaker *et al.*, 2004). This leads to the situation that many travellers use the Internet to search for information but still purchase offline. In order to encourage more online travel shopping, policies on customers' privacy protection in relation to IT usage should be stated explicitly.

### Implications

With less time spent on waiting and planning, and more time on enjoyment, consumers have expressed their increasing interest in more convenience and choice, and in online travel shopping at home via travel web sites (O'Connor and Frew, 2001). At present, there is a large increase in the number of customers who make reservations directly from hotel web sites (Jeong *et al.*, 2003). Customer satisfaction depends to a great extent on the accuracy and comprehensiveness of specific tourism information and the ability of organizations to react instantly to consumer requests. Tourism organizations and destinations, therefore, need to recognize this change

and to develop personalized services to address individual needs. Personalized services driven by advanced customer relationship management (CRM) systems should record customer preferences and requirements for present and future usage (Picolli *et al.*, 2003).

### Technological Innovation

Rapid technological development paradoxically means that the more powerful and complex that ICTs become, the more affordable and user friendly they become, enabling more people and organizations to take advantage of them. Strategically, constant innovation in the applications of hardware, software and network development means that only dynamic organizations, which can assess the requirements of their stakeholders and respond efficiently and effectively, will be able to outperform their competitors and maintain their long-term prosperity.

Technology emerges as an 'info-structure' of an organization that supports the entire range of internal and external communications and processes (Buhalis, 2003), and eTourism is spreading rapidly as a holistic and integrated system of networked equipment and software, which enables effective data processing and communication for tourism organizations and destinations. Aspects of this discussed below are interoperability, web-site design and analysis and modelling, with a brief round-up of the implications of ITC complexity and development.

### Interoperability

Werthner and Klein (1999) defined interoperability as the provision of a well-defined and end-to-end service which is in a consistent and predictable way. This generally covers not merely technical features but also, in the case of electronic market environments, contractual features and a set of institutional rules. Interoperability enables partners to interact electronically with each other by the most convenient method, and to deliver the

right information at the right time to the right user at the right cost. Staab and Werthner (2002) stated that interoperability is a major technical issue offering a realistic alternative to standardization. Jakkilinki *et al.* (2007) proposed an ontology-based eTourism Planner – AuSTO – that enables users to create an itinerary in one single application by using this intelligent tool that builds on semantic web technologies. Similarly, Maedche and Staab (2003) showed that semantic web technologies can be used for tourism information systems to provide useful information on text and graphics, as well as generating a semantic description that is interpretable by machines. The OntoMat-Service, introduced by Agarwal *et al.* (2003), can embed the process of web-service discovery. Travellers thus no longer need to search for information among millions of web sites to obtain the desired information. To the degree that tourism organizations need to interact dynamically with partners to develop and deliver tourism products, interoperability will be critical for their ability to work efficiently with others.

Multimedia is also becoming one of key areas of development that influences tourism. Tourism information needs an extensive representation of photos and graphics in order to provide a tangible image or experience to travel planners. Unlike offline information, which is unilaterally exposed to travellers, the Web allows people from around the world to virtually interact with a destination through three-dimensional (3D) virtual tours (Cho and Fesenmaier, 2001). The experience within a computer-mediated environment can simulate real visits and virtual experience and provide almost real-life experiences. This can lead to the creation and communication of a destination image (Cho *et al.*, 2002). The result has been the adoption of 3D interactive web sites by online marketers to attract online consumers, encourage online purchases and to create loyalty (Fiore *et al.*, 2005). Interactivity can be further enhanced by using multimedia. Abad *et al.* (2005) demonstrated how tourist attractions can be presented dynamically by virtual characters in real time, and how this presentation is enhanced by multimedia information about the items stored in a



database. Using the system, visitors can ask for available attractions that correspond to certain selection criteria with ranking based on the travellers' preferences. Interacting with multimedia-enhanced web sites can produce telepresence and allow people to 'experience' products and destinations without actually visiting a place. Telepresence uses a range of technologies to make users feel as if they were present at a location or situation whereas, in reality, they are not (Steuer, 1992). The technique relies on how closely the computer-mediated experience simulates real-world interaction with a product and is determined by the extent to which interactivity is achieved (Fiore *et al.*, 2005).

Destinations are, by definition, amalgams of tourism products. Dynamic package assembly helps individual customers to create their own travel packages. However, owing to the non-standardized data format among the various available systems, there are difficulties with interoperability (McGrath and Abrahams, 2006; Cardoso and Lange, 2007). One of the major challenges for the wide adoption of such package assemblies, however, is the language barriers (Chen and Hsu, 2000); these barriers result in the mobile information provided not being the latest available because of delays in translation. Although the act of standardizing for different players is a seemingly impossible mission, Dell'Erba *et al.* (2005) set up a virtual interoperable network that allows data exchange through a system translation mechanism in a seamless way to show how interoperability might be achieved.

Singh and Kasavana (2005) predicted that future ICT applications will probably rely on mobile and wireless technologies. Wireless is a term used widely to describe telecommunications in which electromagnetic waves (as opposed to wire) carry a signal. ICT developments have proliferated the use of wireless applications and devices, including cellular (mobile) phones and pagers, global positioning systems (GPSs), cordless computer peripherals and telephones, and home-remote control and monitor systems. Mobile phones now have become a necessity in this era of wireless communication (Langelund, 2007). The proliferation of

different mobile devices, such as personal digital assistants (PDAs) and 3G mobile phones with GPSs enable travellers to retrieve travel-related information without any time or geographical constraints. In addition, mobile services now enable travellers to book hotel rooms, air tickets and car rentals, retrieve information about transportation schedules, obtain travel guides for destinations and dining guides (Berger *et al.*, 2003). Solon *et al.* (2004) developed TeleMorph, which can determine the mobile network bandwidth to output presentations, and receive and interpret voice questions from tourists to show destination information. This technology can prevent information delay when travellers retrieve information from low bandwidth networks. Alfaro *et al.* (2005) implemented a multimedia museum guide on PDAs; each destination in the guide had infrared emitters installed in order to enhance the tourist experience, so that when tourists approach the destination, their PDAs will automatically display a multimedia presentation of that destination.

In addition to mobile networks, wireless local area networks (WLANs) allow users to connect devices to the Internet through a wireless radio connection (WiFi), while Bluetooth connects PDAs, cell phones, computer mice and other peripherals over short distances. The next technological evolution emerging is WiMAX (Worldwide Interoperability for Microwave Access). WiMAX promotes conformance and interoperability of the IEEE 802.16 (wireless broadband) standard and provides wireless data over a long distance (Patton *et al.*, 2005). WiMAX supports the delivery of last-mile wireless broadband access as an alternative to cable and DSL (*digital subscriber line*, is a family of technologies that provides digital data transmission over the wires of a local telephone network). WiMAX is expected to offer the highest possible coverage, up to 30 miles (Oudinma *et al.*, 2007), and provide Internet broadband wireless access to entire destinations. This will support users with Internet access while at the destination without having to pay expensive data-roaming charges. WiMAX is also predicted to have its largest impact in developed countries or in rural,

remote locations characterized by low population density in which an adequate wired infrastructure was never developed, or cannot be developed for economic reasons (WiMAX Forum, 2004). This development narrows the digital divide, favouring the transition to a new stage of information and service providers (Ohrman, 2005). Always-on (when users are connected to the Internet constantly) connectivity creates great opportunities for interactivity at the destination and the provision of personalized, contextualized and location-based services (LBS). The four primary functions of LBS for the traveller are: (i) localization of persons, objects and places; (ii) routing between them; (iii) searching for objects in proximity, such as restaurants, shops, hotels, or sights; and (4) information about travelling conditions, such as traffic-related data (Berger *et al.*, 2003).

#### Web-site design and analysis

Web sites are incredibly important, mission-critical and cost-effective marketing tools for businesses. Good web design goes beyond technology, design and layout. It includes a wide range of content, usability, navigation and interactivity issues (Law *et al.*, 2010). In their study on customers' weighting factors on hotel web-site contents, Law and Cheung (2005) found that reservation information was the most important dimension. A successful web site should, therefore, take customers' interests and participation into consideration, in order to capture information about their preferences, and subsequently use that information to provide personalized communications and services (Doolin *et al.*, 2002). Hashim *et al.* (2007) consolidated 25 tourism and hospitality web-site studies from 1996 to 2006 that covered web-site quality and features analysis, and generated 74 web-site features. Hoteliers must therefore routinely evaluate their web sites in order to ensure that the sites are efficient, appropriate and useful to customers (Baloglu and Pekcan, 2006).

Related to usability is accessibility, which addresses the fact that web surfing is still a barrier for people with disabilities (Michopoulou *et al.*, 2007). Examples of physical

barriers include low-vision users who will need large text or spatial adjustment, blind people who will require screen readers, users with colour blindness who will need adequate contrast of text and background colours, and deaf people who should have visual displays rather than pure audio presentations. Han and Mills (2006) stated that current web-site designs have nine themes that will affect screen reading for visual-impaired users. In response, the World Wide Web Consortium has illustrated the requirements for using web sites and Web-based applications, and has provided supporting information for guidelines and technical work (The World Wide Web Consortium, 2005). Hence, by exploiting this knowledge and following the Web content accessibility guidelines (Chrisholm *et al.*, 1999) from the W3C Web Accessibility Initiative (WAI), content can be presented in an accessible and customizable way, and accommodate users' needs and preferences.

Web-site performance can be measured in various ways, such as evaluating a web site's effectiveness by using the modified balanced scorecard approach (Choi and Morrison, 2005; Law *et al.*, 2010) or the flow experience approach (Skadberg *et al.*, 2005). Other measurements that can be made include determining the adoption level of a web site as an e-business tool through content analysis (Küster, 2006; Roney and Ozturan, 2006) and identifying the factors that affect user satisfaction by using protocol analysis (Essawy, 2006). Problematic integration theory has also been adopted to better understand online marketing activities (Han and Mills, 2006). Previous studies have compared and contrasted web sites between and among different geographic areas. For instance, Law and Liang (2005) compared China-based and USA-based hotel web sites using a multi-criteria decision-making approach, and found that the performance of the USA-based sites was significantly better than that of the China-based sites. Law and Cheung (2006) further selected 30 North America-based, Europe-based, and Asia-Pacific-based travel web sites and analysed their online hotel reservation services. The study showed that North America-based web sites performed

significantly better than web sites from the other two continents in certain attributes.

In the context of web-site usability evaluation, four studies have found that ease of use is one of the most important determinants of perceived web-site quality (Cho and Agrusa, 2006; Park *et al.*, 2007). A good web site should be inclusive and should cater for the needs of different types of online users, including visually impaired and disabled users (Shi, 2006; Han and Mills, 2007). The hospitality and tourism industries should be aware of the fact that people with disabilities and the elderly represent a growing market segment (Buhalis and Michopoulou, 2011). Assistive technologies such as voice browsers can provide certain assistance for these customers to access web information (Pühretmair, 2004). Waldhor *et al.* (2007), for example, implemented an automated call centre agent (RESA) for a low-budget hotel, which enables customers to use their own phones and their voices to reserve hotel rooms via RESA without the need to go through any human agents. RESA can automatically select a desired room on the basis of a customer's voiced criteria. Rumetshofer and Wöß (2004) introduced an intelligent accessibility add-on that allows users to create their own personal profiles with their special needs, and updating depends on the user's input and action over time. To attract business and provide convenience to physically challenged customers, tourism web designers should consider the needs of every group of users and design web sites to address their inclusion. Moreover, web designers should also consider culture and language as factors affecting the success of a web site (Kale, 2006). It is interesting to note that although Germany is the top-spending nation on international tourism, many non-European DMOs do not include a German-language version of their web sites (Arlt, 2006).

### Modelling

Various modelling methods have been presented for analysing tourist data. Delen and Sirakaya (2006) tested the three popular data-mining methods of artificial neural

networks, decision trees and rough sets, and found that the rough sets algorithm was the best forecasting tool among the three. Similarly, Kon and Turner (2005) compared the forecasting accuracy of neural networks and the basic structural method (BSM), and confirmed that the BSM maintained a higher accuracy in forecasting tourism demand. Bloom (2005) recommended that neural network applications be used to track the changing behaviour of tourists within and between market segments. Other researchers have proposed modified neural networks for modelling tourist arrival (Pai and Hong, 2005) and time-series forecasting (Palmer *et al.*, 2006). Similarly, Petropoulos *et al.* (2006) introduced a technical analysis system to forecast tourism demand. By using association rule mining, tourism organizations can identify different types of tourist profiling behaviour (Emel *et al.*, 2007). Wong *et al.* (2006) adopted data-mining techniques to analyse the travel patterns of Northern Taiwanese travellers and suggested that DMOs in Asian countries should promote their destinations in Taiwan. As an alternative to analysing numerical data, text mining is another good choice for analysing tourist data. Lau *et al.* (2005) demonstrated three examples of how text mining can be used as a tool for online text analysis. In addition to analysing tourist data, various researchers have proposed models to enhance the marketing effectiveness of tourism web sites. For instance, Law (2005) introduced an Object-Oriented Database Marketing (OODM) model for application in Asia's hotel industry to enhance its marketing effectiveness. Likewise, Mills *et al.* (2007) introduced a Modified Interactive Tourism Advertising Model (MITAM) that could improve a web site's advertising effectiveness.

The Internet, as the primary search channel for tourists, naturally contains web sites in different languages. Multilingual information-searching applications can thus provide comprehensive search results for people who need to search using a keyword in one language and look for a search result in another language (Li and Law, 2007). Krieger *et al.* (2005) used Internet-enabled conjoint analysis to examine customer wants on cruise

vacations, and identified WOM information and past experience as contributing to customer perceptions and expectations.

### Implications

The technical complexity of modern systems based on ICTs demands that all aspects of the innovation chain integrate their efforts. The concentration and coherence required to achieve both significant technological development and market impact necessitate engagement of both the research and business communities to integrate the rapid coevolution of technology, market, social and administrative requirements. As such, industry practitioners should apply well-developed data exchange formats to achieve better intersystem communications, and should use centralized knowledge bases for tourists to use as a one-stop channel.

With the development of ICT constantly evolving with every passing day, it is also imperative for tourism organizations and destinations to develop internal in-house IT resources and expertise to facilitate the communication between business managers and IT technicians. These professionals could collect, organize, and retrieve up-to-date and relevant technology information from the technical area and relate this information to managers.

### Industry Functions

Although the literature has been dominated by applications which explain how to automate rather than how to assist organizations to evolve to the new era, the importance and necessity of ICT usage for both strategic and operational tourism management are gradually emerging in the literature (Marcussen, 1999a,b; O'Connor, 1999). Increasingly, ICTs are being used to re-engineer all business functions and processes towards supporting the organization in its entirety rather than just automating its operations. This section discusses both the strategic management of DMOs and online tourism marketing.

### Strategic management

ICT developments have direct impacts on the competitiveness of enterprises because they determine the two fundamental roots of competitive advantage: differentiation and cost advantage (Porter, 2001). Hence, tourism destinations need to proactively incorporate ICTs into their efforts to improve service quality, as they enable organizations to dynamically differentiate and specialize their products and services. This almost leads to a market segment where consumers can build their tourism experience by bundling their products dynamically (Buhalis and O'Connor, 2005). Recently, Mazanec *et al.* (2007) argued that it is necessary to develop a web site when the competitiveness of a tourism destination is evaluated. ICTs also become instrumental to cost management in the industry, particularly as regards distribution and promotion costs (Connolly *et al.* 1998), and redesigning processes and the elimination of repetitive tasks reduce labour costs and increased efficiency (Buhalis, 1998). All this has empowered the development of no-frills organizations that use technology heavily for operations and distribution and, at the same time, it has put incredible pressure on traditional organizations to re-engineer their operations. On several occasions, this has led to the outsourcing of functions and process to external organizations (Paraskevas and Buhalis, 2002).

The Internet is changing the structure of the tourism industry by altering barriers to entry, minimizing switching costs, revolutionizing distribution channels, and facilitating price transparency and competition, while enhancing production efficiency (Kim *et al.*, 2004). Porter (2001) demonstrated how the Internet has changed industry forces. The Internet has also enabled destinations to dynamically package their individualized products by combining different travel products (i.e. accommodation and transportation, etc.) (Daniele and Frew, 2005). Access to a greater range of available suppliers has also increased the power of destinations. Intensified rivalry has led to increased difficulty in creating and sustaining competitive advantages through differentiation strategies (Go *et al.*, 1999). Wöber (2001) suggested that the

identification of tourism destinations competing for the same market can be assisted by a Group Decision Support System (GDSS). In this way, decision makers can include their subjective and objective views for analysis as in traditional forms of competitive analysis. To conclude, the Internet forces tourism organizations around the world to change their strategies dramatically (Buhalis and Zoge, 2007). Constant innovations in both product and process supported by proactive and reactive strategies are some of the few sources of competitive advantage in the Internet era (Buhalis, 2003).

In particular for destinations, DMSs emerge as strategic tools for promotion, distribution and operations for both destinations and small and medium-sized *tourist* enterprises (SMTEs) (Buhalis, 1997). They can assist developing a flexible, tailor-made, specialized and integrated tourism product. By enabling users to search and select individual tourism products, DMSs can support travelers in creating their own personalized destination experiences. At the organizational level, DMSs provide the essential infrastructure for DMOs to coordinate their activity and to provide sufficient information and direction to their overseas offices to promote a destination. DMSs emerge as the interfaces between destination tourism enterprises (including principals, attractions, transportation and intermediaries) and the external world (including tour operators, travel agencies and, ultimately, consumers). In some cases, such as in Britain, Singapore and Austria, DMSs have been used for integrating the entire supply at the destination. Their contribution to strategic management and marketing is demonstrated by their ability to integrate all stakeholders at destinations and also to reach a global market at a fairly affordable cost.

### Online marketing

Perhaps marketing and distribution are the business functions most affected by the technological revolution (Go and Williams, 1993; O'Connor and Frew, 2002). Technology-supported organizations need to develop their

knowledge base to improve their management and marketing functions (Fesenmaier *et al.*, 1999). By using the Web and the Internet as marketing tools, tourism organizations have also gained some distinct advantages in cost reduction, revenue growth, marketing research and database development, and customer retention (Morrison *et al.*, 1999). Reaching worldwide customers in a cost-effective way allows organizations to engage in a direct dialogue with consumers (Buhalis, 1998; 2003). The Internet is generally emerging as a multi-promotion tool and distribution channel (Gretzel *et al.*, 2000; O'Connor and Frew, 2004). Web marketing is therefore gradually becoming mainstream (Buhalis, 2003). Wang and Fesenmaier (2006) argued that a successful Web marketing strategy requires the integration and coordination of web-site features, promotion techniques and customer relationship management programmes. Thus, integrating technologies with relationship marketing could help tourism organizations and destinations to maintain competitiveness and improve the management of business relationships with customers (Álvarez *et al.*, 2007).

In the pre-Internet era, tourism suppliers had no other choice but to use intermediaries, such as travel agents and tour operators, for their distribution functions. CRSs and GDSs facilitated the intermediation process (Sheldon, 1997; O'Connor, 2003). Both intermediaries and end consumers are dependent on comprehensive, accurate and timely information to aid in their travel choice because of the intangible nature of the tourism products (Poon, 1993). The Web has enabled organizations to distribute their products not only through direct distribution but also through a very wide range of channels (O'Connor and Frew, 2002). Third-party intermediaries include online travel agencies as well as meta search engines, all of which are able to distribute both static and dynamic information, such as availability and pricing. Electronic intermediaries are also emerging dynamically, and increasingly challenge traditional distributors. For example, Expedia and Last-minute.com are now challenging the business models of Thomson and Thomas Cook, forcing them to rethink their operations and

strategies. Auction sites such as eBay.com, price-comparison sites such as Kelkoo and Kayak.com, price-reversing sites such as Priceline.com, and price-prediction sites such as farecast.com also provide a great challenge for the pricing of both suppliers and intermediaries. In addition, Web 2.0 or Travel 2.0 providers such as TripAdvisor.com, IGOUGO.com and Wayn.com enable consumers to interact and offer peer-to-peer advice. These changes all force all tourism players to rethink their business models and to take drastic actions in redeveloping their value chains. Tourism organizations aim to disintermediate all intermediaries that add cost to their production and distribution. For example, tour operators aim to sell their packages directly, thus bypassing travel agencies. They also disbundle their packages and sell individual components.

At the same time as tour operators are implementing these changes, travel agencies are dynamically packaging tour products and supporting the development of customized packages, thus disintermediating tour operators. The web has therefore introduced utter transparency into the marketplace (Buhalis, 2003; O'Connor, 2003), so that organizations have had to reinforce their brands online and offline and to justify their positioning and pricing strategies. At the time of a very volatile environment in the marketplace, tourism intermediaries have also been forced to readdress both their revenue and cost bases as well as to re-evaluate all partnerships and value chains. Bennett and Lai (2005) identified two principal ways for travel agents to overcome disintermediation, namely repositioning themselves as travel consultants and becoming more technologically oriented. Some travel agencies have formed strategic alliances to strengthen their competitive advantages in the era of Internet (Huang, 2006).

The Internet has transformed the distribution function to an electronic marketplace, where access to information and ubiquity is achieved, while interactivity between principals and consumers provides major opportunities. The Internet promotes the mass customization of tourism products as it supports the industry to target niche markets of

significant size in different geographical locations. Hence, the Internet propels the re-engineering of the entire process of producing and delivering tourism products, as well as boosting interactivity among partners that can design specialized products and promotions in order to maximize the value added provided to individual consumers (Buhalis, 1998, 2003). Ultimately, ICT tools reinvent the packaging of tourism to a much more individual-focused activity, offering great opportunities for both principals and intermediaries, and enhancing the total quality (fitness to purpose) of the final product (Buhalis, 1998).

## Conclusions

The technological revolution experienced through the development of the Internet has dramatically changed the market conditions for tourism organizations and destinations. ICTs support interactivity among tourism enterprises and consumers and, as a result, they re-engineer the entire process of developing, managing and marketing tourism products and destinations. Increasingly the impacts of ICTs are becoming clearer, as networking, dynamic interfaces with consumers and partners, and the ability to redevelop the tourism product proactively and reactively are critical for the competitiveness of tourism organizations and destinations.

Increasingly, ICTs will provide the 'infrastructure' for the entire industry and will overtake all mechanistic aspects of tourism transactions. It is evident, however, that the future of eTourism will be focused on consumer-centric technologies that will support organizations in interacting with their customers dynamically. Consumers are becoming incredibly powerful and are increasingly able to determine elements of their tourism products. They are also much more sophisticated and experienced and, therefore, are much more difficult to please. Innovative tourism enterprises and destinations will have the ability to divert resources and expertise to servicing consumers and provide higher value-added transactions. The development of new and more powerful ICT

applications empowers both suppliers and destinations to enhance their efficiency and to re-engineer their communications strategies. Innovative technologies will support interoperability, personalization and constant networking. Hence, agile strategies are required at both strategic and tactical management levels to ensure that the ICT-driven opportunities and challenges are turned to the advantage of tourism organizations in enhancing their innovation and competitiveness.

Destinations that embrace advanced ICTs and DMSs, in particular, will be able to improve their strategic positioning, improve their competitiveness and optimize their benefits from tourism. To succeed in the future, DMSs will need to combine both technological and management innovation and to develop suitable tools for satisfying the entire range of stakeholders. ICTs and DMSs, then, emerge as essential tools for both tourism demand and supply, as they establish a flexible and profitable communication bridge and a strategic management

tool. They effectively provide the info-structure at destination level and can network the entire range of principals and operators on a neural network.

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