

## Information and Communication Technology in Tourism

*Štefan Bojnec and Zvonko Kribel*

*University of Primorska*

*Slovenia*

Information and Communication Technology (ICT) is one of the key factors of competitiveness as far as tourist markets and strategic tourism management are concerned. In fact it reduces transaction and operational costs. The implications of the ICT revolution for tourism competitiveness and management are identified in different sectors of tourism and its closely associated industries. The international ICT is widely used in industries such as airlines and travel, hospitality, tour operators, travel agencies, computer reservation and management systems for tourism and destinations. The focus of the paper is on on-line tourism and travellers demand and supply response by building and maintaining competitive advantage using ICT. The paper concludes with the importance of both the virtualization of the tourist industry and the development of a destination management system in tourism management and marketing using intranet-extranet-internet-supported tools, the computer reservation system and a global distribution system.

### INTRODUCTION

The word 'traveller' has the same root as 'travail', French word for hard work. Larry Krotz (1996, 4–5) described travelling as 'an unordered and disorganized activity, contrary to the well-arranged events for a group of tourists that visit a nearby museum by train and coaches'. It was Sir Thomas Cook's idea in 1841 (Krotz 1996, 48) to bundle a first tourist package: train transport, few cups of tea, and a printed booklet (he owned one of the biggest printing offices in the United Kingdom). According to the World Tourist Organization (WTO), travellers and tourists may be classified into visitors that spend at least one night outside their usual residence and tourists that stay at least one night in a collective or private accommodation in the place visited (Sheldon, Woeber, and Fessenmaier 2003). In 1990 there were about 450 million tourists. By the end of the 20th century the number grew to almost 700 million by the end of the century, and it is still increasing (Krotz 1996, 205; WTO 2003).

Internet, mobile technology and wireless computing (ICT) provide tourists with the means to gain immediate access to relevant information

of greater variety and in-depth than has been available previously, about destinations throughout the world (WTO 2001). Internet is becoming the primary channel for business-to-business (B2B) communication. The United Nations document TD (XI)/PC/6 (UN 2004, 5) also promoted the use of modern information and communication technology in tourism development. In Italy, a medium Internet user country, a recent SWG report (SWG 2004) on 2003 found that a hefty 54% online users search tourists information on the network. IDC in 2001 predicted an eight-fold increase in e-commerce revenue (WTO 2001, 5): from 634 USD billion in 2001 to more than 5 USD trillion in 2005. The highest growth rates were expected in the Asia-Pacific area.

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Most of tourist operators prefer customers that return to the same destination. Because positive word of mouth is the result of satisfaction, special attention needs to be given to customer satisfaction and complaint handling. The former should be constantly monitored in order to identify the problem areas and to make necessary modifications to enhance customer satisfactions (Gursoy and McCleary 2004). So the service should be constantly monitored. Therefore, the aim and main objective of our paper is to draw special attention to ICT in terms of its crucial role and usefulness in the tourist economy improving efficiency, cost- and price-competitiveness in the world-wide travel, leisure, hospitality, tour operators, tourism and destination management.

#### ICT AND TOURISM SERVICES

The tourism economy is one of the fastest growing activities in developed countries (WTO 2003). This rapid growth has been determined by the rapid growth in tourism demand, both in terms of the rapidly increased number of tourists and their spending, and by the rapid response in supply to these growing tourist niche markets. The ICT additionally contributes to changing patterns in tourist markets and tourist operations. Around 90% of the United States of America households are using the video-on-demand technology with opportunities to choose a travelling itinerary.<sup>1</sup> Moreover, around 50% of population in the developed countries is using Internet with opportunities to choose holidays on the basis of available information at the Internet. Several tourists are already making their own travelling and holidays' decisions on the basis of the information provided at the Internet.

With the fast growing tourism markets, there is also a rapid growth of industries, which are directly and indirectly associated with tourist

expenditures. Several of these industries are also users of the international ICT such as airlines and travel, hospitality, tour operators, travel agencies, computer reservation and management systems for tourism and destinations. The on-line tourism and travellers markets, and the destination management system are using intranet-extranet-Internet-supported tools, a computer reservation system and a global distribution system for tourism management and marketing as factors for building and maintaining competitive advantage (Buhalis 2003). The tourism industry has also moved towards diversification and differentiation of products and development of packages for tourist destinations using ICT in catering, leisure, hotels and other supported activities. Most of tourists get first information at the Internet. This holds for both transit tourists as well as tourists with the overnight stays in a certain tourist destination.

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Most of tourist products are different services for tourists, where ICT is an extremely useful tool in management and operation of these activities. The ICT tools are sometimes deeply involved in selling activities creating a feeling and emotion by tourists. Among these technologically sophisticated tools, which are used in tourist markets, there is the Salzburg Joker card with a special discount for tourists, (see further) or a project where a tour guide gives tourists a 'smart phone' with maps and pictures of the exposed paintings in the museums and a virtual game for pleasure. With a simple push on a bottom it can call a tourist agent. The tourist can choose a 'trace' and the price for the itinerary of the travel. Similarly, before visiting the famous Russian State museum in St. Petersburg, Hermitage, you may have a virtual visit at <http://www.hermitagemuseum.org>.

The WEB cam provides the opportunity to watch the 'current situation' in the place where we want to travel. This is many times provided also on TV. Yet, the I-node (NTT DoComO in Japan) provides opportunities to make a reservation in the Intercontinental hotel in Florence by using a mobile phone. Finally, Lufthansa is offering for around 15 EUR per hour Internet on laptop in the plain during the flight. All these examples clearly indicate a substantial connection between the advanced and sophisticated ICT and its extreme usefulness in the travel and tourism economy.

#### TRANSACTION MODELLING

Modern computer usage improves and inducts centralization, different from old mainframe days, and opposed to recent personal-home com-

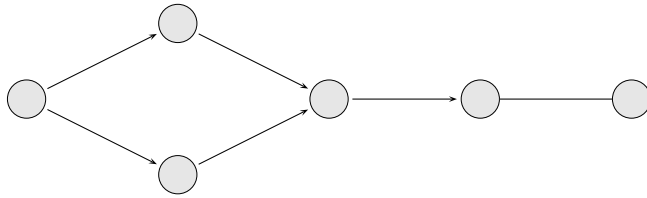


FIGURE 1 E-service with micro payments

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puter technology. Tablet PC and network PC remained prototype market hype words. Most current PC workstations use local applications, but larger companies use also mainframes or other centralised computer facilities. This translates to PC terminal workstation with mainframe-based application where we talk about global reservations systems (GRS) or destination management systems (DMS). The most known GRSs are: Amadeus, Galileo, and Sabre, all of them began their business with airlines. DMSs are much more locally oriented. These systems offer a throughout information of a particular place, its museums, theatres, events, weather, restaurants, all at one single WEB place. Most of these systems require a user to register inserting some own preferences. The best examples are Amazon.com and eBay.com, two of the most successful dot-com companies.

We believe GRS and DMS systems consist of many short and small e-comm transactions, where each transaction comes with an e-micro payment (Geer 2004, 21), the reader probably remembers the PayPal service of eBay.com. A service or a tourist product may be more or less a complex chain of these micro transactions, where each node represents an event, a tourist sub-product, a new destination, or an accommodation (see fig. 1).

Fig. 1 graphically depicts the idea that from the start point of a tourist trip to the final tourist destination it would be possible to choose different paths, but with the associated different transaction and opportunity costs. The ICT considerably reduces transaction and operational costs in the tourism economy. So transaction cost modelling can provide us with some hints on the usefulness of ICT for cost competitiveness and comparative advantages for the development of tourist destinations.

#### EVIDENCE OF ICT USAGE IN TOURISM

Buhalis (2003) presents several examples of the development of the tourist economy in connection with the international ICT in different

TABLE 1 Types of websites used for planning and booking leisure trips in the USA

Type of website	On-line leisure travellers	
	Travel planning (%)	Travel booking (%)
Company sites	77	77
Destination sites	68	29
On-line travel agency sites	61	60
Search engine sites	59	30
Portal sites	54	30
Travel guide sites	29	10
Special interest sites	20	9
Newspaper or magazine sites	14	7
Community sites	11	6

Source: Buhalis (2003) on the basis of Cook (2001).

areas of tourism industries focusing on airlines and travel, hospitality, tour operators, travel agencies, computer reservation and management systems. The evidence of ICT usage in the Slovenian tourism economy is still limited. Therefore, we present some evidence on types of websites used for planning and booking, which are available for developed countries some of which have already been or they are more likely to be introduced also in the Slovenian tourist economy in the near future.

The Internet for travel planning is widely used in developed countries, including Slovenia. A majority of tourists in developed countries consult the Internet to obtain information on company sites, destination sites and on-line travel agency sites (table 1). Potential tourists are searching information on destinations and prices, maps and driving directions, places to stay, activities to do, airline fares and schedules, entertainment opportunities, local event calendars and similar tourist information and tourist attractions. Among the most popular types of websites used for travel are search engines and company-owned websites in the areas of airlines, hotels and rental car companies. However, the Internet is likely to partly substitute phone calls or personal visits to travel agencies and tourism offices.

The on-line travel bookings are more widely used for purchase of airline tickets, hotel rooms and overnight lodging, rental cars, tickets for museums, festivals, sport events and similar, and package tours. The eAirlines is a typical example of a shift from computer reservation systems to global distribution systems (Buhalis 2003). Airline carriers im-

plemented the emerging computer technology to manage reservations, schedules, fares, prices, tickets and boarding passes, itineraries, invoices, and others more accurately and efficiently.

The low cost-carrier Easyjet was one of the first airlines providing the opportunity to use the Internet reservation and selling system. Approximately 90% of all seats are sold via the Internet, making Easyjet one of Europe's biggest Internet retailers ([www.easyjet.com](http://www.easyjet.com)). Since the end of April 2004 it has also been operating with the Ljubljana airport, the largest airport in Slovenia. On 28 April 2004 daily Easyjet flights have been introduced between Ljubljana and London. Therefore, a rapid increase of tourists from the UK to Slovenia, and vice versa, has occurred. Some tourist are coming to Slovenia also by the Irish low-price carrier Ryanair, which so far has not directly operated with the Slovenian airports, but with the airports near the Slovenian borders such as Trieste in Italy near the Slovenian coast, and Klagenfurt and Graz in Austria.

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Low-price carriers seem to be more cost rational and thus cheaper due to cheap on-line Internet booking and tickets selling system, minimum fixed costs for selling and housing facilities, no serving food and drink during the flights, and often lower costs for using airport facilities. For example, the Easyjet at its home page [www.easyjet.com](http://www.easyjet.com) underlined the use of the Internet to reduce distribution costs and then maximise the utilisation of each aircraft by reducing unit costs, enabling a ticket-less travel, providing travel details and booking online, not serving food, ensuring an efficient use of airports and paperless operations.

The Internet sales and communications play a crucial role in the Easyjet business as the Internet provides one of the most cost-effective distribution and communication channels in work with passengers to book and buy their seats online. Fig. 2 clearly illustrates the rapid increase in the number of passengers on Easyjet flights since its first flight in November 1995. The load factor is around 83% and the majority has been the Internet sales. During the last three years, the percentage of the Internet sales has been greater than 86% and currently it is around 90% (Buhalis 2003, 207; see also [www.easyjet.com](http://www.easyjet.com)). The passengers booking online receive a discount for a journey promoting the 'web's favourite airline'.

It is worth mentioning few other examples of ICT usage in tourism and destination management and operation.

First, the <http://vlado.fmf.uni-lj.si/pub/networks/doc/sojo/sojo.pdf> is the Austrian destination management project called 'Salzburg Sommer Joker' where one DM company plans, organizes, manages and controls the configuration of the tourists preferences year by year with an all in-

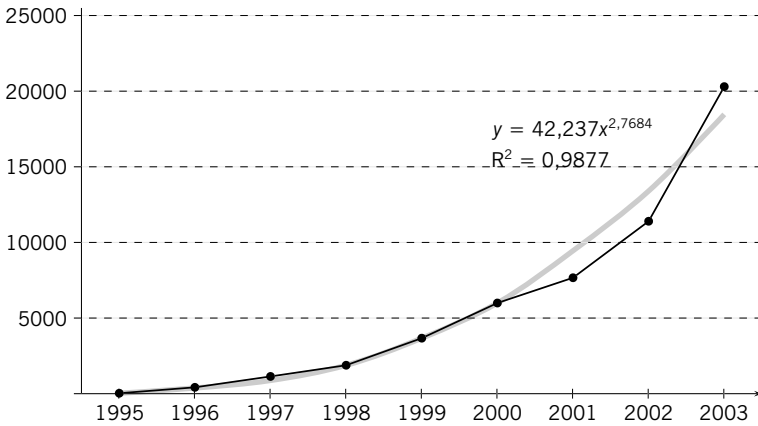


FIGURE 2 Easyjet passengers (in thousands; based on data from [www.easyjet.com](http://www.easyjet.com)).

clusive Joker chip card that offers free admission or a reduced rate to about 180 sights and attractions throughout the Province of Salzburg. When tourists use the Salzburg Sommer Joker their movement is digitally recorded for accounting reasons at the entry points of every tourism event. These data may be statistically analysed to see the most interesting tourism event, the most frequent starting point, and other data for effective destination management.

Second, in a nearby Trieste there is a small pizzeria where the personnel use HP iPaq PDA with Wi-Fi modules. Each table is numbered, single seats are numbered clockwise similar to sectors on a floppy disc. When an occasional customer orders a pizza with some special request, for example without onion, the waiter selects the pizzas' icon on his/her PDA, and enters a note for a special request. With a tip on the screen the order is sent wireless to the restaurants' kitchen. The main advantage with this technology is that anyone can serve and the customers can pay or order to anyone equipped with a PDA within this restaurant.

Third, similar to the software agent science fiction article (Zambonelli and Luck 2004) a group of Italian researchers built a labyrinth action game on a PDA that guides a tourist through Venice museums and other cultural monuments. The system can be extended to communicate with the context and adopt pictures and ambient from the surrounding gallery and insert these figures to the PDA.

#### ICT IN TOURISM AND PROBABLE FUTURE TRENDS

Modern mobile phones have a many megabit pixel digital camera, a digital voice-recording device, and other micro technology electronic capa-

bilities. Mobile phone providers offer new services to pay highways with a mobile phone (South Korea), and many other services will rise based on UMTS. Yet there's only a small probability that PDA and mobile or smart phone worlds will converge to a high sophisticated camera-digital assistant that can communicate via a broadband UMTS. Portable and wearable computing is still energy dependent, and it's difficult to find a computer with a custom keyboard (that permits a longer usage) that may be used without a power outlet. That translates to various power cable adapters inside the EU.

#### CONCLUSIONS

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The ICT plays an increasing role for strategic and operational management and marketing in various activities of the tourism industry: airlines and travel, hospitality, tour operators, travel agencies and destination management and marketing. Among innovative operators are low-cost airlines such as Easyjet and Ryanair with a substantial cost and price reductions and thus a rapid increase in the number of travelling passengers. These low-cost airlines carry around 4% of passengers within Europe, but the percentage is expected to increase to 12–15% by 2010 ([www.easyjet.com](http://www.easyjet.com)). Most seats on the low-cost airlines are sold online. Many tourists are now travelling by low-cost airlines as travelling costs have been reduced considerably. The observed increasing number of tourists, which have been coming to Slovenia by plane since the end of April 2004, is largely a result of the Easyjet airline flight connection between London and Ljubljana (and most recently between Berlin and Ljubljana). The first recorded evidence in terms of foreign tourist visits is impressive. Several new tourists arrivals are now registered from non-neighbouring countries. There is also a shift from computer reservations systems to global distribution systems, then towards the Internet-supported management and operation with the ICT empowered strategic alliances among traditional airlines.

The hospitality industry with various types of hotels and accommodation establishments is another important ICT user using internal systems and intranets, interconnecting partner systems and extranets, and the online Internet. The hotel computer reservation systems and the use of the Internet for reservations are gained in importance by different accommodation establishments. Almost all Slovenian hospitality industry, including tourist farms and most of inns, are placed on the Internet.

The ICT utilization is also widespread among tour operators and travel



agencies. The use of videotext as an early leisure travel network is partly substituted by a more advanced and sophisticated ICT. Some examples have been presented in our paper. The ICT has changed some roles played by travel agencies. Some activities such as airline reservations and hotels booking can now be done directly via the Internet. It is expected that the future of travel agencies is likely to be directed more towards a smaller organizational size but with a broader and more global product focus.

The most recent development in tourism is focused on destinations as territorial units offering multiple and segmented tourist products and choices. The role of ICT for the promotion and management of tourist destinations is a key factor as most of first information and transactions are conducted via the Internet. Of course, a tourist destination can be defined as a micro-territorial unit such as a certain famous town or village (e. g. Piran at the Slovenian coast) or a bit broader as a certain region or a country or more countries at the same time. Moreover, the WTO provides some guidelines for the design of a destination website.

Finally, the ICT revolution has brought considerable changes in the tourism industry management and operation. The usefulness of the ICT as a tool for the tourism industry is widely confirmed. However, it has brought also a considerable change in traditional and new tourism intermediaries, including the rapid changes in ICT with implications of eTourism for destinations, the public sector, and the virtualisation of the tourism industry.

#### NOTES

- 1 According to Buhalis (2003, 116–7) Sweden, the USA, Norway, and Iceland were the countries with more than 50% of population in Internet use in 2001. In the same year, the on-line population per country was greater than 50% in Sweden, the USA and Norway, but with the rapid rise of on-line households adoption in Europe.

#### REFERENCES

- Buhalis, D. 2003. *eTourism: Information technologies for strategic tourism management*. Essex: Pearson Education.
- Cook, S. 2001. Travel planners: How they use web today. Paper presented at ENTER 2001 Conference, Montreal.
- Geer, D. 2004. E-micropayments sweat the small stuff. *IEEE Computer* 37 (8): 19–22.
- Gursoy, D., and K. W. McCleary. 2004. An integrative model of tourists' information search behavior. *Annals of Tourism Research* 31 (2): 353–73.

- Krotz, L. 1996. *Tourists: How our fastest growing industry is changing the world*. New York and London: Faber and Faber.
- Sheldon, P. J., K. W. Woeber, and D. R. Fesenmaier. 2003. *Tourism: principles, practices, philosophies*. 9th ed. New York: Wiley.
- UN. 2004. Outcome of the pre-UNCTAD XI high-level international meeting of experts on sustainable tourism for development. Paper presented at the UNCTAD XI: Conference on Trade and Development; Lisbon, 8 March 2004.
- WTOTBC. 2001. *E-Business for tourism: Practical guidelines for tourism destinations and businesses*. Madrid: World Tourism Organization Business Council.
- WTO. 2003. *Tourism market trends*. Madrid: World Tourism Organization.
- SWG. 2004. SWG Online Research Report 2003. [http://www.swg.it/asp/articolo/varticolo.aspx?id\\_categoria=42&id\\_sezione=52&id\\_articolo=134&tipo=1](http://www.swg.it/asp/articolo/varticolo.aspx?id_categoria=42&id_sezione=52&id_articolo=134&tipo=1)
- Zambonelli, F., and M. Luck. 2004. Agent Hell: A scenario of worst practices. *IEEE Computer* 37 (3): 96–8.