

## CHAPTER 8.

### The Role of the ITS in the Development of Tourism Sustainability: A Smart Tourism Platform

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#### MEASURING SUSTAINABILITY

Presently, there is a general consensus about the need for tourism planning and management based on multidimensional sustainability objectives. In this context, instruments must be created that facilitate understanding of the current situation of tourist destinations to establish public measures that improve tourism sustainability<sup>1</sup>. In order to evaluate different aspects of sustainability, several assessment tools are available, such as Ecological Footprint (EF), Cost Benefit Analysis (CBA), Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), Social Impact Assessment (SIA), etc. Recent development of new tools for assessing sustainability has given rise to two tools: Sustainability Impact Assessment (SIA) and Integrated Sustainability Assessment (ISA) (Mark-Herbert & Rorarius, 2010:103).

In the past 20 years, the world has experienced changes in economic production and consumption patterns, international trade, and information and communication technologies. Significant changes have also occurred in the environmental domain, with accumulating evidence of climate change and its impacts on the planet, of rapid biodiversity loss and species extinctions, of further degradation of land and soils and of the deterioration of inland waters and oceans. Environmental and other indicators enable us to keep track of the state of the environment. (UNEP, 2012).

*Agenda 21* calls for countries, international organizations and non-governmental organizations to develop and use sustainable development indicators (SDIs), as part of an integrated approach to accounting: “Commonly used indicators such as the gross national product (GNP) and measurements of individual resource or pollution flows do not provide adequate indications of sustainability. Methods for assessing interactions between different sectoral

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<sup>1</sup> Blancas, Lozano-Oyola, González, Guerrero, & Caballero, 2011:43

environmental, demographic, social and developmental parameters are not sufficiently developed or applied. Indicators of sustainable development need to be developed to provide solid bases for decision-making at all levels and to contribute to a self-regulating sustainability of integrated environment and development systems” (Agenda 21, Paragraph 40.4).

Blancas et al. (2011:32) differentiate two types of indicators: the key indicators and specific indicators. The key indicators are “those that offer the basic information needed for the management of sustainable tourism in any destination; thus, they evaluate essential issues in managing tourist activity, such as tourist intensity, seasonality of the demand or the effects of tourism on the local community. On the other hand, specific indicators evaluate the sustainability issues that are shaped by the specific characteristics of a given destination and allow us to manage important factors associated with its characteristics (coastal areas, islands, cultural destinations, and so on).”

We need indicators for sustainable development because they enable us to gain an understanding of the complex systems around us. They do this by:

- Synthesizing masses of data;
- Showing the current position, in relation to desirable states;
- Communicating current status to users (Mitchell, May, & McDonald, 1995:105).

Development of the SDIs is a complex, participatory, multi-stakeholder process. In order to illustrate the steps necessary to establish them, we present The Balaton Group approach to indicator development adapted by (Miller & Twining-Ward, 2005:133):

1. Select a small multi-disciplinary working group: a combination of experts and non-experts from the community or audience to use the indicators.
2. Clarify the purpose of the indicator set: whether they are meant for education, decision-making, planning, project management.
3. Identify the community shared values and vision: these are the aspirations of the community for whom the indicators are intended.
4. Review existing models indicators and data: working group examines other indicator projects and data availability and sources.
5. Draft a set of proposed indicators: working group draws on their own knowledge to draft the first set.

6. Convene participatory selection process: draft indicators need to be assessed by a process section of the community, providing an education opportunity, getting local input and gaining local trust and ownership.
7. Perform technical overview: knowledgeable people sort through indicators for technical aspects such as measurability, relevance, etc., and reduce the long list.
8. Research the data: indicators are revised as the realities of data collection become apparent.
9. Publish and promote indicators: indicators are converted into striking graphics, clear language and effective communication campaign.
10. Update the report regularly: steps 8 and 9 need to be regularly repeated to show change over time.

Sustainability indicators are:

1. the measures most frequently adopted by communities worldwide to measure progress towards sustainability;
2. useful public participation exercise, and the resulting set will reflect the priorities of the local community;
3. they provide a useful warning system for a community to foresee where problems may occur.

Selecting a set of sustainability indicators is not an easy task as there is an almost infinite set of indicators from which to choose. They should ideally reflect the priorities of stakeholders, and to assess this requires a public participation process (Sors, 2001:11). Other authors as well underline the necessity of a stakeholder participatory process in defining SDIs: "The application of sustainability indicators at a local scale is a promising tool for addressing the definition of lines of action for local development and evaluating the short and long term effects of strategies developed through the participatory processes" (Castellani & Sala, 2010:877). Lozano-Oyola, Blancas, González, & Caballero (2012:666) proposed three basic functions for sustainable tourism indicators; (1) the formulation of general action plans at a regional level, (2) the definition of short-term strategies for destinations and (3) the establishment of destination benchmarking practices.

Many stakeholders and processes are involved in tourism, so when trying to grasp the structure of this large scale industry, we need to explore tourism as a complex network of products, services, transportation, accommodation,

technologies, organizations and people. Therefore, in creating a list of potential tourism stakeholders, we recommend using the categories of stakeholders given by Miller and Twining-Ward (2005:183):

- Public sector: municipal authorities, regional authorities, various levels of government responsible for tourism and its key assets, other ministries and agencies in areas affecting tourism
- Private sector: tour operators and travel agents, accommodation, restaurants and attractions and their associations, transportation and other service providers, guides, interpreters and outfitters, suppliers to the industry tourism and trade organizations, business development organizations
- NGOs: environmental groups, conservation groups, other interest groups (hunters, fishers and sports/adventure associations), communities, local community groups, native and cultural groups, traditional leaders
- Tourists: organizations representing tourists in the region and point(s) of origin international.

With correctly identifying and effectively motivating stakeholders into cooperating, therefore, by combining knowledge, expertise and capital resources, collaborative strategy can produce consensus and synergy amongst tourism stakeholders, leading to new opportunities, innovative solutions and a greater level of effectiveness that would not have been achieved by stakeholders acting alone (Sigala & Marinidis, 2010:240). Environmental governance comes to the forefront in the debate on how to achieve sustainable development and in the context of the institutional framework for sustainable development it will be discussed at the 2012 UNCSD in Rio de Janeiro (Rio+20). Strong environmental governance is critical to the achievement of environmental progress and sustainability and it is needed at all levels to respond quickly and effectively to emerging environmental challenges, and to work towards agreed environmental priorities (UNEP, 2012:61-62).

As the goal of this chapter is to discover and further explain the possibilities offered by the ICTs to foster and strengthen society's efforts toward sustainability, in the next chapter we'll discuss the advances in ICT in relation to sustainability of tourism in urban areas.

## ICT DEVELOPMENT

If IT is a “collective term given to the most recent developments in the mode (electronic) and the mechanisms (computers and communication technologies) used for the acquisition, processing analysis, storage, retrieval, dissemination and application of information” (Buhalis, 1998:1), IT also have profound implications for the management of the tourism industry by enabling efficient cooperation within the industry and by offering tools for globalization. As a business tool, ITs are a major contributor to competitiveness as:

1. they offer new management and business opportunities;
2. can be applied strategically to gain a competitive advantage;
3. improve productivity and performance;
4. facilitate new ways of managing and organizing; and
5. develop new businesses.

The generation, gathering, processing, application and communication of information became important daily operations and ITs increasingly play a more critical role in tourism marketing, distribution, promotion and coordination (Buhalis, 1998:2-3). This means that at the macroeconomic level ITs became instrumental in the development and prosperity of regions, as they determine their global competitiveness. Tourism firms operate in a business environment where innovation is important for their survival. Globalization of tourism activities, the application of information technologies in tourism firms and the changes in tourism demand and attitudes, all create a dynamic sector where innovation has become of central importance (Toureg, 2009:46). The innovative trends show that tourism will be one of the most impacted industries by ICT innovations. In relation to the vision of “Ambient Intelligence”, shaped by the European IT research, the customer becomes a consumer with a more active role as more possibilities of service customization and product configuration take place. Flexibility during the trip will be increased and travelers will have the possibility to book ad hoc services. Toureg explains how ICT expands tourism opportunities beyond the 3S, with example of cultural tourism, treasure hunting, religious tourism or e-inclusion. ICT can be used to overcome social exclusion and improve economic performance, employment opportunities, the quality of life, social participation and cohesion. In the field of ICT for tourism, new components and distributed architectures for tourism information and communication systems are developed to support users and businesses by offering value added services

and multimedia information on accommodation, events, culture and leisure, together with booking and payment facilities (Toureg, 2009:10-12).

ICTs facilitate future work in urban planning and promote sustainability. Creating models, simulations and scenarios improves planning information systems and simplifies the process of forecasting the impacts of different various alternatives on urban sustainability. Using ICTs encourages communication of planning issues by increasing participation in planning the social acceptance of plans and can lead to efficient infrastructure planning, better management of services and help in spreading the information on best practices of urban sustainability (Ercoskun, 2010:54).

Ali and Frew (2010:480-481) listed several already existing opportunities for the application of ICTs for sustainable tourism development. These are information management, tourist satisfaction, interpretation, enabling partnerships, community participation and energy consumption, all possible by the usage of the following ICT tools:

- Information management: Computer Simulation, Destination Management Systems (DMS), Economic Impact Analysis Software, Environment Management Information Systems (EMIS), Geographical Information Systems (GIS), Global Positioning System (GPS), Tourism Information System (TIS) and Information Management of Weather, Climate and Ocean Changes;
- Tourist satisfaction: DMS, Location Based Services (LBS) and Intelligent Transport Systems (ITS);
- Interpretation: LBS which can be used at the destination to push messages to tourists to create awareness and familiarise them with the culture and customs of a destination.
- Community participation: Community Informatics (CI), GIS and Computer Simulation; and
- Energy usage: Virtual Tourism, ITS and Carbon Calculators.

Development of the networked computer technologies and associated ICTs brings new economic actors in the field of sustainable tourism development – electronic platforms. Belleflamme and Neysen (2009) propose distinction between two types of platforms: the electronic marketplace (EMP) and the online information platform (OIP), where the first type allows the buyers and sellers to operate and to conclude online transactions and the second type focuses more specifically on the informational exchange without playing a role in the

transaction. Online directories, web portals, classified ads, etc., are examples of OIPs and their business is defined by the gathering of the whole existing and recognized supply of holiday services providing an aggregate offer to the attention of potential tourists. On the other hand, online booking centers or electronic travel agencies are examples of EMPs as they allow the users to choose a product, carry out the reservation and by means of electronic payment, secure the transaction (Belleflamme & Neysen, 2009:217-218).

Wide range of stakeholders must be involved in development and daily operation of tourism related activities. Within the sustainable tourism field, we can find the concept of destination management – a collection of applied methods to ensure the sustainability of a tourism destination. Tourism destination management has no single clear definition or perspective and the destination management is regarded as a collection of marketing and branding processes and strategies in tourism literature (Hooft, 2010:14), but as there is no doubt that the destination management organization can support cooperation between various stakeholders, technologies like DMS and GIS could and should be used to help local enterprises in achieving and maintaining tourism sustainability.

In order to understand the possibilities of ICTs for sustainable tourism development, we must understand the current technological changes and the possibilities which this new solutions offer to the tourism stakeholders. Therefore, in order to help us going further in finding new potentials of the current development of ICTs for “smarter” policies and practices in development of sustainable tourism, we’ll explore the “smart city” concept. By analyzing the new networked structure emerging from the coupling of different technologies and user practices, we’ll look for a solution which offers multi-stakeholder involvement, access to real time data and knowledge about the current state of a tourist destination and which allows collaborative action.

### **SMART CITY**

“The cities are becoming new frontier zones, where players with completely different interests meet and confront each other, where lacerating conflicts and social tensions may be born, where the contradictions of globalization concentrate. But cities can also be seen as places where these conflicts can be resolved, where new development and ‘human ecology’ strategies can be born, new coalitions between civil society, public institutions and economic subjects can

come to the fore: hence, the starting point for a new policy and a more vital democracy”<sup>2</sup>.

Nijkamp concludes his study on urban sustainability by stressing how its management became a very complex undertaking as it has to address a formidable number of aspects. Modern city plays a crucial role in the wider context of international climate and environmental policy as the urban ecological footprint shows that the responsibility of local authorities far exceeds the boundaries of their city. But each city also has a vast range of policy options to minimize or even reverse its influences. As reflected in the *Local Agenda 21*, local instruments should appeal to the individual household while referring to the broader environment, thus, bringing the issue of the global environment close to the citizen (Nijkamp, 2007:107).

The recent statistic data of the Internet World Stats (2012) tell us that at the end of the year 2011, Internet was used by 2.2 billion users what makes 32.7% of the total world’s population of 6,9 billion people at that specific moment. But today, the number of “things” connected on the Internet is larger than number of people connected, creating an “Internet of things (IOT)” – the global network of connected “smart objects”. According to Fleisch (2010:3-4), the IOT idea is not new, but it recently became relevant to the practical world, mainly because of the progress made in hardware development in the last decade: the decline of size, cost and energy consumption, hardware dimensions that are closely linked to each other, now all this allows the manufacturing of extremely small and inexpensive low-end computers. IOT is comprised of five billion devices such as mobile phones (3.3 billion), personal computers (1.2 billion), MP3 players (220k), digital cameras (120k), web cams (100k), PDAs (85k), and data servers (27k).

In a speech held in 2008, IBM's CEO Samuel Palmisano summarized the technological advancement into three processes:

- The world is becoming instrumented: "with sensors being embedded across entire ecosystems supply-chains, health care networks, cities, even natural systems like rivers";
- Our world is becoming interconnected: "in an instrumented world, systems and objects can now speak to one another, too. Think about the prospect of a trillion connected and intelligent things – cars, appliances, cameras, roadways, pipelines, even pharmaceuticals and livestock. The

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<sup>2</sup> Fusco Girard, Cerreta, Toro and Forte, 2007:65-66



amount of information produced by the interaction of all those things will be unprecedented";

- All things are becoming intelligent: "New computing models can handle the proliferation of end-user devices, sensors and actuators and connect them with back-end systems. Combined with advanced analytics, those supercomputers can turn mountains of data into intelligence that can be translated into action, making our systems, processes and infrastructures more efficient, more productive and responsive – in a word, smarter." (Palmisano, 2008).

This process of instrumentalisation of the world and a possibility of creating system-of-systems infrastructures become an inspiring idea for global as well as for local sustainability developmental initiatives. At the same time, the consequences of urbanization became obvious as for the first time in human history, since 2008, more people live in urban than in rural areas and in the next 20 years the urban population is expected to grow from 3.5 billion to 5 billion people (UN-HABITAT, 2008). Can the city population be helped with the advances in ICT and "smart" technologies by improving the efficiency and effectiveness of the urban systems? Could the better city management enhance the quality of life for citizens, and support sustainable economic development and what are the challenges on that path? The concept which promises those goals is that of a smart city. According to Caragliu, Bo and Nijkamp (2009:50) "a city is "smart" when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance." Giffinger et al. (2007) proposed the smart city model composed of six dimensions of the smart city, presented in Table 1.

These characteristics and factors form the framework for analysis, by developing and using SDIs, used in 2007 by the European Smart Cities research project, resulting in the assessment of the seventy European cities' performance as smart cities. The authors concluded their work stating that a smart city is a city performing well in all six characteristics, built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens (Giffinger et al., 2007:11).

**Table 1. Characteristics and factors of a smart city**

<b>SMART ECONOMY</b> (Competitiveness)	<b>SMART PEOPLE</b> (Social and Human Capital)
<ul style="list-style-type: none"> <li>- Innovative spirit</li> <li>- Entrepreneurship</li> <li>- Economic image &amp; trademarks</li> <li>- Productivity</li> <li>- Flexibility of labour market</li> <li>- International embeddedness</li> <li>- Ability to transform</li> </ul>	<ul style="list-style-type: none"> <li>- Level of qualification</li> <li>- Affinity to lifelong learning</li> <li>- Social and ethnic plurality</li> <li>- Flexibility</li> <li>- Creativity</li> <li>- Cosmopolitanism/Open-mindedness</li> <li>- Participation in public life</li> </ul>
<b>SMART GOVERNANCE</b> (Participation)	<b>SMART MOBILITY</b> (Transport and ICT)
<ul style="list-style-type: none"> <li>- Participation in decision-making</li> <li>- Public and social services</li> <li>- Transparent governance</li> <li>- Political strategies &amp; perspectives</li> </ul>	<ul style="list-style-type: none"> <li>- Local accessibility</li> <li>- (Inter-)national accessibility</li> <li>- Availability of ICT-infrastructure</li> <li>- Sustainable, innovative and safe transport systems</li> </ul>
<b>SMART ENVIRONMENT</b> (Natural resources)	<b>SMART LIVING</b> (Quality of life)
<ul style="list-style-type: none"> <li>- Attractivity of natural conditions</li> <li>- Pollution</li> <li>- Environmental protection</li> <li>- Sustainable resource management</li> </ul>	<ul style="list-style-type: none"> <li>- Cultural facilities</li> <li>- Health conditions</li> <li>- Individual safety</li> <li>- Housing quality</li> <li>- Education facilities</li> <li>- Touristic attractivity</li> <li>- Social cohesion</li> </ul>

Source: (Giffinger, Haindlmaier, & Kramar, 2010:305).

As we previously stated, tourism is an industry heavily influenced by the ICT development and although the authors of this framework didn't elaborate on the specific role of tourism in the smart city concept, we find that not only "smart living" as noted in Table 1, but all six dimensions a) change the nature of the tourism and b) development of sustainable tourism improves the "smartness" of the city.

### **ICT AND SMART TOURISM: WHAT SHOULD BE LEARNED FROM VENICE'S CASE STUDY?**

In a globalized world, where all markets and segments are intertwined and interconnected, the Internet became a strategic communication tool implemented for competitive organizational strategies. The Internet can be used by local managers in many phases of the tourist consumption process because it allows new techniques for producing, managing and sending information, amplifying marketing and communication opportunities (Tortora, 2010:238). This changing process is also described by Jurin (2008): "As new brand dimensions become hi-touch and high fidelity, end-users of tourism services no longer want

to be isolated but to be engaged in all phases of the branding process and of destination development. New communication systems and technologies, through carefully selected communication instruments, in particular the Internet, will very soon enable a potential tourist to be included in the creation of his or her trip or holiday, in the creation and production of the desired level and intensity of experience from the e-catalogue portfolio of performances or potential events.”

Probably the best example of an Internet tool currently being offered to tourists for accessing information about the tourist destination, marketing city public services useful to tourists, and as a tool for monitoring tourist flow in the city, is the portal *Venice connected*. This web portal was created by the City of Venice and launched in 2009 with the overall goal "to preserve Venice's immense cultural heritage, to safeguard the environment and the natural resources, and to promote the economic interests and the welfare of the local community" (Office for Tourism of the City of Venice, 2012).

The conflicts between physical and cultural heritage of the one of the world's most visited tourist destination and contemporary way of living in Venice is easily understood if we imagine Venice's sixty-thousand inhabitants trying to share their famous narrow streets, bridges and water channels with millions of tourists visiting the city every year. The unique natural and cultural environment makes Venice a compelling destination for tourists, but local inhabitants feel that the overall impact on their city is negative. Much debate has gone into the idea of imposing fees on tourists visiting Venice. However, many politicians objected fiercely, suggesting that Venice would run the risk of becoming another Disneyland in Europe. An integrated "access reform", offering more than the admission (e.g. unlimited use of vaporetti or entry to museums) could lead to a more acceptable option (Mega, 2010:149). We find that a useful tool in resolving this problem could be an innovative tourist information service of the Venice connect portal called *Calendar of sustainable tourism*. This online calendar shows the progress of the flow of tourists in order to help future visitors in choosing the best moment in the year for coming to Venice, suggesting less crowded periods, offering incentives by providing price discounts for underused products/resources, and at the same time, it tries to reduce the negative effects of seasonal tourism. According to previously discussed difference between electronic marketplace (EMP) and the online information platform (OIP) technologies, we can categorize the Venice connect portal as an EMP. The information derived from the online sale of public transport and recreational services (museums, foundations, general attractions, etc.) is used for calculation

of the three fees for the tourist services offered on the portal: reduced fee, standard fee and last minute fee. We find even more interesting the fact that, when tourist eventually arrives to Venice, every usage of the services sold through this portal will generate digital records of its usage. For example, the tourist that bought a ticket for public transport and entrance to museums leaves a “digital trail”, the record with information on where he had parked his car, which public transport did he use when in Venice, what museums did he visit, how many people were in his company and how long did they use those services. The possibility of innovating and creating new products and services for satisfying the visitor needs or dealing with sustainability issues, comes from the fact that using ICT creates large amounts of data on human, in this case, tourist behavior. That leads us to the idea that this web portal should become a part of the larger complex infrastructure, a *smart tourism platform*, with the main goal of improving the quality of life of Venice's citizens, while contributing to environmental sustainability of the city. We propose the smart tourism idea as the pathway for improving customer service and creating sustainable value for stakeholders through the intelligent application of digital technologies.

One of the important features of the smart city solution is “collaborative sensing” or social sharing of sensory observations. Venice seems to already have in place, not only the equipment (noise sensors, sensor-assisted cameras, pollution and air quality sensors etc.), but also an online web platform for human identification and reporting local problems. At the beginning of 2008, the City of Venice introduced the Internet Reporting Information System (IRIS); an open-source software which allows citizens to report, view or discuss local problems by using an online map of the area. Buccoliero & Bellio (2009:134) claim that “the main value of IRIS lies in the back office operating mechanism. Through its introduction, as the Vice Mayor comments, the Administration overcomes the buck-passing which so often affects the public sector in Italy, leading to dissatisfaction by citizens and their strong detachment from politics.” Krebs and June (2006:6) stated that without active leaders who take responsibility for building a network, spontaneous connections between groups emerge very slowly, or not at all, and that an organization with a vision and contacts to external ideas and resources can play the role of the hub. This new “network weaver” role in connecting the tourism stakeholders is becoming increasingly important as the ICTs are basis for enlarging the number of tourist services and by recognizing the fact that most of these services (while still remaining autonomous) can now be interconnected and used as a collaboration platform for development of sustainable tourism.

The example of Tuscany and its investments in technological networks, elaborated in the research by Tortora (2010), points out that if the main goal of social and economic development of a region is sustainable development, communication can help local communities to reach this goal only if there is a coherent and systemic plan of investments in the knowledge of communication and information tools.

When building their complex technological infrastructure, smart cities must not forget to develop and use sustainability indicators, as it was explained earlier in this chapter. Indicators a) quantify information to make its significance more readily apparent and b) simplify information about complex phenomena by making communication about them easier, therefore, sustainable indicators must be built into the sustainable tourism solutions and used to measure progress towards sustainability and guide the decisions of the stakeholders/users of the platform.

Some initial steps in building sustainable tourism indicators for Venice were already taken with the methodology for measuring sustainable development proposed in 2001 by the Fondazione Eni Enrico Mattei (Sors, 2001). Although those indicators were not created in a public participation process, a great effort had to be undertaken to select a set of local sustainability indicators because of Venice's very atypical conditions, making the definition of sustainability exceptionally challenging. In order to continue with finding an optimal set of instruments for the integral measurement of success, a smart destination model made by Jurin (2008) can be used. It requires four types of measurements that should be implemented to measure: financial indicators, the benchmarking of delivering the components of a destination as a brand, tourist satisfaction and internally how a destination as a brand is implemented in practice. All the indicator systems are made out of numerous elements and it makes them difficult to use from the perspective of a tourist, so we propose obtaining the *composite indicators* to facilitate the practical use of the smart tourism platform in guiding sustainable tourism initiatives. The advantage of using aggregate indices over individual indicators is a clear message in terms of understanding the speed and direction of the progress towards/from sustainability of the destination. However, whether individual or aggregated, those indicators are needed as they highlight the linkages between the four components of sustainable development (economy, society, culture and environment) and offer a tool for integrating objective, subjective and strategic analysis of the local context made within a participatory planning process.

The reality of everyday ICT usage in the tourism industry leaves no room for the gap between the “offline world” and “online world”; we live in an “augmented world” in which access to data, information and knowledge isn't limited to wired working stations or personal computers, but is available everywhere and always. Long before coming to their visiting destination, tourists can explore and organize their trip with regards to their individual needs and expectations, helped by numerous ICT technologies. They can find places that were visited by their peers or persons of reference in the past, how they rated them, what they recommend to other people. Direct communication with the service provider goes beyond reservation of the accommodation; today it is possible to virtually visit not only museums or see the representation of the city street layout, but also to go into specifics like booking a table with a nice view in the local pizzeria. With using their smartphones, tourists can navigate through the city advised by the intelligent transport solutions. They can be helped by the intelligent data mining software in finding more complex answers to satisfy their needs, for example, a mother can be helped by her voice controlled smartphone when she wants to locate the closest vegetarian restaurant in relation to her current position and her wish to pay a short visit to a kids' playground as her child becomes tired of ongoing walk through the Venetian narrow streets. By just rising her smartphone, the embedded GPS and camera recognize what's in front of the user and it offers her layers of information displayed over the picture of the current panorama. And it doesn't end with information on the historical facts. For example, smart tourist platform would show what is the current expected time of waiting for the entrance to St. Mark's Basilica as the visitors waiting there have already been quantified (with cameras also used for monitoring security) and their time of waiting is compared with average time of waiting for this time of day, to recommend the best visiting time for her. Smart city concept recognizes the power of private initiative in the innovation of the economy, but the need of releasing public data, creating an “open data” sphere is obvious as the current market for information on public services remains highly underdeveloped. Therefore, we expect that open data across government and public services will in future allow the flourishing of tourist service improvement.

## CONCLUSION

Cities of the 21<sup>st</sup> century present the main field of battle for the sustainable future. With the goal of making local communities sustainable, our organization of economic activities must be adapted to new challenges and must find a way to minimize negative impact on social and natural resources. In this chapter, we've investigated current trends in ICT development and showed examples of usages already in practice in the tourism field. The necessity of using key sustainability indicators and developing specific indicators is emphasized as tourists, private sector, public sectors and NGOs – all the tourism stakeholders, need clear indication of the current status and have an accurate benchmarking system at disposal for evaluating future policies. Participatory planning and decision-making is the guarantee of the local control over the situation and must become an essential part of the environmental governance. Technological solutions can help in fulfilling those needs and conditions, but only if conscious effort is made to embed this features in the technology itself. We tried to show that a coherent and systemic plan of investments in the knowledge and ICT becomes crucial and that public sector and public services are witnessing an immense change by using ICT strategically, offering useful public data to the citizens and business and developing interactive tools for online communication and cooperation.

In conclusion, we offer two ideas worth further exploring: 1) *smart tourism platform* as a medium and 2) *smart tourism* as a type of tourism arising with the intensive ICT usage of the tourist industry, while acknowledging the fact that these activities must minimize the negative impacts of tourism and at the same time, offer new and improved tourist services to the consumers.

We understand *smart tourism* as activities starting with the planning of a visit and continuing with the person's traveling to and staying at the destination, supported by the use of networked infrastructure that offers real-time access to accurate information and knowledge about the destination and thus enables higher quality of the tourist experience and consumption, while at the same time respecting the environmental, social, cultural and economic sustainability of the resources used. In short, smart tourism is the utilization of networked information infrastructure to improve tourism sustainability.

*Smart tourism platform* consists of the (1) ICT communication infrastructure, (2) intelligent urban infrastructure systems and (3) physical objects with built-in sensing, processing and network capabilities. The platform aggregates data and resources from several autonomous horizontally differentiated information systems to:

- provide information needed for the real-time information-intensive tourist experience;
- market and promote existing and develop new tourist products;
- gather, organize and present information and knowledge showing the current position, in relation to desirable states; and
- enable multi-stakeholder collaboration in planning, monitoring, evaluation and adaptation of strategies, tourism governance and management activities oriented towards meeting the needs of environmental, social, cultural and economic sustainability.

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