

The European Tourism Market, its structure and the role of ICTs

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The European Tourism Market, its structure and the role of ICTs

TOURISMlink Consortium

Report for Work Package 1

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Executive summary

Tourism is a key sector of the European economy. It generates more than 5% of the EU GDP, with about 1,8 million enterprises employing around 5,2% of the total labor force. It comprises a wide variety of products and destinations involving many different stakeholders, both public and private. The tourism industry has been increasingly becoming an information-based industry, and is particularly relying on technology supporting information and communication (ICTs). As a consequence, the eTourism market is continuing to grow and represents already an important component in the global tourism market, counting, in Europe, for around 36% of all sales in the travel industry.

Modern technologies, however, pose significant challenges to tourism businesses seeking to embrace them. The lack of agreed technical standards, together with high implementation costs (in terms of monetary and human resources), represents a barrier for the adoption of these instruments, in particular by small enterprises.

TOURISMlink (a project financed by the DG Enterprise and Industry of the European Commission) is a large-scale demonstration action with the objective to modernize the tourism value chain and offer small and medium enterprises (SMEs) in the tourism sector a better position in the global tourism market. Its goal is to facilitate and accelerate the digital connection between smaller local service providers in the broader tourism industry (hospitality, tourism, culture and leisure), and with larger travel agents, tour operators and distributors. This will allow tourism enterprises to improve their competitiveness and respond better and quicker to the evolving market needs of more tailor-made, personalized tourism products.

This report analyzes and presents an updated analysis the European Tourism market and its structure, with the aim of identifying the needs of the sector and of showing to which extent the EU is moving towards new markets or segments and the influence that this may have when considering new ICT tools. Special attention will be given to the adoption of information and communication technology by tourism enterprises and the current use of ICT along the whole value chains, consolidating the industry's requirements unveiled by literature studies and through a survey conducted in the field. It highlights the main competitiveness factors and the role of ICTs in responding to change in tourism demand, and as a driver for growth. The elements and issues discussed in the report form the basis for the next activities in the TOURISMlink project.

A number of crucial factors have been identified:

- European tourism SMEs face a strong competition. For them it is important to differentiate their products from the large industry players by concentrating on niches and creating offers with a specific value to the customer. In this context good cooperation between tourism operators becomes crucial. ICTs can play a key role in building trustworthy and reliable relationships among business partners and in providing them with flexible and dynamic tools to cope with the highly dynamic market challenges.
- Despite the relevance of ICTs for the whole industry, there is still a low level of adoption, mainly due to the characteristics of the European tourism enterprises and their limited size.
- Confirming and extending many studies on the issue, a field survey conducted specifically for this project has acknowledged the main barriers in ICTs adoption by tourism SMEs highlighting in particular: the implementation costs (both monetary & organizational); the difficulties faced in fostering collaboration and cooperation within the industry; the problems encountered in achieving a good interoperability of the ICT systems in-company and between-companies and the substantial lack of agreed technical standards for data representation and exchange.
- Standards in ICTs have become an indefeasible element for companies that want to take advantage from modern eTourism technologies by fostering technological interoperability. Nonetheless, nowadays there exist too many conflicting approaches, deployment costs can be very high, and there is a certain lack of flexibility for many solutions. Interoperable standardized systems are considered a crucial element also due to the strong tendency of tourists and travelers towards a request for immediate answers to their changing wishes or needs, and their high level of *device indifference* that is more and more evident when considering the growing usage patterns of mobile and wireless devices for accessing the Internet for searching information, book travels or compose personalized packages.
- The report closes with a description of the changes and implementations that will be made to an existing technological platform (Travel Open Apps) to integrate the findings of this study (from a functional point of view), and presents a preliminary sketch of possible business usage scenarios along with some initial considerations on possible advantages, issues and criticalities (SWOT analysis).



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1 Introduction

This report analyzes the European Tourism market and its structure, with the aim of identifying the needs of the sector and of showing to which extent the EU is moving towards new markets or segments ant the influence that this may have on new ICT instruments. Therefore special attention will be given to the adoption of information and communication technology by tourism enterprises and the current use of ICT along the whole value chains. The document is the first work package of the TOURISMlink project and will underpin all subsequent tasks in the project by better defining the issues to be addressed.

TOURISMlink main objective is to create a common framework for interoperability among different ICT solutions and systems, building on existing ICT systems and standardization achievements and joining them in a seamless architecture at a European level.

The main goals of the project are:

- to create an European framework of standards which establishes interoperability principles among different business actors and their processes and supports different commercial transactions;
- to develop and validate the system through a series of pilot projects allowing undertakings in source markets and destinations to test it in real life conditions;
- to disseminate the resulting framework among tourism businesses, encouraging them to join and to increase their competitiveness and business possibilities.

The framework will work as a Business to Business (B2B) connector between enterprises, in particular SMEs. It will cover all branches of the tourism industry¹ (hotels, travel agencies, restaurants, etc.) and will be scalable, modular and developed as open source. It will enable undertakings to exchange data and share processes with each other through a set of specifications that allow interaction between the different systems.

Traditional travel agencies will be able to gain access by adapting their systems, via private web interface (for example via an external website), or using TOURISMlink Centralized Reservation System (CRS), while online agencies will be able to access automatically using

¹ Although there is a debate in the academic community about whether tourism can be depicted as an industry or an economic sector and many maintain that these expressions cannot be used, for the sake of simplicity we use the term *industry* in this report to identify the ensemble of what UNWTO terms the core tourism operators and that are the subject of this report: hotels and similar accommodations, travel agencies and tour operators, restaurants and destination management organizations.

standard communication formats (XML-based) by integrating with the system. Hotels and other tourism service providers will be able to connect through their Property Management System (PMS) using standard communication formats (XML-based) or the application provided by TOURISMlink.

Launched in January 2012 by the European Commission, DG Enterprise and Industry, TOURISMlink is run by a consortium of five partners: ECTAA, HOTREC, ITH, BOCCONI and ZN. A website has been set up in order to disseminate information and materials about the project: www.tourismlink.eu.

1.1 Objective and structure of the report

This report contains a survey and an analysis of the European tourism market and its structure. A special attention is paid to the use of Information and Communication Technologies (ICTs) in the industry. The report aims at forming the empirical basis needed to deploy the development activities of the project.

The report contains:

- analysis of European tourism demand²;
- structure of the European tourism industry;
- analysis of the European eTourism market and of ICT adoption in the tourism industry;
- interoperability and ICT standards;
- business scenarios for the adoption of the TOURISMlink platform.
- **NB:** For the sake of readability the data reported here are presented in summary form. A complementary document (Market analysis report annex) contains more detailed information (data tables, figures and extended descriptions etc.) and supplementary materials on the topics discussed here. This document is available on request.

 $^{^{2}}$ **NB**: Given the B2B nature of the whole project the demand side is analyzed only for what concerns the main effects it has on the supply side structure. No attempt is made to go in depth with the different features, segments and groups of consumers.

2 European tourism

2.1 Tourism demand for Europe

The global economy has been dramatically affected by the 2008 financial crisis, showing the worst scenario in terms of production, growth and investments after 1929. However, even if all the sectors indifferently suffered from the economic conditions, tourism reacted better than the average.

As Figure 2.1 shows, the number of international arrivals at the World level denotes a fall in 2008/2009, thus due to the financial crisis; right after the drop, however, the number of arrivals starts increasing at a high rate. The same applies for the single continents analyzed: the larger drop has been registered in Asia/Pacific region (in green in Figure 2.1); this region has registered a flat-growth period for the last three years considered, i.e. from 2008 to 2010, whereas Europe experienced a decrease in the arrivals rate showing signs of recovery since early 2010.



Figure 2.1 International tourist arrivals (Source: UNWTO, 2011)

If we analyze the European evolution over time in terms of share of arrivals from 1980 to 2030 we notice an important drop in the European share of World tourism; in fact, from a 63% of the total arrivals in 1980, the old continent will account only for 41% of the total World

tourism in 2030. In 2010, as shown in Figure 2.2, the European tourism accounted only for 51% of the World tourism as a whole, with a 12% decrease with respect to 1980. At the same time, we observe a substantial increase in the share acquired by Asia and the Pacific, from 8% to 22% Middle East from 3% to 6% and Africa from 3% to 5%.



Figure 2.2 Evolution of international tourism market share (Source: UNWTO, 2011)

The impact of the financial crisis is made evident by the data on the overall change registered in World arrivals from 2006 to 2009; as shown in Figure 2.3, Europe suffered the most during these three years, with a 2.2% decrease in its share compared to other regions.

However, recent indicators of European travel are encouraging; in fact, all destinations including Europe have shown signs of recovery and Europe is on the way to reach the peak it had in 2006. The regions that suffered the most are the core European regions, mainly because they were hardly hit by the Euro-zone liquidity crisis. Those who reacted first are the eastern European countries that drove the recovery of European tourism with double digit growth rates. Forecasts of the European Tourism Travel Commission³ are encouraging, with an expected expansion of 2.3% of European tourism in 2012 preceded by a marked slowdown of growth in the previous period. These expectations are, however, conditional on a series of central issues on the strategies that will be adopted to solve the European debt crisis, hence

³ ETTC (2011). European tourism in 2011: trends and prospects, Quarterly report (Q4/2011).

the stability and growth policies that will be implemented in some crucial areas for European tourism.



Figure 2.3 International tourist arrivals variations 2006-2009 (Source: UNWTO, 2011)

2.1.1 Europe and Emerging Markets

Analyzing the tourism sector using a *within-Europe* perspective sheds light on some interesting facts. First of all, looking at the data available for 2009⁴ in Figure 2.4, we notice that a large part of European tourism is "domestic" tourism; 84% of the arrivals in European countries are due to EU citizens. The second largest regions in terms of arrivals in Europe is the Americas, with a share of 8%, while Africa, East Asia &Pacific and other regions represent only a marginal part with a 8% in total.

An increasingly important role is played by the emerging markets. Even if their role is still marginal in terms of number of arrivals in Europe, China, Brazil, Russia, Korea, Mexico and South Africa are becoming important: given the growth rate of their internal economies and populations, these regions are going to represent a huge share of European tourism in the next two decades. In fact, the attraction policies to be implemented in Europe in the next future need to be focused on a series of products able to fit the specific needs of the new tourists, ranging from tailored holidays for the more demanding guests to the mass tourism

⁴ Last available year using UNWTO data.

accommodations and facilities for larger groups. A quick look at the data (Figure 2.5) shows that China is the leading player among the "new markets" in terms of arrivals in Europe with the other countries playing only a residual role. In terms of variations in overnight stays in Europe (Figure 2.6), however, we notice a decrease for Russian tourists in 2008 and for China and Korea in 2009.

On the other hand, the percentage change for other emerging economies persists in being positive: this is the case of Brazil, a country showing among the highest growth rates of its internal economy, thus expanding its demand also in terms of tourism, specifically European tourism.



Figure 2.4 Origin areas for European tourism (Source: EUROSTAT, 2009)



Figure 2.5 Variations in overnight stays shares for selected countries (NB: scale for China is on the right; Source: EUROSTAT, 2009)



Figure 2.6 Variations in overnight stays for selected countries (Source: EUROSTAT, 2009)



Figure 2.7 Average seasonality in Europe (Source: EUROSTAT, 2009)

Furthermore, it is important to consider the typical seasonality that characterizes European tourism; in this case, there is not a great diversity between the EU27⁵ and the EU12-EU15: the phenomenon shows equivalent patterns in the different European aggregations, with an arrival's peak in July/August and a minimum in December/January.

2.2 European Tourism supply structure

In this section a quantitative overview of the *European tourism supply structure* is provided. The tourist product is a complex bundle of different goods and services demanded by a consumer (the tourist) in order to fulfill his travel experience in a specific destination (Candela, 2010). As a consequence, the tourism value chain is characterized by three main factors:

 heterogeneity: the tourism industry is made up of a large variety of complementary enterprises (tourism attractions, accommodation, intermediaries, bars and restaurants, transports, tourist offices, ...) that, together, provide tourists with the experience they are looking for;

⁵ Here and in the rest of this report EU15 refers to the 15 Member States of the European Union as of December 31, 2003, EU12 refers to the Member States that joined EU afterwards (the new member states) and EU27 the Union in its entirety today.

- *plurality*: there is no single tourist product (even in the same destination), but different forms of tourist consumption are defined by different bundles of goods and services;
- *geographic dispersion*: while consumers (the demand) are located in a geographic area (the area of origin), tourism products and services (the supply) are located in another one (the area of destination where tourism is actually consumed) except for outgoing intermediaries who usually work in the origin countries of tourist flows (Ecorys, 2009).

However, in this heterogeneous and geographically disperse framework, three main actors can be identified, and namely the demand side, consisting of very heterogeneous consumers, the supply side, typically located in a particular tourist destination and, in between, intermediaries, which put together and sell the different tourism services to the customer.

The way in which these three main actors interact between each other, determining the structure of the tourism value chain, has been also strongly influenced by the advent of internet and of e-commerce and is likely to be continuously reshaped further to the progress and innovation in Information and Communication technologies.

If the European tourism supply is to be described in economic terms, the usual definition of tourism makes quite difficult to identify what the tourist industry actually is. Contrary to any other economic sector, the tourism industry in fact cannot be described neither according to a *technology criteria* (given their heterogeneity, tourist companies do not produce according to the same production function and do not make similar goods) nor to a *market criteria* (the tourism product is made of a set of goods and services which are often complementary and not substitutable one with the other). Not only the definition of the industry is difficult, but the availability of statistical data is a further issue of concern since some sub-sectors of the tourism industry cannot be distinguished in the Eurostat NACE classification (Ecorys, 2009).

From an economic point of view, the supply structure of the industry is described through the data available on three sub-sector, according to criteria already adopted in previous reports (European Commission, 2004; European Commission 2007 and Ecorys, 2009): *accommodation* (hotels and similar establishments), *intermediaries* (tour operators and travel agents) and *food and beverage* (restaurants, bars and catering activities)⁶.

Figures are provided, at aggregate level, for the complex of 27 European countries (EU27), for the group of old Member States (EU15) and for the group of new Member States (EU12) in

⁶ The hospitality and the travel industry are essential to the tourist experience and can be univocally seen as tourism activities. Moreover, together with the food and beverage industry, they represent the highest economic share of the tourism industry value (Ecorys, 2009).

order to assess any divergence between clusters of countries with different levels of economic and tourist development. Aggregate data were computed as the sum of single countries' figures and refer to 2000 and 2009 (the last available year). When data for one country were missing, they were estimated according to the average percentage change registered by the other countries in the same group, EU15 or EU12, with respect to the previous year. Specific country data are included in the market analysis report annex. Data were collected from two Eurostat main databases: the annual detailed enterprise statistics on service and the services by employment size classes' database.

According to Eurostat data, in 2009, over 1 840 000 enterprises were active in the European tourism industry: while accommodation and travel agent and tour operators represented, respectively, 14% and 5% of the total number of companies, the share of bars and restaurants was around 81%. However, if the number of people employed is considered, the hospitality sector employs almost one fourth (23%) of the 10.560.000 persons working in the industry while food and beverage activities less than three fourth (73%). The contribution of travel agents and tour operators to the labor force reflects the quota in the number of active companies: 4% of persons employed against 5% of active enterprises.



Figure 2.8 European tourism subsectors (Source: EUROSTAT, 2009)

When considering the turnover, tourist intermediaries generate 24% of the 587 billion euro yielded by the industry compared to the 22% of the hospitality sector and the 54% of the bar and restaurants (Figure 1). As a consequence, it is possible to state that the distribution in the number of enterprises among the three groups considered does not represent neither their employment capacity nor their economic influence (same results also in European Commission, 2004; European Commission 2007 and Ecorys, 2009).

In the following tables (Table 2.1, Table 2.2, Table 2.3), the three dimensions (*number of enterprises, persons employed and turnover*) are considered separately. For each dimension, global figures are provided together with a specific indicator in order to highlight the existence of effective differences among the three sub-sectors considered across different group of countries (old and new European Union member states)⁷ and across time (from 2000 to 2009).

Table 2.1 summarizes the *number of enterprises* active in the three sub-sectors:

	2000		2009		Percentage change			
	enterprises	per 100.000 inhabitants	enterprises	per 100.000 inhabitants	Δ% enterprises	Δ% per 100.000 inhabitants		
Accommodation	n							
EU 27	243885	51	264493	53	8%	5%		
EU 15	213232	57	221711	56	4%	-1%		
EU 12	30653	29	42782	42	40%	43%		
Travel agent an	Travel agent and tour operator							
EU 27	61641	13	86205	17	40%	35%		
EU 15	45850	12	63250	16	38%	31%		
EU 12	15791	15	22955	22	45%	48%		
Food and beverage								
EU 27	1257143	261	1490026	298	19%	15%		
EU 15	1129710	299	1303707	329	15%	10%		
EU 12	127433	121	186319	181	46%	49%		

Table 2.1 Number of enterprises by subsectors (Source: Eurostat, 2009)

- as the 15 first Member States account for 86% of the total number of enterprises in the EU, the distribution of companies by subsectors in EU15 resembles the distribution described above at EU27 level (14% accommodation, 4% travel organizers and 82% bars and restaurants). In the new Member States though, the share of food and beverage activities is still the largest (73%), travel agents and tour operators have a higher weight, compared to EU15, representing 9% of the whole tourism in the EU12 while hotels count for 17%;
- for each group of activity considered, the market is concentrated in four countries -Germany, Italy, France and Spain- where almost half of the activities are located (55% of accommodation, 45% of intermediaries and 58% of bar and restaurants). In the new Member States, where 14% of the European tourist enterprises are placed, Poland and

⁷ Specific country data are included in the market analysis report annex.

Czech Republic account together for more than 50% of the industry in EU12 (61% of hospitality, 58% of travel agents and tour operators and 49% of food and beverage);

- if the number of enterprises is related to the local population, divergence between old and new Member States seems to be lower than what suggested by absolute values. Despite the absolute differences, the indicator underlines that, on average, the number of enterprises per 100.000 inhabitants is similar in EU15 and in EU12: 56 accommodations per inhabitant in EU15 compared to 42 in EU12 and 16 travel agents and tour operators in EU15 compared to 22 in EU12. The divergence remains considerable, both in absolute and in relative terms, only for food and beverage activities (329 in EU15 compared to 181 in EU12);
- between 2000 and 2009, the number of enterprises grew both in the old and in the new Member States, but EU12 countries - in order to respond to the boost in tourism demand- showed a double digit growth rate, higher than EU15. The growing number of companies is a factor of increasing competition in the European tourism sector. However, while the competition process in the hotel sector is mainly driven by quality and innovation, the process in the tour operator industry is led by price competition (European Commission, 2007). these differences may be explained by the increased competition of travel agents and tour operators due to technological advancements and airlines selling tickets directly.

The *number of persons employed* in each group of activity is reported in Table 2.2:

	2000		2009		Percentage change				
	persons employed	per enterprise	persons employed	per enterprise	Δ% persons employed	Δ% per enterprise			
Accommodatio	n								
EU 27	1973444	8,1	2392442	9	21%	11%			
EU 15	1784283	8,4	2123128	9,6	19%	14%			
EU 12	189161	6,2	269314	6,3	42%	2%			
Travel agent a	Travel agent and tour operator								
EU 27	476853	7,7	472199	5,5	-1%	-29%			
EU 15	427033	9,3	403336	6,4	-6%	-32%			
EU 12	49820	3,2	68863	3,0	38%	-5%			
Food and beverage									
EU 27	5734249	4,6	7695253	5,2	34%	13%			
EU 15	5227169	4,6	6948492	5,3	33%	15%			
EU 12	507080	4,0	746761	4,0	47%	1%			

Table 2.2 Number of persons employed by subsectors (Source: Eurostat, 2009)

- first Member States account for 90% of the total number of people employed in the European tourism industry with a distribution of employees by subsector similar to the one described above at EU27 level (23% in the hospitality sector, 4% in travel agent and tour operator activities and 73% in food and beverage). New Member States register slightly higher levels of employment in the accommodation (25%) and in the intermediaries activities (6%) while bar and restaurants employ 69% of the persons working in EU12 tourism industry;
- if the number of employees is related to the number of active enterprises, it is evident that the European tourism industry as a whole is characterized by micro-enterprises (employing 1 to 9 people) varying from 5 persons on average employed per bar and restaurant to 9 employees per accommodation. Though differences exist in the total number of people employed in each group of activity, the size of the enterprises is similar among the 3 sectors. According to the indicator, enterprises in new Member States are, on average, smaller than EU15 enterprises (6,3 employees compared to 9,6 in the hospitality industry, 3 employees compared to 6,4 in travel agents and tour operators and 4 compared to 5,3 in bar and restaurants). The largest hotel chains and travel organizes are in fact mainly located on old Member States (European Commission, 2007);
- the number of people employed in the accommodation and food and beverage industries grew both in the old and in the new Member States, but -as for the growth in the number of enterprises- new Member States have been the real engine of the employment growth between 2000 and 2009 (+42% in the hospitality industry as opposed to +19% and +47% in bar and restaurants as opposed to +33%). The percentage change in the average number of people employed per enterprise is, for both EU12 and EU15 countries, lower than the percentage change in the number of persons employed: despite the increase in the total number of employees, companies' average dimension did not see any significant change between 2000 and 2009
- as far as travel agents and tour operators are concerned, EU15 operators registered a -6% decrease in the number of people employed against a +38% increase in new Member States between 2000 and 2009. However, intermediaries in both group of countries suffered a decrease in the average number of people employed per enterprise (from 9,3 to 6,4 people employed in old member states and from 3,2 to 3 people employed in new member states). The process in the tourism industry is led by price competition;

Data on the *turnover* yielded by tourism related activities in EU are shown in Table 2.3:

	2000		2009		Percentage change				
	turnover	per person employed	turnover	per person employed	Δ% turnover	Δ% per person employed			
Accommodation	n								
EU 27	102726	52,1	130169	54,4	27%	4%			
EU 15	98863	55,4	122724	57,8	24%	4%			
EU 12	3863	20,4	7445	27,6	93%	35%			
Travel agent ar	Travel agent and tour operator								
EU 27	130625	273,9	141084	298,8	8%	9%			
EU 15	127499	298,6	134555	333,6	6%	12%			
EU 12	3126	62,8	6529	94,8	109%	51%			
Food and beverage									
EU 27	230796	40,2	315511	41,0	37%	2%			
EU 15	224392	42,9	300394	43,2	34%	1%			
EU 12	6404	12,6	15117	20,2	136%	60%			

Table 2.3 Turnover by subsectors (Source: Eurostat, 2009)

Turnover (millions) – Turnover per person employed (thousands)

- turnover generated by companies active in old Member States (EU15) represents 95% of the total turnover generated in the industry at European level. As for the number of enterprises and of people employed, also the distribution of turnover among the 3 sectors in EU15 mirrors the distribution at EU27 level (22% accommodation, 24% travel agent and tour operator and 54% bar and restaurant). EU12 countries, instead, register higher values in the hospitality segment (26%) and lower ones within the intermediaries (22%) and the food and beverage (52%) activities;
- relating turnover to the number of people employed allows to highlight the different economic influence of the 3 sectors considered. If food and beverage activities are responsible for half of the turnover generated in the European tourism industry, the average level of turnover per person employed shows that travel agents and tour operators have the highest ratio both in EU15 and in EU12 countries. In 2009, each person employed in this group of activities has generated an average turnover of 298.000 euro against 55.000 euro registered in the hospitality industry and 41.000 euro reported in bar and restaurants. However, it must be noted that, despite the importance of turnover per enterprise, the overall profit margin is small;

- EU12 countries not only account for only 5% of the total turnover generated in the European tourism industry (due to the lower number of active enterprises and employees), but also register, for each segment taken into consideration, a level of turnover per person employed at least half lower the one registered in old Member States (28.000 euro against 58.000 euro in accommodation, 95.000 euro against 334.000 euro in travel agents and tour operators and 20.000 euro against 43.000 euro in bar and restaurants);
- between 2000 and 2009, turnover increased in each sector in both group of countries, but the economic growth was driven by new Member States who showed a growth rate 4 to 18 times higher than the old Members (+93% against +24% in accommodation, +109% against +6% in travel agent and tour operator and +136% against +34% in bars and restaurants). Turnover per person employed grew at lower rates both in EU15 and EU12. However, while enterprises active in EU15 countries did not register any significant change, new Member States, starting from lower levels, proved to be more able to increase the level of turnover for person employed though they did not of course manage to reach the amounts yielded by old Member States companies.

2.2.1 Focus: tourism SMEs companies

As pointed above, if the number of employees per enterprise is considered, the European tourism industry seems to be characterized by the high prevalence of SMEs. In order to highlight this phenomenon, this paragraph is focused on the distribution of the number of enterprises, employees and turnover by companies' size class: *micro* (employing 1 to 9 persons), *small* (employing 10 to 49 people), *medium* (employing 50 to 249 people) and *large* (employing more than 250 persons).

Since food and beverage activities are, almost by definition, *micro* companies, the analysis is limited to the hospitality and the travel organizer industries. If these two sub-sectors are considered, large enterprises account for only 0.2% of the total number of active companies making the rest 99.8% belonging to the so-called SMEs (micro, small and medium enterprises). Even though almost nonexistent (especially in new member states), it should be acknowledged that large companies are responsible for 20% of the European tourist labor force and for 30% of the turnover yielded in the industry.

Accommodation

Micro-enterprises (employing 1 to 9 persons) count for 83% of the total EU hospitality industry in 2009 (Figure 2.9). A part from UK, Ireland and Denmark, this type of accommodation represent at least 70% of the total number of enterprises in all the other Member States reaching a share over 90% in Greece, France, Czech Republic and Poland⁸. Although the total share of *micro* (employing 1 to 9 people) and *small* (employing 10 to 49 people) enterprises is almost the same in old (97.3%) and new (98%) Member States, the latter ones are dominated by *micro* hospitality activities who registered a 51% increase since 2003 making over 90% of the market.

Medium-enterprises (employing 50 to 249 people) and *large* hospitality companies (employing more than 250 people) are almost non-existing in the EU accommodation sector as, all together, they are below an average share of 3% (2.7% in old and 2% in new member states). If Greece, France, Italy, Austria and Netherlands do not have almost any of these companies, *medium and large* enterprises in UK, Denmark, Cyprus and Ireland, on the contrary, represent a share between 8% and 16.5% of the total.



Figure 2.9 Distribution of accommodation sector by company size (Source: EUROSTAT, 2009)

If number of people employed and turnover are considered, it is evident that *medium* and *large* enterprises -despite their low share in the total number of companies- have a big role to play. At European level, accommodation with more than 50 people employed account for 42.2% of the total employment and 46.9% of the industry turnover.

In countries such as the Netherlands, Finland, Spain and Hungary, *large* enterprises, whose share in the total number of enterprises is lower than 2%, register more than 25% of the total

⁸ Specific country data are included in the market analysis report annex.

employment and turnover, reaching a level of 40% in UK. The same holds for *medium* size accommodation representing less than 10% of the total number of enterprises but counting, on average, for 25% of the total labor force and revenue (Denmark, Ireland, Portugal, Bulgaria, Estonia, Cyprus, Latvia, Lithuania and Slovenia).

The high fragmentation of the European hospitality industry is confirmed by data on the share of hotel rooms owned by integrated hotel chains (figure 3). If the American market is mainly dominated by large branded hotels who make 70% of the country accommodation room capacity, the same does not hold for Europe where roughly 20% of hotel rooms is owned by a chain with higher values only in northern European countries (Norway, Finland, Sweden and UK) due to the linkages with the American market and in France and Spain, countries of origin for some of the most largest hotel chains in the World (Accor, NH, Sol Melià and AC Hotels).



Figure 2.10 Room share of integrated hotel chains (Source: Sistema Turismo Italia, 2011)

As an example, Figure 2.11 shows the cumulative distribution of the major hotel chains and groups in three European countries (Italy, Germany and Austria).



Figure 2.11 Distribution of hotel chains in Italy, Austria and Germany (Source: adapted form various industry sources, 2011)

It is clear how a very limited number of companies group a significant number of structures while the largest part (70%) has only a small percentage of properties (less than 2%).

Travel agent and tour operators

Micro-enterprises (employing 1 to 9 employees) count for 93% of travel agents and tour operators operating in Europe in 2009 (figure 4). If also *small companies* (employing 10 to 49 people) are considered, this share reaches a total of 99%. As a consequence, the sector appear to be even more fragmented than the hospitality one. If single countries are taken into consideration, it is evident that *micro-enterprises* dominate the intermediaries market in the new Member States (making more than 95% of the market in Czech Republic, Latvia, Hungary, Poland Romania, Slovenia and Slovakia) while the ratio of *small* companies is "relatively" higher (around 10%) in old Member States such as Denmark, Germany, Ireland, Luxembourg, Netherlands, Austria and UK)⁹.

Following the same scheme illustrated for the hospitality industry, the ratio of *medium* (employing 50 to 249 people) and *large* travel agents and tour operators (employing more than 250 people) active in the European Union does not go further than 1% (1.3% in old and 0.5% in new member states). If large and medium companies are almost nonexistent in Greece, Italy, Czech Republic, Poland, Romania and Slovenia, in UK and Ireland -on the contrary- they count for 4% and 5% of the total.

⁹ Specific country data are included in the market analysis report annex.



Figure 2.12 : Distribution of travel agent and tour operator by company size (Source: EUROSTAT, 2009)

If *medium* and *large* travel organizers account for only 1% of the European travel intermediaries, nonetheless their relevance is evident when their contribution to workforce and turnover generation is considered, especially in old Member States. At EU27 level, travel agents and tour operators with more than 50 persons account for 45% of the labor force and 57% of the industry revenues. However, unlike the accommodation sector, significant differences exist between the old and the new Member States as *medium and large* companies in the latter ones (Belgium, Germany, Spain and the Netherlands in particular) generate almost twice the total level of employment (45% versus 18%) and turnover (58% versus 36%) created in the new Members States. Not only the global share is different but also the distribution of this share between *medium and large* travel organizers: 65% of the employment and turnover yielded in old Member States by *medium and large* are actually generated by *large* companies (with more than 250 people employed) while the opposite holds for new Member States where more than 75% of labor force and revenue is determined by *medium* size enterprises (employing 50 to 249 persons).

According to Ecorys (2009), the high prevalence of SMEs companies -due to a lack of professional and economic resources- represent a potential weakness for the competitiveness of European tourism industry.

In order to respond to market changes and need for innovation, skilled workers are needed. However, though the tourism industry is a powerful engine for job creation, its perception as an employer is quite poor due to hard working conditions, high level of turnover and lack of career opportunities, especially in micro and small enterprises. This makes it difficult for SMEs to attract a labor force with an adequate bundle of (operational and managerial) skills. Not only SMEs face difficulties in attracting talented workers but also suffer from the lack of economic resources to provide their employees, managers and entrepreneurs with specialized training programs (not to mention the lack of an adequate educational offer).

Adequate expertise, knowledge and qualified personnel would for example support SMEs in:

- the introduction and development of new technologies: ICTs have not only changed the way travelers search for information, buy and experience their holidays, but also the way tourist companies should interact with customers and manage a correct flow of information from the company to the market. An efficient use of ICT tools also allows a better internal business organization through for example bookings' management and consumer data collection and analysis;
- enhancing the partnerships with other tourist operators along the value chain: for tourism SMEs to win the market competition, it is important to differentiate their products from the big industry players by concentrating on niches and creating products with a specific value to the customers. However, a similar strategy would require not only economic investments but also an adequate expertise. As these two elements are often unavailable to SMEs, partnerships with other tourist operators along the value chain should be enhanced. A higher level of cooperation among SMEs along the value chain would also allow to provide customers with a more complete travel experience, to better satisfy the needs of new segments of tourists (i.e. elderly people and people with disabilities) that otherwise would not be answered by the single small enterprise, to comply with new standards, to be updated on market trends and to increase the amount of economic and professional resources overcoming dimensional disadvantage;
- increase the chance to have a better access to finance: in order to remain competitive not only human, but also financial resources are necessary. Nevertheless, tourism SME companies often do not manage to get sufficient funds both because of industry specific issues (high uncertainty of success, inefficient use of resources, high vulnerability) and because of the lack of managerial skills.

2.2.2 Focus on rural accommodation

The number of studies looking into the use of ICT in the rural sector is limited. Additionally, they tend to focus only on specific geographical regions (e.g. Ruiz-Molina et al, 2011; and Reino et al., 2011). Therefore, it is hard to get an overview of the online travel market share within this sector in Europe. But an estimation of this can be obtained through these studies. Ruiz-Molina et al (2011) undertook their research among Spanish rural hotels and they found

that a significant percentage of establishments used the Internet for marketing (44%). However, only 36% offer the possibility of booking online and the figure of establishments which offer online payment facilities are limited to 14.9%. Reino et al. (2011) carried out a study through the entire accommodation sector in Scotland, comparing both urban and rural accommodation. Their study suggested that there are significant differences in the level of adoption of electronic distribution systems between these two groups. Their study differentiates among systems and suggest that these differences relate to the level of adoption of OTAs (11.6% by rural versus 23.6% by urban), GDSs (4.7% versus 9.6% respectively) and their own website (84% versus 91% also respectively), which could be booking-enabled or not. The only system which did not show a significant difference in the level of adoption of urban establishments). Additionally, it should be considered that this type of establishments are mostly of a small and medium size, a type of establishment characterized by showing a limited level of ICT adoption, as outlined earlier on in this report. Therefore, a low level of online travel market share can be estimated for this group.

It should be considered that there are a number of portals specifically focused on rural accommodation, which suggests that there is an online market for the sector. Examples of there are Toprural (www.toprural.com/), which operates in Portugal, Spain, France, Italy, Belgium, Luxembourg, Holland, Germany and Austria; Ruralka (www.ruralka.es), which operates in Portugal and Spain; Rusticae (www.rusticae), operating in Portugal, Spain, Argentina and Morocco; and Iberia Rural (www.iberiarural.es/), which sells rooms in Portuguese and Spanish establishments; and Eurogites (www.eurogites.org) which covers the EU region.

With regards to off-line marketing activities, Evans and Ilbery (2002) suggested that in the UK farm-based accommodation, which falls within rural accommodation, used a complex range of options. These authors highlighted holiday accommodation guidebooks produced by private companies and organisations was the most commonly adopted one, however, they explained that they success of this marketing activity was highly variable across geographical areas. Further details about off-line marketing practices within this type of accommodation have not been found in published studies, and their investigation through primary research falls beyond the scope of this project.

2.2.3 Focus on the European transportation system

Although not strictly related to the objectives of this report, this section contains some basic information on the European transportation system for what is of interest for the tourism sector.

Tourism developments have been strongly dependent on the improvements of transportation. The success of tourism growth in recent years is consistent with the rate of growth and improvement of high-capacity infrastructure and the development of the capillary. Highways gave a boost to tourism in coastal destinations and boosted domestic tourism. In addition, charter flights supported the development of mass tourism and the popularization of international tourism. The airlines have contributed to the revolution in transport enhancing the tourist trip to emerging destinations by creating new connection routes, or enhancing residential tourism and second homes in other established destinations. The development of new emerging destinations has been linked to the advancement of modern and technologically advanced transportation facilities.

If the infrastructure has helped the expansion of transportation, tourism has also helped improving transport services. This has taken place by renewing the full service access to airports and ports, improving the quality of existing service and ultimately providing value to the experience desk.

On the other hand, transportation is one of the cornerstones on which sits the tourism value chain. This strategic position allows to locate in the center of many activities to improve and innovate the product and destinations.

As known, the transportation system is one of the most advanced and developed in the World. European tourists use of the available means are summarized in Figure 2.13. The distribution is obviously affected by the type of movements: mainly "domestic" trips (see section 2.1.1) that result in relatively short travels. Land transport is mainly by private means (car or similar) while railways and public or private collective means (buses/coaches) are less employed.



Figure 2.13 Main means of transport for European tourists (Source Eurostat, 2008)

Air travel is the second most important segment. This has seen, in the last years, a sensible growth of low-cost (LCC) companies that today account for about 40% of the passengers served (Figure 2.14).



Figure 2.14 Low-cost airlines growth (Source: OAG Aviation, 2012)

In the SEA segment, the most notable phenomenon is due to the cruise market. As of 2011 it has reached about 6 million passengers per year and has been continuously growing in the last decade even despite the recent critical economic conditions (Figure 2.15).



Figure 2.15 Cruise market growth (Source: European Cruise Council, 2012)

2.3 Remarks on the structure of European tourism and its competitiveness

The data presented in the previous sections allow us to draw some conclusions on the situation of the European tourism industry.

As seen, there is a high prevalence of SMEs (mostly, however, of very small size) with a high fragmentation. For example, the number of chains/groups in the hospitality sector is very limited and shows a significant concentration. The overall productivity (measured as turnover/employee) is not particularly high in hospitality and food & beverage, which leads to a limited availability of economic resources.

Moreover, the literature on the topic (see for example ECOSYS, 2009) states that the industry is characterized by:

- relatively 'old' infrastructure compared to other regions in the World;
- inconsistency of quality of infrastructure & services;
- fragmentation of the value chain, combined with insufficient co-ordination across it;
- lack of sufficient entrepreneurial and managerial skills;
- low innovation capacity

• lack of flexibility to deal with fluctuations in tourism demand.

From the demand side, this results in a diminishing competitiveness of Europe as a tourism destination compared to other regions in the World. In fact, even if still ranking first as destination areas in the World, Europe has, in the last years, slowly but constantly decreased its share on the global market.

2.3.1 A reflection on competitiveness

The competitiveness of a tourism industry is today strictly connected to the competitiveness of the destination in which it is embedded (Antonioli, 1999, 2011; Framke, 2002). Many models have provided thorough analyses of the main factors that influence the capability of companies and groups to attract customers (Porter, 1990). In tourism, the most comprehensive and discussed model is due to Ritchie and Crouch (2003); in this model all the main factors are analyzed and discussed along with their effects on the whole industry (Figure 2.16).



Figure 2.16 Tourism destination competitiveness factors in the model by Ritchie and Crouch (2003)

In essence the model recognizes that destination competitiveness is based on a destination's resource endowments (comparative advantage) as well as its capacity to deploy resources (competitive advantage). The model stresses the fact that, besides the intrinsic

features, other factors connected to the functioning of the tourism system, such as the quality of infrastructures, the management and marketing capabilities or the level and the quality of service, have a profound impact on the image and the competitiveness of the destination.

Later research has confirmed this view and put more emphasis on these factors (Dwyer et al., 2003, 2009; Enright et al., 2004; Smeral, 2007) restating their importance besides the role played by the core resources (natural, historical etc.) of a destination.

The recent studies on the behavior of tourists while choosing a goal for their travels highlight that a destination is chosen as a whole, well before deciding which specific structure (hotel, attraction, etc.) to visit. Moreover, tourists seem to be more attracted by the richness and the variety of the offer rather than being driven only by economic considerations (price) and spend some time before deciding. In this time they make a number of comparisons on all the aspects they (individually) deem important. Decisions and changes can be very fast if tools are available to perform the choice and their final preference goes to destinations that are able to provide them with a full choice and personalization of all (or most) elements of their stay. Single operators, unless having high level of capacities and resources to deliver, can be less attractive and competitive than well organized groups.

Today, as well known, the tools for exploring the available information in order to make a decision are mainly technological tools provided on the Internet (Poon, 1993; Buhalis, 2003). These play an important role in alleviating the historical and almost natural information asymmetry and can give quite a large contribution to making destinations more attractive for the tourists (see for example: Pan and Fesenmaier, 2006). A quick confirmation comes, for example, from the travel & tourism competitiveness report published annually by the World Economic Forum (WEF, 2011). As Figure 2.17 shows, there is a clear positive and significant relationship between the overall tourism competitiveness index and quality of ICT infrastructure (left) or the level of usage of ICTs by tourism companies (right) in the countries examined in the report.


Figure 2.17 Relationship between ICT infrastructure (left) and level of usage of ICTs in business (right) and the Tourism Competitiveness Index (Source: WEF, 2011).

To be effective, ICT tools must be flexible, widely distributed and used in a coordinated way in order to avoid unwanted consequences such as those discussed by Boffa and Sucurro (2012) that state that "simple" travel portals and other possibilities offered online (e.g. specialized search engines or large OTAs favored by fragmentation of offerings) greatly reduce the search costs incurred by the users, but that this big reduction in search costs and efforts may worsen seasonality factors and push customers towards "price only" considerations (Boffa & Sucurro, 2012).

3 ICTs and the European tourism players

The use of technology in the travel trade goes back to the end of the sixties, when airlines started to invest in the automation of the management of their reservations, fares and inventories. So far, this had been processed manually but in 1964, American Airlines created the first computer reservation system to manage its flight reservations: SABRE.

Other airlines or groups of airlines followed, and the airlines realized rapidly that deploying their systems in the travel agencies would allow increasing the efficiency of the reservation systems considerably, compared with the manual systems (telephone or telex reservations). The reservation systems gave also access to schedules, fares and availability as well as electronic bookings and ticketing. As from the seventies, agents were equipped with airlines' terminals giving them access to the airlines' reservation systems. Over the years, airlines joined forces and developed Global Distribution Systems (GDSs), which combined with the Electronic Data Interchange Standards (EDI), enabled airlines and agents to use GDSs offering multiple airlines on a single system.

Since the nineties, the three major international GDSs Amadeus, Sabre and Travelport do offer access to nearly all major airlines, but also to services from other suppliers such as railways, hotels, car rental, cruise companies, etc. The vast majority of travel agents in Europe are connected to at least one GDS, through which they process reservations, issue tickets, and perform other business activities.

While GDSs have been the successful "conveyor belt" between suppliers and the distribution for more than two decades, it should be underlined however that there is a significant proportion of suppliers in the tourism industry which are absent from GDSs. This is the case notably for small hotel properties, some low cost airlines, many small car rental operators and many other service suppliers, such as small regional DMOs (Destination Management Organization).

Starting in the second half of the nineties, Internet provided an outstanding tool to the thousands of SMEs offering tourist services. Without significant investments, tourist service suppliers have been able to develop websites to market their products, and put their services on display or sale worldwide.

The number of online agencies has also been booming over the last 10 years and their turnover in Europe is now quite large as the rest of the online travel market which, in Europe,

estimated at 87 billion Euros. These figure indicate the importance of online distribution today as it represents nearly 36% of all sales in the travel industry.

In the last few years a further "revolution" has impacted the way we communicate, work and conduct business. The buzzword for this is Web 2.0. Not really a technological advancement, since it relies on well known and developed tools, Web 2.0 rather identifies the changes occurred in the ways software developers and people make and use the Web. The applications that facilitate interactive information sharing, collaboration and formation of virtual communities form today a large part of cybernauts' daily activities and may be seen as a natural development of the original Berners-Lee's idea of "a collaborative medium, a place where we all [could] meet and read and write".

Obviously, as it happened for the first Internet revolution, Web 2.0 could not remain unnoticed in activities genetically bound to the human species such as travel. The impact of Web 2.0 on tourism has been (and is) quite important as numerous publications, scholarly and not, continue to state. The importance is so high that some have started to use the term tourism digital ecosystem to mean the strict embeddedness of ICTs into all kind of operations performed by the industry (Nachira, 2002, 2005; Pollock, 2001).

From a technological point of view, then, the wide diffusion of mobile devices (mainly smartphones and tablets) has further modified the way people access the Internet and avail themselves of online resources, providing more opportunities to all online information providers. This is more evident in the behavior of the most *mobile* individuals: travelers and tourists.

According to the Global Trends Report by Euromonitor International (2010), "the growing importance of mobile technology is leading to a shift in power from technology players such as search engines like Google to smartphone manufacturers and developers. Following the success of the iPhone, smartphones are revolutionizing the travel industry thanks to geo-localization services based on GPS technology. Smartphone penetration is expected to reach 92% in Europe by 2014 according to Ovum, with mobile phones set to overtake PCs as the most common web access device worldwide.

Business travelers were the first consumer group to adopt mobile travel technology due to the need to make last minute reservations. Leisure consumers are quickly catching up. Mobile applications offer various services from flight booking/check-in (BA), guidebooks (Lonely Planet), tourist information (Visit Lisbon) to building an itinerary (TripIt). GPS-based travel applications impact travel behavior, favoring last-minute bookings via smartphones at your destination, leading to shorter booking windows".

According to the report, the three key aspects on the future outlook are:

- The evolution of m-commerce is expected to be extremely fast, with high international roaming costs being the major obstacle.
- 50% of European travelers are forecast to use a smartphone to find travel information and/or make reservations by 2015, according to Euromonitor International.
- An important development is the rise of travel and tourism reservations through social networks' applications such as Facebook for iPhone.

The main impact that technology has had in the industry relates to its distribution. With regards to the internal business processes, these have changed little. Yet it is worth noting that the process of marketing and reputation management is highly impacted by the social networks and other online platforms. This may highly impact on the decision to acquire a product. Additionally, the information provided through these sites facilitates the process by which providers can learn about customers preferences, setting up a new approach to customer relationship, which is called Customer Experience Management (CEM). They contribute to efficient management of these experiences by allowing integration of different hotel multichannel interactions with customers. But the remaining business processes, for example check-in, check-out, room management, supply management, event management, management of additional services in hotels, continue to use ICT mainly as a tool to improve the efficiency and productivity.

3.1 ICTs adoption

In general the adoption and use of ICTs in EU is at a good level, although, as the Global Information Technology Report published by the World Economic Forum (WEF, 2012) shows that, with respect to the most advanced economies, the EU average is lower (Figure 3.1), leading also to a lower competitiveness index (Figure 3.2). The areas in which the difference is higher are business and government usage and, as a consequence, the economic impacts.

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Figure 3.1 The EU27 ICT readiness index compared with that of the most advanced economies (ADV) (Source; World Economic Forum, 2012)



Figure 3.2 The difference (%) between EU27 ICT readiness index and that of the most advanced economies (ADV) (Source; World Economic Forum, 2012)

Little specific data exist regarding the level of ICTs adoption by the European tourism industry, the only sector analyzed by the general survey data on small and medium enterprises conducted by Eurostat being the hospitality sector. However, some interesting considerations can be drawn from these data. Figure 3.3 and Figure 3.4 show two indicators: the fraction of enterprises using online for selling products and services and the fraction of turnover generated by using online applications.



Figure 3.3 ICTs adoption by European SMEs: % of enterprises using online selling applications (Source: EUROSTAT, 2011)

As can be seen, while in general the adoption of online e-commerce applications is not very high in Europe, the hospitality sector declares relatively good usage (around 45% of enterprises use e-commerce facilities). However, the results of this usage do not seem particularly relevant: less than 13% of the industry's turnover appears to be generated online.



Figure 3.4 ICTs adoption by European SMEs: % of turnover generated by using online applications (Source: EUROSTAT, 2011)

A few cases concerning three countries: Spain, Italy and Ireland are discussed in the next section as examples.

3.1.1 Focus: ICTs adoption in three countries

Spain

Table 3.1 illustrates the level of adoption in the Spanish hotel sector by showing the penetration of different technologies. As it can be seen, the overall level is quite limited for most technologies. Even the most popular of these systems (Online Reservations System, for example) does not reach a full adoption level.

There are also significant differences among systems' levels of adoption. For example, 67.9% of the hotels have systems supporting Online Reservations. However, the adoption of Extranets and Online Human Resources systems is limited (16.4% and 16.2% respectively). Moreover, the data show that there are significant differences on the level of adoption when the size of the enterprises is considered. We can see that these variations can be found even between companies of medium and small size. An example of this is the level of intranet adoption, which in small companies is of 23.7% while in medium enterprises this is of 49.2%.

	Small Enterprise (%)	Medium Enterprise (%)
Intranet	23,7	49,2
Extranet	16,4	35,2
Online Reservations	67,9	79,8
Online Payments	27,6	41,5
Online Human Resources	16,2	37,2
Electronic Billing	43,1	58,8
ERP	11,1	27,2
CRM	24,1	51,6

Table 3.1 ICT Adoption in Spanish Hotels (Source: Fundetec, 2009)

Ireland

A recent investigation describes the adoption level and the main barriers to adoption in the Irish tourism industry (Duffy, 2010). The authors, using a technology acceptance model and an e-business scorecard questionnaire, assign a maturity level (from 1 to 20) to a number of technologies. The index takes into account numerous factors (see Duffy, 2010 for details). The author then assesses the level reached by several sectors of the Irish tourism industry (self-catering, tourism activities, attractions bed&breakfast, travel agencies, hotels and restaurants). The results are shown in Figure 3.5.

Even in this case, e-business maturity is relatively low. Interestingly, the differences in the level of ICT adoption do not depend on the size of the operators but on the type of business: Self-Catering businesses (SC) have the lowest level of ICT adoption (their technological level mainly stays at adoption of email), while, bars/restaurants and hotels have highest levels.

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Figure 3.5 ICT Adoption by the Irish Tourism Industry

Italy

According to the most recent data collected by ISTAT (the Italian Statistical Bureau), almost 97% of Italian hotels have a website, and 32% deem important selling via Internet. This confirms the better performance of hospitality enterprises in the general scenario of the SMEs as seen for the general data on European countries (Table 3.2).

Table 3.2 Adoption of technologies in the Italian SMEs and in the hotel sector (Source: ISTAT, 2009)

	Have	Online	Online	
	Website	booking	payment	
All				
Mini	60.1%	13.2%	5.8%	
Small	80.0%	13.7%	5.2%	
Medium	85.2%	16.0%	7.9%	
Hotels	95.6%	74.4%	26.7%	

The Italian hotel sector use mainly the Web as promotional channel, while the usage of mobile applications, although growing, is still very low (Figure 3.6).



Usage of promotional channels (Italian hotels, 2009)

Figure 3.6 Usage of promotional channels in Italian hotels (Source: ISTAT, 2009)

The ownership of the website used for marketing or selling products and services varies, but most declare to use own website for selling, while marketing looks to be mainly "outsourced" (Table 3.3).

Ownership of website used for:				
	Selling	Marketing		
Own	60.6%	37.3%		
Other intermediaries	56.1%	14.9%		
Consortia/brands	23.3%	22.5%		
Hotel association	22.4%	36.2%		
Local organizations	18.6%	48.0%		
Chain/group	14.0%	5.1%		
Management company	5.9%	2.7%		
Voluntary chain	4.7%	1.5%		
Franchising co.	3.8%	1.1%		

Table 3.3 Ownership of website used for marketing or sales activities by Italian hotels (Source: ISTAT, 2009)

It must be also noted that the usage of ICTs, at least for what concerns the online presence, in the Italian tourism industry does not seem too advanced. In fact, of the many possible functions offered on the Web today (those collectively known as Web 2.0) very few are used. A large fraction of the websites (43.4%) do not have any link to Web 2.0 platforms (Facebook, Twitter, and similar), and almost 25% have only one connection to such functions (Figure 3.7).



Figure 3.7 Web 2.0 functions used by Italian tourism industry websites (Source: MET Bocconi, 2012)

3.2 ICT infrastructure in Europe

As discussed above, the infrastructure available to enterprises of any kind is a crucial factor for ensuring efficient and effective use of technologies, and this is mainly true for the tourism industry.

To assess the quality of the infrastructure it is possible to use indicators concerning the penetration and the cost of broadband connection capabilities.

According to the last Eurostat data (2011) the situation for European countries does not look much different when compared with that of other developed countries. Figure 3.8 shows the data for all European countries and the average penetration level for OECD.

The average monthly costs calculated by Idate (http://www.idate.org) for the European and some non-European countries are shown in Figure 3.9. The main differences in costs are due to the contribution of the new EU countries, for which costs are definitely higher than those existing in the rest of Europe.

Linking tourism professionals with the digital market



Figure 3.8 Broadband Penetration in Europe and OECD (Source: Eurostat and OECD, 2011)



Total cost/month in €/PPP (VAT incl.)

Figure 3.9 Cost of Broadband connections

It must be noted however, that even if the broadband penetration looks sufficient on the average, the distribution of the values is largely uneven (Figure 3.8) and many countries, especially the new EU members, show poor values. Moreover, the distributions are calculated with reference to the population which, as well known, is mostly concentrated in large urban areas. For example, while that around 95 percent of European citizens are now served by

broadband, less than 80 per cent of rural areas have a broadband access. The tourism industry is spread on the territory and many enterprises are located in rural areas where coverage is very poor or nonexistent. However, location can play a determinant role. For example, in the case of accommodation establishments, a large number is located in rural areas where they tend to have more limited access to technology. Therefore, for what concerns European tourism in general, we may state that there is an issue with the technological infrastructure needed for an effective use of the modern ICT applications for the industry.

3.3 European eTourism market

According to the last available data (PhoCusWright, 2011), online travel is rising in 2011, and the travel industry is increasing its investments in online channels, as more consumers migrate their travel decision-making into the virtual arena. The European eTourism market is forecasted to reach 87 billion euro in 2012, it is estimated to be about 36% of the total European tourism market, and may be able to overcome in size the US market by 2013 (Figure 3.10).



Online Travel Penetration* of the Total Travel Market, Global Markets, 2008-2012

Figure 3.10 History and trend of the eTourism market in different regions (Source: PhoCusWright, 2011)

However, not all European markets are equal (Figure 3.11). The online travel share of the total travel market varies significantly by country, with the U.K. leading, and Spain and Italy lagging far behind. In many countries growth continues to be inhibited by economic



uncertainty, lower levels of Internet access, and the presence of dominant offline travel distribution networks.



Figure 3.11 European eTourism market shares by country (Source: PhoCusWright, 2011)



EU eTourism market shares (2012)

Figure 3.12 eTourism market shares by type of company (Source: PhoCusWright, 2011)

The main players in the online arena are (Figure 3.12), without doubt, the large online travel agencies (OTAs) that count for 37% of the whole, while traditional and low-cost airlines occupy the second place. Smaller is the fraction due to direct hotel bookings and tour operators or traditional travel agencies. It must also be noted that the transportation system

(airlines, both traditional and low-cost, railways and car rental) when combined form the major contributor to the European eTourism market. From a *production* point of view, these are very simple products and their prevalence can be interpreted as a symptom of the difficulties the supply has in offering complex products online.



Figure 3.13 Top five European OTAS' market share (Source: PhoCusWright, 2011)

The distribution of shares is largely uneven in the OTA sector, as the main five brands account for more than 50% of the market and rule the market with their policies and conditions (Figure 3.13). Their market penetration, and the ratio between OTA and direct sales, has been growing in the last years (Figure 3.14), reducing significantly the disintermediation phenomenon which has characterized the early Internet eCommerce diffusion.



Figure 3.14 OTA market positions in Europe (Source: PhoCusWright, 2011)

3.4 Global distribution systems

In the ICT scenario, Global Distribution Systems (GDSs) continue to play a crucial role for a significant part of the travel distribution chain. They are the key technology infrastructure connecting suppliers, tour operators, and retailers. The GDSs aggregate the billions of possible airfares, schedules, hotel and car rental rates, availability information, and other content (ETTSA, 2010).

	Amadeus	Sabre	Travelport
Owned & Operated GDSs	Amadeus	Sabre (Ownership stake in Abacus, GDS in Asia)	Apollo Galileo Worldspan
Net Revenue 2009 (millions)1	€2,461	N/A	€1,616
Employees (approx.)²	9000	9,000	5,300
Ownership	BC Partners Cinven Air France Iberia Lufthansa, and publicly listed on select European exchanges (AMS)	Silver Lake, Texas Pacific Group	Blackstone Group, One Equity Partners, Technology Crossover Ventures, and Travelport management

Figure 3.15 Main GDSs (Source: ETTSA, 2010)

The major GDSs are shown in Figure 3.15. They are active worldwide even if a geographical specialization exist. In Europe the main actor is Amadeus. In Europe – the World's largest regional travel market in gross bookings – GDS companies processed nearly 295 million air, hotel, and car rental transactions and €55 billion in gross travel bookings in 2008. Their share of the global travel market in Europe looks slowly but steadily decreasing (Figure 3.16).



Figure 3.16 GDSs share of global European travel market (Source: ETTSA, 2010)

However, it must be noted that GDSs are the main source for all the OTAs and practically for all other intermediaries selling travels, whether online or offline (Figure 3.17). This makes them by far the largest players in the eTourism market in Europe and worldwide. For this reason their data are not included in the surveys on eTourism intermediaries.



Source: PhoCusWright Inc.

Figure 3.17 GDSs contribution to tourism intermediaries activities

3.5 ICTs in the transportation sector

Information and Communication Technologies (ICT) have re-structured the transportation sector in several ways. First of all, they have allowed potential clients to directly access the

tourism offer, without needing intermediaries. The new technological developments support the communications of systems through the Internet and now customers are an integral part of the value chain, and are able to access companies' inventories and place their own bookings in real time. Additionally, they 've benefited from a wide range of developments.

The current debate about new technologies on tourism intermediation focuses primarily on the role in this new scenario will play intermediaries. During the last decade, airlines have been relentless and successful in their search for direct bookings online. In addition to own websites, advertising and online marketing communications, they have provided direct incentives, such as special web fares, or negative incentives, adding costs when using nonpreferred channels (some airlines charge fees for the use of their facilities calls). Airlines are investing heavily in their online tools, offering more features and amenities to customers to differentiate themselves from other channels. Monitoring, management and online mileage redemption have become a standard feature, as well as online billing, updates or special offers.

In the travel industry and especially in the current climate of economic difficulties, the price is a major determinant in the choice of consumers. No wonder, then, if OTAs or the websites of the transport companies have become the preferred shopping channel. This has helped boosting sales and share of online distribution for transport companies. An example is that the airline transportation sector in the U.S. has incremented online revenue from less than 3% in 1999 to over 30% in 2008 (PhoCusWright, 2009).

Along with the traditional airlines, from the earliest period of the online travel distribution, low-cost airlines (LCC's) have been the most aggressive. In most of the LCC almost 78% of their income comes from online facilities, well above the 30% for traditional airlines. All types of transport, including railway, buses (long distance, intercity, urban), taxis, etc. have also seen an increment in their online revenue shares, although to a lesser extent (see Figure 3.12).

Other technological advances have been used in the transport sector and have brought new types of business such as:

- e-ticketing: airlines companies introduced electronic tickets on all trips in an attempt to eliminate ticket management costs.
- self-check in applications (both online and at the kiosks) enable customers to undertake the check in process themselves, lowering the burden of administrative procedures of

airline companies. Similarly, railway companies have adopted automatic systems to issue tickets.

- OTAs such as Lastminute or Priceline: The service offers packages consisting of airline tickets, hotels and some kind of show, currently selling tickets for flights of airlines Lufthansa, British Midland and Air New Zealand, hotel reservations and Swallow Thistle chains, and the show tickets Royal Festival Hall and the Welsh National Opera. The goal is "to gather into a bundle tickets and tickets that are not sold." Priceline began selling tickets on the net in a radically different from what had been done before. Similar to an electronic auction, the user of this service disclose the price she is willing to pay for travel between two cities. Then she provides data for credit card and accept the commitment to purchase a ticket if Priceline finds a company that allows you to travel the desired price
- Geoplaneta routing, a door to door system, or layout of routes with very high levels of accuracy and digital cartographic mapping or location of a particular tourist spot including cities. The service should be operational in the second half of 2012. It is a geotourism service designed in combination with satellite navigation systems (GPS). Geoplaneta also plans Internet specific training programs aimed at the professional sector.

Areas related to travelling, such as airport management, also avail themselves of a number of technological advances in terms for improved mobility and costs reduction. This is the case of SITA and Motorola which have partnered with the objective of reducing delays in loading and unloading aircraft and reach a significant level of savings in ground operations through a new, comprehensive tool: SITA Mobile Workforce Solution. This tool eliminates the management of ground operations paper-based static processes and provides real-time data to reduce business costs, automate workflow management, increase flexibility and improve workforce management of accidents and customer service. Using a single Motorola mobile terminal for all applications, managers can deal with up to five loading and unloading procedures at the same time. A significant improvement in the current standards.

3.6 Main barriers for ICTs adoption

Despite the relevance of ICT for the industry, the previous sections suggest the low level of implementation of ICT in the industry. This section reflects on the reasons behind this low level of implementation, and it does this through a review of the relevant literature.

Studies undertaken in the last years suggest that common barriers of adoption by SMEs tend to be the lack of understanding of the value of IT (Martin, 2004; Duffy, 2010) combined with a relative scarcity of resources, both in terms of economic or financial capabilities and of expertise and skills possessed by the people employed in the industry. Griffin (2004) suggested that a key driver of adoption relates to the pressure made by partners, customers and media, and in occasions the technology is not integrated into the overall business strategy.

Some of the reasons relate to the characteristics of the businesses which make it particularly prone to this influence. This is the case of the area of location, which in the case of the accommodation establishments means that these are located in rural areas, where there tends to be a more limited access to the technology. Another characteristic, very common to many tourism businesses and that also makes it prone to becoming a barrier for adoption is the size of businesses. As shown previously, the large majority of most of the tourism businesses are very small enterprises that are more likely to present a low level of ICT adoption.

3.6.1 A survey on ICT adoption issues in EU

Besides the already known issues described in the literature, and in order to assess the present situation for what concerns the major issues faced by the European tourism industry in adopting and using effectively modern ICT applications, the TOURISMlink project team has conducted a targeted survey.

The term survey is used here as a generic term. As it will be highlighted in the following, it was more a way to run an extended focus group rather than a classical survey. The aim was not to collect more specific data on the situation but rather that of eliciting any comments, ideas, or perceptions on the issues.

From a methodological point of view the following path was adopt.

A questionnaire was distributed to the associations members of ECTAA and HOTREC. These were then distributed among their members. The quantities estimated are of about 2000, the response rate was relatively low (15%). All queried companies can be classified as small or medium enterprises (they have on average 5 to 10 employees, the largest being in the hotel sector). These are estimated numbers as in many cases the questionnaire was answered by the association and therefore contains "aggregated" data. More specifically, the questionnaire

(see Appendix) asked a number of questions on the major problems faced in using ICTs, mainly for what concerns online B2B operations.

A series of focus groups (three) were held as meetings and saw the participation of tourism operators and tourism associations representatives. In addition to that, consortium members had a number (about a dozen) of individual conversations with local country tourism operators. Here too, the majority of the companies investigated were of small size but some of the large players (GDSs, OTAs International Hotel Chains) were included.

Summing all up, the countries covered in this series of investigations are: Belgium, Croatia, Finland, France, Germany, Greece, Hungary, Italy, Spain, Netherlands, Norway, United Kingdom, that constitute a significant array and of much interest for the reliability of the outcomes.

The answers to the quantitative part of the questionnaire were too dispersed and too few to have a significant outcome, but, given the objective of the investigation and the availability of these data through the published literature, this is not considered an issue – the main focus was in understanding adoption problems. Although (probably) not numerically significant from a classical point of view, the sample can be considered able to provide the information required in a significant way, given also the wide geographical coverage.

The qualitative answers (comments, observations etc.) were added to the notes and reports taken during the focus groups meetings and complemented by a series of comments derived from other individual interviews conducted by the consortium team members. The whole corpus underwent narrative and content analysis (Mainil et al., 2010; Ritchie et al, 2005) in order to identify key concepts expresses by the panels; from these we derived the items described hereafter.

The qualitative analysis of the answers has confirmed previous findings, but has also highlighted some issues that previous studies had somehow neglected. All the indications collected are well in line with the vast literature on the topic, and are, furthermore, almost independent from the country of residence of the companies/associations. It was also noticed that a "saturation" (i.e. the point at which no new information or themes are observed in the data) occurred at a very early stage in the analysis (Bowen , 2008; Guest et al., 2006; Leech, 2005). All these considerations allow us to be quite confident in the validity of the outcomes of this investigation.

The main problems identified by the respondents were:

- lack and cost of communication infrastructures (e.g.: broadband, both fixed and mobile);
- shortage of skills and expertise and scarcity of personnel resources;
- cost of technological equipment, especially for what concerns software applications (mainly for mini & micro enterprises);
- scarcity of ICT applications specifically designed for mini and micro enterprises;
- very limited capabilities available for using efficiently ICTs in B2B operations;
- difficulty in collaborating with other companies due to the number of different platforms used in the industry, especially when dealing with large aggregators (GDSs or large OTAs) and lack of standardization for data.

The last two items seem particularly interesting and confirm the goodness of the choices made for the activities of this project.

At the same time, and almost consequently to the issues listed above, a number of needs or wishes have been expressed. The most important are:

- limited invasiveness and ease of use for any possible development in this area;
- availability of platforms specifically designed for SMTEs;
- availability of seamless integration features for what regards the most diffused in-house systems, especially for what concerns the hospitality sector that already uses a number of PMSs;
- integration with major aggregators and intermediaries (GDSs, large OTAs)
- standardization of data representations and communication protocols and good interoperability to ensure efficient collaborations with other companies.

•

Table 3.4 summarizes the main issues impacting ICT adoption by tourism SMEs presented in this section and suggests priority actions to help addressing them.

Issues	Priorities		
Lack of Infrastructure (i.e. limited broadband	Development of policies supporting		
penetration and high costs)	infrastructure development.		
Limited skills	Ease of use and implementation for		
	technology		
Cost of technology (especially for mini and micro	ICT specifically designed for SMTEs (to		
enternrises)	ensure that this is scalable, relevant and		
	affordable)		
Missing standards for data	Definition of standards for data		
	representation and communication protocols		
Limited knowledge in the usage of ICTs for B2B	Training and education programs		
	Interoperability with major in-house systems		
Difficulty to collaborate with other companies	and intermediaries (GDSs and OTAs) to		
	ensure efficient collaborations		

Table 3.4 Issues and priorities for ICT adoption by tourism SMEs

As a final consideration, it is worth analyzing the role played by the national and regional destination management organizations (DMOs). In Europe they are mainly public organizations and in many countries the function is carried out by some local government department. Their main responsibility is promoting the area they represent, and in many cases they also consolidate and distribute a comprehensive range of tourism products through a variety of channels and platforms, supporting many of the activities in the destination.

In this respect, well designed and integrated ICT platforms can be of great support to a DMO in their actions. On the other hand, DMOs need to take their role forward and use advanced ICTs to foster tourism development and assuming a crucial catalyzing role for the whole industry.

4 Interoperability and standards in eTourism

"A standard is a set of agreed rules and guidelines for common and repeated use for a particular, pre-defined, purpose. It needs to lay down a solid and equitable foundation for the global exchange of goods and services, incorporating all the key elements required by market and societal forces" (ISO definition).

Standardization can be achieved at two levels:

- *content:* standards are related to the way in which the goods and services are described (e.g. ontologies).
- *structure:* standards define the organization and use of different languages to represent goods and services (e.g. XML, RDF, etc.).

4.1 eBusiness standards for SMEs

eBusiness applications provide access to a wide number of distribution channels, both for sales and procurement. Therefore, it is important to have the ability to process and communicate information in a completely unambiguous way in order to reduce the cost of managing data information and provide clarity both internally as well as with external customers and suppliers.

Seamless exchanges of large quantities of information about products can only be possible with a "shared language".

Business standards define data formats and establish rules for the exchange of data, forming the basis for efficient B2B and B2C business processes (ordering, delivering and billing) and for quick, automated and efficient internal processes.

The benefits of using standards are important:

- standards ensure clarity of understanding as well as reduce and remove ambiguity;
- the widespread use of a chosen standard for each business process results in reduced total cost of ownership (lifetime) cost as there is less customization and the sharing of ongoing costs with more organizations;
- the use of a common standard can act as a catalyst for exchanging and improving business processes, such as those within a supply chain or community permit reduced

cycle times and so reduces inventory. In some cases, this can even lead to global warehouse or vendor managed inventory;

• within organizations, common naming and financial standards result in better management information and information management.

However, some risks are also present:

- there are too many technical standards to choose from. The need to support multiple standards results in extra costs and can limit effective communication between business parties;
- some organizations can finish up with two or more systems each with different standards. The adoption of different standards in the same business process results in increased cost and less effective management information;
- standards that are not yet finalized can result in ongoing / continual costs making the lifetime cost of ownership too high;
- there is a risk of costs in determining which standards to use and a risk of picking a standard which is superseded in the future. Standards which can be further developed, but continue to support backwards compatibility, typically reduce the overall cost of maintenance and upgrades.

Data standardization is today obtained by using specialized language frameworks able to render the desired characteristics. The most used and known is the Extensible Markup Language (XML). XML is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable (Cunningham, 2006; Flynn, 2011). It is defined in the specification produced by the W3C (World Wide Web Consortium: http://www.w3.org/). It is a textual data format designed in order to ensure simplicity, generality, and usability over the Internet. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures.

Many communication protocols have been defined that use XML as data standard. The most interesting and diffused are those collectively known as web services (ErI, 2006). W3C defines a "Web service" as "a software system designed to support interoperable machine-to-machine interaction over a network". It has an interface described in a machine-readable format (Web Services Description Language, WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP (Simple Object Access Protocol, is a protocol specification for exchanging structured information) messages, typically delivered using HTTP.

One more W3C standardization proposal is the Resource Description Framework (RDF). It is a family of specifications (http://www.w3.org/RDF/) originally designed as a metadata data model. It has come to be used as a general method for conceptual description or modeling of information that is implemented in web resources, using a variety of syntax formats. RDF descriptions can be embedded in XML documents.

4.1.1 Web Services Standards

A Web service is a method of communication between two electronic devices over the Web. Table 4.1 gives brief information on different standards related with Web services.

Standards	Protocols/Resources	Data Formats	Advantages	Disadvantages
WS-BPEL	SOAP	XML	Provides industry standard language for expressing business processes. Appropriate for stateful processes (complex and long- running logic). Transport agnostic, http not needed. Extensivility.	Not appropriate for limited-profile devices such as PDAs and mobile phones. It 's perceived as complex technology.
RESTful Services	НТТР	JSON PO-XML RSS/ATOM	Appropriate for completely stateless web services. Also useful for limited-profile devices such as PDAs and mobile phones. Widely distributed.	Not appropriate for stateful processes.

Table 4.1 Standards Related to Web Service Standards

4.2 Data Organization

A fundamental issue in any attempt to define a standard data representation is the definition of the terms used. In computer science and information science, there are several ways of organizing data. For the purpose of this work two different approaches are of relevance to this project. These are *Ontologies* and *Relational Databases*. Both ontologies and

relational databases require the use of an agreed terminology. This section examines both topics of data organization: ontologies/relational databases and terminology.

4.2.1 Ontologies/ Relational Databases

An ontology formally represents knowledge in a domain as set of concepts along with the relationships between those concepts (Gómez-Pérez et al., 2004). It can be used to reason about the entities within that domain and may be used to describe the domain. An ontology is a formalization of a shared vocabulary and taxonomy which models the domain with the definition of objects and/or concepts and their properties and relations. Ontologies are the structural frameworks for organizing information and are used in many computer science areas. Their definition is fundamental to the design and use of technological architecture framework.

In tourism many proposals have been put forward for ontologies. A summary is shown in Table 4.2 (an extended description can be found in the appendix document).

Ontology	Language	Advantages	Disadvantages	Usage
Harmonise	RDF	Mature ontology, successfully tested in several projects.	Too generic for its direct use. For its usefulness, an extension to some of its subdomains is needed.	Multiple projects: Tiscover, Tirol Werbung, Eurotours, Turespaña, etc
Mondeca	OWL	Very extensive ontology, it supports multimedia content. Its developer is leader in semantic web.	Private ontology, no open source.	Hi-Touch ontology, "Nièvre en Bourgogne" project, "Fédération des Parcs Naturels Régionaux" project, etc.
Hi-Touch	OWL	It uses descriptors to personalize contents based on users ´ preferences. It supports multimedia content.	Private ontology, no open source.	According to the developers, this platform was successfully applied in some French regions.
QALL-ME	OWL-DL	It covers a great number of aspects of the tourism domain, includes geographical data, and	Too generic to represent very specific domains. Limited testing has been undertaking to assess its	They are prototypes, none of them is in actually under development.

Table 4.2 Main tourism ontologies

		can be combined with the QALL-ME framework, for multilingual capacity.	effectiveness.	
DERI	OWL	Very good description of accommodation and tourism infrastructure domains. It also includes geographical information, for calculating distances.	Really focused on the commercial aspect.	Its data seems to be really focused on Austrian tourism.
CDOTT	OWL DL	Modular design. This offers the possibility to include other ontologies (e.g. W3C Time, W3C Geo).	Its level of development is unknown. There is no information regarding the availability of any prototype or its application in real environments.	Unknown.
CONTUR	OWL	Open source. Successfully tested in 2 scenarios: Atapuerca and Travel Guide creation.	Not globally adopted.	ConTur project

The development of ontologies for data organization is an ideal which computer scientists envision for the development of booking engines. However, the reality is that it involves a high number of calculations for each query. This is the reason why for practical reasons most distribution systems are based on relational databases. This is the case of tourism booking platforms such as Travel Open Apps o Rezgo.

4.2.2 Terminology

The UNWTO, has attempted to define a standard vocabulary for tourism. The multilingual "Thesaurus on Tourism and Leisure Activities" (UNWTO, 2001) is the fruit of over 20 years work seeking to develop a specific documentation language to help search for information relating to tourism activities. It can be used as a guide to tourism terminology, as well as for the standardization and normalization of a common indexation and research language, at an international level. Terms very specific to tourism have been extensively defined so that individuals unfamiliar with this vocabulary can also use the Thesaurus. The Thesaurus is a useful reference and background document for all tourism professionals, especially those responsible for managing documentation departments in the tourism sector.

One more framework should be mentioned here. It concerns the classification of the contractual side of business to business transactions. The Common procurement vocabulary (CPV) (European Commission, 2002) establishes a single classification system. This

classification endeavors to cover all requirements for supplies, works and services. By standardizing the references used by contracting authorities to describe the subject matter of their contracts, the CPV improves the transparency of public procurement covered by Community directives.

4.3 Interoperability

According to the IEEE Glossary: "Interoperability is the ability of two or more systems or components to exchange information and to use the information that has been exchanged". Interoperability encompasses the ability of organizations to work together towards mutually beneficial and commonly agreed goals. According to the definition used in the European Interoperability Framework (EIF, 2010):

"Interoperability, within the context of European public service delivery, is the ability of disparate and diverse organizations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organizations, through the business processes they support, by means of the exchange of data between their respective ICT systems."

This definition can be applied to any kind of services not only public services. Therefore, for tourism services we can define interoperability in the same way as:

"Interoperability, within the context of Tourism service delivery, is the ability of disparate and diverse organizations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organizations, through the business processes they support, by means of the exchange of data between their respective ICT systems."

An interoperability framework is an agreed approach to interoperability for organizations that wish to work together towards the joint delivery of services. Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices (Wegner, 1996).

4.3.1 Interoperability Levels

Interoperability needs to be considered at three levels (Figure 4.1):

• *organizational level*: coordinated processes in which different organizations achieve a previously agreed and mutually beneficial goal;

- semantic level: precise meaning of exchanged information which is preserved and understood by all parties;
- *technical level*: planning of technical Issues involved in linking computer systems and services.



Figure 4.1 Interoperability levels

4.3.2 Why Interoperability?

Interoperability is likely to foster innovation by reducing lock-in effects and lowering entry barriers. Interoperable ID systems, for instance, allow Internet users to switch between different ID providers, but also to choose more freely among businesses engaged in e-commerce (e.g. online travel agency), thus enhancing competition among them. Enhanced competition benefits users by reducing prices and by providing incentives for product and service innovation (Gasser and Palfrey, 2007).

Empirical evidence of the link between interoperability and innovation is not conclusive, but anecdotal evidence is plentiful, and the absence of much evidence to the contrary, is sufficient to support the claim of a link in general between interoperability and innovation.

Time, maturity of the space, barriers to entry, and complexity of relationships are key factors. In order to determine which type of approach to take to interoperability in order to maximize innovation, it matters a great deal to what extent the relevant market is mature,

where the technologies and usage patterns fall on a time spectrum, and how many players are implicated.

Other benefits of interoperability are openness of market (more choices), increase in "healthy" competition, operational efficiency and effectiveness.

In the context of interoperability certain conditions need to be met such as strong collaborative environments or government-led top-down policies, e.g.: disclosure of information, open source, etc.

Interoperability addresses the need for:

- cooperation among the agents in the tourism value chain with the aim to establish tourism services;
- exchanging information among the agents in the tourism value chain;
- sharing and reusing information among the agents in the tourism value chain to increase efficiency;

The result is:

- improved tourism service delivery;
- lower costs for businesses and citizens due to the efficient delivery of services.

4.3.3 Approaches towards ICT Interoperability

Gasser and Palfrey (2007) undertake a review of different approaches towards ICT interoperability and classify these based on two dichotomies, i.e. "unilateral/collaborative" approaches and "non-regulatory/regulatory" approaches, and on a number of characteristics. These are represented in Figure 4.2.



Figure 4.2 Approaches towards ICT Interoperability (Gasser and Palfrey, 2007)

Non-regulatory Approaches

- unilateral design: it is an approached marked by a comparatively low degree of collaboration between two parties achieving interoperability. It occurs when a market participant designs its products or services in a way that allows other players to offer interoperable products or services;
- reverse engineering: it consists on that approach by which a system is specifically developed with those characteristics that make it compatible with an existing one. This is the case of mash up applications, which by their own definition, are compatible with other systems;
- *IP licensing*: it is marked by a comparatively low degree of collaboration between two
 parties achieving interoperability. It becomes particularly important where
 interoperability is achieved by granting the contracting party access to technology, its
 specifications, and rights associated with its use. The effectiveness of this approach
 relates to the company's willingness to grant a license, and also to the specific content
 of the agreement (i.e. scope and compensation);
- technical collaboration: it usually involves some form of IP licensing, but it normally goes beyond the degree of cooperation that is usual in IP licensing. This is an approach usually taken by companies belonging to different levels of the value chain that try to enhance the customer experience, by enlarging their usage possibilities;

 open standards: this is an approach to interoperability that has gained much attention in recent times, while its exact definition remains a subject of controversy. In one interpretation, open standards require that (a) they are approved by formalized committees that are open to participation by all parties and operate on continuous bases, and (b) are made accessible to the public free of charge. They have great potential to achieve high degrees of interoperability. However, they are a purely voluntary effort and anecdotal evidence suggests that companies with patent portfolios might easily interfere or even block such initiatives.

Regulatory Approaches

- mandating standards: this approach consists of the establishment by the Government
 of the standard, or of a deadline by which all the industry players must develop and
 implement a common standard. The effectiveness of this approach is usually very high,
 as it leaves no option to those players who may not have an interest on adopting
 interoperable standards. In terms of effectiveness and flexibility of the systems, this
 approach tends to lead to poor performance solutions. This is because governments
 tend to be ill-equipped to choose the most suitable standard, and tend to operate under
 conditions that make it difficult to respond in due time to market developments or
 changes in technology;
- disclosure of information (compulsory licensing): it consists of the government mandating the disclosure of information that is essential to build interoperable systems, components, and applications. The success of this approach depends upon the characteristics of its implementation, i.e. the amount and level of information that is disclosed, the number of parties gaining access to the disclosure of information. Furthermore, the efficiency of such rules depends on their specifications;
- transparency rules (labeling requirements): through this approach the government will
 foster transparency and mandate the disclosure of information concerning the
 characteristics of a certain product or service. The effectiveness is difficult to assess,
 depending on the design of the label. The cost of this approach is suggested to be
 higher than that one of the disclosure of interoperability information. However, it is
 expected to be a much more effective approach;
- *public procurement*: governments may favor interoperable products or services when undertaking procurement decisions and thereby provoke or support the market's tipping towards interoperable solutions. The effectiveness of this approach is high when the decision has a considerable and lasting market impact;

• *competition law*: this relates to government intervention on competition law. However, this approach tends to entail significant government costs, related to Antitrust interventions; when applied it is very effective.

4.3.4 Barriers or difficulties to interoperability

Interoperability, rather obviously, has a number of recognized barriers and difficulties for the adoption and implementation; the most important are:

- standards ensure clarity of understanding as well as reduce and remove ambiguity. However, standardization efforts are not always successful as they can be lengthy processes, with little flexibility and sometimes too expensive for small enterprises. In addition, people usually are reluctant to changing their way of working;
- fixed standards often suffer from a lack of flexibility and extendibility. They cannot cover the complete heterogeneity of existing electronic marketplaces, they cannot be adapted to occurring changes or new requirements and they offer no possibility for suppliers to differentiate their offer. Additionally, the effort for setting up and maintaining such standards is high and integrating them into existing systems is often difficult;
- there is no single architecture that invariably leads to interoperability. Open source standards have the disadvantage of being at times difficult to implement and time consuming, because they may depend on the coordination of a large number of agents. However, the success factors of a standardization process are mainly context-specific, and strongly dependent on the structure of the market, its network dynamics, and the existent legal framework (Gasser and Palfrey, 2007);
- there is a marked absence of standards for web service connections. Sometimes, although companies use some standard (OTA, for example), they make modifications to the specifications to suit their needs. Other companies use their own standards which hinders integration. The implementation of new connections can be hard if the systems are very different from each other. Moreover, in order to shorten software development times, the distribution channels do not implement some of the functionalities, risking to become useless. Some systems are highly advanced but others lack important features (for example do not have a cancellation request for online bookings). This illustrates the problems that can arise when implementing a new connection between systems. Fortunately many big players usually offer good connections, based on standards (OTA, XML), which makes integration easier;

 network developing strategies of the main market players. The main players of the market may have an interest to market a non-interoperable technology if they feel strong enough to develop a network by themselves. This was the case of Apple. A different approach was initially taken by Microsoft, who worked together with allies in the PlaysForSure initiative and benefited from positive feedback and network effects (Gasser and Palfrey, 2007).

Finally it must be noted that the existence of a legislative framework, mainly consumer protection law or competition law specifically addressing interoperability issues, plays a very important role on the ICT interoperability landscape. Hence, lack of such type of legislation or uncertainty about this may have inhibited ICT interoperability (Gasser and Palfrey, 2007).

4.3.5 Existing specifications for interoperability

Three different approaches may be taken to interoperability. These are unilateral openness, reverse engineering, and the development of open standards. Unilateral openness relates to the effort made by the own developer of a system to make it accessible to others without the need of developing any agreement for cooperation. The most common example of this relates to the development of software interfaces to provide connectivity to own system. Reverse engineering consists of the opposite approach, by which a system is, by purpose, developed with those characteristics that make it compatible with existing systems. And finally, open source relate to the developing of standards based on agreements among different organization's for standardization (Gasser and Palfrey, 2007).

The main specifications for interoperability in tourism are summarized in Table 4.3 and Table 4.4 (extended descriptions can be found in the appendix document).

Initiatives	Data formats	Tourism resources considered	Advantages	Disadvantages
TTI (Travel Technology Initiative)	XML	Accommodation, flights, ferry, general sales, insurance, rail, travel agents, tour operators.	It covers many tourism resources. Widely adopted.	Set of specifications for standardization in EDI and XML, but no protocol for web service available.
ACRISS (Association of Car Rental Industry	N/A	Car rentals	Made to tailor the needs of the sector.	It is only for car rental companies. It provides a classification of terms but it doesn 't provide a

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System Standards)				technological solution.
ΙΑΤΑ	N/A	Airlines	Made to tailor the needs of the airline sector	Only for airlines. It provides a classification of terms but it doesn ´t provide a technological solution.
ANVR	XML	Transport, accommodation, cruise, tour activities, travel agents, tour operators.	Made to tailor the needs of these sectors.	It doesn't provide a technological solution, only XML standards.
TAP-TSI	SOAP XML	Railway information (before and during journey, reservations, payments, luggage management, connections, tickets)	European-wide procedures and interfaces between all types of railway industry actors. Required by two European legislations: Directive 2008/57/EC and European rail passengers' rights Regulation EC/1371/2007	N/A Project ongoing (started mid- 2011)

Table 4.4 Main Tourism Interoperability Solutions

Solutions	Protoco Is	Data format s	Resources considered	Advantages	Disadvantages
Harmonise/ Harmosearch	SOAP	RDFS/ XML	Accommodation , activities, food and drink.	It does not require the adoption of new technology.	Mapping of data requires advanced technical skills. Its use is limited. It relies on the existence of in- house technology for managing booking.
Visit Technology Group	SOAP, REST	XML	Accommodation (cabins, apartments, hotels, camping, hostels etc), activities, transport (flight, ferry, cruise, train, rental car, bus).	Information, reservation, packaging, switch and distribution system. Cloud computing, pay as you sell, low commissions, dynamic packaging and pricing, supports multiple currencies and languages, many distribution possibilities (both B2C	The mobile platform for both information and reservation possibilities are being developed. Mainly implemented on regional and destination levels. NTO implementations: Visit Norway (through Book Norway/BIT Reiseliv) and Sweden.
1

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				and B2B platform). Implemented in the Nordic countries, Baltics, France, Italy and US. The travel switch supports GDS, CRS and PMS connectivity.	
OTA (Open Travel Alliance)	SOAP	XML	Flights, cruises, packages, golf, hotels, ground transportation, insurance, railways, car rentals, tour activities	Supported by the major agents in the tourism industry. It covers many tourism resources. It 's widely adopted.	It doesn 't serve the needs of smaller operators. It is very costly to implement.
Caval Project	REST	XML	Accommodation , transport, travel agencies, tour operators, activities.	Made to tailor the needs of these sectors.	It provides standards but it doesn t provide a technological solution. Adoption geographically limited.
Travel Open Apps	SOAP	XML	Accommodation , transport, travel agencies, tour operators, activities.	Cloud computing. Low commission. Dynamic price management. Includes all tourism operators. Many distribution possibilities. B2B and B2C platform. Ongoing work to develop dynamic packaging.	At this moment only available to Valencian businesses. Not available to businesses through mobile phones. No social media application.
REZGO	REST	XML	Tours and activities.	Cloud computing. Pay as you sell payment module. Low commissions. Many distribution possibilities. Accessible to businesses from mobile phones. Worldwide destinations.	No dynamic packaging. No B2C. No social media application. Only for tours and activities.
Seekda Connect	SOAP	XML	Accommodation	Multichannel distribution solution for the hotel sector. CRS function. Booking solution for direct distribution. Booking engine for facebook.	Only accommodation booking. No dynamic price management. Middle and southern European market.

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				CRS interface to Google Travel Ads. Channel management for indirect distribution.	
Tiscover	SOAP	XML	Accommodation	Cloud computing. Low commissions. It offers the possibility of seeing destination by webcam.	Only accommodation booking. No dynamic price management. Only available to businesses in Austria, Switzerland, Italy and Germany. Only distributed through their own website.
Venere	SOAP	XML	Accommodation	Worldwide destinations.	Only for accommodation establishments. B2C. Pricy commissions (up to 15%).

4.3.6 Application program interfaces in the tourism sector

Many large online tourism operators have designed standard methods to exchange and access relevant data. They are usually packaged into some kind of application program interface (API) which is a specification intended to be used as an interface by software components to communicate with each other. An API, usually, consists of a set of libraries that can be used in an application written by the user. Many application programming interfaces (APIs) have been developed for software developers to use to process XML data, and several schema systems exist to aid in the definition of XML-based languages. Table 4.5 provides a list of the main APIs available (an extended description can be found in the appendix document).

Table 4.5 APIs used by main online tourism operators

	Protocols	Data formats	Tourism resources considered	Content availablity	Widgets for website
TripAdvisor	SOAP	XML	Hotel, tourism attractions, restaurant	Some content is free but other products require a licensing agreement to access	Yes
Expedia	REST/SOAP	XML/JSON	Flights, car rentals, hotels and vacation rentals	Free access to APIs	Yes
Expedia Quick Connect	HTTPS	XML	Hotel, rates	Free access to APIs	No

XMI-Venere Connect	SOAP	XML, OTA	Hotel, rates	Free access to APIs	No
Amadeus	HTTP/SOAP	XML/OTA	Flights, hotel, car rentals, ticket	Full documentation is not publicly available	No
Booking.com	XML- RPC/OTA	XML	Hotel	Available for partners and hotels.	Yes
Trivago	NA	NA	Hotel	Trivago review widget	Yes
Kayak	НТТР	XML	Flight, car rentals, hotel, cruises, deals	You need to be an affiliate	No
Micros- Fidelio OXI Interf. For Opera	Oracle Database Link and Queuing, HTTP, FTP, TCP/IP, file transfer	XML, OTA, HITIS, IFC	Blocks/group, profiles, reservations, inventory, stay history, rates	3 to 6 months certification process needed	No

4.3.7 Cloud computing

Recently, a number of technical proposals have been put forward in order to ease the storage and the exchange of large quantities of data. Cloud computing (see: http://en.wikipedia.org/wiki/Cloud_computing) refers to the delivery of computing and storage capacity as a service to a heterogeneous community of end-recipients. The name comes from the use of clouds as an abstraction for the complex infrastructure it contains in system diagrams.

Cloud computing entrusts services with a user's data, software and computation over a network. It has considerable overlap with *Software as a Service* (SaaS). End users access cloud based applications through a web browser or a light weight desktop or mobile app while the business software and data are stored on servers at a remote location. Proponents claim that cloud computing allow enterprises to get their applications up and running faster, with improved manageability and less maintenance, and enables IT to more rapidly adjust resources to meet fluctuating and unpredictable business demand.

Cloud computing relies on sharing of resources to achieve coherence and economies of scale similar to a utility (like the electricity grid) over a network (typically the Internet). At the foundation of cloud computing is the broader concept of converged infrastructure and shared services.

Table 4.6 provides a summary of the main cloud computing facilities.

Software	Initial release date	License(s)	Written in	As a service	Local installations
Fluid operations	2009-03-01	Propietary	Java, C	YES	YES
AppScale	2009-03-07	BSD	Python, Ruby, Go	YES	YES
Cloud Foundry	2011-04-12	Apache	Ruby, C	YES	YES
Cloud.com	2010-05-04	Propietary, GPL v3	Java, C	YES	YES
Eucalyptus (computing)	2008-05-29	Propietary, GPL v3	Java, C	YES	YES
Nimbus (cloud computing)	2009-01-09	Apache	Java, Python	YES	YES
OpenNebula	2008-03	Apache	C++, C, Ruby, Java, Shell script, lex, yacc	YES	YES
OpenStack	2010-10-21	Apache	Python	YES	YES

Table 4.6 Cloud computing software - General information

4.4 Remarks on tourism standards and interoperability

As discussed in the previous sections, interoperability and standards have become an indefeasible feature for companies that want to take advantage from modern eTourism technologies. From the analysis of the current situation we have highlighted a number of issues that hinder their adoption mainly by the small and medium European tourism enterprises:

- there are too many proposals, often conflicting. Some are of very limited use and some can be used only in specific environments. Most are proprietary implementations and not widely or easily available;
- implementation costs are often very high. Many, especially the most "complete" are quite difficult to put into operation and require large efforts in designing interfaces compatible with internal systems or with multiple suppliers, which, again, is a barrier for many SMEs;

 there is a lack of flexibility of some of the extant solutions, that, for example, do not allow dynamic packaging and dynamic pricing. This results in an insufficiency of their interoperability with the applications of many large operators and do not provide SMEs the option to increase their distribution possibilities.

As a conclusion for our survey, we may state that an ideal platform should be consider the following arguments:

- the system should be flexible and offer different implementation possibilities, even in cases in which the company has very limited resources or have a low technological preparedness. Moreover, the system should be open with respect to the possible users, allowing a full compatibility with the major players in the market;
- modern technologies and their possible short and medium term evolution must be taken into consideration (e.g. Web 2.0 and collaborative environments, mobile and wireless communications etc.);
- the system must allow the possibility to deal with single products or with packages that need to be built in a dynamical way and have the least possible restrictions and constraints.
- the B2B system must be designed following a Service Oriented Architecture;
 - SOA services have been implemented in most cases as SOAP web services and in some cases the services are also available as RESTful services;
 - XML is more commonly used for interfacing with SOA services and defining the data format to be exchanged than other schemes (e.g. JSON);
- the data format should follow the OTA specification (or a slightly modified OTA specification).

5 A business scenario for the TOURISMlink platform

The TOURISMlink platform has the objective provide small operators with a wide market visibility that major players in the technological scenario (large OTAs or GDSs) already give them but at a price that by many is considered too high. The platform is being designed to cover the specific needs of small tourism businesses, paying attention to the characteristics of the different industry sectors and to help the overcoming the main barriers they identify in adopting modern ICTs.

The analysis reported in this document suggests that the eTourism market, besides representing already an important factor in the global tourism market, continues to grow. Consumers find highly beneficial the possibility of searching for information and of booking the different tourism products online. However, as stated several times, the lack of agreed technical standards, together with the high costs of implementation place a barrier for the adoption of these instruments by small enterprises.

TOURISMlink addresses these issues by providing them with a platform by which they can obtain visibility in the online market, and increase their potential business. The platform provides a high level of flexibility to the industry, and allows distributing products and services individually or combined as a package. Furthermore, these packages do not necessarily have to be assembled by tour operators or travel agents, they can also be built by single suppliers that can fixing deals with other businesses participating in TOURISMlink, or even by the consumer, when products are made available to some B2C platform. This leaves business a great flexibility and freedom of action, without having to stand to the limitations or constraints posed by other online intermediaries.

For the customers (tourists and travelers), it is expected that this platform will create an advantage, because through the portal, they will have the ability to book their entire holidays. This will include not only the accommodation and air transport but also many other types of transport (train, coach, car rentals, etc.), as well as restaurant services and tourism activities. As an alternative, they could search for pre- bundled deals or generate their individualized packaged options.

The technology used is designed to be user friendly and embedded in a cloud computing environment. This means that the minimum technical requirement to access the platform will be having access to the Internet. Furthermore, it will be accessible from any digital device, with specific interfaces for tablets and mobile phones. This will facilitate the use by very small operators that are normally run by a small number of staff members (and sometimes only by the owner).

The importance of trust among operators is crucial to developing agreements. So this is the reason why the development of a social media tool has been considered a requirement for TOURISMlink. This application will enable tourism operators developing their own reputation and establishing a trusted network of collaborators. Finally, the dynamic pricing functionality will help tourism providers to optimize their returns.

5.1 Travel Open Apps

TOURISMIINK, as a technological platform, is based on the Travel Open Apps Project (http://www.travelopenapps.org). Travel Open Apps aims at defining and developing an online comprehensive system of distribution and tourism e-commerce and making available a Web 2.0 collaborative business environment to the entire tourism sector of the Valencia Region, oriented to market intelligence and promotion of new technologies, e-commerce and marketing applied to tourism.

Travel Open Apps is today the tourist distribution platform for the Region and is considered a key competitiveness factor in a constantly changing and complex globalized tourism sector. Conceived as a multiproduct system available for all agents in the tourism sector (accommodation establishments, leisure agencies, restaurants, tourism destinations, transport agents, travel agencies, etc.), it is connected to the main distribution channels and operators in order to increase the number of possible selling points.

Beside a stardardized framework for data representation and exchange, the project provides a number of ancillary functions, especially designed for SMEs:

- Central reservation system (CRS). It contains information about all the rates and allotments for all the products available in the platform. It also provides all the basic algorithms for the availability process and price calculation. It's the core of the system.
- Company management system. This includes a property management system (PMS) functionality and integrates elements such as a customer relationship management (CRM) system and business intelligence (BI) tools.
- Advanced website creation system. This, in turn, comprises a content management system (CMS) and ecommerce management module, and allows creating websites B2C under any combination of destinations and/or products.

- Channel management system. This comprises a B2B consolidator and a channel manager. Channel Manager allows online agencies to receive updated product from the accommodations.
- Multimedia repository. This is a multimedia documental source which used from the websites generated through the CMS.

Travel Open Apps is focused, as stated, on interoperability, the most important features are:

- service oriented architecture;
- XML/SOAP publisher, providing a global interface to access the entire product set available on the platform;
- external systems channel, allowing other systems to add their product to the platform, and benefit from advanced availability/price calculation algorithms;
- external providers channel, allowing providers to offer their final product through XML / SOAP protocol;
- web booking engine integration, allowing small customers to enhance their own websites very easily;
- possibility to distribute products to other sale platforms (e.g. Booking.com, Expedia.com).

5.2 Success factors

A number of critical factors can identified for this project. They are deemed important for the success of the project in itself, but, more importantly, they can ensure the compliance of what is to be implemented with the real needs and expectations of the European tourism market and therefore secure a wide diffusion of the TOURISMlink platform after the formal end of the project.

To this extent, this section lists a set of key issues that should be taken into consideration. It briefly mentions, for what possible at this time, a number of technical, business, and managerial (legal, administrative, etc.) aspects. They will be deepened in while proceeding with the project and form the basis for the execution of the next activities. They will also be part of the evaluation criteria that are to be set for the field test of the system.

5.3 Technical aspects

5.3.1 Standardization

B2B is characterized by numerous real-time interactions between partners, aiming to provide better service and products to customers. These interactions should be based on standards to facilitate interoperability, i.e. to facilitate the specification of the set of common elements managed in these interactions such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices.

The benefits of employing a standard are important:

- standards ensure clarity of understanding as well as reduce and remove ambiguity;
- lower costs for businesses and citizens due to the efficient delivery of services and reduction in the need for customization;
- catalyzing function for exchanging and improving business processes;
- within organizations, common naming and financial standards result in better management information and information management.

5.3.2 Openness

The functionalities of any promotion or commercialization tourism application could present a high risk of obsolescence, as well as maladjustment to needs and expectations of customers. The development of framework based an open source code and developers' community ensure the possibility to easily update it with new improvements and adaptations. These contributions extend lifetime and invest return of this framework with a continual customization of market needs, allowed to be in the vanguard of touristic distribution. For this reason, the platform should in open source code in order to ensure the continual updating of the code and to minimize technological dependence, although there is technological companies with advanced solutions.

The use this type of license to guarantee the future development of the tool and of additional functionalities, creating a community of developers to encourage the possibility of reaching a critical mass of developers who guarantee an evolutionary maintenance and swift adaptation to new trends in the market.

Also, the new development and functionalities could be shared economic cost because these developments are common for all participants, and they could select it if they are interesting.

5.3.3 SaaS (Software as a Service)

The platform could be in the "cloud", offered as a service to tourism enterprises, so that they do not need to invest heavily on technological infrastructure, neither in too specialized technical knowledge. As seen through this report, in fact, there is a need to provide enterprises, especially SMEs, with a solution that enables them to widen their markets without excessive expenditures in technical or human resources. In this regard, Software as a Service (SaaS) looks to be a suitable model.

5.3.4 SOA Architecture design

The architectural design is a crucial issue. It must provide the possibility to implement an efficient and effective system, based on current infrastructures while ensuring a long term adaptation to technological evolutions. For this, SOA offers the following advantages:

- SOA is decentralized and allows different parts of the organization to be "loosely coupled", or to implement networked organizations;
- provides location independence (services do not need to be located at a particular system or particular network);
- ensures authentication and authorization support at every level;
- allows high dynamicity in the search and connectivity to other services .

Short-term benefits of a SOA implementation are:

- enhanced reliability;
- reduction of costs associated with the acquisition and maintenance of technology and leverage of existing investments in technology;
- leverage of existing development skills;
- accelerated progress towards standards-based servers and application consolidation in order to provide data bridges between incompatible technologies.

Long-term benefits of a SOA implementation are:

- ability to easily build composite applications and to meet dynamic customer demand;
- creation of a self-healing infrastructure that reduces management costs;
- reduction of the need for expensive custom developments;

• provision of truly real-time decision-making applications and closer link between the management of business functionality and the business units.

5.3.5 Business and market aspects

It is rather clear today that single tourism operators have increasing difficulties in finding the resources (economic and organizational) needed to successfully face the complex technological environment and to meet their business objectives. A key to success is to identify and broaden all forms of collaboration or cooperation. In our case, a B2B platform should allow to connect and be interoperable with larger online distribution companies in order to extend the offer in more destinations.

A further key factor is the commitment of the main national associations representing the different tourism industry sectors. This will help reaching a critical mass of participants in order to raise the interest of the parties involved and look appealing for all of them. Moreover, as already stated earlier in this report, the role of destination management organizations is crucial for their competence in promoting the different locations, for their responsibility in governing all the stakeholders and for their capability to foster industry's cooperative and collaborative efforts.

One more, important, element is that the TOURISMlink platform, as described previously, can accommodate not only traditional core tourism operator, but can be used also by a number of other companies interested in the activities performed by tourists or visitors, those that can be defined as complementary products/services (exhibition, event or museum tickets, for example) which can be of great interest for foreign visitors and can greatly contribute to the assembly of high value offers.

In this regard, important examples of complementary offer are the functionalities for transports and itinerary planning. It is possible to handle them by specifying pick up points or route points:

- pick up/drop point: is defined by explicitly choosing the point(s) where clients can be collected or dropped by using geolocalization. They are the beginning and end points of a route.
- *route point*: again defined by explicitly choosing the point(s) or by geolocalization. They differ from the previous for giving only a geographical information for the route (with no change in the number of passengers).

All the route points can also be set by using some external itinerary planning or optimization program. In the itinerary planning functionalities other features (multimedia information, typologies, modalities...) can be inherited by other complementary offer functions.

On the technical side, small and medium tourism enterprises seem to be all lacking sufficient knowledge and capabilities. For a successful assimilation of the TOURISMlink platform by the market it is important to involve major ICT providers (both of *internal* and *external* systems), who have adequate expertise and resources to support the project. (e.g.: Amadeus, MICROS Fidelio and others).

5.3.6 Managerial aspects

A major challenge of TOURISMlink project is to address the inertia of tourism players often too bound to conventional data exchange methods. They show a certain reluctance to make changes, particularly those that involve new technologies. Communicating the technical aspects and the advantages of the project is not an easy task. In this regard, a strong marketing and promotional campaign is important. It can "sell" the system to players, mainly those with limited resources.

5.3.7 Usability factors

The travel and tourism market produces a large proportion of its revenues online. The information exchange market is highly dynamic and the processing techniques must be continuously adapted to the changes in order to be able to stand the pressing requests of the customers, mainly for what concerns reliability, completeness and timeliness.

Tourism supply needs then to dynamically adapt to the preferences expressed by customers and be able to offer products and services with high flexibility. The TOURISMlink platform should allow creating this customized offer. This can be accomplished by exploiting two approaches to managing channels:

 PULL distribution model will be used by travel agencies to contract tourism services, particularly by the smaller agencies. This will help them in orienting their business strategies towards increased segmentation and personalization. Traditional (or lowtech) travel agencies will be able to access *manually* (using a private web interface), while online agencies will access automatically, using standard data exchanges. • PUSH distribution model will be used to manage the distribution towards other online travel operators and agencies by automatically augmenting and updating their inventories.

Finally, given the known shortage of technological skills and expertise in the European travel and tourism industry, it is necessary to devise an educational and training plan that will deliver sessions about IT technologies, the use of platform and provide continuing support along the project.

5.3.8 Usefulness factors

As stated by Amadeus (2011): "Mobile technology promises to transform the travel experience. The always-connected traveler will expect and demand information and services that simplify the planning, booking and overall travel experience". Hence, the development strategy of the B2B platform takes into consideration the relationship with mobile technologies for certain business transactions.

There is a growing trend towards travel aimed at specific activities or experiences rather guided by destination (nature tours, adventure sports, educational programs, gastronomy tours). The offer must take this into consideration. This can be done, within the TOURISMlink platform by designing packages able to fulfill this type of requests.

The B2B platform should take into account the support for mobile and cross-border payments.

- *mobile payments*: The adoption of universal mobile payment systems will allow the traveler to use their phone to pay for goods and services. The B2B platform should incorporate and be interoperable with these payment systems.
- cross-border payments: an additional important issue is the support for international or cross-border payments. Globalization is demanding a cost-effective, simple, and reliable payment services with a wider reach. To this end, organizations such as the International Payments Framework Association (IPFA) are working to provide rules, standards, operating procedures, and guidelines to improve cross-border payments. Furthermore, electronic alternatives to credit card payments (such as PayPal) are emerging that allow money transfers to be made electronically.

Finally there will be a need to formulate some kind of unified contract model for facilitating negotiations at all levels.

5.3.9 Data security

The data security feature of Travel Open Apps will be transferred to the TOURISKlink platform. One of the tasks of the pilot experimentation phase will be to thoroughly test these features and, if needed, to apply the needed changes. The following sections give a short description of the features as currently implemented.

Security Architecture

The design of Travel Open Apps separates business logic from the logic of security, i.e., it has separate mechanisms for security management, policy management access control, authentication, and to the modules management platform.

The system defines a security module which is responsible for the proper registration, authentication and authorization of users of Open Travel Apps. This module creates a relationship of trust between users, access points to the platform and the different modules of the platform Open Travel Apps.

Security Access Control: System Access Module

Access control to the Open Travel Apps platform is done through a light authentication (userID / password). The authentication mechanism is the same in the different points of access of the platform: Web, XML, etc. Protocol supports single sign-on (SSO) that enables the user to access various systems of the platform with a single instance of identification.

This module enables access to the platform access to the modules to which the user has permission. Each user has a logon name and password or login or password. The key is stored encrypted with MD5.

Access control to system resources

The Security module allows permissions structure that can be assigned to users through groups or profiles. This is provided by modules, each module has defined permissions that can be enabled and each permission is assigned to a group or profile. Following a user is linked to a group/s, and thus inherits permissions recorded for the group, but also you can define user permissions isolated. With this scheme, when a user changes its profile type, it is not necessary to redefine all the permissions but simply make the change to the group.

Data integrity

A backup system is arranged in order to prevent data loss. Incremental backup, performed at pre-set intervals, is prepared and stored in a different location with respect to where the platform is housed.

5.3.10 Education

A training and education program is an important determinant for the success of any initiative such as TOURISMIINK. A preliminary plan has been devised. This plan will be tested as well as part of the experimental pilot phase. For the time being, the education and training requirements can be sketched as follows.

The plan includes the provision of on-site sessions conducted by a project consultant with tourism and teaching expertise. Teaching and learning materials will be provided and will supplement other project documentation.

In addition, given that the project will be evolving constantly, users will be offered a learning platform that will support and strengthen the knowledge acquired during the training sessions, and provide documentation and assistance of the platform for the ongoing maintenance.

The main objectives for a training and education plan are:

- provide appropriate training for all those working with the platform;
- break down technological barriers;
- achieve an optimum level of understanding of all functions and roles;
- achieve homogeneous levels of training and learning;
- offer a helping hand to users as they learn how to work with the platform;
- report activities at all times and achieve enhanced user participation;
- capture the comments and suggestions of the end-users of the platform;
- identify areas for improvement and set new goals based on them.

5.4 The overall scenario: a schematic view

A general view of the functioning of the TOURISMlink platform, from an operational and business point of view can be summarized as shown in Figure 5.1 and Figure 5.2.

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Figure 5.1 General scheme for the use of TOURISMlink/Travel Open Apps platform by participating companies

In short:

- tourism companies, service providers and complementary offer providers access the TOURISMlink platform directly, by means of their workstations, or through software modules interfacing their internal systems;
- they make available their products and services along with the business details (prices, conditions, constraints, availability, dependencies etc.);
- these products (or services) can then be used by the same or other companies that have access to the platform and can be offered to the B2C environment through individual websites or other distribution channels;
- products and services can be offered separately or combined with other elements present on the platform (or externally) to form packages. The high standardization and interoperability of the system, coupled with its efficiency and usability characteristics, guarantees the real possibility of these combinations as well as their dynamic adaptation to request changes.

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Figure 5.2 Business scenario for the use of TOURISMlink/Travel Open Apps platform

5.4.1 A preliminary SWOT analysis

From the considerations contained in this document and the description of the possible business scenarios, combined with the experience gained so far from the operation of Travel Open Apps in the Valencia Region, it is possible to assemble a preliminary SWOT analysis for the TOURISMlink platform.

It must be well noted here that many elements for a complete analysis are missing at this stage of the project. Business and governance models, cost-benefit issues and specific operational and usage patterns will be implemented and studied in later phases of the project and need to be validated with the series of field tests that will be organized and executed in the near future. Only then a full picture can be drawn.

For what is the knowledge at this stage the SWOT analysis can be made as shown in Figure 5.3.



Figure 5.3 A preliminary SWOT analysis for TOURISMlink

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6 Appendix: Survey questionnaire



7 References

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