

## ICT Impact on tourism industry

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### Abstract

*The goal of this paper is to analyze the effects of ICT on firms' competitiveness, as well as on their level of innovation, productivity and on the market share depending on the tourism area: Accommodation, Gastronomy and Travel Agencies. On the whole, it has been proved that the use of diverse ICTs has little effect on the level of competition as well as on increasing productivity, while in general, they have a positive effect on increasing the market share of the firms.*

*Keywords - ICT, competitiveness, productivity, market share, innovation, tourism*

## INTRODUCTION

In the last years, the world's economic and social structure has undergone some important changes, especially because of the introduction of information and communication technology (ICT). ICTs have transformed tourism globally and offer a range of new opportunities for development. Tourism related products could boost the globalization of the tourism industry in areas such as hotels, restaurants, travel agencies or tour operators. Hence, the use of ICTs has the potential to turn markets from local into global and in times of crisis firms can have better prospects to survive and improve their position in the market, especially, in tourism where the number of competitors increases on a daily basis.

Tourism has become a key sector in the world economy. According to the World Tourism Organization, international tourist arrivals totalled 940 million during 2010, increasing 7%. Apparently, tourism industry has a great potential to grow, about 5% each year (UNWTO, 2011). Tourism industry could gain more opportunities in the market from the use of the internet (Gratzer et al, 2004); for example, China is fast becoming a booming tourism source country, as an ever increasing number of its citizens travel overseas. (Xiaoqiu Ma et al, 2003).

The spread of ICTs has a great impact on ensuring sustainable global and tourism development, above all in less developed areas (UNCTAD, 2004). However, there is also a digital gap between tourist markets and destinations within and among countries and this inequality creates the so-called Digital Divide (Minghetti & Buhalis, 2010; Shanker, 2008). Digital Divide arises from this inequality above all in less developed countries, excluding them for potential opportunities in the tourism market.

## LITERATURE REVIEW

Although ICTs appear to offer new opportunities for business mainly relevant in four different aspects: gaining a competitive advantage, improving productivity, developing new businesses and facilitating new ways of management (Buhalis, 1998, 2003; Gruescu

et al., 2009; Ion & Andreea, 2008; Irvine & Anderson, 2008; Shanker, 2008), it seems that firms do not experience an increase in their outcome because of the use of ICTs. The main effect that ICTs have is that they keep a float businesses that use them (Law & Jogaratnam, 2005).

As regards the influence ICT has on competitiveness in hospitality, some authors consider ICT as a key factor in competitiveness, because it reduces transaction and operational costs (Bojnec & Kribel, 2004; Buhalis & O'Connor, 2005; Buhalis & Kaldis, 2008). Unfortunately, there is no consensus as to how effective the use of ICT is, e.g. Mihalič (2007) was unable to prove a direct positive link between the implementation of ICT and competitiveness. Other researchers argue that the competitiveness variable will improve only when there is an increase in innovation together with a wider use of technology (Blake, 2006).

Scheidegger (2006) states that the tourism industry is one the least productive sectors in the economies of the most developed countries. Other authors maintain that there is no discernible relationship between ICT and productivity in hospitality (Byrd & Marshall, 1997; Dos Santos et al, 1993). Some other studies suggest that there is a real connection (Brynjolfsson, 1993; Sigala, 2003a, 2003b), while others support the idea that the impact of ICT is negative (Mihalič, 2007).

Another relevant variable is market share, where authors like Evans & Peacock (1999) found that ICT penetration in the mainstream travel and tourism sectors can reduce the market share and market penetration of small and medium-sized enterprises (SMEs) while studies carried out by some others like Buhalis (2003) show that ICT is used by enterprises to protect their market shares and safeguard their position. Again there is no real evidence of the positive impact of ICT on market share in the tourism industry.

Finally, the last variable to take into account is innovation. Innovation in process/delivery and organization are the most relevant areas where tourism firms have an advantage, while product innovation apparently is not quite as common a phenomenon in the target sector (Jacob et al., 2003). ICT in tourism industry affects the change of internal strategies, rendering them more flexible to changes, helping them to adapt to the new needs of the market (Vilaseca et al., 2006, 2007). E-innovation taken as part of an innovative strategy has the potential to change tourism industry processes (Hipp & Grupp, 2005; Martin, 2004). The main common factor as regards ICT and innovation in tourism firms is that thanks to the use of ICT enterprises have changed the internal processes.

In the current literature on tourism industry, authors usually look into a specific area. The study reflected in this paper is broken down into three main sub-sectors within the broad ranging area of tourism: Accommodation, Gastronomy and Travel Agencies. Most of the papers that dwell on this industry have found that the different types of sub-sector are important actors that should be taken into account for an in-depth study of the sector (Bojnec & Kribel, 2004; Jacob et al, 2003; Tahayori & Moharrer, 2008).

ICTs are becoming a key determinant of organizational competitiveness and productivity, allowing the tourism industry to increase its market share and boost its capacity to launch new innovations. This paper focuses on the use of ICTs as strategic tools to enhance the benefits in the tourism industry.

Taking into consideration the great relevance of ICT in this sector, the aim of the research shown in this paper is to analyze the impact that the adoption and use of ICT has on managerial output in the UE market. More specifically, the goal of this research is to analyze the effects of ICT on firms' competitiveness, as well as on their level of innovation, productivity and on the market share depending on the tourism area: Accommodation, Gastronomy and Travel Agencies.

## DATA AND METHODOLOGY

### E-Business Watch Survey

The data used for the empirical part of this study come from the E-Business Watch Survey of 2006, launched by the Commission and the Sectoral e-Business Watch. The main objective of the survey is to provide an overview of the use of ICT and e-business in enterprises in twenty-nine European countries by means of representative samples. The survey, carried out using computer-aided telephone interview technology, was answered by decision-makers in enterprises. The survey was conducted among firms from the following sectors: food and beverages; foot wear; pulp, paper and paper products; ICT manufacturing; consumer electronics; shipbuilding and repair; construction; tourism; telecommunication services and hospital activities. For this paper, only the tourism sector is considered. The firms in this sector were chosen because they can go global more easily by means of the use of ICTs.

The questionnaire provides information about diverse aspects related to ICT and the company itself. More specifically, it provides information on ICT infrastructure, e-skills development and outsourcing, ICT expenditure and investments, internal and external e-collaboration, online sourcing and procurement, online marketing and sales, e-standards and interoperability issues, ICT impacts, drivers and inhibitors, innovation activity of the company and background information of the company.

The sample of the survey is made up of firms making wide use of computers, which were in operation within the national territory of the twenty-nine countries surveyed. Those firms also carried out their primary business activity in one of the ten sectors specified in the previous paragraph. The sample has been stratified randomly from the population in each one of the twenty-nine countries. Samples were drawn locally by fieldwork organizations based on official statistical records and widely recognized business directories.

The fieldwork was carried out in March and April 2006, at different time intervals depending on the country. This paper centres on the tourism sector and the final sample includes 2,665 firms in twenty-six European countries, which represents approximately 18.95% of total firms contacted.

### Dependent variables

The dependent variables make reference to four different aspects closely related to firm outcomes: competition, productivity, market share and innovation. The definitions of these dependent variables and their descriptive statistics by sector are shown in Table 1.

In order to capture competition, three variables have been used. The first one rates on a one (rather decreased) to three (significantly increased) scale to what extent competition has changed in the sector due to ICT. The next two variables measure on a three-point Likert scale whether the market-share and productivity of the firm have changed over the past 12 months. A value of one is assigned to those who answered that the market-share or productivity had decreased; a value of two to those saying that it had roughly stayed the same and a value of three to individuals answering that they had increased.

As far as innovation is concerned, two variables have been used. These two variables measure, making use of dummy variables, whether during the past twelve months the company has launched any new or substantially improved product or services (product innovation) and whether the firm has introduced any new or significantly improved internal process (process innovation).

**Table 1. Definition and mean values of the dependent variables by sector of activity**

		Accommodation	Gastronomy	Travel Agencies
Competition increase	N	592	493	271
	Rather decreased	1.35%	2.23%	1.48%
	Somewhat increased	61.82%	71.40%	48.34%
	Significantly increased	36.82%	26.37%	50.18%
Productivity increase	N	824	1,184	352
	Decreased	5.22%	8.11%	6.53%
	Roughly stay the same	40.65%	42.82%	32.10%
	Increased	54.13%	49.07%	61.36%
Share market increase	N	798	1,151	336
	Decreased	7.39%	8.77%	8.93%
	Roughly stay the same	51.01%	49.96%	40.18%
	Increased	41.60%	41.27%	40.89%
Product innovation	N	869	1,202	367
	No	61.45%	66.14%	49.32%
	Yes	38.55%	33.86%	50.68%
Process innovation	N	868	1,203	366
	No	68.09%	73.90%	60.11%
	Yes	31.91%	26.10%	39.89%

## Independent variables

The first two independent variables are the use of ICT and ICT investment, which are measured by means of dummy variables. More specifically, the survey provides information as to whether firms had access to the internet and whether the company had made investments in ICT in the past year 2005, for example in new hardware, software or networking capabilities.

The survey also provides information about the use of different technologies or media to communicate with other people. The variables measure if firms use or pilot Radio Frequency Identification Technologies (RFID).

The next variable examines how important the role e-business plays in a firm is as regards the way the company operates, ranging from three (significant role) to one (none at all).

The last group of ICT taken into account is related to electronic trading with suppliers and customers. The variables measure whether firms use the Internet to place orders for goods or services online (orders on-line) and whether customers order goods or book services online (sales on-line).

The last variable looks into the most significant market area in which the company operates. This is measured using three dummy variables, namely regional market, national market and international market.

Table 2 summarizes the independent variables across sectors.

## Control variables

A series of control variables that, according to previous literature, influence the impact of ICT on productivity and on outcomes, are included. These variables capture firm characteristics, such as size and year of foundation.

## Methodology

With the use of the STATA 11 software, probit models were estimated for binary dependent variables, whereas ordered probit models were used when the dependent variables were an ordered scale. In addition, it should be mentioned that condition indices and variance inflation factors show values below the usual thresholds of 30 and 5, respectively (Judge et al., 1988), indicating that multicollinearity is not a problem in our models.

## RESEARCH FINDINGS

This section is structured as follows: first, the basic characteristics of the sample are described; then, multivariate analysis techniques are used to analyze how ICTs influence firm outcomes.

**Table 2. Independent variables by sector**

		Accommodation	Gastronomy	T r a v e l Agency
Use ICT	N	886	1,237	380
	No	1.24%	11.88%	0.26%
	Yes	98.76%	88.12%	99.74%
Investments in ICT	N	868	1,219	375
	No	29.03%	43.15%	25.07%
	Yes	70.97%	56.85%	74.93%
RFID technology	N	856	1,202	374
	No	96.85%	98.92%	97.33%
	Yes	3.15%	1.08%	2.67%
e-business	N	875	1,218	371
	None at all	19.32%	44.58%	20.75%
	S o m e significance	49.94%	42.69%	42.59%
	Significant role	30.74%	12.73%	36.66%
Orders online	N	884	1,234	380
	No	39.93%	56.81%	32.11%
	Yes	60.07%	43.19%	67.89%
Sales online	N	886	1,231	379
	No	29.80%	70.43%	48.55%
	Yes	70.20%	29.57%	51.45%
Market	N	863	1,221	376
	Regional	16.80%	58.39%	21.54%
	National	44.84%	32.68%	48.40%
	International	38.35%	8.93%	30.05%

## Sample characteristics

Table 1 and 2 present the main descriptors of the dependent and independent variables. It is clear that there is a wide range of differences on firm outcomes as well as on ICT adoption among sub-sectors of the tourism industry.

Although the percentage of firms that use ICT is more or less equal in all sub-sectors of tourism, the effects that ICTs have on firms differ by sub-sector. More than 50% of travel agencies state that ICTs increase competition, while the figures are only 26% in the gastronomy sector.

Regarding productivity and market share variations during the past twelve months, differences among sub-sectors are lower. Approximately 50% of firms in the accommodation and gastronomy sub-sectors and 61% of firms in the travel agency sub-sector claim that productivity increased dramatically in the previous twelve months. As to

market share, around 41% of surveyed firms in all sub-sectors confirmed that it had increased in the course of the previous year.

Looking into innovation, there are differences by sub-sector. The travel agency sub-sector is the most innovative one in products as well as in processes. In this sub-sector, over 50% of firms interviewed had launched some new product or service during the last year and 39% of them had introduced some process innovation, whereas in the accommodation sub-sector, only 38% of firms interviewed had launched some new product in the previous twelve months and 32% had made innovation in processes. The least innovative sub-sector is the one of gastronomy, where 33% of firms had launched some new product and only 26% had introduced innovations in processes.

Concerning the independent variables, the survey shows that close to 100% of firms sampled in all the countries had Internet access. Over 55% of firms in the gastronomy sub-sector had made investment in ICT in the last year, while the figures rose to 70% in the accommodation and travel agency sub-sectors. The use of RFID technologies is negligible in all sub-sectors as a means to communicate with people, with under 5% of firms interviewed using them. E-business plays a major role in the way in which they operate in the accommodation and travel agency sub-sectors, while in the gastronomy sub-sector it plays not part at all in around 45% of firms interviewed.

Firms in the travel agency sub-sector placed more online orders than in the accommodation and gastronomy sub-sectors, while customers buy more products online in the accommodation sub-sector than in the other two sub-sectors.

Finally, with references to how significant the market in which firms operate is, the national market comes first in the travel agency and accommodation sub-sectors, followed by the international and regional markets, while regional markets are the most important in the gastronomy sub-sector, where national and international markets are less relevant.

## ICT effect on firm outcomes

By means of multivariate analysis, this study will analyze how ICTs influence firm outcomes in the different tourism sub-sectors. Tables 3a-c present the effects that ICT has on competition, productivity and market share of companies, as well as on innovation.

The first column in each of the tables 3a-c analyzes the effect that ICT has on the level of competition in a given sub-sector. Only in the accommodation sector does the use of ICTs have any positive effect on competition. The effect of ICTs on the gastronomy sector is negligible, while in the travel agency sub-sector lack of data available makes the analysis impossible. In this sector, investment in ICT has a negative impact on competition. As concerns e-business, the more companies use e-business in all sub-sectors, the bigger the increase in the level of competition in that sub-sector, except in the case of travel agencies. In the gastronomy sub-sector, the use of RFID technologies and operating in international markets increase the level of competition.

As regards productivity and market share, while the use of ICTs increases market share in the gastronomy and travel agencies sub-sectors, it only increases productivity in the gastronomy sub-sector and it has a negative impact on travel agencies. In these same

two sub-sectors, online orders increase productivity and market share, while online sales increase market share in the gastronomy sub-sector.

The use of e-business has a positive effect on productivity as well as on market share in all sub-sectors. Operating in regional markets does not seem to increase productivity for firms in the accommodation sub-sector, whereas operating in international markets has a negative effect on the market share of firms in the gastronomy sub-sector.

The use of ICTs has a positive effect on process innovation in firms in the accommodation and travel agency sub-sectors; they also have a positive effect on product innovation when used by travel agencies. In general, the use of e-business and both online orders and sales have a positive impact on product and process innovation in all sub-sectors. The use of RFID technologies helps process innovation for firms in the accommodation sub-sector. Finally, operating mainly in regional markets has a negative effect on innovation in both products and processes in the travel agency sub-sector.

## CONCLUSIONS

On the whole, it has been proved that the use of diverse ICTs has little effect on the level of competition as well as on increasing productivity, while in general, they have a positive effect on increasing the market share of the firms. Besides, the use of ICT seems to favour innovation in the companies, considering innovation as launching new products / services to the market, as well as improving or introducing new processes. Likewise, e-business increases the level of productivity, market share and process innovation. Online orders have a positive effect on process innovation.

This study shows that the influence ICTs have on competitiveness, productivity, market share and innovation are very different depending on the sub-sector. While in the accommodation and gastronomy sub-sectors ICTs have a great impact, in the travel agency sub-sectors they seem to promote an increase of market share and innovation, but it affects in competition and productivity negatively.



**Table 3a. Probit and ordered probit results of the influence of ICT on firm outcomes in the accommodation sub-sector.**

	Competition increase		Productivity increase		Market share increase		Product Innovation	Process Innovation		
Use ICT investment	1.331***	0.471	0.127	0.261	0.321	0.356	-0.090	0.614	3.780***	0.189
R F I D technologies	-0.693	0.512	0.011	0.306	0.468*	0.278	-0.046	0.311	0.601*	0.362
e-business	0.429***	0.113	0.224***	0.061	0.145*	0.086	0.212***	0.077	0.248**	0.102
Online orders	-0.049	0.152	0.145	0.112	0.142	0.114	0.289**	0.115	0.376***	0.118
Online sales	-0.041	0.138	0.106	0.106	0.026	0.130	-0.017	0.122	-0.017	0.132
Regional market	-0.227	0.171	-0.227**	0.101	-0.099	0.101	-0.063	0.139	-0.134	0.141
International market	-0.019	0.100	-0.119	0.135	-0.006	0.130	0.053	0.134	0.113	0.094
N	502		688		671		715		715	
log-likelihood	-346.802		-568.966		-592.998		-451.105		-410.672	
R2	11.54%		6.27%		4.64%		10.06%		14.99%	

**Table 3b. Probit and ordered probit results of the influence of ICT on firm outcomes in the gastronomy sub-sector.**

	Competition increase		Productivity increase		Market share increase		Product Innovation	Process Innovation		
Use ICT investment	-0.193	0.286	0.298***	0.089	0.224*	0.127	-0.204	0.193	-0.066	0.147
R F I D technologies	0.808*	0.416	0.454	0.463	0.202	0.267	-0.009	0.395	0.198	0.344
e-business	0.303***	0.115	0.192***	0.062	0.091**	0.047	0.209***	0.061	0.368***	0.081
Online orders	0.000	0.112	0.181**	0.091	0.235***	0.067	0.180	0.119	0.233***	0.078
Online sales	0.009	0.128	0.112	0.070	0.270***	0.060	0.129	0.088	0.185**	0.094
Regional market	0.103	0.112	0.059	0.097	0.027	0.095	-0.104	0.090	0.024	0.119
International market	0.472**	0.228	-0.114	0.118	-0.269*	0.152	-0.076	0.153	0.034	0.148
N	434		1,016		996		1,037		1,033	
log-likelihood	-275.808		-895.567		-895.239		-623.006		-535.948	
R2	8.77%		8.37%		8.05%		9.30%		15.42%	

**Table 3c. Probit and ordered probit results of the influence of ICT on firms' outcomes in the travel agency sub-sector.**

	Competition increase		Productivity increase		Market share increase		Product Innovation		Process Innovation	
Use ICT			-4.314***	0.289	0.819***	0.187	4.431***	0.44	4.585***	0.342
ICT investment	-0.564***	0.151	0.076	0.137	0.370**	0.165	0.054	0.17	0.102	0.190
R F I D								0.27		
technologies	0.249	0.563	0.818	0.548	-0.270	0.574	0.178	8	0.017	0.285
e-business	0.186	0.121	0.238***	0.091	0.166*	0.098	-0.044	2	0.233*	0.134
Online orders	0.209	0.194	0.315**	0.146	0.354**	0.141	0.351**	1	0.704***	0.131
Online sales	-0.117	0.175	0.148	0.157	0.001	0.181	0.562***	6	0.013	0.147
R e g i o n a l								0.16		
market	0.061	0.224	-0.177	0.137	-0.199	0.207	-0.299*	7	-0.388**	0.183
International								0.14		
market	0.081	0.154	0.089	0.116	0.190	0.134	0.055	2	0.287	0.181
N	239		308		292		317		317	
log-likelihood	-175.523		-241.824		-249.740		-198.568		-179.264	
R2	7.78%		14.08%		14.25%		16.61%		25.40%	

\*\*\* p<0.01; \*\*p<0.05; \*p<0.1.

Control variables included

Standard deviation in brackets.

## REFERENCES

Blake, A., Sinclair, M.T., & Campos Soria, J.A. (2006). Tourism productivity: Evidence from the United Kingdom. *Annals of Tourism Research*, 33(4), 1099-1120.

Bojnec, Š., & Kribel, Z. (2004). Information and Communication Technology in Tourism. In *Intellectual Capital and Knowledge Management. Proceedings of the 5th International Conference of the Faculty of Management Koper, University of Primorska*, 18–20 November 2004, Portoroz, Slovenia, pp. 445-454. Retrieved May 11, 2010, from <http://www2.fm-kp.si/zalozba/ISBN/961-6486-71-3/445-454.pdf>

Brynjolfsson, E. (1993). The productivity paradox of information technology. *Communications of the ACM*, 36(12), 67-77.

Buhalis, D. (1998). Strategic Use of Information Technologies in Tourism. *Tourism Management* 19(1), 409-421.

Buhalis, D. (2003). *eTourism: information technology for strategic tourism management*. Essex: Pearson Education Limited.

- Buhalis, D., & O'Connor, P. (2005). Information Communication Technology Revolutionizing Tourism. *Tourism Recreation Research*, 30(3), 7-16.
- Buhalis, D., & Kaldis, K. (2008). eEnabled internet distribution for small and medium sized hotels: the case of Athens. *Tourism recreation research*, 33(1), 67-81.
- Byrd, T.A., & Marshall, T.E. (1997). Relating information technology investment to organizational performance: a causal model analysis. *OMEGA International Journal of Management Science*, 25(1), 43-56.
- Dos Santos, B.L., Peffers, G.K., & Mauer, D.C. (1993). The impact of information technology investment announcements on the market value of the firm. *Information Systems Research*, 4(1), 1-23.
- E-business Watch. (2006). The European e-Business Report. European Commission, Brussels. Retrieved May 11, 2010 from [www.ebusiness-watch.org/key\\_reports/documents/EBR06.pdf](http://www.ebusiness-watch.org/key_reports/documents/EBR06.pdf).
- Evans, G., & Peacock, M. (1999). A comparative study of ICT and Tourism and Hospitality SMEs in Europe. In: Buhalis, D., & W. Schertler (Eds.), *Information and Communication Technologies in Tourism 1999* (pp.247-257). Wien: Springer-Verlag.
- Gratzer, M., Werthner, H., & Winiwarter, W. (2004). Electronic business in tourism. *International Journal Electronic Business*, 2(5), 450-459.
- Gruescu, R., Nanu, R., & Pirvu, G. (2009). Information and Communications Technology and Internet Adoption Tourism. *Bulletin UASVM Horticulture*, 66(2), 407-413.
- Hipp, C., & Grupp, H. (2005). Innovation in the service sector: the demand for service specific innovation measurement concepts and typologies. *Research Policy*, 34, 517-535.
- Ion, P., & Andreea, Z. (2008). Use of ICT in SMEs management within the sector of services. *The Journal of the Faculty of Economics - Economic, University of Oradea, Faculty of Economics*, 4(1), 481-487.
- Irvine, A., & Anderson, A.R. (2008). ICT (information communication technology), peripherality and smaller hospitality businesses in Scotland. *International Journal of Entrepreneurial Behaviour & Research*, 14(4), 200-218.
- Jacob, M., Tintoré, J., Aguiló, E., Bravo, A., & Mulet, J. (2003). Innovation in the tourism sector: results from a pilot study in the Balearic Islands. *Tourism Economics*, 9(3), 275-295.
- Judge, G.G., Carter Hill, R., Griffiths, W.E., Lutkepohl, H., & Lee, T. (1988). *Introduction to the Theory and Practice of Econometrics*. New York: Wiley & Sons.
- Law, R., & Jogaratnam, G. (2005). A study of hotel information technology applications. *International Contemporary Hospitality Management*, 17(2), 170-180.
- Martin, L.M. (2004). E-innovation: Internet impacts on small UK hospitality firms. *International Journal of Contemporary Hospitality Management*, 16(2), 82-90.

Mihalič, T. (2007). ITC and productivity – the case of the Slovenian travel industry. In: Keller, P., & T. Bieger (Eds.), *Productivity in Tourism: fundamentals and concepts for achieving growth and competitiveness* (pp. 167-188). Berlin: Erich Schmidt Verlag.

Minghetti, V., & Buhalis, D. (2010). Digital Divide in Tourism. *Journal of Travel Research*, 49(3), 267-281.

Scheidegger, E. (2006). Can the state promote innovation in tourism? Should it?. In: OECD (Ed.), *Innovation and Growth in Tourism* (pp. 11-16). Paris: OECD.

Shanker, D. (2008). ICT and Tourism: Challenges and Opportunities. Conference on Tourism in India - Challenges Ahead. Indian Institute of Management, Kozhikode, 15-17 May 2008.

Sigala, M. (2003a). The information and communication technologies productivity impact on the UK hotel sector. *International Journal of Operations & Production Management*, 23(10), 1224-1245.

Sigala, M. (2003b). Unravelling the impact of Information and Communication technologies (ICT) on restaurant productivity. 11th European Conference on Information Systems (ECIS) New Paradigms in Organisations, Market and Society. Naples, Italy: University of Napoli Federico II, University Cattolica del. S. Cuore, Milano, 16- 23 June, 2003.

Tahayori, H., & Moharrer, M. (2008). E-Tourism: The Role of ICT in Tourism Industry, Innovations and Challenges. Retrieved May 11, 2010, from <http://www.scribd.com/doc/7113770/Tourism-The-Role-of-ICT-in-Tourism-Industry-Innovations-and-Challenges>.

United Nations Conference on Trade and Development (UNCTAD). (2004). UNCTAD'S eTourism Initiative, Doc. TD(XI)/BP/6), 26 April. Retrieved May 11, 2010 from: [http://www.unctad.org/en/docs/tdxipbd6\\_en.pdf](http://www.unctad.org/en/docs/tdxipbd6_en.pdf).

Vilaseca, J., Torrent, J., Lladós, J., & Garay, L. (2006). El impacto de las TIC en la empresa turística: el caso de Cataluña. UOC, Working Paper Series, WP06-003.

Vilaseca Requena, J., Torrens Sellens, J., Lladós Masllorens, J., & Garay Tamajón, L. (2007). Tecnologías de la información y comunicación, innovación y actividad turística: hacia la empresa en red. *Cuadernos de Turismo*, 19, 217-240.

United Nations World Tourism Organization (UNWTO) (2011). UNWTO Tourism Highlights (2011). Madrid: UNWTO.

Xiaoqiu Ma, J., Buhalis, D., & Song, H. (2003). ICTs and Internet adoption in China's tourism industry. *International Journal of Information Management*, 23(6), 451-467.