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Effects of the Internet use in the technical efficiency of the tourism sector: a case study of the hinterland regions of Catalonia

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Abstract: The use and management of new technologies is acknowledged as a key tool in the acquisition of competitive advantages in all the sectors. Particularly in the tourism sector, the use of website may influence the ability of companies to get to new markets.

This paper aims at analysing the relation between the use of websites by companies of the tourism sector and its economic results. To tackle this objective, the technical efficiency of the tourism sector in the Pyrenean region of Catalonia is worked out. The paper uses a sample of companies from the SABI Van Dijk database, belonging to the hinterland regions in the North of Catalonia during the period 2011-2014. The non-parametric *Data Envelopment Analysis* (DEA), the normality test Kolmogorov-Smirnov and the decision tree segmentation techniques have been used to test the research hypothesis.

The main results of the paper show a positive association between the use of new technologies by the companies and their economic outcomes. On the contrary, there is not a positive association between having a website and the technical efficiency of the companies.

Keywords: Tourism sector; Internet; Technical efficiency; Webpage.

Efectos del uso de Internet en la eficiencia técnica del sector turístico: un estudio de caso de las regiones del interior de Cataluña

Resumen: El uso y dominio de las nuevas tecnologías es reconocido como una herramienta clave en la adquisición de ventajas competitivas en todos los sectores. Concretamente en el sector turístico, el uso de páginas web puede influir en la capacidad de las empresas de llegar a nuevos mercados.

El objetivo de este trabajo es analizar la relación entre la utilización de herramientas web por las empresas del sector turístico y sus resultados económicos. Con tal motivo, se analiza el nivel de eficiencia del sector hotelero y alojamientos turísticos de la región pirenaica de la Comunidad Autónoma de Cataluña.

Para llevar a cabo el estudio, se ha seleccionado una muestra de empresas a partir de la base de datos SABI de Van Dijk, centrada en las divisiones administrativas en el norte de Cataluña para el período 2011-2014. Se ha empleado el método no paramétrico *Data Envelopment Analysis* (DEA), el test de normalidad Kolmogorov-Smirnov y el método de clasificación de árboles, que permiten predecir el comportamiento de la variable dependiente en base a las variables independientes.

Los resultados obtenidos muestran la existencia de una asociación entre la utilización de nuevas tecnologías en las empresas y sus resultados económicos. Por el contrario, no hay asociación positiva entre tener página web y eficiencia técnica.

Palabras Clave: Sector turístico; Internet; Eficiencia técnica; Página web.

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1. Introduction

The growing trend towards the use of the internet as a tool to search for information and services offered by the tourism industry is a fact in the last decades. Due to this major change in the demand side, businesses operating in the touristic industry need to carry out both a growing advertising investment and a technological revolution (Buhalis & Law, 2008).

The use of the Internet allows a quick relation between the potential customer and the companies, because it eliminates intermediaries and the customer has direct access to the sales channels. Thus, this worldwide economic trend has caused a fundamental change in the regional and international structure in general and of the tourism industry in particular (Buhalis & Law, 2008).

E-commerce has become in recent years a mainstay for a company willing to obtain a good position in the online market and to expand its business opportunities not only at a national level but also at the international one (Bartlett & Ghoshal, 2000).

Catalan[1] hinterland economy is mostly based on its tourism industry (Miró & Alsina, 2013) –especially since 2008, when the international crisis arose. In this context, this sector has become a socioeconomic driver for the development of the hinterland regions that are located in the northern Lleida area, such as Pallars Sobirà, Pallars Jussà, Alt Urgell and the Aran Valley (Miró, 2014), and Berguedà in the north of the Province of Barcelona.

Figure 1: Geographic area

Source: © World Stadiums and © *Institut Cartogràfic de Catalunya*

These regions altogether stand for a 0.65% of the Catalan national Gross Domestic Product for the year 2008 and the 0.66% of the total population in 2012, with an industrial fabric composed basically of small and medium enterprises (SMEs). It represents a small economy with a decreasing growth, in general terms. At the same time, it is difficult for any productive process in the area to achieve increasing returns to scale (Becattini, 2002), since there is no longer a group of specialized companies able to take advantage of the potential economies of scale in the region.

For the SMEs that predominate in the tourism industry of this area, active internet usage may provide a way to get to new markets with low costs avoiding, thus, the numerous entrance barriers that the international market has (Hamill, 1997). The Internet gives small and medium enterprises the chance to have a new sales channel in countries they could otherwise access to (Chaffey, Mayer, Johnston & Ellis-Chadwick, 2000).

Therefore, the need to adapt to these new economic and competitive circumstances has to generate a qualitative leap for the companies making up a country's industrial fabric. In particular, that is the forecast for the industrial fabric of the northern Catalan regions, integrated by small and medium enterprises that may exploit the benefits of internet usage for their internationalization (Quelch & Klein, 1996). That requires a shift from a fixed channel one-way model to an interactive model in which

the customers conduct direct search according to their interests and in so doing they get to the products that best fulfil their needs (Aguayo, 2003).

This paper analyses the usefulness of the internet tool to improve the competitiveness of inner regions –which are on the periphery and usually out of the national and international networks, focusing on their offer of a quality tourism product or service. In particular, it aims at determining if there is any relation between having a website and the accessibility of this to the international markets –through the translation to foreign languages, in the technical efficiency (TE, henceforth) of the companies.

The remainder of the paper is organized as follows: in the second section we set the theoretical framework and present the main hypothesis to be tested. Section 3 addresses the methodological issues and data used to undertake the study. Afterwards the main insights are presented and discussed. The paper finishes with some brief conclusions.

2. Theoretical framework

Tourism is one of the most important sectors of the industrial fabric both in developed and development countries. This economic sector is highly affected by the technological changes that take place in the global environment. In particular, continuous innovations in the field of Information and Communication Technologies (ICT) are the main drivers of the radical transformation of the tourism sector along the last 30 years (Román, 2005). Thus, being able to follow and adapt to the technological changes has become a key aspect in the management of innovative companies, which allows a constant improvement in all the economic sectors (Capó-Vicedo, Expóstio-Langa & Masià-Buades, 2007). Accordingly, the economic activities that integrate the tourism sector must technologically reorganize the value creation chain (Esteban Talaya, Millán-Campos & Molina-Collado, 2000).

In the knowledge society, the Internet has become a success factor for the present and future of the tourism sector, especially in the area of marketing and distribution (Carpintier, 1996). That is also true for all of the other related activities: information search, reservations, purchases of tourist products and services and so on (Pablo, 2004).

The Internet allows the achievement of important advantages compared to a more traditional way of performance by the companies. It also improves the relationships between companies and with the customers. Within this framework, tourism is set in a new competitive environment, where information becomes a key resource and the core of possible competitive strategies for this sector.

In this sense, it is worth to note the value of the Internet tool as a way to increase the share both at national and international markets (Laso & Iglesias, 2002). This tool is also useful to improve the competitiveness, to increase the sales, to capture the greatest number of tourists and to be recognized among the customers (Esteban Talaya *et al.* 2000). Thus, the Internet brings about these opportunities, and at the same time is the tool that allows to operate new marketing, communication, sale and advertising strategies (Gómez-Limón Rodríguez, San Martin-Fernández & Peña-Albillo, 2000).

The impact of Internet may be analysed in relation to several aspects, such as the organisational context, the national and the international environment, and the business strategy (Hamil, 1997; Alonso & Furio Blasco, 2006).

In order to develop a competitive advantage in any type of company and particularly in the tourist companies, it is necessary to design the website and to focus it on a specific sales target. To take advantage of the opportunities and the benefits that a world network offers, it is necessary to provide clear and understandable information to the potential customers. In this sense, the use of the market-specific languages is the key to get to the customers to whom the products and services are offered (Laso & Iglesias, 2002).

According to the literature, the factors that contribute to a better technological adaptation of the companies and consequently, to transform it into higher profitability, efficiency and productivity, are: the managers leadership, the existence of a emblematic trademark, the adaptation of the company to emerging markets and to the demographic changes, the training of employees, and the business model as well as the adaption of the company to internal and external markets (Sáenz, 2000). All of these factors guarantee an improvement of the business efficiency (Aguilar, Crespo & Rubio, 2007).

The concept of productive efficiency refers to the most suitable use of the available resources given the existing technology at the moment. The goal is to get the Pareto optimum, meaning that an efficient allocation is the best possible, resulting from a known set of customers' preferences, resources and technology (Bhaduri, 1998).

According to Farrell (1957) the productive efficiency is comprised of (Álvarez Pinilla, 2001):

a) Technical Efficiency, which reflects the ability of the company to obtain the maximum amount of outputs given the inputs. TE can be divided into three subgroups (Färe, Grosskopf & Lovell, 1985):
   I) Scale efficiency
   II) Congestion efficiency
   III) "Pure" technical efficiency
b) Allocative Efficiency, which refers to the use of inputs in the optimum proportions, given their respective prices.
c) Scale Efficiency, referring to a situation where the company produces in the optimal size scale that makes it possible to obtain the output that maximizes profit.

Farrell (1957) brings the concept of radial index with respect to the efficiency index, which refers to the efficient positioning of a production unit compared to an efficient process, where the efficient process is represented through the estimation of multiple productive units. Depending on the perspective that is taken, whether inputs or outputs, different boundary sets or production-possibilities frontier (PPF) are delivered.

Two technical methods are usually employed to estimate business efficiency, the parametric and the non-parametric approaches (Hjalmarsson, Kimbhakar & Heshmati, 1996). Within the parametric estimation approach, the *Stochastic Frontier (SF)* has been largely applied. This method has been qualitatively promoted based on the works of Aigner, Lovell, & Schmidt (1977) and Meeusen & van den Broeck (1977).

Non-parametric methods are usually represented by Data Envelopment Analysis (DEA), which does not require previous financial outcomes or using parameters to run its estimation (Kumbhakar, 2000).

There are just a few papers that focus on the efficiency of the tourism and particularly in the hotel industry. In the early 90's Baker & Riley (1994) suggest the use of ratios to analyse the TE of the hotels' performance. McMahon & McDowell (1995) study the influence of hotel management in the efficiency.

Most of the papers that analyse tourism and TE are based on the DEA method. For instance, Johns, Howcroft & Drake (1997) use a multi-input and multi-output model to estimate the TE of 15 hotels in the UK for a period of 12 months. The same method is used by Chiang *et al.* (2004) for 25 hotels in Taipei and by Barros (2004) for a set of hotels in Portugal.

Other works have employed the SF method. For example, Anderson, Lewis & Parker (1999b) use just one output (total revenue) to estimate the TE of 48 hotels in North America. Anderson, Fish, Xia & Michello (1999a) employ both methods –SF and DEA, to compare and analyse 31 corporate travel apartments in the USA. Barros (2004, 2006) uses DEA to analyse the efficiency of hotels in Portugal.

3. Data and methodology

3.1. Data

This paper uses Informa D&B and Bureau Van Dijk's *Sistema de Análisis de Balances Ibéricos* (SABI) database. It contains Financial Statements' historical data recorded in the Central Mercantile Register from more than 1,200,000 Spanish companies, with a historical record of annual accounts up to 12 years.

Data with activity code 55 of NACE-2009 representing the tourism industry and its direct subsectors have been selected for this paper (see Table 1).

Table 1: Classification of actitivies

55	Accommodation services
551	Hotels and similar accommodation
5510	Hotels and similar accommodation
552	Holiday and other short-stay accommodation
5520	Holiday and other short-stay accommodation
553	Camps and caravan parks
5530	Camps and caravan parks
559	Other accommodation
5590	Other accommodation

Source: INE

Based on this classification, a database of 156 companies has been built from 2011 to 2014. The selection of the observation units complies with the homogeneity requirement of DEA methodology. The parameters that have been used to select the observation units are the two following ones:

All the units belong to the set of activities belonging to the tourism Industry according to the NACE code 55.

All of the units are located in the hinterland regions of Catalonia.

Thus, a panel data with a total of 624 observations has been obtained.

The records allow to get information about each one of the variables designed to estimate the TE of the companies, namely the labour costs (Castellani, 2001), the net revenues (Girma *et al*. 2003) and other items included in the balance sheet and the income statement of the company, for example, material (Olley & Pakes, 1996) and capital cost (Olley & Pakes, 1996).

The data refers to those companies located in the regions of Pallars Sobirà, Pallars Jussà, Aran Valley, Alt Urgell and Berguedà.

The selection excludes those companies with turnover and total assets equal or less than zero, those ones with an added value or a number of employees equal to zero and those firms that do not offer specific information on reliability conditions. The variables are deflated according to the specific industry index. Labor, capital and material costs are deflated by the Consumer Price Index elaborated by the National Statistics Institute (INE).

Once the net turnover variable was set, an internet active search was carried out to find out which companies from the region have their own webpage and, amongst them, what is their accessibility, meaning into how many languages they are translated.

3.2. Methodology

In this section the two methodologies used in the paper are presented, referring to TE models and segmentation techniques.

a. Data Envelopment Analysis

The DEA is the most commonly used method to the estimate TE by nonparametric techniques (Coelli, Rao, O'Donnell & Battese, 2005). This method is suitable for when there are more than one output and prices are unreliable or unknown. The DEA method solves an optimization problem for each decision making unit (DMU). In this case, the boundary is represented by the convex combinations of those efficient production units. Those that are inefficient are "wrapped" by the border.

In the manner of the production-possibility frontier, the DEA method fulfils the following axioms:

1) The production set is convex and bounded.
2) No production unit may exist if it does not have inputs.
3) It should imply a type of returns to scale in the sector.

The ratio between outputs and inputs of each production unit evaluated under the assumption of the DEA method was proposed by Charnes, Cooper and Rhodes (1978), and has been further enhanced by a variety of new models. There are four main DEA models: i) The model with constant returns to scale, CCR, ii) the model with variable returns to scale (BCC), iii) the alternative model and iv) the multiplicative model.

In this paper the TE is estimated according to the model proposed by Charnes, Cooper and Rhodes (1978), which is a constant returns to scale model (CCR, hereinafter).

The CCR model is defined by,

$$EP_{CCP}\left\{(x,y): x \geq \sum_{j=1}^{N} x_j \lambda_j; y \leq \sum_{j=1}^{N} y_j \lambda_j; \lambda_j \geq 0 ; j = 1,2,... n \right\} \tag{1}$$

Where *(x, y)* respectively represent the vectors of inputs and outputs, *j* is each of the companies comprising the sample and λ is the vector intensity that defines the border and allow to modify the assumption of returns to scale.

In this case the restriction is determined by,

$$\lambda_j \geq 0 \tag{2}$$

specifying the constant returns to scale.

The estimate of the TE can be oriented in the direction of the inputs or from the perspective of the outputs. The maximum equiproportional expansion that is possible in all outputs while maintaining the provision of fixed inputs is determined by,

$$\lambda \left(x.y \right)_{CCR} = \max \Big\{ \lambda \mid \lambda \; y \; \varepsilon \; ISO_{y(x)CCR}, ^\vee \lambda \geq 1 \Big\} \tag{3}$$

In order to estimate the outputs by fixing the inputs, the DEA efficiency ratios are calculated according to the following linear programming

$$
\begin{aligned}
&\text{Max.} && \left(\vec{u} , y_i \right) \\
&\text{s.a}^2. \; x, y && \vec{v} \; x_i = 1 \\
& && \vec{u} \; y_i - \vec{v} \; x_i \leq 0 \; where \; i = 1 ,..., N \\
& && u , v \geq 0
\end{aligned}
\tag{4}
$$

Where x_i represents the inputs of the i-th DMU evaluated and y_i represents the outputs of the i-th DMU evaluated. And:

$\vec{u}$ It is a vector of outputs SX1 to be estimated.

$\vec{v}$ It is a vector of MX1 optimal combination of inputs to be estimated.

In order to measure the impact of the Internet tool use in the improvement of the TE, the test Kolmogorov-Smirnov is used. This test allows to compare the distribution function of the sample with the distribution function that is proposed to describe the data $F_0(x)$.

The hypothesis is specified as:

$$
\begin{aligned}
&H_0 : F(x) = F_0(x) \\
&H_1 : F(x) \neq F_0(x)
\end{aligned}
\tag{5}
$$

The hypothesis is specified as:

$$D(x_1, \ldots, x_n) = \sup_x |F^*_n(x) - F_0(x)| \tag{6}$$

where $F_n(x)$ is the estimator of the probability of observing values inferior or equal to x_i, $F^*_n(x)$ is the empirical distribution function of the sample. $F_0(x)$ represents those values that are smaller or equal to x_i when H_0 is true. Finally, D is the difference between the actual absolute frequency and the actual cumulative frequency (Delgado, Fariñas & Ruano, 2002).

b. Segmentation techniques

The second method used in this paper is based on decision trees also called segmentation models. The objective is to define and validate the models in order to determine which variables explain the variability of a dependent variable (Breiman, Friedman, Olshen & Stone, 1984). This model is

designed as an algorithm to build trees that are applied to regression and classification problems. They are explanative techniques that belong to the set of regression models but they have the advantage that both the criterion and the predictor variables may be either of quantitative or qualitative nature. This method sets a hierarchical analysis regarding all the independent variables that have been introduced into the model and allows to indicate which one best discriminates (Galguera, Luna & Méndez, 2006).

The main objective is to make it evident the relationship between the TE and the availability of a website. A second group compares the efficiency taking into account the specific region where the companies are located.

There are four main algorithms that may be used to carry out the tree analysis: CHAID (*Chi-square automatic interaction detector*), exhaustive CHAID, (*CRT-Classification and regression trees*), and QUEST (*Quick, unbiased, efficient, statistical tree*). In this paper the exhaustive CHAID is used, with the presentation of binary trees, with all the possible segmentations of each predictor (Kass, 1980).

The regression tree has nodes; each node box is stamped with the local estimation of the output. In each node the conditional probability of relevance an each class is storaged:

$$P\left(c \,\|v_j(x)\right) = \frac{P\left(c \,\|v_j(x)\right)}{\sum_{k=1}^{n_c} P\left(c_k, v_j(x)\right)} \tag{5}$$

The combination of classifiers is performed by most:

$$g_c(x) = \frac{1}{n_t} \sum_{j=1}^{n_t} \overline{P}\left(c \,|v_j(x)\right) \tag{6}$$

The similarity between the calculated members, evaluating on a fixed set n of examples of tests as:

$$\widehat{s}_{ij} = \frac{1}{n_t} \sum_{k=1}^{n} f(x_k) \tag{7}$$

Where,

$$f(x_k) = \begin{cases} 1 & if \quad c_i(x_k) = c_j(x_k) \\ 0 & otherwise \end{cases} \tag{6}$$

TE is the variable used to build the decision tree, which is estimated according to the DEA method as defined above. The criterion variable is the region where the companies are located. Finally, the relationship between the TE and the proxy for internationalization, i.e., the translation of the website into foreign languages is assessed.

3.3. Results

a. Structure of the Tourism industry in the North of Catalonia

The present paper focuses on the tourism industry located in five Catalonian regions, four of them in the province of Lleida –Pallars Jussà, Pallars Sobirà, Alt Urgell and the Aran Valley, and one in Barcelona province –Berguedà.

Desk research allowed to identify which of the companies of the sample have a website. The results are summarised in the Table 2.

Table 2: Availability of website by companies, by regions

	Does the company has a website		Website / total number of companies
	Not	Yes	%
Alt Urgell	20	8	28.57
Pallars Jussà	9	4	30.77
Pallars Sobirà	24	7	22.58
Berguedà	24	16	40.00
Aran Valley	32	12	27.27
Total	**109**	**47**	**30.13**

Source: Own elaboration

The table shows that only a few companies have a website (30.13% on average). The region of Berguedà is clearly the leader, since a 40% of the companies have this tool. On the other hand, the regions of Aran Valley, Pallars Sobirà and Alt Urgell are under the average, with a 27.27%, a 22.58% and a 28.57%, respectively, of the companies owning a website.

In the Table 3 the net turnover of the companies is presented, distinguishing whether they have or not a website. The figures show that on average, those companies that have a website have a greater turnover.

Table 3: Average net turnover in relation to having a website by region (2014)

Region	Do the companies have a website?		Average net turnover (in thousands of euros)
Alt Urgell	Not	20	133.37
	Yes	8	210.55
Berguedà	Not	24	176.18
	Yes	16	340.07
Pallars Jussà	Not	9	194.81
	Yes	4	108.43
Pallars Sobirà	Not	24	174.52
	Yes	7	132.64
Aran Valley	Not	32	257.08
	Yes	12	378.54
Total	**Not**	**109**	**193.25**
	Yes	**47**	**277.24**

Source: Own elaboration

In three of the five regions, the companies that have a website enjoy a much higher average net turnover in comparison to the companies that do not have a website.

Apparently, there is a positive relation between owning a webpage and the companies' financial economic results if they make use of the Internet as a distinguishing service from their competitors. To confirm econometrically this hypothesis a logistic regression is carried out for the year 2014.

First the estimated parameter (β) and its standard error are presented (Table 4). The Wald test is used to assess the statistical significance.

Table 4: Equation variables

		B	Std. Error	Wald	gl	Sig.	Exp(B)
Step 0	Constant	-0.841	0.087	92.952	1	0.000	0.431

Source: Own elaboration

The level of significance, smaller than 0.05, does not allow to accept the null hypothesis, therefore, there is a relationship between both variables (net turnover and website). The Odd Ratio (Exp (β)) for the variable TE would be 0.431. The proportion of enterprises using website regarding the variable TE is 0.431 times higher than those that do not use a website.

Next the three measures that summarise the models are presented. They allow to assess the validity of the model in a global way (Table 5).

Table 5: Models summary

Step	-2 log likelihood	Cox & Snell R square	Nagelkerke R square
1	732.586	0.049	0.069

Source: Own elaboration

The -2 log likelihood measures how well a model fits the data, in this case small values are sought to assert that there is a good fit. Likewise, Cox & Snell R square and Nagelkerke R square indicate the model validity with very small coefficient of determination values, they do explain the model; 4.9% or 6.9% of the dependent variable variation is explained by the variable included in the model (TE).

The Hosmer and Lemeshow test shows the global adjustment of the model. The following results were obtained (Table 6):

Table 6: Hosmer-Lemeshow Test

Step	Chi-square	gl	Sig.
1	12.586	8	0.127

Source: Own elaboration

The significance level is higher than 0.05 hence the null hypothesis is accepted, therefore, the model is coherent with the economic logic? Therefore our model in question are within economic logic.

Finally, the regression coefficients with their corresponding standard errors are presented (Table 7). The Wald test is used to assess the null hypothesis ($\beta_i = 0$).

Table 7: Equation variables

		β	S.E	Wald	gl	Sig.	Exp(B)
Step 1[a]	TE	0.275	0.210	1.717	1	0.190	1.317
	Nº Worker	0.090	0.019	21.685	1	0.000	1.094
	Constant	-1.318	0.138	91.813	1	0.000	0.268

Introduced variable(s) in step 1: TE
Source: Own elaboration

Regarding the variable TE of the equation, it has a level of significance higher than 0.05, hence the null hypothesis is not rejected. On the contrary, β has a positive influence on the model, which means that it does influence the model in any way. Thus, the model explains the existence of a positive relation between the dependent and the independent variables and it is possible to obtain the value of the TE increase in relation to the website usage.

The Kolmogorov-Smirnov test is applied to observe if there is a positive relationship between an improvement of the TE depending on whether the company uses or does not use a website. The results are shown in Table 8.

Table 8: Kolmogorov-Smirnov Test

Smaller group	D	P-value	Corrected
0:	0.1484	0.003	
1:	0	1	
Combined K-S:	0.1484	0.006	0.005

Source: Own elaboration

In this case, the null hypothesis is rejected at a level of 0.005; therefore, the observed values of the frequencies for each class are equal to the theoretical frequency of a normal distribution. Thus, significant differences are found between the companies that have websites and those that do not have them.

b. Companies' Internationalization through websites

This section presents the results related to the use of different languages in the website as a strategy to reach to a higher number of customers far from the national frontiers.

Table 9 summarises the use of different languages by the companies in their websites. This table shows the total number of companies that have their website in one language or another.

Table 9: Companies that have their webpages in other languages

Language	Webpages	Recount	%
Catalan	Yes	39	82.98
Spanish	Yes	37	78.72
English	Yes	28	59.57
French	Yes	25	53.19
Other	Yes	9	19.15

Source: Own elaboration

Catalan is the most used language in the webpages, Spanish being the second one. Other languages, for instance English and French, are not very exploited, what leads to state that the companies are not reaching the international market. That is, it cannot be affirmed that there is a real internationalization, because the international market is not specially taken into account, and the accessibility to the national market is set out. The Table 10 presents the results per region.

It can be stated that the dominant languages in all regions are Catalan and Spanish. Catalan is at its maximum usage in Berguedà, 87.5%, and Pallars Jussà, 100%, whereas Spanish is at its maximum usage in Aran Valley, 100%.

All the companies in the studied regions translate its webpages into other languages (English and French). Only Alt Urgell and Aran Valley seem to be willing to get to other markets because they translate their websites into other different languages as well

Table 10: Languages used in all the companies that have a webpage per region

Language accessibility		Alt Urgell		Pallars Sobirà		Pallars Jussà		Berguedà		Aran Valley	
		Total	%	Total	%	Total	%	Total	%	Total	%
Catalan											
	Not	1	12.5	0	0	0	0	2	12.5	5	41.7
	Yes	7	87.5	7	100	4	100	14	87.5	7	58.3
Spanish											
	Not	1	12.5	2	28.57	2	50	5	31.3	0	0
	Yes	7	87.5	5	71.52	2	50	11	68.7	12	100
English											
	Not	2	25	2	28.57	3	75	8	50	4	33.3
	Yes	6	75	5	71.52	1	25	8	50	8	66.7
French											
	Not	3	37.5	2	28.57	3	75	9	56.2	5	41.7
	Yes	5	62.5	5	81.52	1	25	7	43.8	7	58.3
Others											
	Not	5	62.5	7	100	4	100	14	87.5	8	66.7
	Yes	3	37.5	0	0	0	0	2	12.5	4	33.3

Source: Own elaboration

c. Region with the highest Technical Efficiency

In this section the results for the relation between the use of Internet and the internationalization through the website and the TE are presented.

The resulting classification tree for Technical Efficiency is shown in Figure 2. Regions and website are considered as independent variables.

Each node of the tree shows the predicted value, which is the mean value for the dependent variable at that node. The results show that the tree leads to the same partition of the observations, fourteen child nodes suggesting the presence of fourteen groups and that the detected portions are all statistically significant (p-value<0.05).
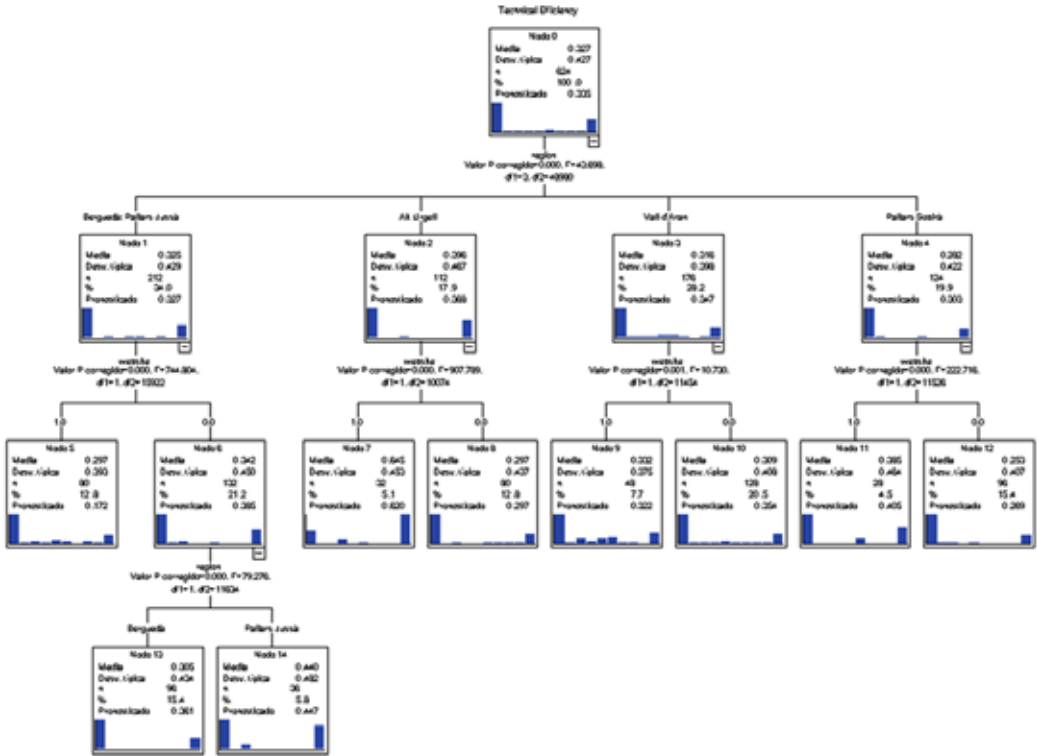
In particular, the four groups of classification for regions are Berguedà, Pallars Jussà, Alt Urgell, Vall d'Aran and Pallars Sobirà. For the first group, it can be seen that the regions that achieve a greater influence on TE are those corresponding to Berguedà and Pallars Jussà corresponding to node 1. This means that companies that are located in these regions have a higher ET value. The following predictor is website (where 1 stands for having a website and 0 for not having a website). For the regions that do not have a website (node 6) have a higher percentage with respect to relationship with the region and the TE with a 21.2%. Lastly, within node 6 the region with a greater TE is Berguedà.

The results corresponding to Node 3 belong to the Vall d'Aran. Despite being the region with a greater number of touristic companies, it is far away from Berguedà and Pallars Jussà. Not having a website in this region points out to a greater influence on the TE (Node 9).

The results in Figure 2 indicate that the Berguedà region is the one with the best result in terms of efficiency, taking into account that in this region the greatest percentage of companies with website are located. This result falls in line with the same found in Johns *et al.* (1997) and Barros (2004).

In Catalonia there are two co-official languages, Catalan and Spanish. Therefore, the possibility to translate the website into another language would allow access to the international clients who do not know the official languages. The variable languages of the website is used as a proxy for the companies' internationalization. That is used to analyse its impact on the net turnover and the TE. Table 11 shows the main results.

Figure 2: Decision Tree

Source: Own elaboration

**Table 11: Distribution and Net Turnover TE variable region
with respect to the language of the website**

		Average Technical Efficiency				
		Region				
		Alt Urgell	Berguedà	Pallars Jussà	Pallars Sobirà	Aran Valley
Catalan	No	0.154	0.367	0.607	0.263	0.355
	Yes	0.533	0.338	0.204	0.288	0.367
Spanish	No	0.154	0.350	0.497	0.320	0.344
	Yes	0.533	0.374	0.406	0.003	0.392
English	No	0.147	0.342	0.523	0.320	0.334
	Yes	0.621	0.417	0.003	0.003	0.460
French	No	0.140	0.331	0.523	0.320	0.332
	Yes	0.745	0.476	0.003	0.003	0.488
Other	No	0.184	0.355	0.483	0.269	0.316
	Yes	0.786	0.394	.	.	0.767

| | | Average Net Turnover | | | | |
| | | Region | | | | |
		Alt Urgell	Berguedà	Pallars Jussà	Pallars Sobirà	Aran Valley
Catalan	No	16,552,183	16,731,594	35,637,173	31,618,611	36,363,725
	Yes	37,957,792	92,085,163	48,179,775	9,964,983	42,773,542
Spanish	No	16,877,196	42,387,716	32,119,146	29,849,843	29,774,640
	Yes	36,982,754	44,997,270	80,071,526	10,501,129	57,673,680
English	No	16,110,057	40,556,424	42,083,846	29,849,843	30,451,604
	Yes	43,146,521	53,301,020	8,447,502	10,501,129	68,576,862
French	No	16,654,590	39,610,252	42,083,846	29,849,843	30,739,623
	Yes	46,048,963	59,582,199	8,447,502	10,501,129	72,500,942
Other	No	17,517,900	42,904,759	39,496,435	26,729,082	3,152,324
	Yes	58,450,958	26,916,255	.	.	9,564,916

Source: Own elaboration

The use of other languages in the company's websites has a positive impact on the net turnover of the business. The picture is different when the TE variable is taken into account, since there is not a clear improvement of the companies that have their websites translated into foreign languages, except for Alt Urgell, Berguedà and Aran Valley. In the mentioned regions a positive relationship between a better average TE and the accessibility of the website is observed.
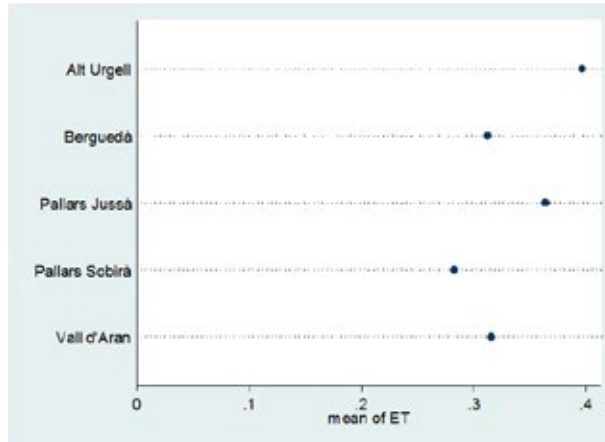
Through the creation of a dichotomic variable, which is defined as 0 for using just the official languages –Spanish and Catalan, a 1 for using at least one foreign language, the impact in the TE is obtained (Table 12).

Table 12: The impact of internationalization in the TE

| | Languages | |
Region	0	1
Alt Urgell	0.533	0.717
Berguedà	0.356	0.429
Pallars Jussà	0.305	0.002
Pallars Sobirà	0.146	0.002
Aran Valley	0.380	0.572
Total	**0.344**	**0.344**

Source: Own elaboration

The total average TE is the same for those companies that do not translate their websites into foreign languages. The picture clearly differs by region; in Alt Urgell, Berguedà and Aran Valley the companies with websites only accessible in official languages have a higher average TE with respect to the companies with the website translated into other languages, whereas Pallars Jussà and Pallars Sobirà offer opposite results. The figure 3 below shows the regions that are best placed in terms of TE compared with the average of the whole sector.

Figure 3: TE average by Region

Source: Own elaboration

According to Figure 3, the regions with a better average TE are Alt Urgell and Aran Valley. On the contrary, the regions of Pallars Jussà and Pallars Sobirà, which have an important tourist fabric, have poor results in terms of the TE.

4. Discussion and Conclusions

The regions that make up Catalonia region's northeast core have big natural and historical attractions and a good way to promote this potential tourism product is using the new technologies. In particular, maintaining a website may help to increase the market share and the positioning as an attractive area for tourism.

In this paper the influence of using new technologies in the performance of business companies in the hinterland regions of Catalonia has been studied. The use of these technologies by tourist companies in the studied region is actually not very spread, since just a 30% of the companies use the Internet as a marketing tool. This situation is not very different from that found in other studies (Martínez, Majó & Casadesús, 2006).

Notably, the companies in the sample that use new technologies in their businesses have an average higher net turnover in comparison to the companies that do not use the internet. This result is coherent with other studies focused on companies that sell their products and services through internet (Carpintier, 1996; Esteban Talaya *et al*. 2000). The utilisation of Internet sets a new way to economically grow for companies in the tourism sector (de Pablo, 2004).

Moreover, the use of the internet in the tourism companies affects the TE, meaning that those companies that use the website achieve, on average, an improved result of their TE in comparison to other companies that do not have a website. In this paper, an association between a greater TE with a higher value of turnover has been found in the companies in the analysed regions. This result confirms other results previously found (Anderson *et al*. 1999a). Therefore, the use of the website represents a suitable strategy to improve the competitiveness of the tourism companies (Berne, García & Múgica, 2012). Learning on the usage of these technologies would promote ways of economic growth (Álvarez-Pinilla *et al*. 2001).

The results obtained in this study indicate that companies in the tourism sector in the hinterland regions of Catalonia have a wide margin of improvement regarding TE. This result is not surprising because overall the tourism sector tends to inefficient values, as has been reported by Anderson et al. (1999) for the hotel sector and by Sellers, Nicolau y Mas (2002) for travel agencies.

The normality of the relation between the variables ET and having a website was proven by the Kolmogorov-Smirnov test. According to this test, there exists a significant difference between the companies that have a website and the companies that do not use this tool.

The decision tree indicates that the regions of Berguedà and Pallars Jussà have the best average value of TE. Comparing the TE of the companies that have a web and those others that do not have a website, the results show a better performance of companies without this tool. This result is unexpected to some extent,

taking into account the results of previous studies (Buhalis, 1998, de Pablo, 2004); nevertheless, a plausible explanation for this result may be the specific features of the hinterland regions, which are far away from the traditional tourist market of Catalonia. These regions have several disadvantages in relation to the Catalan tourism sector, such as the lack of investment in R&D, infrastructures, etc. (Miró y Alsina, 2013; Miró, 2014).

Finally, the companies of the tourism sector that translate their websites into different languages, set aside the official ones, have a higher average turnover. On the contrary, the opposite relation was found for the relation with TE. This result is coherent with the previous one indicated above. Therefore, although the use of different languages in the website may be use to get to new markets and increase the service sales (Buhalis, 1998), the statement does not imply a better use of resources, hence a higher value of TE..

The regional study that has been carried out in this paper is a starting point for future research at the national level. This is important, due to the central relevance the tourist sector has achieved along the last decades in the Spanish economy (Brida *et al.* 2008).

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Notes

[1] The article 2 of the Spanish Fundamental Law recognises the autonomy right of the nationalities and regions that integrate the Spanish territory and the article 143.1 determines them. An autonomous community refers to neighbouring provinces with common historic, cultural and economic features, insular territories and provinces with historic regional status. Catalonia is one of the 17 Autonomous Communities that are within the Constitution framework Spanish, the region is organized in four provinces −Barcelona, Girona, Lleida and Tarragona- and 947 municipalities.

[2] s.a.: subject to.