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Consumer engagement in e-Tourism: Micro-panel data models for the case of Spain

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Abstract

This article analyzes the consumer's adoption of the Internet for information or shopping of tourist services. Based on the Surveys on Equipment and Use of Information and Communication Technologies in Households, by the National Statistics Institute of Spain, a micro-panel database (2008–2016) is constructed. Using this database and random effects logistic models, the impact of socioeconomic characteristics on the individual's adoption of the Internet for tourism purposes is estimated. The results indicate that education, family size, digital skills, income, habitat, and employment situation are all significant for explaining the online booking of transportation or accommodation services; however, gender and age are not significant for the case of transportation. Differences between online buyers of tourism services and individuals who only look for information (bookers vs. lookers) are highlighted. Policy recommendations and business strategies are suggested, either to enhance e-Tourism or to increase the conversion rates of lookers into bookers.

Keywords

bookers, conversion rates, e-Tourism, logistic regression, lookers, micro-panel data

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Introduction

Historically, the evolution of the tourism sector has been closely linked to the development of new technologies. Initially it was the establishment of the Computer Reservation Systems in the 1970s and Global Distribution Systems in the late 1980s that dramatically transformed the practices and strategies of the industry. More recently, the development of the Internet in the late 1990s has brought about a profound change in business strategies and consumer habits.

This work focuses on the effect of new technologies on the consumer side of the tourism market. And, more specifically, it tries to explain the behavior of the consumer in relation to the adoption of the Internet as a shopping or information channel for tourism products.

The rise of the Internet has drastically changed the way citizens travel, prepare and book travel arrangements. Yet the development of new technologies has also complicated the decision of buyers since now they not only have to decide what to buy, but which shopping channel to choose (Chiang and Dholakia, 2003).

The adoption of electronic commerce has been widely studied, but most of the times without distinguishing by types of products. Here, bearing in mind that not all products are equally suitable for selling online, the goal is to contribute to a better understanding of consumer behavior in relation to a specific category as is the case of tourist-related products.

Among all the goods and services that can be purchased online, tourism services (accommodation, transportation, etc.) have always occupied the first positions. The success of the consumer adoption of e-Tourism can be explained based on the following reasons. On the one hand, holidays and leisure services are usually bought without experiencing them first, so buying them online is not so different from an offline experience in this respect. Also, the immediacy of the purchase in the sense that it is not necessary to wait for the product to arrive home (the confirmation of the hotel reservation or the airline tickets, for example, are obtained immediately with a simple click and no postal mail is needed). In addition, because the sector was one of the pioneers in online sales, it has already generated great confidence among consumers. Another factor contributing to the expansion of e-Tourism may be the wide variety of tourism services distributed through the Internet[1] compared to those available through physical travel agencies. To these specific advantages of the online purchase of tourist products, the general advantages of electronic commerce must be added: convenience schedule (24/7), access to a wider range of services, lower prices, discounts to Internet users, possibility of using price comparators, changes and cancellations are easier to manage, and possibility of using customer reviews.

We are interested in knowing the factors that affect the likelihood that a given individual decides to use the Internet either for information or as a shopping channel for tourism services. We are also interested in analyzing the signs, sizes, and significance of their effects on the likelihood. To carry out this work, data for the period (2008–2016) from the Survey on Equipment and Use of Information and Communication Technologies in Households (ICT-H Survey) of the Spanish National Statistical Institute are used. Based on the annual cross-section data of the period 2008–2016, a micro-panel database was elaborated. This is one of the strengths of this work because, as far as we know, this is the first time that panel data techniques have been used to model the behavior of individual consumers in what has to do with the adoption of information and communication technologies (ICTs).

An additional advantage of this work is the availability of disaggregated data according to the category of the tourism service (accommodation and transport) and this will allow knowing if the behavior of the consumers is the same in both cases and, and if it is not, to analyze possible reasons.

Another difference of this work with respect to the previous ones is that it does not limit itself to analyzing the characteristics of those who buy tourism services online versus those who do not, but it sheds some light on why people who use the Internet as a source of information may not buy online.

The results of the article may be useful for designing policies aimed at promoting e-Tourism, designing the advertising and marketing campaigns of online companies and, what is more innovative, for designing possible incentives to convert Internet users who only use the Internet as an information channel (lookers) into online tourism buyers (bookers).

The rest of the article is structured as follows. The second section provides a general overview of the situation of e-Tourism in Spain and its recent evolution. A brief review of literature on e-Tourism is collected in the third section. The data and their sources are presented in the fourth section where, in addition, it is detailed how, from the cross-section data of each of the years (2008–2016), a micro-panel data set of individuals has been constructed. The fifth section presents the models of consumer adoption of Internet for purchases or reservations of tourism services. The models used are classic logistic models of ICT adoption, but in this case with the peculiarity of using micro-panel data. The sixth section is devoted to developing a model that explains the characteristics of the individual seeking information online but who does not complete the process online (looker, but not booker). Finally, the conclusions and some policy recommendations are in the seventh section.

The situation of e-Tourism in Spain

Any attempt to understand the tourism market requires having deep knowledge of the part of the business that takes place online. This is true in general and, of course, also for the case of Spain where a large part of the tourist activity developed by its residents takes place through the Internet. So for example, according to a recent study by Google España (Minerva Travel, 2017), today more than 80% of travelers have purchased online at least one component of the trip and 70% of hotel bookings were made online.

Figure 1 based on data from the ICT-H Survey of the Spanish National Statistical Institute shows the levels and evolution of the penetration rates of electronic tourism during the period 2008–2017. Obviously the highest values correspond to the use of the Internet for any subject related to tourism (information search, reservation of accommodation, reservation of transport services, car rental, etc.). At the other extreme, the lowest penetration rates correspond to the booking of transport services (17.6% of the individuals in 2017), while the percentage for the case of accommodation was 21.9. The same figure shows a positive evolution in all cases and this is especially true for year 2013 onward (possibly reflecting the beginning of the economic recovery after the crisis). In Figure 1 (and also in Table 1 later), it is considered that an individual has made e-Tourism if she/he has purchased at least one service online during the year (either accommodation or transport or both). To illustrate, we can say that the average profile of online tourism users can be summarized as follows (for the year 2016): men, between 35 and 44 years old, urbanites (living in cities with more than 500,000 inhabitants), employees, belonging to a family of four members, with a medium-high level of income, and who has completed secondary school.

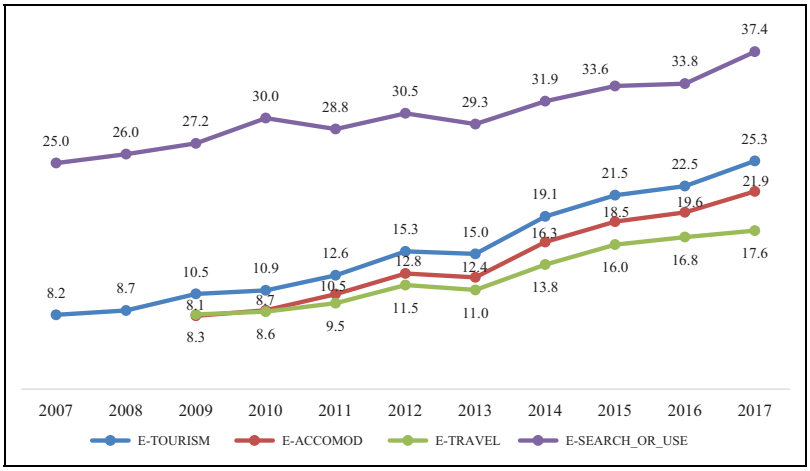

Figure 1. Evolution of e-Tourism in Spain (penetration rates as percentage of individuals). An individual is considered as adopter of a service if he/she has used that service at least once within the last 12 months.

However, even though consumer participation in e-Tourism has experienced a notable advance, there are a couple of issues that should be highlighted. One is that the levels reached are still low (there is a wide margin for improvement). The other is that participation in e-Tourism is not distributed evenly among different groups. In this sense, Table 1 allows us to see the participation rates according to different characteristics of the individuals.

The existence of disaggregated information allows us to discriminate the penetration rates according to the different types of services used. In this way, Table 1 shows the penetration rates for booking accommodation services (E-ACCOM), buying transport services (E-TRAVEL), or any of the aforementioned (E-TOURISM). Finally, the last column (E-SEARCH_OR_USE) contains the penetration rates of individuals who have accessed the Internet for any issue related to tourism (to buy, book, or simply search for information). In each of the cases, the information of the first and last available years is displayed, which allows us to observe the level and evolution of the penetration rates.

In Table 1, it is worth highlighting the existence of a multidimensional digital divide. And what is worse, those gaps are not always shrinking over time as fast as it would be desirable. This happens, for example, with the gender gap for the case of E-TOURISM. The gap[2] at the beginning of the period was 24.2% and by the year 2017 was still of 12.9% in favor of men.

Something similar happens with the age gap. The gap between age groups, although it is narrowing, is still huge. For instance, according to the values for the case of E-TOURISM in the first column of Table 1, the gap between the highest and the lowest penetration rates (groups 25–35 and over 65, respectively) was 96.6% at the beginning of the period and 87.7% in 2017 always in favor of people between 25 and 35 years.

For the table to be manageable, we defer to the annex the penetration rates by autonomous communities. But, in this sense, there are also large interregional differences. Although the penetration of e-Tourism is growing in all regions, the differences between them still remain very high at the end of the period. In 2017, the penetration rates of E-TOURISM fluctuate in a range between 38.4% in Madrid and 20.9% in the case of Andalucía.

Table 1. Penetration rates of the different services through different groups of individuals.

	E-TOURISM		E-ACCOM		E-TRAVEL		E-SEARCH_OR_USE	
	2008	2017	2009	2017	2009	2017	2008	2017
GENDER								
Female	9.1	26.3	8.0	22.7	9.3	18.7	28.7	39.9
Male	12.0	30.2	11.1	25.9	11.3	21.4	33.5	42.8
AGE								
<25	11.2	30.6	10.1	24.0	12.4	23.0	45.5	47.5
25–35	20.5	47.0	16.8	40.9	19.1	33.3	53.0	60.5
35–45	13.1	39.6	12.9	35.2	12.1	26.6	39.2	54.1
45–55	10.8	32.5	10.3	28.1	10.5	23.0	29.5	50.2
55–65	4.6	21.7	5.2	18.3	5.6	16.2	14.2	35.7
65+	0.7	5.8	0.6	4.8	0.9	4.5	2.9	11.3
EDUCATION								
Primary	0.4	2.5	0.5	1.6	1.0	1.8	3.5	6.5
Secondary	8.6	22.7	7.2	18.7	7.3	14.6	33.6	40.5
Bachelor's degree	17.0	49.1	15.4	43.8	18.0	35.1	51.9	65.0
Master or PhD	31.0	67.4	28.6	59.6	30.3	53.5	66.0	77.6
HABITAT POPULATION								
>500,000	15.0	34.2	12.8	29.3	13.8	26.7	37.2	49.3
100,000–500,000	11.4	26.6	7.0	22.9	9.8	18.0	35.2	42.1
20,000–500,000	9.7	27.7	10.0	23.5	10.9	19.9	30.6	39.8
<20,000	6.6	22.8	6.8	20.0	6.5	14.0	24.3	34.2
DIGITAL SKILLS								
Low	2.8	2.0	0.7	1.3	1.4	1.0	22.1	14.0
Medium	8.4	15.3	4.7	11.8	6.0	8.6	55.2	42.4
High	27.2	41.6	16.2	35.2	17.9	27.0	72.8	60.5
Very high	52.4	70.0	45.0	61.7	46.0	53.8	86.7	80.6
EMPLOYMENT SITUATION								
Employed	16.1	44.4	15.6	39.1	15.7	31.4	44.2	59.0
Unemployed	5.6	18.1	5.3	14.5	7.4	12.3	27.7	34.7
Retired	1.4	8.5	1.2	7.1	1.7	6.5	4.9	16.0
Student	13.7	31.6	11.0	25.5	13.0	23.7	48.3	47.5
Housekeeper	2.0	5.9	1.3	4.5	2.2	3.3	8.5	14.2
Other	5.6	13.3	8.1	10.1	12.5	10.3	18.6	28.4
HOUSEHOLD MEMBERS								
1	8.8	21.6	7.4	18.7	9.4	17.1	19.6	30.4
2	10.4	22.3	8.9	19.1	9.9	16.4	25.5	33.0
3	11.1	30.5	10.4	26.0	10.9	22.1	33.7	45.5
4	12.3	36.7	11.5	32.0	10.8	24.1	38.1	52.7
5+	7.1	23.8	6.4	19.7	8.8	17.5	28.4	36.5
INCOME								
Low	2.1	9.8	1.8	7.4	2.2	6.5	9.6	19.5
Medium	6.6	20.6	6.0	16.9	6.7	13.7	25.1	34.0
High	18.3	42.0	14.9	37.5	15.0	29.3	49.3	58.8
Very high	26.9	66.0	29.9	60.5	29.4	52.0	61.6	75.7
TOTAL	10.5	28.2	9.5	24.2	10.3	20.0	31.1	41.3

Literature review

The impact of ICTs on tourism (e-Tourism) has drastically modified the ways in which tourism services are accessed and consumed as well as business strategies in terms of preparation and marketing of their products. Then, it is not surprising that studies have proliferated to try to understand the sector from this new perspective. Currently there are a variety of literature compilations that bring together papers about the impact and application of new technologies to tourism. A landmark article in this literature on e-Tourism is the work by Buhalis and Law (2008). Recently, Navío-Marco et al. (2018) revisited this paper with hopes of observing the main changes in e-Tourism since 2008, verifying the fulfillment of the tendencies anticipated by Buhalis and Law and incorporating new contributions in this research area.

If we focus our attention on the acceptance of e-Tourism by consumers (as in the present work), it is important to highlight the review by Ukpabi and Karjaluoto (2017). In this work, the authors review a total of 71 articles (from 2005 to 2016) trying to identify the factors influencing consumers' e-Tourism acceptance and usage.

This section is intended to be a brief summary of some recent studies on acceptance and adoption of e-Tourism. First, we present the main theories, models, and frameworks on which most of these studies are based. Then, according to the different services to which they refer, the works are classified into three groups: accommodation, transportation, and travel information search.

There are several models generally accepted to explain the adoption of new technologies by the consumer and therefore applicable to the case of e-Tourism. The pioneering models within this category are the theory of reasoned action (Ajzen and Fishbein, 1980), the theory of planned behavior (Ajzen, 1991; Davis, 1993; Davis et al., 1989), and the technology acceptance model (TAM; Davis, 1993; Davis et al., 1989). The original version of the TAM investigates the impact of technology on user behavior, using two key constructs: perceived usefulness (PU) and perceived ease of use (PEOU). The PU of an individual refers to the subjective evaluation of the benefits induced by the use of information technologies. The PEOU indicates the degree to which the prospective user expects the achievement of their goal to be simple and effortless (Davis et al., 1989). Both PU and PEOU have a direct and positive impact on the use. But both constructs are also determined by the individual characteristics (age, education, digital skills, income, etc.) of the potential users.[3]

Accommodation

When it comes to accommodation, there are works that refer to the quality and design of the website and its effect on online reservations (Bai et al., 2008; Baloglu and Peckan, 2006; Kim and Kim, 2004; Law and Cheung, 2006; Law and Hsu, 2006). Some other studies investigate the impact of demographic and travel characteristics of hotel guests on online and offline reservations (Crnojevac et al., 2010; Golmohammadi et al., 2017; Pitoska, 2013; Ruiz-Gómez et al., 2018). Recently, the works analyzing the importance of online reviews and advertising in the choice of accommodation have acquired great relevance (Bronner and de Hoog, 2011; Filieri and McLeay, 2014; Muñoz-Leiva et al., 2018).

Transportation

Regarding online acquisition of transport tickets, a large part of the articles are devoted to air transport. This is not surprising, since it is the service that is hired the most (in fact, some

airlines do not offer another distribution channel). In this regard, the following papers stand out: Buhalis (2004), Crespo-Almendros and Del Barrio-García (2016), Escobar-Rodríguez and Carvajal-Trujillo (2013), Lee et al. (2018), Ruiz-Gómez et al., (2018), and Sahli and Legohérel (2016).

Travel information search

Finally, as far as travel information search is concerned, there are works dedicated to the study of the factors that cause a potential tourist to look for information on the Internet, though not purchasing online (Jun et al., 2007; Susskind et al., 2003). Other works analyze the moderating effect of gender in the intention of searching for information online (Kim et al., 2007). There are also other works studying how the characteristics of individuals determine the sources of information used (Chung and Koo, 2015; Filieri and McLeay, 2014).

Data

The data used in this work come from the ICT-H Survey of the Spanish National Statistical Institute (INE, 2018). The cross sections are available from 2007 to 2018. The Survey follows the methodological guidelines of the Statistical Office of the European Union (Eurostat). It is the only source of its kind that has data comparable not only between the EU member states, but also in other international spheres.

The ICT-H Survey is a micro-panel-based study, aimed at people aged 10 and above residing in dwellings, that collects information on home equipment in ICTs (television, telephone, radio, computer equipment) and on the use of computer, Internet, e-commerce, and a variety of other services. Through personal and telephone interviews (40% and 60%, respectively), the database provides information on a wide range of social variables, including media use, demographics, and socioeconomics at an individual and household level. This data set is appropriate for the objectives and the hypotheses of the present study, as it provides information on the usage of the Internet for tourism purposes together with many other related variables. The ICT-H survey provides the relative weight for each respondent. The data are representative at the national, provincial, and autonomous community levels.

From this annual information on dwellings, we developed a panel of individuals. To do this we had to identify the individuals that were repeated in each wave. It has been a hard and time-consuming task, but we believe that it gives us the opportunity of improving in many aspects the results obtained so far in the literature. The use of panel data offers a series of advantages over the exclusive use of cross-section data. According to Hsiao (2007) these are some of them: greater capacity for modeling the complexity of human behavior, controlling the impact of omitted variables, improving the efficiency of econometric estimates,[4] and more accurate inference.

We have a panel for the years 2007–2016. However, for our models we excluded 2007 due to the unavailability of household income data. Then, we ended up with an unbalanced panel with 51,326 individuals and 114,284 observations. The number of observations for each individual ranges from one to four. The histogram of frequencies is shown in Figure 2.

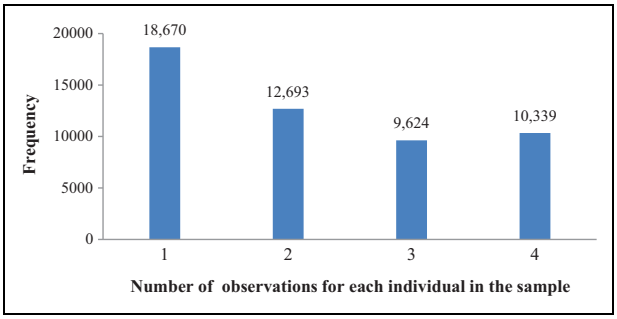

Figure 2. Description of the unbalanced panel data. Histogram of frequencies of appearance of each individual in the sample.

Models of adoption of e-commerce for tourism services

Based on the general models of adoption of new technologies mentioned in the third section (especially in the TAM models), the determinants of the online purchase of various tourist services are studied. The goal here is to model the use of the Internet by individuals for booking or purchasing tourist services. We present three models for the acquisition of holiday accommodation services, travel services, or any of the previous two.

Considering that in our case the dependent variable is a binary variable (adoption or non-adoption of the online service), we will turn our attention to the binary choice models. The probability of the occurrence of an event is modeled using the logistic function. The logistic regression allows predicting the probability of the adoption of a service with the help of a number of predictor variables: the socioeconomic characteristics of the individual. These models also show the extent to which changes in the values of the attributes may increase or decrease the predicted probability of outcome event. Models of this type have been previously used to model the utilization of other Internet services (Garín-Muñoz and Pérez-Amaral, 2011; Garín-Muñoz et al., 2019; Valarezo et al., 2018).

The dichotomous dependent variables in each of the cases are the following:

E-ACCOMM: takes the value 1 if the individual has purchased/booked online any holiday accommodation service (hotel, apartment, etc.) for private use within the last 12 months; 0 otherwise.

E-TRAVEL: takes the value 1 if the individual has purchased/booked online other services for travel (public transport tickets, car rental, etc.) for private use within the last 12 months; 0 otherwise.

E-TOURISM: takes the value 1 if the individual has used the Internet either to book or buy accommodation services or transportation services (or both) for private use within the last 12 months; 0 otherwise.

On the other hand, and based on previous empirical studies, the explanatory variables are as follows:

GENDER: 1 if male; 0 if female.

AGE: six age groups (16–24, 25–34, 35–44, 45–54, 55–64, 65 or more).

EDUCATION: four education groups measured by years of study of the respondent.

HH_MEMBERS: five categories according to the number of members of the household (1, 2, 3, 4, 5 or more).
DIG_SKILLS: four levels of digital skills. Self-elaborated index by using a self-assessment approach, where the respondent indicates whether he/she has carried out specific tasks related to computer and/or Internet use, without these skills being assessed, tested, or actually observed. The different tasks are weighted according to their degree of difficulty. Then, the respondents are grouped into four levels: low, medium, high, and very high.
EMPLOYM_SIT: six categories (employed, unemployed, retired, student, housekeeper, others).
HABITAT: four categories according to the number of residents of the municipality (<20,000, 20,000–100,000, 100,000–500,000, >500,000).
INCOME: four groups measured by monthly net income of households (in euros).
YEAR: Temporal dummies are included to control the effect of time.
CCAA: Regional dummies are included to control the effect of the Autonomous Community of residence of the individual.

The probability for the occurrence of an event is modeled using the random effects logistic regression. The logistic regression allows predicting the probability of the adoption of a service with the use of a number of predictor variables: the socioeconomic characteristics of the individual. Logistic models for adoption of ICTs have been used before but, as far as we know, have never been used in a large micro-panel data set.

In these kinds of models, the dependent variables are dichotomous whereas the independent variables can be either continuous or categorical. For the purpose of the present analysis, the characteristics of the respondents were converted into binary values, indicating the membership of an individual to one of the categorical values.

Table 2 shows the binomial regression results on factors predicting online booking of holiday accommodation (model 1), travel services (model 2), and e-Tourism accommodation and/or travel services (model 3) for the case of Spain.

All the three models were statistically significant and able to distinguish between respondents who used each one of the services and respondents who did not. The results of the three models are presented with odds ratios. The odds ratio reflects the examined category's relation to the reference category, which here is the variable's first category. Values greater than 1 mean a greater probability compared to the reference group and values less than 1 a smaller probability to use the corresponding service.

Results

Under the assumption that other conditions remain constant, below are listed the effects of each of the individual characteristics on the probability of engaging e-Tourism. The main results can be summarized as follows:

Age:

- Individuals aged 25–34 are most likely to perform this type of online shopping.
- Individuals older than 65 have a lower propensity to buy/book these products online and behave in a way that is not significantly different from those in the reference group (16–24).
- The online acquisition of travel services is manifested more independently of the age group to which the individual belongs than the booking and purchase of holiday accommodation.

Table 2. Random effects estimates of logistic regressions for online buying or booking of tourism services.

	Model 1, accommodation		Model 2, travel		Model 3, e-Tourism	
	Odds Ratio	z	Odds Ratio	z	Odds Ratio	z
GENDER (Female)						
Male	1.20	4.27	1.08	1.74	1.11	2.58
AGE (16–24)						
25–34	1.91	6.13	1.41	3.19	1.87	6.64
35–44	1.71	5.13	1.20	1.72	1.61	5.03
45–54	1.50	3.69	1.23	1.89	1.43	3.62
55–64	1.21	1.56	1.25	1.80	1.27	2.15
>65	0.84	−0.99	0.99	−0.02	0.88	−0.82
EDUCATION (Primary studies)						
Secondary studies	1.62	3.97	1.70	4.38	1.55	4.23
Bachelor's degree	2.24	6.37	2.52	7.29	2.21	7.20
Master or PhD	3.08	8.93	3.83	10.62	3.24	10.72
HOUSEHOLD MEMBERS (One person)						
Two	0.89	−1.78	0.73	−4.93	0.81	−3.39
Three	0.63	−6.89	0.48	−10.75	0.55	−9.31
Four	0.58	−7.65	0.42	−12.07	0.53	−9.54
Five or more	0.42	−7.87	0.42	−8.15	0.42	−8.69
DIGITAL SKILLS (Medium)						
Low	0.11	−17.13	0.14	−15.81	0.13	−20.65
High	4.73	27.38	4.30	24.50	5.01	31.70
Very high	18.12	46.42	16.23	43.39	20.75	52.63
EMPLOYMENT SITUATION (Employed)						
Unemployed	0.63	−7.29	0.73	−4.96	0.68	−6.57
Retired	0.85	−1.47	0.94	−0.51	0.95	−0.50
Student	0.69	−3.21	0.85	−1.38	0.74	−2.91
Housekeeper	0.72	−2.68	0.78	−2.04	0.72	−2.95
Other	0.75	−2.04	0.76	−1.94	0.74	−2.35
HABITAT (<20,000 inhabitants)						
20,000–100,000	1.01	0.18	1.11	1.80	1.08	1.36
100,000–500,000	0.91	−1.03	0.97	−0.38	0.95	−0.64
>500,000	1.13	2.48	1.33	5.51	1.22	4.24
INCOME (low)						
Medium	1.86	8.59	1.30	3.66	1.57	7.07
Medium-high	3.24	15.42	1.95	8.93	2.66	14.39
High	5.41	19.47	3.25	13.80	4.26	18.53
YEAR						
2009	—	—	—	—	1.16	2.18
2010	1.12	1.57	1.01	0.09	1.18	2.28
2011	1.36	4.19	1.03	0.36	1.35	3.97
2012	1.24	2.90	0.97	−0.37	1.21	2.47
2013	1.53	5.50	1.21	2.51	1.63	6.41
2014	1.98	9.33	1.31	3.66	1.95	9.08
2015	3.42	17.03	2.15	10.55	3.33	16.48
2016	3.24	16.54	2.10	10.49	3.15	16.02

(continued)

Table 2. (continued)

	Model 1, accommodation		Model 2, travel		Model 3, e-Tourism	
	Odds Ratio	z	Odds Ratio	z	Odds Ratio	z
CCAA (Andalucía)						
Aragón	1.36	2.75	1.27	2.06	1.32	2.63
Asturias	1.45	3.47	1.34	2.75	1.40	3.41
Baleares	1.55	3.64	4.30	12.63	2.95	9.69
Canarias	1.02	0.13	1.87	5.22	1.40	2.95
Cantabria	1.87	5.29	1.74	4.70	1.89	5.88
Castilla-La Mancha	1.21	1.62	0.94	−0.44	1.18	1.56
Castilla y León	1.04	0.39	0.96	−0.34	1.04	0.34
Cataluña	1.60	4.10	1.68	5.60	1.54	4.99
Extremadura	1.23	1.68	0.48	−5.36	0.99	−0.05
Galicia	1.25	2.03	1.18	1.51	1.24	2.16
La Rioja	1.43	2.89	1.22	1.61	1.51	3.54
Madrid	1.87	6.90	1.89	6.92	1.98	7.99
Navarra	1.92	6.58	1.62	4.82	1.81	6.43
País Vasco	2.14	7.25	1.50	3.77	2.05	7.14
Murcia	1.08	0.65	0.77	−2.05	0.95	−0.41
Comunidad Valenciana	1.33	2.98	1.12	1.18	1.27	2.62
Ceuta	0.95	−0.18	0.59	−1.71	0.88	−0.52
Melilla	1.11	0.37	2.52	3.54	1.66	1.99
CONSTANT	0.0004	−34.02	0.001	−30.62	0.0009	−35.48
N observations	42,787		42,787		48,170	
N groups	23,442		23,442		25,990	
Joint significance	Wald $\chi 2$ (52) = 4407.87		Wald $\chi 2$ (52) = 4009.43		Wald $\chi 2$ (53) = 5255.69	

Note: An individual is considered as an accommodation or a travel adopter if he has carried out an online purchase of those services within the last 12 months. To be considered as an overall adopter, the individual must have used Internet either for accommodation or travel reasons or both. The population consists of all individuals who have used the Internet at least once in the last 12 months. Heteroskedasticity consistent covariance matrix. Reference category for each variable in parenthesis. The z statistic measures the individual significance of each parameter. It behaves as asymptotically normal (0, 1) under the null of equality to zero.

Education:

- As would be expected, education significantly affects all three models positively.

Household members:

- Individuals belonging to single-person households are the most likely to hire online tourism services.
- As the number of family members increases, the probability decreases significantly. This is true for the three models.

Digital skills:

- The digital competences of the individual turn out to be positive, monotonically increasing and highly significant when determining the likelihood of being engaged in e-Tourism in any of its modalities (transport, accommodation, or both).

Employment situation:

- The employment situation of the individual also has a high predictive power on the probability of acceptance of e-Tourism.
- People with employee status have the highest probability of practicing this type of tourism booking.
- However, it is worth noting that pensioners do not behave very differently from employees. Here it is important to remember that we are assuming that the rest of the factors remain constant (gender, age, digital skills, income, etc.)

Habitat:

- Citizens living in cities with more than 500,000 inhabitants behave differently from the rest (more likely to book any tourist service online).
- However, the behavior of individuals from small cities (100,000–500,000 inhabitants) is not significantly different from individuals living in municipalities of less than 20,000 inhabitants.

Income:

- As expected, the level of household income affects positively the probability of acquiring tourist services online.
- We observe in the estimates that the effects increase monotonically with income and are statistically highly significant.
- This is true both for booking transport services and holiday accommodation.
- However, greater effects are observed in the case of accommodation.

Time dummies have also been included and an increasing trend is observed in all cases (especially since 2013). This could be revealing, among other things, an increase in the supply of these services online as well as improved overall economic conditions.

The inclusion of *regional dummies* also reveals important and significant differences between autonomous communities. In summary, one can say that Madrid has one of the highest values in the three models.

Model of use of the Internet for travel planning information search

Tourism is a very information-intensive activity. Information is needed for choosing a destination and for selecting accommodation, transportation, sightseeing tours, and so on. Nowadays, in the process of searching for travel information, the Internet already plays a key role. However, it is well known that many people seeking information on the Internet do not buy online.[5] Increasing the conversion rate of lookers into bookers is a fundamental goal for entrepreneurs in the sector.

In this section, we will focus on differences in model structure between individuals using the Internet exclusively for travel information searching (lookers) and online booking travelers (bookers). The results obtained will allow us to see what factors may be acting as barriers to using the Internet as a shopping channel for tourism.

Our data set provides us with information on the use of the Internet for anything related to tourism and for purchasing and reserving tourist services. By taking the difference, we built the variable referring to the use of the Internet just for information search. So we developed a model for explaining the determinants of the behavior of individuals who only use the Internet to look for information, but not to buy or make reservations (model 4).

Table 3. Random effects estimates of logistic regressions for online booking (bookers) or searching information (lookers) of tourism services.

	Model 3, bookers		Model 4, lookers	
	Odds ratio	z	Odds ratio	z
GENDER (Female)				
Male	1.11	2.58	0.80	−6.55
AGE (16–24)				
25–34	1.87	6.64	1.15	1.69
35–44	1.61	5.03	1.04	0.51
45–54	1.43	3.62	1.03	0.41
55–64	1.27	2.15	1.01	0.06
>65	0.88	−0.82	0.83	−1.51
EDUCATION (Primary studies)				
Secondary studies	1.55	4.23	1.45	6.05
Bachelor's degree	2.21	7.20	1.55	6.07
Master or PhD	3.24	10.72	1.60	6.41
HOUSEHOLD MEMBERS (One person)				
Two	0.81	−3.39	1.06	1.07
Three	0.55	−9.31	0.81	−3.81
Four	0.53	−9.54	0.82	−3.33
Five or more	0.42	−8.69	0.67	−4.68
DIGITAL SKILLS (Medium)				
Low	0.13	−20.65	0.23	−31.75
High	5.01	31.70	1.87	15.84
Very high	20.75	52.63	3.26	22.86
EMPLOYMENT SITUATION (Employed)				
Unemployed	0.68	−6.57	0.73	−6.61
Retired	0.95	−0.50	1.18	2.03
Student	0.74	−2.91	0.49	−7.54
Housekeeper	0.72	−2.95	0.95	−0.70
Other	0.74	−2.35	0.80	−2.10
HABITAT (<20,000 inhabitants)				
20,000–100,000	1.08	1.36	1.06	1.30
100,000–500,000	0.95	−0.64	1.09	1.21
>500,000	1.22	4.24	1.10	2.30
INCOME (Low)				
Medium	1.57	7.07	1.45	7.97
Medium-high	2.66	14.39	1.94	12.60
High	4.26	18.53	2.41	13.00
YEAR				
2009	1.16	2.18	0.82	−3.35
2010	1.18	2.28	1.01	0.24
2011	1.35	3.97	0.64	−6.97
2012	1.21	2.47	0.43	−12.56
2013	1.63	6.41	0.47	−11.30
2014	1.95	9.08	0.41	−13.66
2015	3.33	16.48	0.47	−11.61
2016	3.15	16.02	0.40	−14.54

(continued)

Table 3. (continued)

	Model 3, bookers		Model 4, lookers	
	Odds ratio	z	Odds ratio	z
CCAA (Andalucía)				
Aragón	1.32	2.63	1.02	0.19
Asturias	1.40	3.41	0.94	−0.71
Baleares	2.95	9.69	1.23	2.00
Canarias	1.40	2.95	1.38	3.49
Cantabria	1.89	5.88	1.18	1.74
Castilla-La Mancha	1.18	1.56	1.13	1.36
Castilla y León	1.04	0.34	1.05	0.54
Cataluña	1.54	4.99	1.11	1.41
Extremadura	0.99	−0.05	0.87	−1.47
Galicia	1.24	2.16	0.82	−2.17
La Rioja	1.51	3.54	1.12	1.08
Madrid	1.98	7.99	1.16	1.85
Navarra	1.81	6.43	1.21	2.38
País Vasco	2.05	7.14	1.03	0.37
Murcia	0.95	−0.41	1.10	1.00
Comunidad Valenciana	1.27	2.62	1.13	1.60
Ceuta	0.88	−0.52	1.22	0.90
Melilla	1.66	1.99	1.28	0.98
CONSTANT	0.0009	−35.48	0.1491	−15.14
N observations	48,170		34,287	
N groups	25,990		20,846	
Joint significance	Wald $\chi 2$ (53) = 5255.69		Wald $\chi 2$ (53) = 3048.31	

Note: The category in parenthesis is the base category.

Model 4 uses the same explanatory variables and estimation techniques (random effects logistic regression) as models 1, 2, and 3 presented before (Table 2). The comparison of models 3 and 4 is shown in Table 3.

Model 4 is statistically significant (Wald χ^2 (53) = 3048.31) with the expected relations between odds ratios and mostly individually significant. The comparison of models 3 and 4 can give clues on how to improve the conversion rates (looking to booking). In Table 3, model 4 shows the binomial regression results on factors predicting the probability of using the Internet just for searching travel information (probability of being a looker). In the same table, model 3 (probability of being a booker) is also presented for comparison. The following are some of the conclusions drawn from the results of both models:

Gender affects significantly in both cases, although the sign of the effect is the opposite. All other conditions being equal, men are more inclined to buy or book tourist services online than women. However, women are more likely to use the Internet for any use related to tourism. This is a clear case where segmentation by gender can be very helpful. By segmenting potential customers into two instantly identifiable groups and adjusting

messaging, the better the odds to close a sale. In person, salespeople sell differently to men and women and this also has to be done online. However, when it comes to online sales, visual recognition does not work and to distinguish by sex, other procedures must be used (e.g. the use of an application to match first names to gender or directly asking the potential customer when registering). Since women are more likely to use the Internet to find information for travel planning, marketers must take this into account when designing the website and its functionality. By creating gender-sensitive online communications strategies, marketers can increase conversion rates (from lookers into bookers).

Age is a relevant factor to explain the probability of being a booker; however, it is not a significant variable to explain the probability of searching for travel information online. So any initiative to increase the conversion rate should be directed equally to all individuals regardless of the age group to which they belong.

Education, *digital skills*, and *income* significantly affect both models positively. However, the effects are greater when it comes to buying rather than searching for information.

The *employment situation* of the individual affects both decisions in a similar way. It is striking, however, that pensioners have similar behavior to those employed when deciding whether to buy online tourism services. However, when deciding to use the Internet for information purposes they have a propensity that is significantly higher.

Conclusions and policy recommendations

This article analyses the use of the Internet for tourism purposes by consumers in Spain. The rates of electronic tourism penetration and their recent evolution are shown first. In view of those rates, one can conclude that there is a multidimensional digital gap between different groups of individuals that, in addition, is not closing over time. To see the possible ways to act in order to increase participation and reduce the digital divide, we elaborated several models where the adoption of the Internet is explained through individual sociodemographic characteristics. The empirical framework is based on the TAM models and we use a self-constructed micro-panel data set (for the years 2008–2016) derived from Spain's official annual surveys on ICT usage in households and by individuals. This data set is an important contribution of our work. It allows us to use panel data techniques in our estimates, which represents a novelty in this type of work. Panel data techniques have several advantages over the exclusive use of cross-section data techniques.

The models that explain the individual's adoption of the Internet as a shopping channel are estimated by using random effects logistic techniques. The results reveal that the three models (accommodation, transportation, and e-Tourism) are statistically significant and able to characterize those who adopt the Internet as a channel of purchase and those who do not. On the other hand, the variables education, digital skills, income, and habitat of the population have positive and significant effects on the use of the Internet as a shopping channel. Individuals living in single-person households and employees have a greater propensity to demand the considered tourism services online. Gender and age are not significant for the case of booking transportation services, although for accommodation and for the general model, being a man and being young positively affect the likelihood of buying online. Possible reasons for this to happen may be that transportation is a necessary service and that its demand is unrelated with the age or gender of the potential customer.

The last part of the work highlights the differences between individuals who purchase tourism services through the Internet and those who only search for information through that channel (bookers vs. lookers). One of the main differences is the effect of gender in each case. Although the gender is significant in both cases, all other conditions being equal, men are more inclined to buy or book tourist services online than women. However, women are more prone to use the Internet for tourism information. This is a clear case where segmentation by gender can be very helpful.

Based on the results of this work, a number of policy recommendations can be inferred. Even though, from a public policy perspective, it is not clear why e-Tourism should be promoted, nevertheless bridging the digital divide between the different population groups should be an objective in order not to leave part of the population behind in the adoption of the digital society. In this sense, and specifically referring to the gender gap, entrepreneurs in the sector should try to capture those women who search for information on the Internet and get them to complete their online shopping process. By creating gender-sensitive online communications strategies, marketers can increase conversion rates (from lookers into bookers).

Moreover, e-Tourism is a typical gateway for the information society, thus it may be appropriate to promote education on Internet-related topics, especially for disadvantaged groups such as rural, women, older, and low-income citizens. This is also the case in some geographical areas such as Murcia, Ceuta, Castilla y León, Extremadura, and Andalucía as can be seen in Table 2.

These policy recommendations could be confirmed and refined if a more specific survey were available, with data on expenditure and frequency of use by individuals. Actual observed data (instead of declared data) would also be useful. A series of possible additions and improvements to the questionnaire will be transmitted as suggestions to the National Institute of Statistics to explore the possibility of taking them into account for future questionnaires.

As successive data become available over time it will be useful to introduce dynamics in our models. This would allow knowing, for example, whether the use of the Internet for tourism purposes during a given year depends on whether it was previously used and, if so, what the level of satisfaction of the consumer last year was and if that level significantly influences the probability of doing e-Tourism this year.

Even so, the current research has been able to deal with many interesting issues raised in Spain in this area. This study could be replicated for other European countries.

Annex

Table 4 presents the penetration rates of online tourism services according to the region of residence of the individual (at the beginning and at the end of the period).

The results show the existence of a clear digital divide also between regions. It is worth highlighting the case of Madrid, which is always in the top positions of the ranking for all services. It is also interesting to highlight the case of Baleares (the Balearic Islands) which, possibly due to its insularity, turns out that its inhabitants are very inclined to use the Internet as a channel for buying tourism. At the other extreme we have the Andalucía and Extremadura cases where these types of services still have a very limited use.

Table 4 also reflects that the gap between regions is still large. This should be kept in mind by policy makers in order to try to ensure that none of the territories are left behind in terms of building a digital society, as this could lead to the social exclusion of its residents.

Table 4. Penetration rates of the different services according to region of residence of individuals.

	E-TOURISM		E-ACCOM		E-TRAVEL		E-SEARCH_OR_USE	
	2008	2017	2009	2017	2009	2017	2008	2017
Autonomous regions								
Andalucía	6.9	20.9	5.7	17.5	7.1	14.4	25.6	34.6
Aragón	8.7	32.0	9.1	27.3	8.6	20.8	30.8	46.0
Asturias	10.5	26.7	10.3	23.8	9.8	17.8	29.0	38.6
Baleares	17.2	38.0	11.4	26.9	19.3	33.3	36.9	47.4
Canarias	7.1	25.7	4.3	18.9	8.0	20.8	29.7	42.2
Cantabria	10.5	30.3	11.4	27.9	11.1	22.0	34.0	43.7
Castilla y León	7.4	23.4	8.8	20.0	7.3	16.3	26.1	36.9
Castilla-La Mancha	6.4	24.5	7.1	21.7	6.2	13.7	26.2	37.3
Cataluña	13.7	32.2	13.1	28.9	13.8	24.2	36.7	42.5
Comunidad Valenciana	9.3	26.6	9.5	22.7	8.5	18.3	28.7	44.2
Extremadura	5.8	22.5	5.1	21.2	3.8	11.0	21.5	32.9
Galicia	8.7	22.8	6.1	18.1	9.2	14.9	23.8	32.0
Madrid	17.0	38.4	14.6	33.8	15.7	29.7	41.0	51.7
Murcia	6.2	21.4	6.0	18.8	5.1	12.6	24.2	35.2
Navarra	10.4	36.2	13.7	31.5	12.4	26.2	32.4	50.2
País Vasco	13.7	31.9	12.0	29.2	11.5	20.2	36.4	46.4
La Rioja	9.6	27.4	7.3	23.1	8.7	17.6	31.0	38.8
Ceuta	6.8	24.6	4.8	21.0	6.0	16.3	26.9	36.0
Melilla	9.7	28.1	14.5	16.3	14.4	26.1	31.1	54.0
Total	10.5	28.2	9.5	24.2	10.3	20.0	31.1	41.3

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Notes

1. In fact, for example, the low-cost airlines have made the Internet their only channel of distribution.

2. The gender gap has been calculated by the difference between the penetration rates for males and females relative to the penetration rate for males. Gender gap in 2008 = (12 − 9.1)/12 = 24.2%. Gender gap in 2016 = (30.2 − 26.3)/30.2 = 12.9%.
3. Thus, for example, an individual with a high level of digital qualification will have a perception of elevated ease of use as well.
4. Panel data usually contain more degrees of freedom and more sample variability than cross-sectional data which may be viewed as a panel with $T = 1$, hence improving the efficiency of econometric estimates (e.g. Hsiao et al., 1995).
5. According to our data, the conversion rate from being a "looker" to being a "booker" was 32% in Spain (2017).

References

Ajzen I (1991) The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50(2): 79–211.

Ajzen I and Fishbein M (1980) *Understanding Attitude and Predicting Social Behavior*. Upper Saddle River: Prentice-Hall.

Bai B, Law R and Wen I (2008) The impact of website quality on customer satisfaction and purchase intentions: evidence from Chinese online visitors. *International Journal of Hospitality Management* 27(3): 391–402.

Baloglu S and Peckan YA (2006) The website design and Internet site marketing practices of upscale and luxury hotels in Turkey. *Tourism Management* 27: 171–176.

Bronner F and de Hoog R (2011) Vacationers and eWOM: who posts, and why, where, and what? *Journal of Travel Research* 50(1): 15–26.

Buhalis D (2004) eAirlines: strategic and tactical use of ICTS in the airline industry. *Information & Management* 41(7): 805–825.

Buhalis D and Law R (2008) Progress in information technology and tourism management: 20 years on and 10 years after the Internet—the state of eTourism research. *Tourism Management* 29(4): 609–623.

Chiang K and Dholakia RR (2003) Factors driving consumer intention to shop online: an empirical investigation. *Journal of Consumer Psychology* 13(1): 177–183.

Chung N and Koo C (2015) The use of social media in travel information search. *Telematics and Informatics* 32(2): 215–229.

Crespo-Almendros E and Del Barrio-García S (2016). Online airline ticket purchasing: influence of online sales promotion type and Internet experience. *Journal of Air Transport Management* 53: 23–34.

Crnojevac IH, Gugić J and Karlovčan S (2010) eTourism: a comparison of online and offline bookings and the importance of hotel attributes. *Journal of Information & Organizational Sciences* 34(1): 41–54.

Davis FD (1993) User acceptance of information technology: system characteristics, user perceptions, and behavioral impacts. *International Journal of Man-Machine Studies* 38(3): 475–487.

Davis FD, Bagozzi RP and Warshaw PR (1989) User acceptance of computer technology: a comparison of two theoretical models. *Management Sciences* 35(8): 982–1003.

Escobar-Rodríguez T and Carvajal-Trujillo E (2013) Online drivers of consumer purchase of website airline tickets. *Journal of Air Transport Management* 32: 58–64.

Filieri R and McLeay F (2014) E-WOM and accommodation: an analysis of the factors that influence travelers' adoption of information from online reviews. *Journal of Travel Research* 53(1): 44–57.

Garín-Muñoz T and Pérez-Amaral T (2011) Internet usage for travel and tourism: the case of Spain. *Tourism Economics* 17(5): 1071–1085.

Garín-Muñoz T, Pérez-Amaral T, Valarezo A, et al. (2019) Models for individual adoption of eCommerce, eBanking and eGovernment in Spain. *Telecommunications Policy* 43(1): 100–111.

Golmohammadi AR, Jahandideh AR and O'Gorman KD (2017) Booking on-line or not: a decision rule approach. *Tourism Management Perspectives* 2–3(2012): 85–88.

Hsiao C (2007) Panel data analysis: advantages and challenges. *Test* 16(1): 1–22.

Hsiao C, Mountain DC and Ho-Illman K (1995) Bayesian integration of end-use metering and conditional demand analysis. *Journal of Business and Economic Statistics* 13: 315–326.

INE (2018) Survey on Equipment and Use of Information and Communication Technologies in Households. *Micro data*. Available at: http://www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736176741&menu=resultados&secc=1254736194629&idp=1254735576692 (accessed 20 May 2019).

Jun SH, Vogt C and MacKay KJ (2007) Relationships between travel information search and travel product purchase in pretrip contexts. *Journal of Travel Research* 45: 266–274.

Kim GW and Kim DJ (2004) Factors affecting online hotel reservation intention between online and non-online customers. *Hospitality Management* 23: 381–395.

Kim DY, Lehto XY and Morrison AM (2007) Gender differences in online travel information search: implications for marketing communications on the Internet. *Tourism Management* 28: 423–433.

Law R and Cheung C (2006) A study of perceived importance of the overall website quality of different classes of hotels. *International Journal of Hospitality Management* 25(3): 525–531.

Law R and Hsu CHC (2006) Importance of hotel website dimensions and attributes: perceptions of online browsers and online purchasers. *Journal of Hospitality & Tourism Research* 30(3): 295–312.

Lee KF, Haque A and Maulan S (2018) Understanding the effect of consumer perceptions on buying intention for air tickets online in Malaysia. *International Journal of Academic Research in Business and Social Sciences* 8(2): 423–439.

Minerva Travel (2017) Google España. Available at: https://www.thinkwithgoogle.com/_qs/documents/4749/infografia_minerva_travel_v2.pdf (accessed 20 May 2019).

Muñoz-Leiva F, Liébana-Cabanillas F and Hernández-Méndez J (2018) E-tourism advertising effectiveness: banner type and engagement as moderators. *Journal of Services Marketing* 32(4): 462–475.

Navío-Marco J, Ruiz-Gómez LM and Sevilla-Sevilla C (2018) Progress in information technology and tourism management: 30 years on and 20 years after the Internet—revisiting Buhalis & Law's landmark study about eTourism. *Tourism Management* 69: 460–470.

Pitoska E (2013) E-tourism: the use of internet and information and communication technologies in tourism: the case of hotel units in peripheral areas. *Tourism in Southern and Eastern Europe* 335–344. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2289872 (accessed 20 May 20191).

Ruiz-Gómez LM, Navío-Marco J and Rodríguez-Hevia LF (2018) Dynamics of digital tourism's consumers in the EU. *Information Technology & Tourism* 20(1–4): 59–81.

Sahli AB and Legohérel P (2016) The tourism web acceptance model: a study of intention to book tourism products online. *Journal of Vacation Marketing* 22(2): 179–194.

Susskind AM, Bonn MA and Dev CS (2003) To look or book: an examination of consumers' apprehensiveness toward internet use. *Journal of Travel Research* 41(3): 256–264.

Ukpabi DC and Karjaluoto H (2017) Consumers' acceptance of information and communications technology in tourism: a review. *Telematics and Informatics* 34(5): 618–644.

Valarezo A, Pérez-Amaral T, Garín-Muñoz T, et al. (2018). Drivers and barriers to cross-border e-commerce: evidence from Spanish individual behavior. *Telecommunications Policy* 42(6): 464–473.

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