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Digital Destinations in the Tourist Sector: A Path Model for the Impact of e-Services on Tourist Expenditures in Amsterdam

Bart Neuts[1]
João Romão[2]
Peter Nijkamp[2]
Eveline van Leeuwen[2]

[1] *KU Leuven, Belgium;*
[2] *Faculty of Economics and Business Administration, VU University Amsterdam, and Tinbergen Institute, The Netherlands.*

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The Netherlands
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Duisenberg school of finance
Gustav Mahlerplein 117
1082 MS Amsterdam
The Netherlands
Tel.: +31(0)20 525 8579

Digital destinations in the tourist sector: a path model for the impact of e-services on tourist expenditures in Amsterdam

Bart Neuts

Dept. of Earth and Environmental Sciences, KU Leuven, Celestijnenlaan 200E, 3001 Heverlee, Belgium

e-mail: bart.neuts@ees.kuleuven.be

telephone: +32 16322447

fax: + 32 16328150

João Romão

Dept. of Spatial Economics, VU University Amsterdam, De Boelelaan 1105, 1081 HV Amsterdam, the Netherlands

e-mail: j.romao@vu.nl

Peter Nijkamp

Dept. of Spatial Economics, VU University Amsterdam, De Boelelaan 1105, 1081 HV Amsterdam, the Netherlands, and Tinbergen Institute.

e-mail: p.nijkamp@vu.nl

Eveline van Leeuwen

Dept. of Spatial Economics, VU University Amsterdam, De Boelelaan 1105, 1081 HV Amsterdam, the Netherlands

e-mail: e.s.van.leeuwen@vu.nl

Abstract Innovations in information and communication technologies (ICT) in recent decades have had profound implications for tourism services, promotion, or distribution. We apply a Structural Equations Model (SEM) to analyse the relationships between the characteristics of tourists visiting Amsterdam, the importance they attach to different kinds of information contents available on the Internet, and the actual performance of the city as a tourism destination, measured by the expenditures and the duration of stay of the visitors. Findings indicate that the choice of e-services depends on the travel motive, age, education, income, gender, nationality, and length of stay. Furthermore, use of e-forums and virtual tours was found to significantly affect local expenditure.

Keywords *ICT · Internet · mediatisation · destination · tourism performance*

JEL Classification *C51 · M31 · L83*

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1 Introduction

In recent decades, tourism has become one of the largest global industries. According to UNWTO (2010), international tourist arrivals reached 935 million in 2010 (25 million in 1950). Tourism came fourth in the ranking of export categories (after fuels, chemicals, and automotive products), while tourism exports accounted for 30% of the world's exports of commercial services (UNWTO 2009). This extremely fast growth of tourism activities implies strong competition among different holiday destinations which offer a wide range of products and services, according to their natural, cultural, economic or political conditions. This global competitive environment calls for dedicated efforts in destination management and promotion, in order to create an attractive portfolio of tourism products and services at the local level.

Clearly, the process of democratization and mass tourism that has been observed since the middle of the 20th century has led to the creation of multiple segments for tourism demand, according to characteristics (e.g. nationality, cultural background, social status, or education), and motivations (see also Matias et al. 2011). This double process – differentiation of destinations and segmentation of tourists – raises the issue of matching the characteristics of destinations with the motivations and personal characteristics of tourists. This matching problem highlights the importance of the proper management and implementation of promotional strategies that contribute to the creation of suitable and tailor-made products and services at the local level, in order to satisfy the needs and motivations of specific groups distributed over a global market.

The unprecedented development of information and communication technologies (ICT) in the last few decades has exerted a profound impact on tourism activities. The development of the Internet, multimedia production, and other ICT applications have created new opportunities for marketing and distribution strategies, as well as new sources of competitive advantage (Singer et al. 2010). The increasing complexity of the contemporary information systems has changed the prevailing market structures, and has created new opportunities for small companies to reach global markets at relatively low costs (Karanasios and Burgess 2008). In this context, Buhalis and Law (2008) systematized various ICT characteristics that are particularly relevant for tourism activities, namely:

interoperability, multimedia, wireless technologies and web design. Those technologies have led to an increased bargaining power of consumers thanks to the existence of direct communication channels with suppliers, an improved flexibility in customer-supplier relations, and an abundance of available information. Similarly, Aldebert et al. (2011) stress the importance of: infography and design (since 2003), new and more interactive software solutions (since 2005), mass use of the Internet (since 2005) and mobile phones (since 2006), and Web 2.0 (since 2008). Sigala et al. (2011) refer to the potential of social networks (Web 2.0) to personalize the processes of communication, and to enhance the possibilities to develop Customer Relationship Management strategies. The tourist can collect information from multiple sources before the visit and produce his/her own information during and after the visit (Mansson 2011). This process of convergence implies an interdependence between different media supports and multiple ways of accessing media content (Jenkins 2006). Furthermore, considering the close link between tourism activities and territories (tourism supply depends on the specific characteristics of each place, while tourism services are necessarily produced and consumed in the same place), developments in Geographical Information Systems (GIS) have created new opportunities for tourism marketing and promotion (Chang and Caneday 2011).

These new tendencies in the processes of production and acquisition of information about tourist destinations have been the subject of various recent studies. These have shown, for example, that the general use of social networks tends to significantly reduce the role of the informative websites managed by Destination Management Organizations (Parra-Lopez et al. 2011). Other studies have focused on personal travel blogs (Lin & Huang 2006), or photography websites (Lo et al. 2011), showing the diversity of independent and complex information available for the tourists when choosing a destination.

There is clearly a need for solid, evidence-based research. Considering the variety of possibilities available on the Internet to collect information about a tourist destination, the purpose of the present study is to analyse the relationships between the characteristics of the tourists visiting a major tourism destination (i.e. Amsterdam), the importance of the different e-services used by them before the trip, and the actual performance of the city as a place for tourism (measured by the total expenditures made by the tourists in the city and by the duration of their

visit). These various relations are described comprehensively in Figure 1 and can be clarified as follows: (1) there is a relationship between the characteristics of tourists and the e-services used; (2) the use of e-services influences the tourist expenditures in the destination city; (3) the length of stay has an effect on the e-services used; (4) the personal characteristics have a direct influence on expenditure; (5) the personal characteristics are associated with the length of stay; (6) the length of stay influences expenditure.

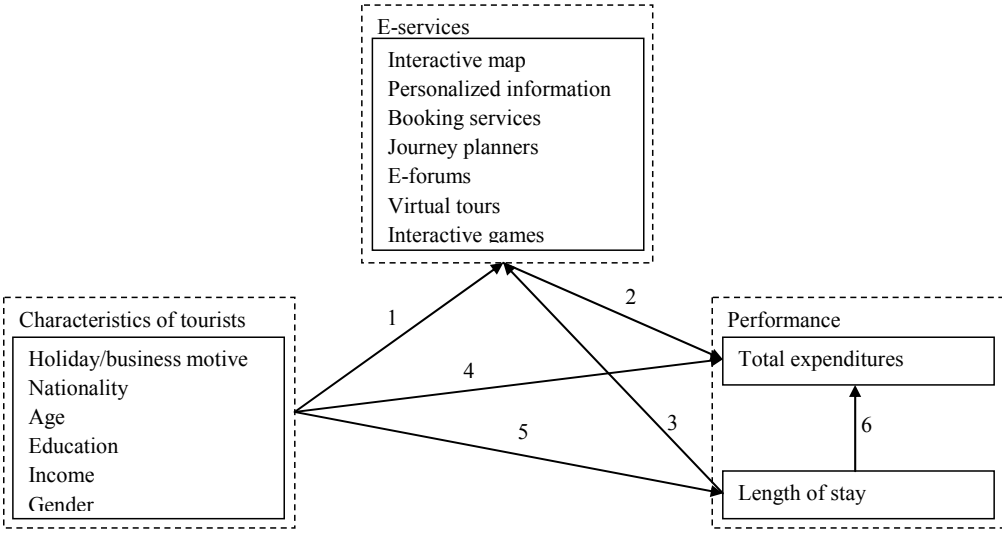

Figure 1 Conceptual path model

2 Methodology

A sample of 645 visitors was collected for the study. The participants were national and international tourists in the city of Amsterdam, the Netherlands. The data was mainly collected within the Sixth Framework Programme of the European Union (FP6 EU) project, "Integrated e-Services for Advanced Access to Heritage in Cultural Tourist Destinations" (ISAAC), with the aim to evaluate the advantages, reasons for failure, and barriers related to the introduction of integrated e-services in tourist places. Visitor surveys were carried out by trained interview teams from the University of Nottingham between August and November 2007. The questionnaires used both online and face-to-face interview modes (stand-alone computer versions or paper versions), with an eventual

response rate of 31% online responses, 24% stand-alone lap-top surveys, and 45% completions on paper (see also ISAAC D1.4, 2007).

The information collected in the survey that is of primary importance for this study comprises: personal characteristics, the appreciation of different e-services, and the expenditures made with respect to the visit. Table 1 provides an overview of the personal variables concerned and their frequencies. These personal characteristics were either dichotomized (gender, nationality, holiday purpose, business purpose) or could be measured on an ordinal measurement scale (age, education, income). Both the number of nights spent in Amsterdam (mean = 2.63; SD = 2.35) and the tourist expenditure at the holiday destination (mean = 105,337.48; SD = 1,288,638.26) were the subject of open, continuous questions. The mean value and standard deviation of the expenditure variable was a cause of concern, since the initial results showed a large influence of outlier values on the mean statistics, possibly caused by the open nature of the question. Deletion of the 5% upper and lower expenditure values resulted in a more plausible mean value of 564.25 (SD = 731.04) for 525 observations. In the section concerning the importance of e-services, tourists were asked to indicate the relevance of interactive maps, personalized information, booking services, journey planners, E-forums, virtual tours, and interactive games on an ordinal 5-point Likert scale.

Table 1 Frequency of personal variables

Variable	Frequency
Gender (Female)	52.5%
Age	
<18	6.4%
18-34	62.8%
35-54	22.2%
55-74	8.4%
>74	0.3%
Education	
Pre high school	5.3%
High school	22.0%
Vocational	11.9%
Bachelor degree	35.0%
Higher degree	25.7%
Income	
< €15,000	27.3%
€15,001-€25,000	15.2%
€25,001-€35,000	11.5%
€35,001-€45,000	7.9%
€45,001-€55,000	4.7%
>€55,000	16.9%
Nationality (Dutch)	20.2%
Purpose	
Holiday	74.0%
Business	10.5%

The hypothesized relationships between the exogenous and endogenous variables were subsequently tested in the AMOS 19.0 Structural Equations Model (SEM) package for SPSS, using the ML method of parameter estimation. SEM allows for both the simultaneous estimation of a series of multiple regression equations and the incorporation of latent variables, thereby accounting for measurement errors in the estimation process (Hair et al. 1998). Nonetheless, our proposed path model (see Figure 1) does not contain any latent constructs. Even though the seven different e-services might be presumed to underlie a set of higher-order constructs (see Van Leeuwen and Nijkamp, 2010), the results of multicollinearity diagnostics, with all Variance Inflation Factors between 1.24 and 1.54, and tolerance values between 0.65 and 0.8, did not indicate a statistical necessity to combine the different e-service variables. In order to be able to identify a larger number of possible significant relationships, the path model of personal characteristics, e-services, and expenditures critically distinguishes between all seven e-services independently. As a result of the non-latent construction of the model, the Mulaik and Millsap's (2000) four-step modelling approach, consisting of (a) an explanatory factor analysis; (b) a confirmatory factor analysis to confirm the measurement model; (c) a structural model to test the relationships; and (d) nested models testing to identify the most parsimonious model, could therefore be reduced to a two-step approach, in which only steps (c) and (d) need to be performed.

A number of goodness-of-fit indicators can be reported as well. The χ^2-statistic reflects the statistical difference between the observed matrix of covariances, identified from the data, and the ideal covariance matrix predicted from the model structure. While Barrett (2007) states that the χ^2-statistic should be considered the only reliable test in order to accept or reject a proposed model, other authors (e.g. Fan et al. 2011; Kenny and McCoach 2003; Schumacker and Lomax 2004) have noted that the χ^2-value is dependent on sample size, model complexity, and deviation from multivariate normality in the data. Therefore, alternative model fit indices may have to be employed. In this paper, the root-mean-square error of approximation (RMSEA) and the comparative fit index (CFI) are reported as alternative fit statistics.

3 Results

The initial tested path model showed inferior goodness-of-fit indices, but this was to be expected, since the exploratory nature of the study had as its main objective to identify the significant paths from a large number of initial estimates. For that reason, the original model was modified based on the t-test values of non-significant paths and the subsequent changes in the χ^2-value, in order to come to a more parsimonious, good-fitting model. After the deletion of 44 insignificant paths, the resulting empirical model showed satisfactory fit indices on all reported tests with an χ^2-value of 52.91 ($p = .292$) with 49 degrees of freedom, RMSEA = 0.012, CFI = 0.998, and CMIN/DF = 1.1 (for a discussion of these thresholds, we refer to Wheaton et al., 1977; Tabachnick and Fidell, 2007 and Steiger, 2007). Furthermore, Bollen-Stine's Bootstrap, which is often preferred in case of non-normality in the data, had a significant p-value of 0.353 for a bootstrap sample of 2000 observations, giving a further indication that the model fits the data to a satisfactory degree.

Table 2 gives an overview of the relationships between personal characteristics (including number of nights) and the seven e-services which were found to be significant by an ML estimation. Educational level appears to have the most significant relationships with the different types of e-services. The data suggest that higher educated people are more likely to attach importance to interactive mapping and electronic booking services, while personalized information, e-forums, virtual tours, and interactive games are considered less important for higher educated tourists. Age appears to negatively influence the evaluation of e-services, with negative estimates for the relationships with interactive maps, personalized information, booking services, e-forums, and interactive games, which confirms the idea that younger people are more open to the use of advanced e-services. Virtual tours and interactive games are both gender-related, with female travellers giving more importance to these services, while income and an electronic journey planner have a significant positive correlation. Another interesting observation is that Dutch tourists show less interest in the availability of e-services for the tourist destination of Amsterdam.

In Table 3, significant relationships are reported between the personal characteristics of the individual tourist and the number of nights spent in

Amsterdam. As would be expected, Dutch tourists are less likely to spend more nights in Amsterdam, while travelling with a holiday motive is positively related to the number of nights spent in the destination city.

Table 2 ML estimates between characteristics and e-services

	Unstandardized estimates *(SE)*
Interactive map	
Nature holiday	.217*(.104)***
Age	-.157*(.065)***
Educational level	.078*(.039)***
Dutch nationality	-.540 *(.125)****
Personalized information	
Age	-.140*(.061)***
Educational level	-.109*(.037)****
Dutch nationality	-.486 *(.109)****
Booking service	
Age	-.145*(.062)***
Educational level	.078*(.036)***
Dutch nationality	-.362*(.123)****
Length of stay	.049 *(.020)****
Journey planner	
Income	.050 *(.024)****
E-forum	
Age	-.260 *(.056)****
Educational level	-.129 *(.036)****
Virtual tours	
Nature business	.425 *(.134)****
Gender	-.177 *(.082)****
Educational level	-.075 *(.038)****
Dutch nationality	-.263 *(.107)****
Interactive games	
Gender	-.176 *(.082)****
Age	-.257 *(.057)****
Educational level	-.181 *(.035)****

Note: * p-value < .05; ** p-value <.01; *** p-value <.001.

Table 3 ML estimates between characteristics and length of stay

	Unstandardized estimates *(SE)*
Length of stay	
Nature holiday	.524*(.195)****
Dutch nationality	-2.487*(.213)****

Note: * p-value < .05; ** p-value <.01; *** p-value <.001.

Table 4 shows the variables which were found to significantly influence the level of expenditure in Amsterdam. Of the seven e-services, only two had a

significant effect on tourist expenditure, with e-forums having a negative influence, and virtual tours being positively related to tourist spendings. Number of nights and family income have a further positive influence on expenditures, while higher education levels are related to lower expenditures. Finally, there is statistical evidence that domestic tourists spend significantly less money in the destination.

Table 4 ML estimates between characteristics, e-services, length of stay, and expenditure

	Unstandardized estimates *(SE)*
Expenditure	
E-forum	-59.203*(21.638)****
Virtual tours	67.028*(20.478)****
Length of stay	112.899*(10.973)****
Income	90.560 *(13.189)****
Educational level	-55.780 *(19.225)****
Dutch nationality	-257.387 *(64.840)****

Note: * p-value < .05; ** p-value <.01; *** p-value <.001.

While the previous tables have given an overview of all significant direct relationships, a number of variables have a further indirect influence on tourist expenditures through their interaction with intermediate variables. In addition to the direct effect of the nationality characteristic, a significant negative indirect effect is found through its interaction with both the number of nights and the e-forum service. This implies that Dutch tourists spend less money per day or night than foreigners. Both the holiday (59.151) and the business (28.457) motive have a further positive indirect effect on money spent, compared with visiting friends or family, while gender indirectly negatively affects expenditure with a further regression value of -11.866 (meaning that men tend to spend more money in the destination city of Amsterdam). Finally, age (15.384) and education level (2.626) further influence the expenditure through an interaction with the e-forum variable.

4 Discussion and Conclusions

The results obtained clearly show that e-services are much more relevant for foreign tourists than for Dutch persons visiting Amsterdam, which is probably related to the need for foreigners to collect a priori more systematic information about the destination and the choice to be made in the light of the possibility to

visit several other cities around the world. This conclusion suggests that the tourist attractions in the city (including museums or cultural events) should reinforce their presence on the Internet, with a view to attract the attention of potential foreign visitors.

The fact that younger tourists tend to use e-services more intensively will probably have less impact in the future: it is likely that these younger tourists will continue to use e-services when they get older, together with a new generation. The clear differences between visitors with different levels of education regarding the choice of e-services suggest the importance of developing different types of information channels for different types of consumers: interactive maps and electronic book services tend to be used more by tourists with a high level of education, while e-forums, virtual tours, interactive games, or personalized information seem to be more attractive to tourists with lower levels of education.

This study has also shown that tourists with higher incomes tend to use electronic journey planners more intensively, which suggests a high level of systematic and planned orientation about the trip before the departure for this kind of tourists. On the other hand, the high importance of e-forums for tourists with the lowest level of expenditures in Amsterdam suggests that they use this platform in order to find more affordable ways to enjoy the city. Curiously, people with higher levels of education tend to spend less in Amsterdam, which is an interesting concern that should be addressed by the marketing strategies for the development of tourism in Amsterdam.

Despite the relevance of these findings, it should be stressed that the data used in this research do not yet include information about the use of social networks, since this kind of platform was not so popular at the time when the information was collected. Nevertheless, considering the massification of these tools in the last few years, including social networks in a similar framework could become an extremely important further development of this analysis.

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