Institut de Recerca en Economia Aplicada Regional i Pública
Research Institute of Applied Economics

Document de Treball 2017/13 1/27 pág.
Working Paper 2017/07 1/27 pág.

"What really matters is the economic performance: Positioning tourist destinations by means of perceptual maps"

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Abstract

The present study aims to cluster the world's main tourist destinations according to the growth of the economic performance of the tourist activity and of the tourist and economic development experienced during the last decade. With this objective, we combine the information from a set of tourist and economic indicators for the main 45 tourist destinations over the period between 2000 and 2010. Destinations are ranked with respect to their average growth rate over the sample period. By assigning a numerical value to each country corresponding to its position, all the information is summarised into two components ("economic performance of tourist activity" and "tourist and economic development") via multivariate techniques for dimensionality reduction: multidimensional scaling (MDS) and categorical principal components analysis (CATPCA). By means of perceptual maps, we find that destinations can be clustered into four different groups. The first one, dominated by Western and Northern Europe markets, contains some of the top destinations (France, Spain and the United States). A second one, with a predominance of Mediterranean destinations (Cyprus, Greece, Italy and Israel), obtains high scores in both dimensions. In the third one, we find Cambodia and China, alongside Egypt and Turkey. Finally, a fourth group dominated by Eastern Europe destinations (Bulgaria, Croatia and Latvia) with low scores in both dimensions.

JEL classification: A12, C38, F43, M31, Z3, Z32

Keywords: Tourist destinations; Positioning; Perceptual maps; Multidimensional Scaling (MDS); Categorical Principal Components Analysis (CATPCA).

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Acknowledgements

We wish to thank Laura Muñoz and Jacinta García at the World Tourism Organization (UNWTO) for providing us with the data used in this study. This paper has been partially financed by the project ECO2016-75805-R of the Spanish Ministry of Economy and Competitiveness.

1. Introduction

Tourism is one of the fastest-growing economic sectors in the world, and it has turned into a key driver of socio-economic development. Travel and passenger transport represents 30% of the world's exports of services. The number of international tourist arrivals (overnight visitors) in 2015 increased by 4.6% to reach a total of 1186 million worldwide (UNWTO, 2016). While other commodity prices showed decreasing prices, international tourism receipts increased by 4.4% in real terms in 2015 (UNWTO, 2016). Accordingly, tourist destinations have to make major efforts to develop and manage their brand within an increasingly competitive market (Mariani et al., 2014; Wang & Pizam, 2011).

Countries worldwide are opening up to tourism. Consequently, emerging destinations are playing an increasingly important role in this competitive environment. According to the UNWTO (2015), arrivals in emerging destinations between 2010 and 2030 are expected to increase at twice the rate of those in advanced economies, reaching a 57% share of the market. Mature destinations in Northern and Western Europe and North America are expected to experience a comparatively slower growth during the next two decades. On the contrary, Africa, the Middle East, and especially Asia and the Pacific are the regions expected to grow faster. As a result, tourism in emerging markets is drawing increasing attention (Cohen et al., 2014). Despite the growing interest in emerging markets, most tourism research still focus on the world's top tourist destinations (Claveria, 2016; UNWTO, 2015).

This study aims to shed some light on the evolution of tourism trends during the last decade in the world's main 45 tourist destinations. We use the methodology proposed by Claveria (2016) to position and cluster 20 emerging tourist destinations. We aim to contribute to tourism research literature by analysing how the dynamic interactions between the main tourist and economic indicators ultimately affected the positioning of destinations since the turn of the century. Li et al. (2013) noted the importance of the economic dimension in determining destinations competitiveness. Song et al. (2012) pointed out that one of the limitations of most tourism studies is the omission of economic indicators and the lack of attention paid to economic return. To cover this deficit, we combine official tourism data with economic information at the macro level, and generate an indicator of economic performance of inbound tourism (total number of international tourist arrivals) at the destination level: the ratio of total expenditure per tourist.

On the one hand, we use data from the Compendium of Tourism Statistics provided by the World Tourism Organization (UNWTO). Data include the annual number of international overnight visitors, total expenditure, total number of rooms, and the percentage of the occupancy rates from 2000 to 2010. The country selection criterion is based on the number of international overnight visitors and the availability of secondary data for the sample period, under the constraint that all regions are represented. We use the UNWTO regional classification.

On the other hand, we incorporate economic information in the form of the Gross Domestic Product (GDP) provided by the World Bank. Finally, in order to capture the relationship between tourism and development beyond economic growth alone, we include the Human Development Index (HDI), which is a composite indicator obtained as the geometric mean of three indices. The HDI can be regarded as a summary measure of average achievement in three key dimensions of human development: the health dimension, assessed by life expectancy at birth; the education dimension, measured by mean of years of schooling for adults aged 25 years and more and expected years of schooling for children of school entering age, and the standard of living dimension, which is measured by the logarithm of the gross national income (GNI) per capita so as to reflect the diminishing importance of income with increasing GNI.

This research also differs from previous destination positioning studies in that we use annual percentage growth rates of the variables to avoid the issues derived from working with non-stationary time series (Oh, 2005; Lim & McAleer, 2002). Several authors have pointed out the importance of working with growth rates instead of levels (Li et al., 2013), since most tourism variables are non-stationary due to its steady growth (Chu et al., 2014).

The proposed approach for positioning tourist destinations is based on a two-step methodology proposed by Claveria (2016). First, we rank the 45 tourist destinations regarding their average growth rates in all items over the sample period, indirectly introducing a dynamic perspective into the analysis. By assigning a numerical value to each destination corresponding to its position in the rankings, we then cluster the destinations by means of two dimensionality reduction techniques: Multidimensional Scaling (MDS) and Categorical Principal Component Analysis (CATPCA). Finally, we use perceptual maps to project the results and to position the destinations.

The remainder of the study is organized as follows. The next section provides a review of the existing literature. Section 3 describes the data set. In Section 4 we rank the destinations and present the results of the multivariate analysis. Finally, Section 5 concludes.

2. Literature review

The factors conditioning the demand for tourism range from politics to economics. Wang (2009) stressed the importance of identifying the key factors affecting tourism demand in order to effectively understand changes and trends in the tourism market, and create competitive advantages for the tourism industry. Several authors have examined the effects of economic variables in both the hospitality industry (Lee & Ha, 2012) and tourism development (Novak et al., 2011; Pranić et al., 2012).

The contribution of tourism to economic growth, as well as to destination competitiveness, has been extensively analysed in the tourism literature (Balaguer & Cantavella-Jordá, 2002, Brida et al., 2016; Capó et al., 2007; Chou, 2013; Croes, 2011; Crouch & Richie, 1999, 2006; Durbarry, 2004; Oh, 2005; Pérez-Rodríguez et al., 2015; Schubert & Brida, 2009; Schubert et al., 2011; Seo et al., 2010; Torraleja, 2009). Recent literature highlighted the role of capital formation, arguing that the mechanism underlying tourism's welfare-promoting effect heavily relies on capital goods imports (Nowak et al., 2007; Cortés-Jiménez et al. 2011). Foreign direct investment, trade volume, and exchange rates have also proved to be linked to tourism (Santana-Gallego et al., 2010, 2011; Wong & Tang, 2010).

Nevertheless, there are few studies addressing the interdependence between tourism and economic growth by means of multivariate analysis (Chandra & Menezes, 2001). Multivariate methods can be classified into two major categories: dependency and interdependency techniques. While dependency procedures assume that a set of variables is explained by other variables, interdependency methods involve the simultaneous analysis of all the variables in the dataset. By reducing the dimensionality in a dataset, interdependency analysis is used to detect underlying relationships between variables. There are several multivariate techniques for dimensionality reduction: cluster analysis, multiple correspondence analysis (MCA), exploratory factor analysis (EFA), confirmatory factor analysis (CFA), principal components (PCA), etc. For a detailed description of these techniques see Hair et al. (2009), Jolliffe (2002) and Sharma (1996).

Dimensionality reduction techniques have been used in a wide range of tourism studies: from image and perception analyses to motivation research. One of the main areas in which multivariate analysis is widely used is market segmentation studies (Dey & Sarma, 2010; Donaire et al, 2014; Keng & Cheng, 1999; Lee et al., 2006; Park & Yoon, 2009; Rid et al., 2014; Sinclari-Maragh et al., 2015; Upchurch et al., 2004; Voges, 2007).

Guo et al. (2015) conducted conjoint and a cluster analyses to segment Chinese spa customers in Hong Kong. Arimond & Elfessi (2001) used MCA to spatially map attributes from a categorical survey data, and then cluster analysis to identify market segments.

MDS is also known as Principal Coordinates Analysis or Torgerson scaling (Torgerson, 1952, 1958). MDS is a multivariate analytical procedure that allows to visualize the level of similarity between individuals based on the proximity of individuals to each other in a generated projection, known as perceptual map. These representations allow the visualization of the strengths and weaknesses of destinations. For an overview of MDS, see Borg & Groenen (2005), Borg et al. (2013) and Fentom & Pearce (1988). In a recent study, Marcussen (2014) reviewed 64 papers that applied MDS to tourism research, finding that the most common topics were image and positioning of destinations. For a review of the literature on destination image see Pike (2002).

The first application of MDS to tourism destinations was that of Wish et al. (1970). Since then, a large number of studies have analysed the positioning of destinations by means of MDS (Andreu et al. 2000; Crompton et al., 1992; Gursoy et al., 2009; Kayar & Kozak, 2010; Kim, 1998; Leung & Baloglu, 2013; Li et al., 2015; Marcussen, 2014; Uysal et al., 2000). Haahti (1986) assessed the relative status of Finland as a summer holiday destination compared to nine European competitors. Applying a two-dimensional MDS analysis, Gartner (1989) clustered four American states with similar tourism and recreation attributes. Kim & Agrusa (2005) positioned seven honeymoon destinations according to the perception of Korean tourists regarding eight attributes. Kim et al. (2005) used MDS to identify the position of overseas golf tourism destinations. Omerzel (2006) analysed the competitiveness of Slovenia as a tourist destination regarding the ratings for 85 indicators grouped into six categories. Via MDS analysis, Zins (2010) depicted destination images of ten different countries from the perspective of two traveller segments.

Lozano & Gutierrez (2011) applied MDS to analyse 25 European destinations. Marcussen (2011) combined MDS with FA to position and group 33 European destinations in relation to each other. Using official data from Eurostat regarding monthly overnight stays from 1998 to 2009, the author found that European destinations could be grouped by major language spheres. Claveria & Poluzzi (2017) arrived to a similar conclusion for the world's top ten destinations.

In a similar study, Leung & Baloglu (2013) evaluated the destination competitiveness of 16 Asia Pacific destinations, generating three-dimensional perceptual maps, and using cluster analysis to identify groupings on the maps. Recently, Li et al. (2015) analysed the position of the United States (US) against its major non-Asian competitors. By combining MDS, MCA, and logistic regression, the authors found that the US holds a unique position in relation to its competitor destinations. MDS has also been applied in other tourism studies. Chhetri et al. (2004) identified the underlying dimensions influencing visitor experiences in nature-based tourism destinations.

Recent developments in multivariate analysis focus on dealing with nonlinear relationships in data. PCA has been extended by using autoassociative neural networks (Kramer, 1991), principal curves and manifolds (Hastie & Stuetzle, 1989), and kernel approaches (Schölkopf et al., 1998). Another machine learning technique are Self-Organizing Maps (SOMs) (Kohonen, 2001). SOMs can be regarded as a nonlinear generalization of PCA (Liu & Weisberg, 2005). SOM analysis is used to generate visual representations of data that allow to disclose unknown patterns. While SOMs are starting to be used in economic studies (Claveria et al., 2016; Sarlin & Peltonen, 2013, Zarate-Solano & Zapata-Sanabria, 2017), to our knowledge, the only application in tourism is that of Bloom (2005), who used a SOM for segmenting the inbound tourism demand to Cape Town.

CATPCA, also known as nonlinear PCA, represents another development in nonlinear dimensionality reduction. See Gifi (1990) for a historical overview, and Linting et al. (2007) for an exhaustive treatment of nonlinear PCA. CATPCA does not assume that the relationships between variables are linear, and can discover nonlinear relationships between variables. Another advantage of CATPCA over standard PCA, is that it allows incorporating nominal and ordinal variables. In spite of these features, few studies have applied CATPCA in tourism research (Correia et al., 2007; Green, 2005).

In order to cover this deficit, we compare the performance of CATPCA and MDS in the positioning of the main 45 destinations based on the rankings regarding different official indicators that combine tourist and economic information. These procedures are used to reduce the dimensionality of data by transforming the original set of correlated variables into a smaller set of uncorrelated variables known as factors, which can be interpreted as synthetic indicators that maintain the original ordinal structures.

3. Data

The dataset is comprised of two major sources of information: tourist and economic indicators. On the one hand, we use official data from the Compendium of Tourism Statistics provided by the UNWTO (http://www2.unwto.org/content/data-0). We focus on five indicators: overnight visitors (thousands), total expenditure (US$ millions), occupancy rate (%), rooms, and inbound expenditure over GDP (%). From these set of data, we calculate and additional indicator of economic performance at the destination level: the ratio of total expenditure per tourist.

On the other hand, we add economic information in the form of the GDP at market prices based on constant local currency provided by the World Bank (http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG). Finally, we include the HDI (http://hdr.undp.org/en/content/human-development-index-hdi), which is a composite indicator of life expectancy, education, and income per capita that allows us to capture the relationship between tourism and development beyond a strictly economic sense.

The country selection criterion is based on the number of international overnight visitors and the availability of secondary data for the sample period (2000-2010), under the constraint that all regions are represented. We use the UNWTO regional classification, which divides the world into five major regions Europe (Northern, Western, Central/Eastern, Southern/Mediterranean), Asia and the Pacific (North-East Asia, South-East Asia, Oceania, South Asia), Americas (Caribbean, North, Central and South America), Africa (North, Sub-Saharan), and Middle East.

The set of countries is as follows (Table 1): Austria (1), Botswana (2), Bulgaria (3), Cambodia (4), Chile (5), China (6), Costa Rica (7), Croatia (8), Cyprus (9), Dominican Republic (10), Egypt (11), Estonia (12), Finland (13), France (14), Germany (15), Greece (16), Hong Kong (17), Indonesia (18), Ireland (19), Israel (20), Italy (21), Jamaica (22), Jordan (23), Latvia (24), Lithuania (25), Madagascar (26), Mexico (27), Morocco (28), New Zealand (29), Norway (30), Panama (31), Paraguay (32), Philippines (33), Poland (34), Portugal (35), Singapore (36), Slovenia (37), South Africa (38), Spain (39), Sri Lanka (40), Sweden (41), Tunisia (42), Turkey (43), United Kingdom (UK) (44), and the US (45).

The information in Table 1 indicates that the tourism sector is highly concentrated in few destinations, as the first five national markets (France, Spain, the US, China and Italy) account for almost 50% of world tourism. The next ten destinations (the UK, Germany, Mexico, Turkey, Austria, Greece, Poland, Hong Kong, Portugal and Egypt) represent an additional 32% of total international overnight visitors.

Table 1. Frequency distribution of international inbound tourism – Annual average 2000-2010

Destination	Average 2000-2010	Relative frequency worldwide	Destination	Average 2000-2010	Relative frequency worldwide
France	76,934	14.43%	Sweden	4,561	0.86%
Spain	53,019	9.94%	Norway	3,811	0.71%
US	50,719	9.51%	Dom. Rep.	3,558	0.67%
China	44,269	8.30%	Finland	3,142	0.59%
Italy	40,731	7.64%	Jordan	2,928	0.55%
UK	26,470	4.96%	Philippines	2,559	0.48%
Germany	21,711	4.07%	Cyprus	2,405	0.45%
Mexico	21,167	3.97%	New Zealand	2,225	0.42%
Turkey	19,998	3.75%	Chile	2,121	0.40%
Austria	19,956	3.74%	Israel	1,867	0.35%
Greece	14,677	2.75%	Estonia	1,762	0.33%
Poland	14,323	2.69%	Costa Rica	1,593	0.30%
Hong Kong	13,981	2.62%	Botswana	1,590	0.30%
Portugal	9,736	1.83%	Lithuania	1,563	0.29%
Egypt	8,516	1.60%	Slovenia	1,551	0.29%
Croatia	7,764	1.46%	Jamaica	1,546	0.29%
South Africa	7,346	1.38%	Cambodia	1,413	0.27%
Ireland	7,201	1.35%	Latvia	1,153	0.22%
Singapore	6,916	1.30%	Panama	831	0.16%
Morocco	6,242	1.17%	Sri Lanka	485	0.09%
Tunisia	6,106	1.14%	Paraguay	352	0.07%
Indonesia	5,453	1.02%	Madagascar	221	0.04%
Bulgaria	4,618	0.87%			

Note: Tourist arrivals are measured in thousands. Dom. Rep. stands for the Dominican Republic.

In Table 2 we compute the annual percentage growth rates of all the variables used in the study. Given that growth rates are dimensionless measures of the amount of variation of a specific variable from one year to another in percentage terms, they provide a comparative overview of the evolution of the different tourist and economic indicators. Thus, Cambodia and Madagascar are the destinations that show the highest average growth rates for most variables. In the case of the expenditure per tourist, Cambodia obtains the second lowest average rate, as opposed to Madagascar with the highest average rate. At the opposite end, Cyprus shows some of the lowest average growth rates for most tourist variables (total expenditure, occupancy, and GDP).

Table 2. Descriptive analysis – Average annual percentage growth rates (2000-2010)

	Expenditure per tourist	Overnight visitors	Total expenditure	Inbound expenditure per GDP	Rooms	Occupancy	GDP	HDI
Austria	3.14	2.14	5.41	-0.37	-0.05	0.86	1.69	0.51
Botswana	-2.45	9.35	4.69	-6.45	11.46	2.46	4.00	0.77
Bulgaria	4.00	8.63	13.10	-0.10	8.83	-0.21	4.27	0.77
Cambodia	-1.63	20.20	18.45	6.44	12.47	3.79	8.12	1.82
Chile	1.61	5.45	6.59	-3.39	4.26	0.07	3.92	0.68
China	4.66	7.23	12.51	-3.61	6.49	1.19	10.33	1.55
Costa Rica	-1.16	6.93	5.87	-2.06	3.88	1.77	4.16	0.85
Croatia	4.67	9.06	12.83	1.04	-0.72	6.80	2.65	0.63
Cyprus	2.46	-0.85	1.52	-6.48	-0.20	-0.11	3.26	0.50
Dom. Rep.	0.81	4.28	5.12	-1.70	2.78	0.12	5.01	0.85
Egypt	0.14	11.69	11.63	3.64	8.43	0.99	4.90	1.08
Estonia	-1.19	9.02	7.13	3.72	12.63	0.11	4.19	0.65
Finland	3.58	3.91	7.19	1.13	0.15	-1.64	2.12	0.52
France	3.44	0.59	4.01	-1.36	0.43	0.21	1.47	0.44
Germany	2.21	4.33	6.56	2.23	0.73	1.03	1.12	0.53
Greece	1.91	2.07	3.78	-3.06	2.36	-2.39	2.04	0.67
Hong Kong	3.56	9.66	13.40	9.75	5.37	1.41	4.45	1.00
Indonesia	2.41	4.02	7.00	-6.78	3.28	1.35	5.21	1.39
Ireland	7.51	1.13	8.84	1.13	1.97	-1.13	3.18	0.42
Israel	0.86	5.64	3.56	-4.05	1.53	-0.35	3.88	0.34
Italy	1.76	1.80	3.20	-1.95	1.25	-0.74	0.64	0.56
Jamaica	-0.73	4.09	3.37	-0.44	2.34	0.59	-0.50	0.69
Jordan	6.16	8.82	15.49	3.04	3.40	4.11	6.14	0.72
Latvia	10.02	10.15	19.85	6.53	6.63	-0.82	4.42	0.72
Lithuania	6.35	2.12	6.72	-5.07	7.08	1.99	1.59	0.87

Notes: HDI stands for the annual average growth rate of the Human Development Indicator during 2000-2010. Statistics are conducted for the sample period: 2000-2010. Dom. Rep. stands for the Dominican Republic.

Table 2. (cont.) Descriptive analysis – Average annual percentage growth rates (2000-2010)

	Expenditure per tourist	Overnight visitors	Total expenditure	Inbound expenditure per GDP	Rooms	Occupancy	GDP	HDI
Madagascar	18.43	14.93	18.72	12.91	8.49	5.19	2.94	1.24
Mexico	2.37	1.98	4.37	-2.65	3.33	-0.15	2.14	0.64
Morocco	4.63	8.50	13.40	5.17	5.50	-2.99	4.64	1.35
New Zealand	4.16	4.00	8.40	-0.59	19.99	0.00	2.57	0.33
Norway	2.82	3.72	6.80	-2.59	1.89	-0.93	1.72	0.32
Panama	5.30	10.48	16.17	7.36	3.89	4.59	5.82	0.62
Paraguay	5.32	5.35	10.74	1.16	5.21	0.83	3.01	0.79
Philippines	-0.36	4.93	5.16	-4.02	-5.86	1.37	4.74	0.61
Poland	8.97	-3.02	5.72	-4.34	6.62	-0.52	3.88	0.49
Portugal	15.44	-3.83	7.61	1.76	2.47	-1.50	1.03	0.43
Singapore	5.53	5.53	11.56	0.48	2.87	1.74	6.18	0.77
Slovenia	2.66	7.28	9.85	2.47	3.23	1.09	2.86	0.58
South Africa	9.59	3.59	12.53	0.97	2.86	-0.57	3.55	0.78
Spain	4.14	1.43	5.66	-2.16	2.52	-1.27	2.52	0.43
Sri Lanka	5.87	5.20	10.92	-0.33	2.62	3.38	5.27	-0.01
Sweden	2.93	6.89	8.25	3.53	1.44	0.73	2.39	0.11
Tunisia	1.52	3.45	5.20	-1.98	2.12	-0.63	4.45	1.01
Turkey	-0.04	15.61	15.28	8.31	6.22	2.74	4.26	1.04
UK	0.97	1.98	3.14	-0.42	2.40	0.71	1.94	0.39
US	1.74	2.16	4.03	0.01	1.93	-0.75	1.88	0.29

Notes: See Notes of Table 2

4. Multivariate analysis

4.1. Ranking of destinations

In this section we rank the 45 destinations according to the average annual growth experienced over the period comprised from 2000 to 2010 for each variable (Table 3).

Table 3. Ranking of destinations – Average annual percentage growth rates (2000-2010)

Expenditure per tourist	Overnight visitors	Total expenditure	Inbound expenditure per GDP	Rooms	Occupancy	GDP	HDI
Madagascar	Cambodia	Latvia	Madagascar	New Zealand	Croatia	China	Cambodia
Portugal	Turkey	Madagascar	Hong Kong	Estonia	Madagascar	Cambodia	China
Latvia	Madagascar	Cambodia	Turkey	Cambodia	Panama	Singapore	Indonesia
South Africa	Egypt	Panama	Panama	Botswana	Jordan	Jordan	Morocco
Poland	Panama	Jordan	Latvia	Bulgaria	Cambodia	Panama	Madagascar
Ireland	Latvia	Turkey	Cambodia	Madagascar	Sri Lanka	Sri Lanka	Egypt
Lithuania	Hong Kong	Morocco	Morocco	Egypt	Turkey	Indonesia	Turkey
Jordan	Botswana	Hong Kong	Estonia	Lithuania	Botswana	Dominican Rep.	Tunisia
Sri Lanka	Croatia	Bulgaria	Egypt	Latvia	Lithuania	Egypt	Hong Kong
Singapore	Estonia	Croatia	Sweden	Poland	Costa Rica	Philippines	Lithuania
Paraguay	Jordan	South Africa	Jordan	China	Singapore	Morocco	Costa Rica
Panama	Bulgaria	China	Slovenia	Turkey	Hong Kong	Hong Kong	Dominican Rep.
Croatia	Morocco	Egypt	Germany	Morocco	Philippines	Tunisia	Paraguay
China	Slovenia	Singapore	Portugal	Hong Kong	Indonesia	Latvia	South Africa
Morocco	China	Sri Lanka	Paraguay	Paraguay	China	Bulgaria	Singapore
New Zealand	Costa Rica	Paraguay	Ireland	Chile	Slovenia	Turkey	Botswana
Spain	Sweden	Slovenia	Finland	Panama	Germany	Estonia	Bulgaria
Bulgaria	Israel	Ireland	Croatia	Costa Rica	Egypt	Costa Rica	Jordan
Finland	Singapore	New Zealand	South Africa	Jordan	Austria	Botswana	Latvia
Hong Kong	Chile	Sweden	Singapore	Mexico	Paraguay	Chile	Jamaica
France	Paraguay	Portugal	US	Indonesia	Sweden	Poland	Chile
Austria	Sri Lanka	Finland	Bulgaria	Slovenia	UK	Israel	Greece
Sweden	Philippines	Estonia	Sri Lanka	Singapore	Jamaica	South Africa	Estonia
Norway	Germany	Indonesia	Austria	South Africa	France	Cyprus	Mexico
Slovenia	Dominican Rep.	Norway	UK	Dominican Rep.	Dominican Rep.	Ireland	Croatia
Cyprus	Jamaica	Lithuania	Jamaica	Sri Lanka	Estonia	Paraguay	Panama
Indonesia	Indonesia	Chile	New Zealand	Spain	Chile	Madagascar	Philippines
Mexico	New Zealand	Germany	France	Portugal	New Zealand	Slovenia	Slovenia

Notes: HDI stands for the annual average growth rate of the Human Development Indicator. Dom. Rep. stands for the Dominican Republic.

Table 3 (cont.)**.** Ranking of destinations – Average annual percentage growth rates (2000-2010)

Expenditure per tourist	Overnight visitors	Total expenditure	Inbound expenditure per GDP	Rooms	Occupancy	GDP	HDI
Germany	Finland	Costa Rica	Dominican Rep.	UK	Cyprus	Croatia	Italy
Greece	Norway	Poland	Italy	Greece	Mexico	New Zealand	Germany
Italy	South Africa	Spain	Tunisia	Jamaica	Bulgaria	Spain	Finland
US	Tunisia	Austria	Costa Rica	Tunisia	Israel	Sweden	Austria
Chile	US	Tunisia	Spain	Ireland	Poland	Mexico	Cyprus
Tunisia	Austria	Philippines	Norway	US	South Africa	Finland	Poland
UK	Lithuania	Dominican Rep.	Mexico	Norway	Tunisia	Greece	France
Israel	Greece	Botswana	Greece	Israel	Italy	UK	Spain
Dominican Rep.	UK	Mexico	Chile	Sweden	US	US	Portugal
Egypt	Mexico	US	China	Italy	Latvia	Norway	Ireland
Turkey	Italy	France	Philippines	Germany	Norway	Austria	UK
Philippines	Spain	Greece	Israel	France	Ireland	Lithuania	Israel
Jamaica	Ireland	Israel	Poland	Finland	Spain	France	New Zealand
Costa Rica	France	Jamaica	Lithuania	Austria	Portugal	Germany	Norway
Estonia	Cyprus	Italy	Botswana	Cyprus	Finland	Portugal	US
Cambodia	Poland	UK	Cyprus	Croatia	Greece	Italy	Sweden
Botswana	Portugal	Cyprus	Indonesia	Philippines	Morocco	Jamaica	Sri Lanka

Notes: See Note of Table 3.

The rankings in Table 3 confirm some of the results of the previous section. China and Cambodia are in the top positions regarding the average growth in GDP and HDI. Cambodia is also in the top positions in all tourist indicators except for the average growth rate in expenditure per tourist. Madagascar is in the first position with respect to the average growth of the expenditure per tourist and the inbound expenditure over GDP, and in the top positions for most of the indicators with the exception of GDP. On the other extreme, Cyprus occupies low positions in most tourist indicators. See Sun et al. (2015), Chheang (2008), Peypoch et al. (2012) and Altinay & Bowen (2006) for recent tourism research about China, Cambodia, Madagascar and Cyprus respectively.

4.2. Positioning of destinations

By assigning a numerical value to each country corresponding to its ranking in Table 3, we generate a set of categorical data that we use to cluster the different destinations. The grouping of all countries is done by means of two optimal scaling techniques for categorical data: CATPCA and MDS, using IBM SPSS Statistics 24 (Meulman et al., 2012).

Both techniques allow us to reduce the information contained in Table 3 into two dimensions. We have used the Kaiser-Guttman method (Guttman, 1954; Kaiser, 1960; Yeomans & Golder, 1982) in order to determine the number of factors to retain. According to this criterion, only the factors that have eigenvalues greater than one are retained for interpretation. Eigenvalues represent the amount of variance accounted for by a specific component. Each component has an eigenvalue, so the sum of all eigenvalues equals the number of variables in a component analysis. In the screeplot of Fig. 1 we graph the eigenvalues of the correlation matrix of the quantified variables. We can observe that only the first two factors have eigenvalues larger than the unity. As a result, the appropriate number of components to be chosen is two.

In Table 4 we present a summary of the models. Regarding CATPCA, the first two factors account for almost 83% of the variance of the variables under analysis, indicating a similar goodness of fit of the components as the obtained with the MDS model.

Table 5 shows the obtained component loadings, which we use to label the two dimensions to which we have reduced the dataset to. We have applied Varimax rotation to facilitate the interpretation of the components. The five factors with the highest loadings in the first dimension are (Fig. 2): the rakings regarding the average growth of overnight visitors, total expenditure, rooms, GDP and HDI. Therefore, the first dimension better captures the aspects reflecting the development of the economy and the tourism industry, whereas the second dimension those more related to the profitability of the tourist activity at the destination level. Accordingly, we label the first dimension as “tourist and economic development”, and the second as “economic performance of tourist activity”.

Fig. 1. Scree plot

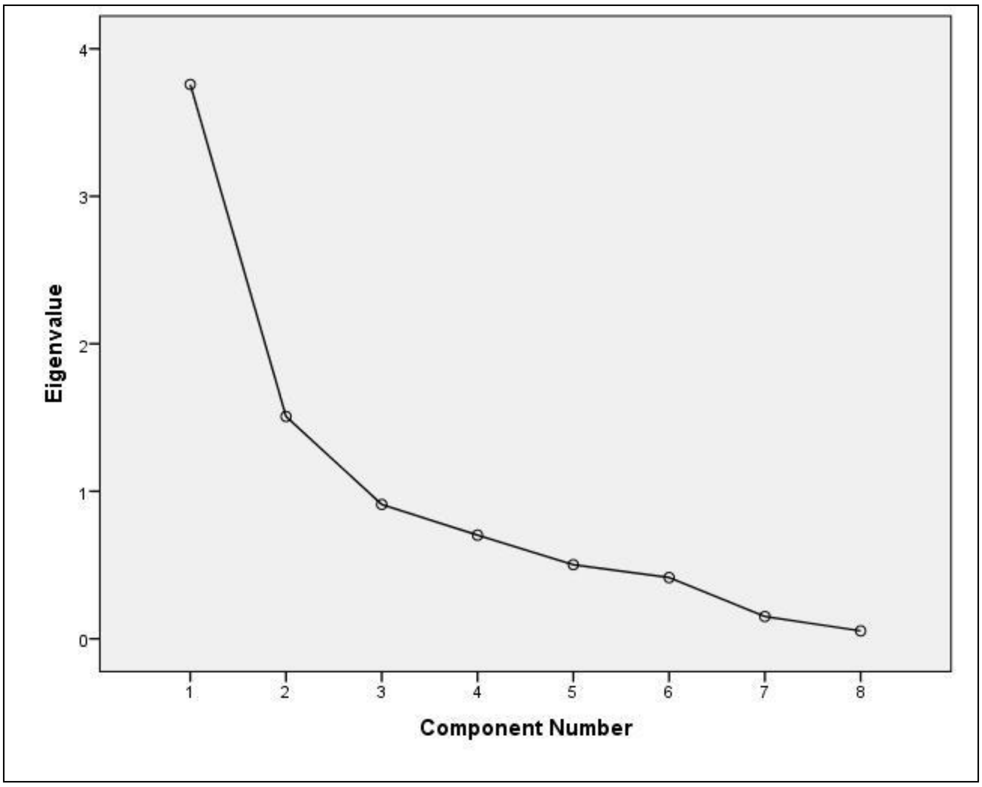


Table 4. Multivariate analysis – Summary

CATPCA Model				MDS Model	
Dimension	**Cronbach's alpha**	**Variance** Total (eigenvalue)	**Variance** % of variance	**Stress**	0.17
1	0.85	3.65	45.62	**RSQ**	0.86
2	0.79	2.98	37.24		
Total	0.97	6.63	82.87		

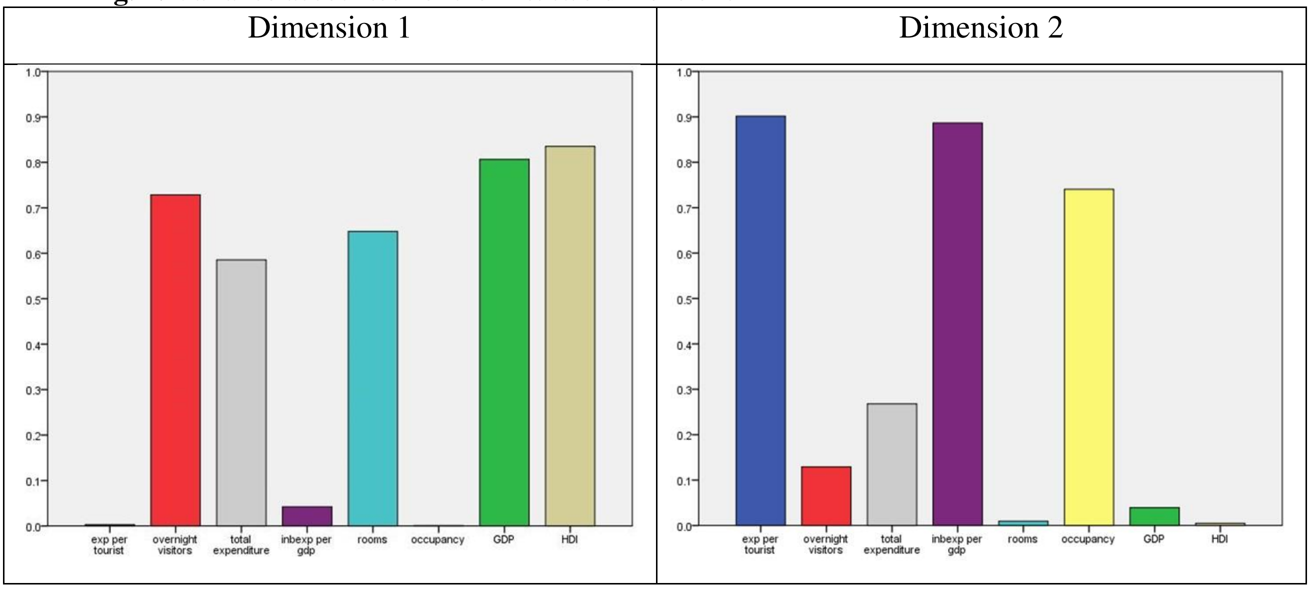
Notes: *Cronbach's alpha mean is based on the mean of the eigenvalue. Rotation method: Varimax with Kaiser Normalisation. Kruskal's stress values indicate the amount of distortion in distances to tolerate. Stress values range from zero to one, zero indicating a perfect representation of the input data in two dimensions. The RSQ stands for the squared correlations in distances. RSQ values are the proportion of variance of the scaled data (disparities) in the partition which is accounted for by their corresponding distances.

Table 5. Rotated component loadings – CATPCA

Position	Dimension	
	1	2
Expenditure per tourist	.055	.949
Overnight visitors	.854	.359
Total expenditure	.765	.518
Inbound expenditure per GDP	.206	.942
Rooms	.805	.097
Occupancy	.029	.860
GDP	.898	-.198
HDI	.914	.071

Note: Rotation method: Varimax with Kaiser Normalisation. Component loadings indicate Pearson correlations between the quantified variables and the principal components (ranging between -1 and 1).

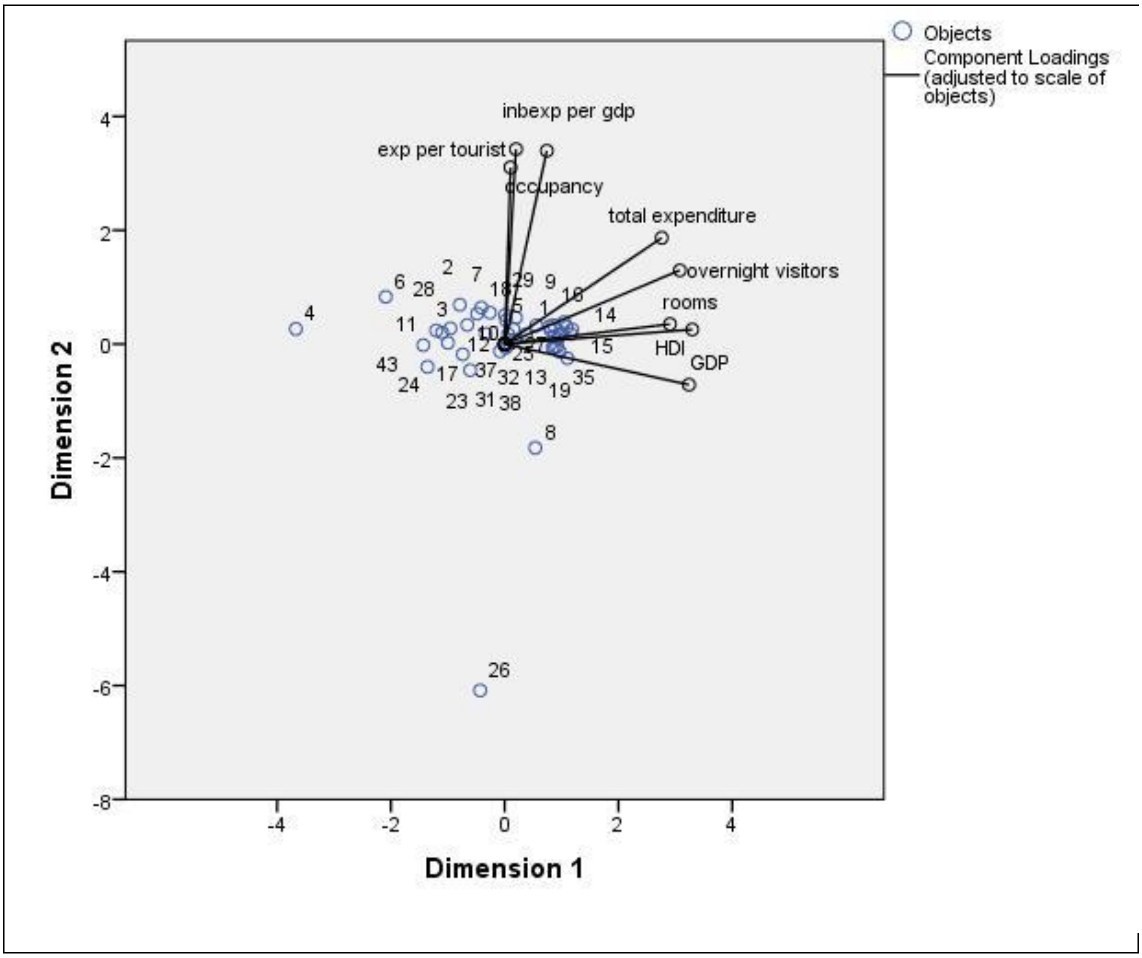
Fig. 2. Variance accounted for the first two dimensions



Figures 3 and 4 are two-dimensional scatterplots that represent the coordinates of the first two retained dimensions for each destination. Fig. 3 shows the biplot projecting the two dimensions obtained with CATPCA, and Fig. 4 the perceptual map projecting the first two dimensions obtained by means of MDS. Along both dimensions, the biplot in Fig. 3 overlaps the object scores (destinations) and the component loadings (indicators). The coordinates of the end point of each vector are given by the loadings of each variable on the two components. Long vectors are indicative of a good fit. The variables that are close together in the plot are positively related, while the variables with vectors that make approximately a 180º angle with each other are closely and negatively related. Finally, variables that are not related correspond with vectors making a 90º angle.

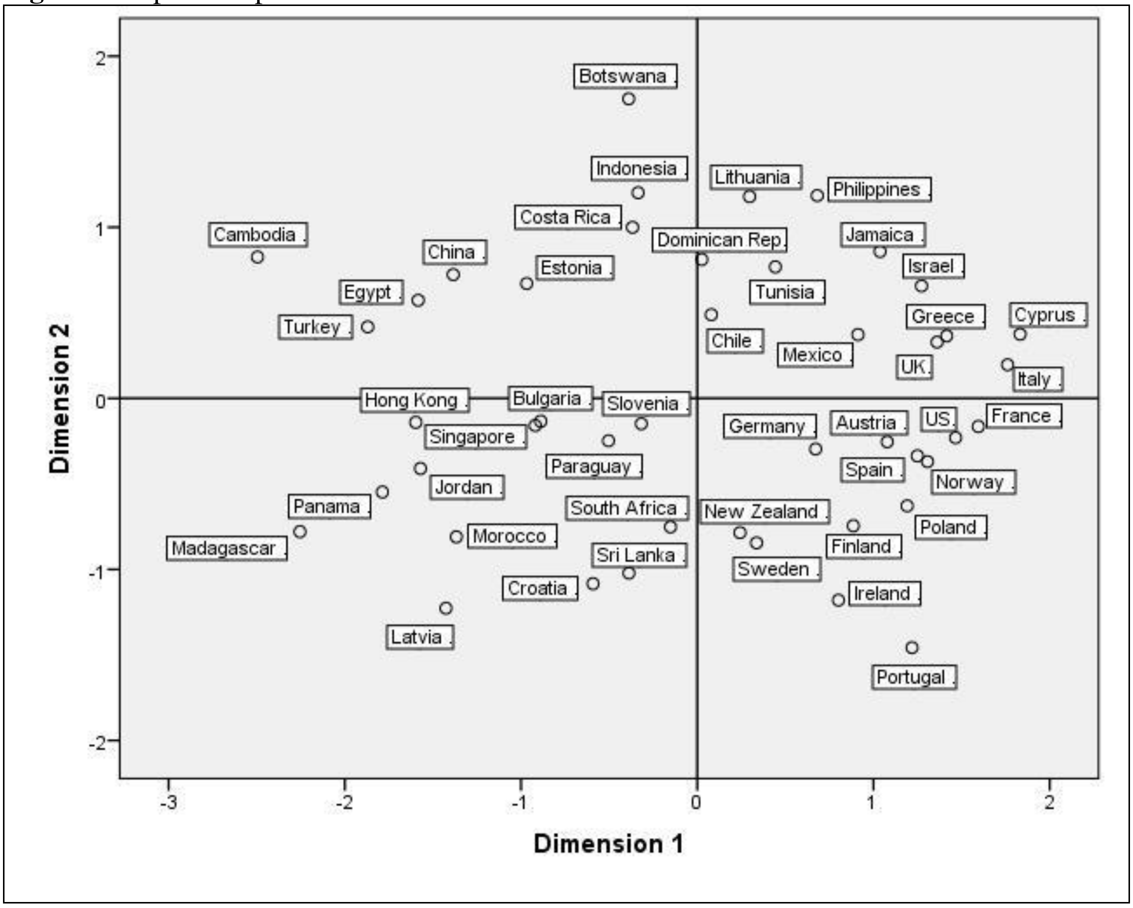
In Fig. 3 we can observe that the first dimension captures more variance than the second dimension, both among the items and the cases. The rankings regarding expenditure per tourist, expenditure over GDP and occupancy tend to coalesce together, indicating a close and positive relation between them, but no relation with the rest of the variables. The rankings regarding total expenditure and overnight visitors also coalesce together, in a similar way as the rankings regarding the growth in rooms and HDI, and GDP to a lesser extent.

Fig. 3. Biplot with rotated component loadings and objects – CATPCA



Note: Rotation method: Varimax with Kaiser Normalisation. For visual clarity, we have coded each country with a number: Austria (1), Botswana (2), Bulgaria (3), Cambodia (4), Chile (5), China (6), Costa Rica (7), Croatia (8), Cyprus (9), Dominican Republic (10), Egypt (11), Estonia (12), Finland (13), France (14), Germany (15), Greece (16), Hong Kong (17), Indonesia (18), Ireland (19), Israel (20), Italy (21), Jamaica (22), Jordan (23), Latvia (24), Lithuania (25), Madagascar (26), Mexico (27), Morocco (28), New Zealand (29), Norway (30), Panama (31), Paraguay (32), Philippines (33), Poland (34), Portugal (35), Singapore (36), Slovenia (37), South Africa (38), Spain (39), Sri Lanka (40), Sweden (41), Tunisia (42), Turkey (43), UK (44), and the US (45).

Fig. 4. Perceptual map – MDS



Note: Derived stimulus configuration. Euclidean distance model.

The perceptual map in Fig. 4 is divided in four quadrants. The first top right quadrant contains destinations with high scores in both dimensions: Lithuania, the Philippines, Jamaica, Dominican Republic, Chile, Mexico, Tunisia, Israel, Greece, Cyprus, Italy, and the UK. In the lower right quadrant, with high scores in the first dimension, we find France, Germany, Austria, Spain, Portugal, Ireland, Poland, Sweden, Finland, Norway and New Zealand. In the next quadrant to the left, we have Panama, Hong Kong, Singapore, Sri Lanka, Madagascar, South Africa, Morocco, Jordan, Bulgaria, Croatia, Slovenia and Latvia. Finally, the last quadrant, contains the countries with high scores in the second dimension: China, Cambodia, Indonesia, Botswana, Costa Rica, Estonia, Turkey and Egypt.

To a certain extent, the first quadrant is dominated by Mediterranean destinations (Cyprus, Greece, Israel, Italy), while in the second there is a predominance of Western and Northern Europe destinations, containing some of the most of mature markets (Austria, France, the US). In the third group, we find a high proportion of Eastern Europe destinations (Bulgaria, Croatia and Latvia), and Madagascar, slightly apart from the rest. A similar thing happens with Cambodia in the fourth quadrant top left. This differentiated positioning is due to the fact that both countries experienced the highest average growth rates for most variables during the sample period, displaying top positions in most tourist indicators (Table 3). However, while Madagascar is in the first position with respect to the average growth of the expenditure per tourist, Cambodia has the second lowest average rate. This persistent growth of the tourism industry in Cambodia poses profound challenges, especially in terms of profitability. Chens et al. (2008) found that in spite of Cambodia's endowed resources, the country needed supporting factors to increase its competitiveness.

On the whole, both techniques depict a similar positioning of the destinations with respect of the rankings in Table 3. The groupings are also consistent with the results of the descriptive analysis in Section 3. These results show the potential of dimensionality reduction and data visualization techniques for exploratory data analysis, as well as their applicability as tools for the identification of key attributes in the positioning of tourism destinations.

This evidence adds to previous studies by Assaf & Tsionas (2015), Claveria (2016, 2017), Huang & Peng (2012), and Yau & Chan (1990). Yau & Chan (1990) used MDS to map seven cities of the Asia and the Pacific region regarding prices and range of activities, and they also found that the market position of Singapore was close to that of Hong Kong. Assaf & Tsionas (2015) ranked 101 countries according to 20 indicators of quality grouped in three dimensions (infrastructure, human resources and nature), finding that based on overall quality, Cambodia, Egypt and Madagascar were worse positioned than the rest of the destinations analysed in the study. In their research, most of the countries with low scores in infrastructure fell below the median, while Austria, the US, the UK, France, New Zealand and Sweden were in the top positions.

5. Summary and concluding remarks

This study assesses the performance of data visualization techniques for the positioning of tourism destinations. We compare the performance of CATPCA and MDS. These techniques allow us to generate two-dimensional visual representations of large datasets. Via perceptual maps we capture the strengths and weaknesses of destinations, and allow visualizing the similarity between them.

First, the world's 45 top destinations were ranked according to the average annual growth experienced over the sample period for a set of tourism and economic indicators.

By means of two dimensionality reduction techniques for categorical data, all the information was summarised into two components: "tourist and economic development" and "economic performance of tourist activity". Finally, two-dimensional projections representing the coordinates of the first two retained dimensions for each country were generated to map all destinations simultaneously.

We found that countries can be clustered into four different groups. The first one, containing some of the destinations with the highest scores in both dimensions, is dominated by Mediterranean countries (Cyprus, Greece, Israel, and Italy). In the second group there is a predominance of Western and Northern Europe destinations, and it contains some of the most of mature markets (Austria, France, and the US). The third group, with low scores in the first dimension but high ones in the second, is the more geographic diverse, with countries like Cambodia, China, Botswana, Egypt and Turkey. Finally, in the group with low scores in both dimensions, we find a high proportion of Eastern Europe destinations (Bulgaria, Croatia and Latvia).

The study aims to shed some light on how the interactions between the main tourist and economic indicators ultimately affects the positioning of destinations. Given that the analysis exclusively makes use of official data, it is easily replicable to different sets of destinations. The proposed approach facilitates the identification of attributes that are most relevant in positioning tourism destinations, and could thereby assist in monitoring the evolution of destination competitiveness in an ever-changing tourism market, and in the enhancement of destinations competitiveness.

Nevertheless, this is is a descriptive study, and inference cannot be made. Either for lack of data, or the existence of outliers, there have been several issues left for further research. An independent analysis by purpose of travel and the inclusion of additional tourism indicators, such as the contribution of tourism to employment or the average expenditure per day, would give further insight into the profitability and the contribution of tourism development to economic growth. On the other hand, another question left for future research is the implementation and assessment of artificial intelligence techniques such as self-organizing maps in the positioning of the destinations.

Acknowledgements

We wish to thank Laura Muñoz and Jacinta García at the World Tourism Organization (UNWTO) for providing us with the data used in this study. This paper has been partially financed by the project ECO2016-75805-R of the Spanish Ministry of Economy and Competitiveness.

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