

## FURTHER INSIGHTS INTO TOURISM SUPPLY AND DEMAND PATTERNS OF EUROPEAN COUNTRIES

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### Abstract

The globalization phenomenon has conducted to an enhanced access to more and more touristic destinations all over the world, increasing the key-driver role of tourism on the economic and social development. In 2015, at international level, tourism sector had a direct contribution of 3% of total GDP, while its total contribution reached 9,8% of total GDP. The number of tourist arrivals increased by 4,6% in 2015 and the international tourism receipts grew by 4,4% in real terms. In addition, Europe remained the most visited region in the world and ranked first with more than 600 million tourist arrivals (51%) and tourism receipts of 451 billion US dollars (36%).

This paper aims at identifying the profile of tourism participating countries, considering the tourism demand and supply perspective. Principal Component Analysis is conducted on EUROSTAT data, covering 27 European countries, 2015. It enables identifying significant influence factors on the tourism demand and supply in recent years, as well as various patterns in countries' touristic behavior. Two main components were extracted from the initial data set, concentrating 70,643% of the total variability of the data and describing the touristic demand and supply, together with their determinants.

**Keywords:** Country profile, Principal Component Analysis, Tourism demand, Tourism supply.

**JEL Classification:** C38, L83

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### Introduction

Due to the globalization phenomenon, which made the touristic destinations more accessible, the key-driver role of tourism on the economic and social development has increased. Europe remained the most visited region in the world and ranked first with more than 600 million tourist arrivals (51%) and tourism receipts of 451 billion US dollars (36%).

In this paper the Principal Component Analysis was conducted in order to identify the profile of tourism participating countries, using determinants of tourism demand and supply. Two main components were extracted from the initial data set, concentrating

70,643% of the total variability of the data. These components will be used in future work to link the tourism supply and demand determinants in a regression model.

### **Literature Review**

Due to the increasing role of tourism activity in enhancing new economic opportunities, researchers all over the world have tried to identify its determinants and to find the best ways to maximize its efficiency.

Craggs (2008) conducted studies on visitor perception, behaviour and experience at urban waterfront destinations, identifying that frequency of visits and age influence the overall satisfaction and exploring various patterns of visitors' expenditures.

Gomezelj Omerzel (2011) inquired for various factors that influence the demand for a tourist destination in Slovenia, focusing on stakeholders' perceptions and providing a measurement model of competitiveness indicators.

Leatherman and Marcouiller (1996) proposed an estimation method of the tourism contribution to employment and income generation in a touristic region, using secondary data; they emphasized the necessity of distinguishing between „out-of-region demand attributable to travellers/visitors versus seasonal home-owners”.

Pérez-Dacal, Pena-Boquete and Fernández (2014) provided a measurement procedure of tourism specialization, considering both tourism and supply sides, based on Spain case; amenities were included in the range of influence factors as well.

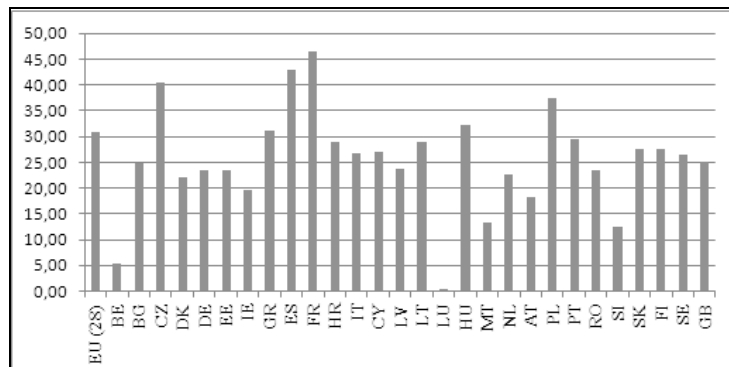
Brakke (2005) performed a study on the international tourism industry, proposing a fixed-effect demand model, in order to express the behaviour of the number of international tourist arrivals (the explained variable) on the following explanatory variables: income per capita in origin country, price competitiveness index for the destination country and a political variable.

Sinclair (1998) studied the behaviour of the tourism receipts/arrivals depending on the income per capita, relative prices, exchange rates, transport costs and dummy variables. Many tourism demand models have considered as one of the independent variables the income elasticity, most studies finding this variable to have a significant impact on tourism demand: Gray, (1966). Other studies focused on the effect of terrorism on the tourism demand. Thus, Enders, Sandler and Parise (1992) found that terrorism have a significant impact on tourism receipts, leading to an income decrease and to a change of the touristic destination. Drakos and Kutan (2001) revealed that the impact of terrorism on the touristic demand might be significantly different from one region to another.

### **Characteristics of European tourism demand and supply**

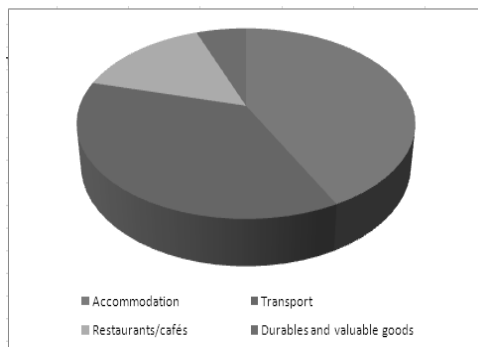
The globalization phenomenon has conducted to an enhanced access to more and more touristic destinations all over the world, increasing the key-driver role of tourism on the economic and social development. In 2015, at international level, tourism sector had a direct contribution of 3% of total GDP, while its total contribution reached 9,8% of total GDP (Travel&Tourism. Economic Impact 2016). The number of tourist arrivals increased by 4,6% in 2015 and the international tourism receipts grew by 4,4% in real terms. In addition, Europe remained the most visited region in the world and ranked first with more than 600 million tourist arrivals (51%) and tourism receipts of 451 billion US dollars (36%) (UNWO. Tourism Highlights, 2016 Edition). Domestic participation in tourism for personal purposes – at EU 28 level - remained at an approximately constant level, slightly exceeding 30% of total population in 2015. France recorded the highest indicator level

(46,56%), followed by Spain (42,96%). On contrary, Luxembourg ranked last – with only 0,38% of domestic population participating in tourism, preceded by Belgium – with 5,36% (Figure no. 1).

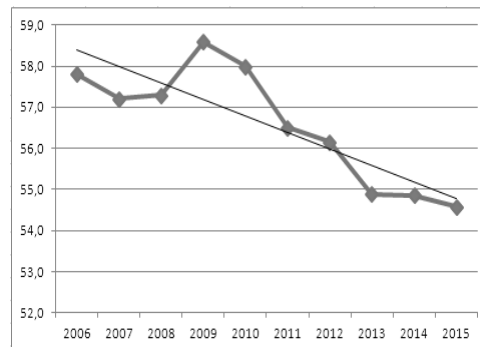


**Figure no. 1: Participation in tourism for personal purposes – domestic - (%), 2015**  
*Source: authors' processing, based on EUROSTAT data.*

The average expenditure per night for domestic tourists was 48,12 Euro/night at EU (28) level, with a maximum value of 193,5 Euro/night in Luxembourg, followed by 110,56 Euro/night in Austria and 96,3 Euro/night in Denmark. The lowest values were recorded in Czech Republic and Latvia (below 15 Euro/night). At European level, the accommodation expenditure represents approximately 43% out of total travel expenditure, the transport expenditure 37%, food & beverage expenditure 15% and expenditure for acquiring durables and valuable goods 6% (Figure 2).



**Figure no. 2: The structure of travel expenditures EU (28), 2014 (%)**



**Figure no. 3: Total nights spent by residents (%) EU (28), 2006-2015**

*Source: authors' processing, based on EUROSTAT data.*

At EU (28) level, the total number of nights spent by residents was slightly above 50% between 2006 and 2015, experiencing a downward trend. The maximum value was reached in 2009 (58,6%), while the minimum level was in 2015 (54,58%). In Romania it was recorded the highest value of the indicator (80,98% in 2015), followed by Poland and Germany (around 79%). Malta and Croatia had reached the lowest level (below 10% in

2015) (Figure 3). In EU 28 the accommodation capacity followed an upward trend between 2012 and 2015, from almost 553 thousand establishments to 578 thousand. By country, the highest accommodation capacity exists in Italy (167,7 thousand establishments in 2015), exceeding by a significant number all the other countries.

### Data and Methodology

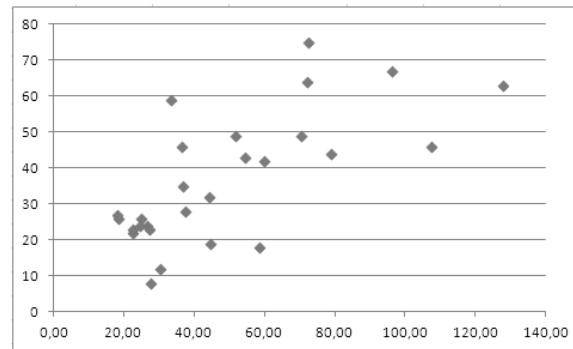
The analysis aims at identifying the profile of tourism participating countries, considering the tourism demand and supply perspective. Principal Component Analysis is conducted on EUROSTAT data, covering 27 European countries, 2015. It enables identifying significant influence factors on the tourism demand and supply in recent years, as well as various patterns in countries' touristic behaviour. The analysis initially covered ten variables characterizing the socio-economic environment which influences the tourism activity in European Union countries. As a result of correlation matrix analysis, there were removed the very highly correlated variables and the very weakly correlated variables as well. The final eight variables refer to the following pillars (Table no. 1):

**Table no. 1: List of variables**

Variable	Pillar	Significance
Gross Domestic Product ( <i>GDP</i> )	Economic, social and environmental development	Summarizes the economic development level of a country (million Euro)
Average Annual Earnings ( <i>EARNINGS</i> )		Reflect the average annual net earnings in a country (Euro)
Greenhouse Gas Emissions ( <i>GGE</i> )		Presents annual total emissions in relation to 1990 emissions (units of CO2 equivalents).
Number of Establishments ( <i>ESTABLISHMENTS</i> )	Tourism supply	Measures the number of accommodation establishments (hotels; holiday and other short-stay accommodation; camping grounds, recreational vehicle parks and trailer parks) (number)
Employment in accommodation and food services ( <i>EMPLOYMENT</i> )		Measures the number of people employed in accommodation and food services (Thousand people)
Participation in tourism ( <i>PART_TOURISM</i> )	Tourism demand	Participation in tourism for personal purposes – one night or over (%)
Average expenditure per night ( <i>EXP_PER_NIGHT</i> )		Measures the total consumption expenditure made by a visitor for a 1 night and over trip (Euros per night)
Internet purchases by individuals ( <i>INTERNET_PURCHASING</i> )		Measures the individuals' Internet online purchases made in the last three months (Percentage of individuals)

*Data processing was performed using SPSS Ver. 20.*

Between the total consumption expenditure made by a visitor for a 1 night and over trip and the use of the Internet to purchase goods and services - for example - there is a rather strong positive correlation, but not so strong to eliminate one of the two variables within the analysis (Figure 4). The result could be explained by the recent expansion of ICT technologies, the increasing access to modern technology and the increasing Internet usage for acquiring goods and services, including tourism services.



**Figure no. 4: The correlation between the average expenditure per night (Euro/night) and the use of the Internet to purchase goods and services (% of individuals)**

*Source: Authors' processing, based on EUROSTAT data*

As the values of the variables are significantly different, they were standardized. Kaiser-Meyer-Olkin Measure of sampling adequacy is 0.657, indicating that the Principal Component Analysis is suitable for the data considered. The value of Bartlett's Test of Sphericity (145.524) reveals that there is no enough evidence to accept the null hypothesis, according to which the correlation matrix is an identity matrix. Thus, we reject the null hypothesis (significance level: 0.000) (Figure 5).

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	,657
Approx. Chi-Square	145,524
Bartlett's Test of Sphericity	df. 28
Sig.	,000

Component Transformation Matrix		
Component	1	2
1	,768	,641
2	,641	-,768

**Figure no. 5: Bartlett's Test of Sphericity**      **Figure no. 6: Component Transformation Matrix**

*Source: made by the authors, using SPSS 20, based on EUROSTAT data*

Communalities table reveals large shares of each variable variance explained by the two principal components extracted. As a result of data projection on the first two components, they explain 70,643% of the total variability of the data set (43,449% for the first component and 27,194% for the second one) (Figure 7).

Component	Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3,476	43,449	43,449	3,476	43,449	43,449	43,449
2	2,175	27,194	70,643	2,175	27,194	70,643	70,643
3	,967	12,088	82,730				
4	,679	8,489	91,220				
5	,384	4,798	96,017				
6	,157	1,964	97,981				
7	,117	1,466	99,448				
8	,044	,552	100,000				

Extraction Method: Principal Component Analysis.

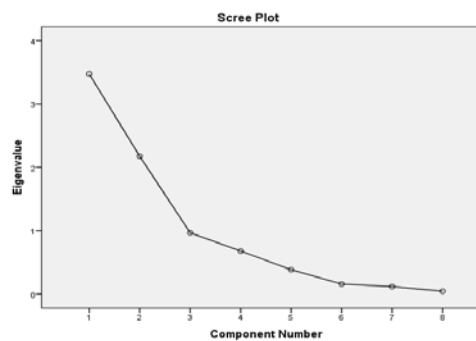
**Figure no. 7: Total Variance Explained**

	Component	
	1	2
	Zscore(Earnings)	,860
Zscore(Internet_purchasing)	,822	,325
Zscore(Exp_per_night)	,757	,413
Zscore(GDP)	,751	-,539
Zscore(Establishments)	,456	-,753
Zscore(Employment)	,688	-,693
Zscore(Part_tourism)	,417	,548
Zscore(GGE)		,341

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

**Figure no. 8: Component Matrix**



**Figure no. 9: Scree Plot**

Source: made by the authors, using SPSS 20, based on EUROSTAT data

The correlation coefficient between the two factors extracted is 0,641, revealing a relatively strong positive relationship between them (Figure 6). After applying the factor rotation procedure, the structures of the two components are (Figures 8, 9, 10 and 11):

- The first component includes variables related to average annual net earnings, percent of individuals purchasing goods and services on the Internet, Greenhouse Gas Emissions on one hand and variables related to tourism demand (average travel expenditure and percent of population participating in tourism activity for personal purposes) on the other hand; consequently, this component was named **Tourism demand and its determinants**;
- The second component includes variables related to economic development level (GDP) and variables related to tourism supply (employment level in accommodation and food services and number of accommodation establishments for touristic purpose); consequently, this component was named **Tourism supply and its determinants**.

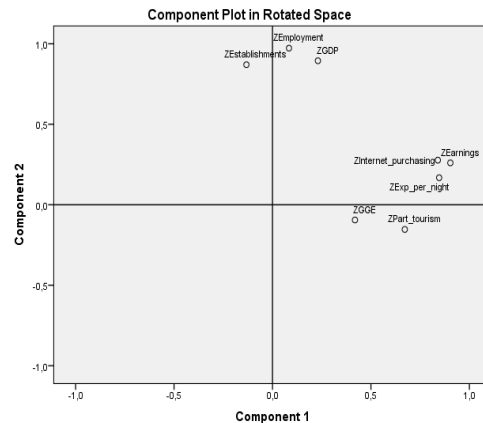
**Rotated Component Matrix<sup>a</sup>**

	Component	
	1	2
Zscore(Earnings)	,903	
Zscore(Exp_per_night)	,846	
Zscore(Internet_purchasing)	,840	
Zscore(Part_tourism)	,672	
Zscore(GGE)	,419	
Zscore(Employment)		,973
Zscore(GDP)		,895
Zscore(Establishments)		,870

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.



**Figure no. 10: Rotated Component Matrix**      **Figure no.11: Component Plot in Rotated Space**

Source: performed by the authors, based on EUROSTAT data

From the tourism demand and its determinants perspective, it was performed a multi-criteria ranking (by the five variables included in the first component); its results emphasize that developed countries in Northern and Western Europe rank on best places (Denmark, Germany, Finland, Ireland and the UK), while countries in southern Europe or former socialist countries rank on the last places (Portugal, Romania or Bulgaria). Technology plays an important role in increasing the individuals' participation in tourism activities; most of the best-ranked countries (Denmark, Germany and Great Britain) experience the highest shares of individuals who use Internet to acquire goods and service, including tourism services. However, some of these countries have in common a less favourable position regarding the air pollution (higher Greenhouse Gas Emissions in 2015), even than some of the last-ranked countries (Romania, Bulgaria).

Similarly, from the tourism supply and its determinants perspective, a multi-criteria ranking has been applied (by the three variables included in the second component); its results reveal that UK, Italy, Germany, France and Spain are the top countries, while Estonia, Latvia, Lithuania, Cyprus and Malta are the last ranked countries. The best-ranked countries in the hierarchy share the most favourable position, considering all the three ranking criteria altogether.

**Conclusions and future work**

The analysis conducted in the present paper proposes an identification of tourist behaviour patterns of European countries, based on a number of tourism demand and supply indicators, and on several potential influencing factors. Thus, there were included eight variables in the analysis, whose values characterize the economic, social and environmental development level for 27 European countries, in 2015. Two main components were extracted from the initial data set, concentrating 70,643% of the total variability of the data. The two main components describe the touristic demand and supply, together with their determinants. The first component (*Tourism demand and its determinants*) includes two indicators that measure - physically and financially - the tourism demand: the average travel expenditure (per night) and the percent of population participating in tourism activity for personal purposes. Countries with significant tourist flows are characterized by higher

employees' earnings and increased share of individuals purchasing goods and services on the Internet, but also by higher Greenhouse Gas emissions. The second component (*Tourism supply and its determinants*) includes two indicators that measure the tourism supply: employment in accommodation and food services and number of accommodation establishments for touristic purpose. Countries with significant tourism supply are characterized by high GDP levels, enhancing financial resources for investments in the creation, expansion and modernization of tourism base and infrastructure. Some of the European countries – like Germany or United Kingdom – are among the top countries by both criteria: tourism demand and supply.

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