

# EU Travel and Tourism Industry - A Cluster Analysis of Impact and Competitiveness

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## Abstract

*The tourism industry has known a sustained growth in recent decades, this sector taking advantage of the capacity to generate added value regardless of the type of capital input. The impact of tourism on the economy is indisputable, but the efficiency and the competitiveness provide a sustainable development of this industry. The EU enlargement, geographical and numerical, provides both - a diversity of tourism destinations and an opportunity for growth, considering widening of single market. This paper aims to assess tourism in the European Union, considering the impact and value of the tourism multiplier effect in economy, respectively efficiency and competitiveness of tourism. This paper proposes a classification of EU countries based on cluster analysis, using K-means algorithm.*

**Keywords:** *tourism, European Union, cluster analysis, multiplier coefficients, efficiency, competitiveness.*

## 1. Introduction

The economic importance of tourism was for many decades underappreciated, but nowadays we discover that the concept of „tourism activity” became „tourism industry”. The European Union gives tourism a high importance, which contributes substantially to its economic and social objectives. Regarding the tourism, the EU has as main objective to achieve an optimal balance of tourism activities in member countries. In 2010 the Commission proposed a strategy for boosting European tourism, in order to maximize the potential of this sector. A total of 21 proposals, on the four main directions, are subject of the Commission's strategy on tourism in Europe - „Europe - the world's No 1 tourist destination – a new political framework for tourism in Europe”: (1) Stimulate competitiveness in the European tourism sector (Promoting diversification of the supply of tourist services; Developing innovation in the tourism industry; Improving professional skills; Encouraging an extension of the tourist season ; Consolidating the socioeconomic knowledge base for tourism); (2) Promote the development of sustainable, responsible and high-quality tourism ; (3) Consolidate the image and profile of Europe as a collection of sustainable and high-quality tourist destinations; (4) Maximise the potential of EU financial policies and instruments for developing tourism.

This paper proposes an assessment of tourism in the European Union, starting from two types of information: the impact of tourism in the EU economy and the competitiveness of the tourism sector.

Based on statistics provided by the World Travel and Tourism Council and the World Economic Forum, we calculate multiplier coefficient for tourism, the tourism industry efficiency, the balance of payments in international tourism, and finally grouping EU countries based on these variables using cluster analysis. Related to the World Travel and Tourism Council analyses, the direct impact includes employees and the related value added for accommodation, recreation, transportation etc, while the indirect impact measures the supply chain impact, the induced impact measures the impacts of incomes earned directly and indirectly as they are spent in the local economy. Direct, indirect and induced impacts are equal with the total economic impact of tourism (World Travel and Tourism Council, 2013a).

World Economic Forum has calculated since 2008 (next editions were in 2009, 2011, 2013) a tourism competitiveness index. „The Travel & Tourism Competitiveness Index (TTCI) aims to measure the factors and policies that make it attractive to develop the T&T sector in different countries”(World Economic Forum, 2013). The index includes 14 criteria, on the three main pillars: A - Regulatory framework (Policy rules and regulations, Environmental sustainability, Safety and security, Health and hygiene, Prioritization of Travel and Tourism);B - Business environment and infrastructure (Air transport infrastructure, Ground transport infrastructure, Tourism infrastructure, Information and Communications Technical infrastructure, Price competitiveness in T&T industry); C - Human, cultural, and natural resources (Human resources, Affinity for Travel & Tourism, Natural resources, Cultural resources). The paper is structured as follows: literature review, research methodology, results and discussion, conclusions.

## **2. Literature review**

The specialized literature has covered important stages in analyzing the impact and competitiveness of tourism destinations over the last few decades.

The impact of tourism (Sadler, 1975; Liu et al., 1984 Rita, 2000; Dwyer et al., 2004; Ivanov & Webster, 2007) or competitiveness of destinations (Gooroochurn & Sugiyarto, 2005; Kayar & Kozak, 2007; Leung & Baloglu, 2013) were important directions for assessing the growing importance of tourism in the global economy.

Statistical and mathematics methods were options of many researchers, among them we notice the tourism multiplier analysis (Archer, 1982; Hughes, 1994; Dwyer et al., 2004) or cluster analysis (Brida et al., 2010; Brida et al., 2012; Leung & Baloglu, 2013, Chen, 2011; Vareiro Cruz et al., 2013)

Sadler (1975) analyzed the costs and the benefits generated by tourism in the economies of developing countries. Archer (1982) examines the origins, nature and evolution of tourism multipliers, their misuse, strengths, weaknesses and limitations, and their value for planning and policymaking. Liu et al. (1984) have demonstrated the importance of side effects generated by revenues from tourism in economy. Hughes (1994) claimed that the multiplier calculated in relation to tourist expenditure is too wide or too narrow. Dwyer et al. (2004) had a critical approach to the methods widely used in estimating the economic impact of tourism, including multiplier analysis, proposing alternative techniques better related to the economic reality of our times. Ivanov & Webster (2007) tested a methodology for measuring the contribution of tourism to economic growth in the three EU countries: Cyprus, Greece and Spain.

Gooroochurn & Sugiyarto (2005) considers that tourism competitiveness is a complex concept, difficult to measure, proposing a model to measure it based on 8 indicators - price, openness, technology, infrastructure, human tourism, social development, environment and human resources.

The results showed that the most competitive destinations are the U.S., Sweden, Norway, Finland and Australia. Leung & Baloglu (2013) have proposed multidimensional scaling and cluster analysis methods to evaluate the destination competitiveness, based on The Travel & Tourism Competitiveness Report.

Chen (2011) used cluster analysis to group residents by their perception of the tourism impact events. Brida et al. (2010) used cluster analysis in the segmentation of host population by the views about the tourism policy strategies. Brida et al. (2012) appealed also to cluster analysis to assess residents' perceptions of the impact of cruise tourism on the local community. Cruz Vareiro et al. (2013) used cluster analysis to group residents according to their perception of the impact of tourism development, the results of classifying them into three groups - the Sceptics, the moderately Optimistics and the Enthusiasts

Tourism in the European Union was also a theme widely approached (Rita, 2000; Coles & Hall, 2005; Kayar & Kozak, 2007; Halkier, 2010) in various studies - competitiveness, impact, and policy development.

Rita (2000) highlights the importance of tourism as a generator of economic growth and jobs, saying that despite clear evidence of the importance of tourism in economic and social terms, it has made great difficulty getting its recognition within the EU legal policy. Kayar & Kozak (2007) evaluated tourism competitiveness in EU countries compared with Turkey, based on 13 key factors using cluster analysis and multidimensional scaling techniques. Study results show the grouping of the analyzed countries in three clusters, the fact that Turkey is only competitive by prices and underscores tourism competitiveness determinants: air and ground transport infrastructure, natural resources, cultural resources, health and hygiene. Halkier (2010) considers that in the absence of major programs to develop quality tourism services and the competitiveness of European destinations, the EU's role in tourism development has often been seen as quite limited. Halkier (2010) also examines two areas of EU policy - Competition Policy and Regional Development, in relation to tourism, concluding that, while policies aimed specifically tourism was limited, the side effects generated by the tourism sector are clearly considerable.

Since the number of member states has increased from 25 (2004), it has been reviewed the importance of tourism in the European Union. „European tourism needs to be managed with foresight, proactively rather than retrospectively responding to change, with its managers more keenly sensitised to the regularity of enlargement events, adjustments in EU governance, economic and social reorganisations in existing and new member states, and the potential restructuring of markets.” (Coles & Hall, 2005). The addition of Romania and Bulgaria in 2007 and most recently of Croatia in 2013 brings again into question the need to transform tourism in an EU priority.

### **3. Research Methodology**

The research methodology includes three stages: (1) empirical data analyze, (2) calculation and assessment of multiplier tourism coefficient and efficiency of industry, (3) cluster analysis.

Using statistics provided by WTTC reports on the impact of tourism in the economy of the current European Union member states has been analyzed both, in comparison to the year 2013, and also the changes for the 2003-2013, respectively 2013-2023 period, considering the following indicators: direct share of tourism in GDP, total share of tourism in GDP, direct share of tourism in employment, total share of tourism in employment.

It was examined, based on the index calculated by the World Economic Forum in 2008 and 2013, the tourism competitiveness of EU countries compared (score and world rankings) and evolution of TTCI index and his three pillars: A – Regulatory framework, B – Business environment and infrastructure, C – Human, cultural, and natural resources.

The position of the EU countries in international tourism was evaluated based on the balance of payments- residents spending outside the country and international tourism receipts, for each of the 28 Member States in 2013.

The second step was to assess the impact of tourism in EU member states by calculating multiplier of tourism and industry efficiency.

"According to the World Tourism Organization, the multiplier effect can be defined as the additional amount of income earned by a unit of tourist expenditure that will be used in the economy. Some authors propose the following method of calculating the multiplier effect" (Bulin:104):  $K = (\text{direct impact} + \text{indirect impact} + \text{induced impact}) / \text{direct impact}$ .

Adapting this formula, we calculate K for GDP and K for employment as follows:

$$K_{GDP} = \frac{\text{total impact in GDP}(\%)}{\text{direct impact in GDP}(\%)} \quad K_{Employment} = \frac{\text{total impact in employment}(\%)}{\text{direct impact in employment}(\%)}$$

The results were analyzed comparatively, static (2013) and dynamic (evolution compared to 2003 and projections for 2023), taking into account reference value in the literature for tourism multiplier ( $k = 3$ ).

Further, we calculated the tourism industry efficiency as the ratio of the total contribution / direct contribution of tourism to GDP and total / direct tourism employment:

$$E_{DIRECT} = \frac{\text{direct impact in GDP}(\%)}{\text{direct impact in employment}(\%)} \quad E_{TOTAL} = \frac{\text{total impact in GDP}(\%)}{\text{total impact in employment}(\%)}$$

The results were analyzed comparatively static (2013) and dynamic (evolution compared to 2003 and projections for 2023), taking into account that a greater than one value of the industry's show efficiency and a value below one shows its inefficiency.

The last step consisted in cluster analysis using K-means method. „This procedure attempts to identify relatively homogeneous groups of cases based on selected characteristics, using an algorithm that can handle large numbers of cases[...]the algorithm requires you to specify the number of clusters" (IBM).

For this we used STATISTICA software, the number of clusters was predefined to 3. In turn, the European Union countries were grouped based on the following variables: K GDP and K Employment; E Direct and E Total; The three main components of tourism competitiveness index (A, B, C).

After results were revealed the movements produced in the groups on the three moments - 2003, 2013 and 2023 (WTTC prognosis) and examined the evolution of averages of cluster analyses variables.

We assume comparisons and include all 28 EU member states in the analysis for 2003, when Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia

(which joined the EU on May 2004), Romania and Bulgaria (January 2007) and Croatia (July 2013) were not members yet.

## 4. Results and discussion

### 4.1 Empirical analyses

**Impact of tourism.** Direct contribution of the tourism industry on GDP in European Union countries registered in 2013 shares between 1,6% (Romania) and 13,5% (Malta). Low share of less than 2 percent were recorded in Denmark (1,9%), Germany (1,6%), Lithuania (1,8%) and Luxembourg (1,6%), instead new-member Croatia registering a double-digit percentage (12,1%). Further, the shares in the total contribution (including the direct contribution, plus indirect and induced contribution) range from 27,7% (Croatia) and 4,5% (Lithuania). Over 20 percent of the GDP is tourism and the activities / sectors adjacent in Cyprus (20,5%) and Malta (25,5%), while in Germany the share is only 4,7%.

The situation is broadly similar in the case of tourism contribution in employment. Thus, the direct contribution share of less than 2 percent we find in Germany (1,8%) and Lithuania (1,8%), while on the opposite side, the higher shares are in Malta (14,7% ) and Croatia (13,2%). Also, the total contribution of the tourism industry in employment is only 4.4% in Lithuania and 5% in Germany, while in Croatia is 29,8%, 26,3% in Malta and 22% in Cyprus.

Relating to 2003, in 11 of the 28 current EU member countries, all four indicators of impact of tourism analyzed knew a decline - Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, France, Germany, Lithuania, Malta and Netherlands, in other countries the phenomenon being contrary - Greece, Ireland, Latvia, Luxembourg, Portugal, Romania, Slovakia and Slovenia. The most unfavorable evolution was recorded by Bulgaria, the direct contribution of tourism in the economy decreasing by more than 3 percentage points (3,6 percentage points to GDP, 3 percentage points for the employed population), while the total by 12 percentage points (of GDP ) and 10.6 percentage points (employed population). The best results in the European Union were recorded by Greece (increase of direct contribution to GDP by 1 percentage point and 1,2 percentage points for the employed population) and Luxembourg (total contribution increases by 2,9 percentage points GDP and 4.1 percentage points for the employed population).

Projections for the next 10 years show an increase of the importance of tourism in 27 of the 28 European Union member countries, except Bulgaria, which keeps the downtrend. WTTC projections show that Croatia (direct contribution to GDP will increase by 4,2 percentage points and 2,9 percentage points employed population) and Cyprus (total contribution to GDP will increase by 9.9 percentage points and in employment by 8 percentage points) will have the best results in the Union in the next period (2013-2023).

**Tourism competitiveness.** Although Switzerland is on the first position among global tourism competitiveness, the podium is completed by two EU countries - Germany (2) and Austria (3), both with the same overall score (5,39) in 2013. Moreover, the following places in the 2013 world rankings are also occupied by the EU countries - Spain (4) and the UK (5), both with 5,38 score, France (7th rank, 5,32 score) and Sweden (9th rank, 5,24 score ) being also in the top 10.

Analyzing the scores on the the three pillars, the best scores in European Union are recorded by Austria for A pillar (score 5,80 in 2013), Germany for B pillar (5,29 in 2013) and UK for C pillar (5,57 in 2013).

In contrast, are members of the European Union where the tourism competitiveness index is very low, much below their potential - Romania (rank 68 in 2013 and 69 in 2008), Slovakia (rank 54 in 2013) and Bulgaria (rank 50 in 2013). Romania recorded the lowest values for two of the three pillars (5,61 for A, 3,67 for B, 2013), for C pillar lowest value being in Latvia (3,81).

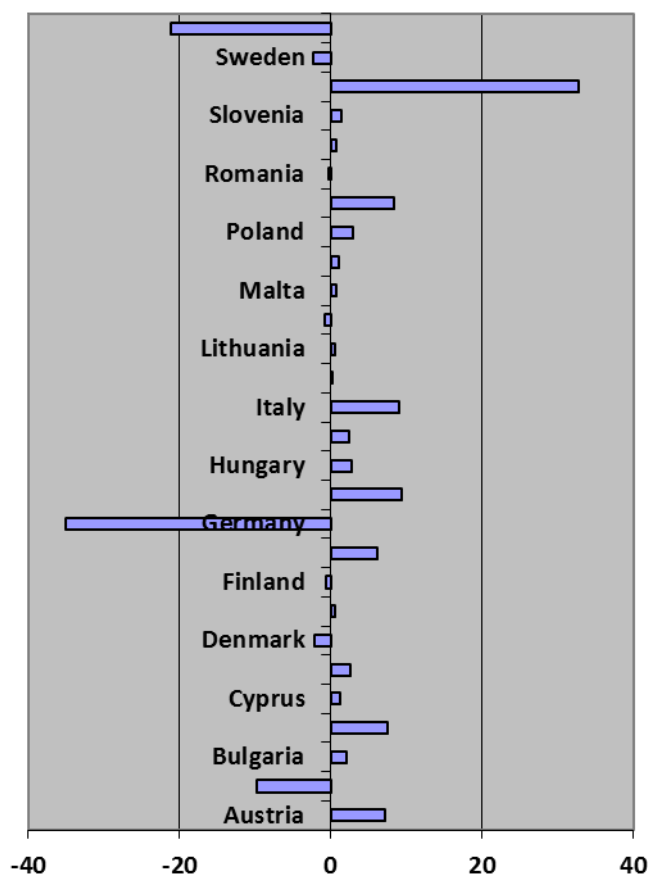
On the evolution of EU countries from the first year was calculated ICCT (2008, noting that at that time Croatia was not a member), it is observed that a performance improvement of competitiveness on the all three pillars recorded by four countries - Belgium, Ireland, Poland and Romania, a decrease in the index (also on the all three pillars) is signaled in Hungary, Portugal and Slovakia. Moreover, Poland and Belgium are the countries with the best performance for the period 2008-2013, with increases in the overall index of 0,29 and 0,2, which resulted in gaining a fourteen, respectively nine positions in the world rankings. Instead, Slovakia has dropped the most places -16 positions, and Greece has declined the most in index (-0,17) which made falling 10 positions in the world rankings. On the three pillars, the best performance in the period 2008-2013 was registered in Poland (pillar A, 0,41), Bulgaria (pillar B, 0,4) and the Netherlands (pillar C, 0,39). In the same period the most significant decrease in competitiveness was recorded in Greece (pillar A, -0,44), Denmark (pillar B, -0,22) and Bulgaria (-0,38).

**Table 1. International tourism**

Country	Visitor exports (bn euro)	Outbound tourism (bn euro)
Austria	16,6	9,4
Belgium	10,2	20,0
Bulgaria	3,3	1,2
Croatia	8,4	0,9
Cyprus	2,2	1,0
Czech Republic	5,8	3,2
Denmark	5,3	7,4
Estonia	1,3	0,8
Finland	3,9	4,5
France	44,3	38,2
Germany	37,4	72,4
Greece	11,0	1,6
Hungary	4,6	1,8
Ireland	7,1	4,6
Italy	33,3	24,3
Latvia	0,9	0,6
Lithuania	1,1	0,6
Luxembourg	1,1	1,9
Malta	1,1	0,3
Netherlands	16,4	15,3
Poland	9,0	6,1
Portugal	12,0	3,7
Romania	1,8	2,1
Slovakia	1,8	1,0
Slovenia	2,2	0,8
Spain	49,1	16,3
Sweden	12,8	15,1
UK	29,3	50,4

Source: based on WTTC Country Reports

**Fig. 1. Tourism Balance of Payments**



Source: author's calculations based on WTTC Country Reports

Regarding the tourism balance of payments (exports - imports), we concluded that in the European Union in 2013 there are 8 importing countries (tourist expenditure abroad residents are

higher than receipts from international tourism) - Belgium, Denmark, Finland, Germany, Luxembourg, Romania, Sweden and UK. Evaluating more closely the balance receipts of expenditures we distinguish three major tourism exporters in EU: Germany - receipts of 37,4 billion euros, 72,4 billion expenditures; United Kingdom - receipts of 29,3 billion euros, 50,4 billion expenditures; Belgium – receipts of 10,2 billion, 20 billion expenditures. The largest exporter of tourism in the EU is Spain - 49,1 bn receipts, the balance excess of 32,8 bn euros.

Significant excedentary balances also register Italy - receipts of 33,3 bn, the excedentary balance of 9 bn, France - receipts of 44,3 billion, excedentary balance of 6,1 billion, but a high volume of imports.

Also, Germany and the UK although they have high receipts from tourism (37,4 bn and 29,3 bn euros), they are the largest consumers of tourism in the EU - spending 72,4 billion (Germany) and 50,4 billion (United Kingdom). Important exporters of tourism in EU are also Austria, Croatia, Greece or Portugal.

#### 4.2. Tourism multiplier and efficiency

Based on statistics provided by the WTTC, we calculated the tourism multipliers and efficiency and the results are in the table below.

**Table 1. Multipliers and efficiency of tourism (2003, 2013, 2023)**

Country	Multipliers						Efficiency					
	K GDP			K Employment			E Direct			E Total		
	2003	2013	2023	2003	2013	2023	2003	2013	2023	2003	2013	2023
Austria	2,87	2,77	2,66	2,81	2,68	2,53	0,91	0,91	0,84	0,93	0,94	0,89
Belgium	2,52	2,55	2,36	2,52	2,50	2,41	0,93	0,92	0,93	0,93	0,93	0,91
Bulgaria	3,45	3,57	3,50	3,55	3,56	3,45	1,14	1,09	1,03	1,11	1,09	1,04
Croatia	2,24	2,29	2,21	2,18	2,26	2,22	0,80	0,92	1,01	0,83	0,93	1,01
Cyprus	3,10	3,06	2,95	2,95	2,86	3,41	0,90	0,87	1,17	0,94	0,93	1,01
Czech Republic	3,03	3,00	2,90	2,31	2,06	1,98	0,67	0,56	0,54	0,88	0,82	0,78
Denmark	3,55	3,74	3,64	2,83	2,86	2,78	0,69	0,66	0,69	0,87	0,86	0,90
Estonia	4,03	3,97	4,03	3,92	3,80	3,68	1,03	0,97	0,89	1,05	1,02	0,98
Finland	3,00	3,09	2,96	3,19	3,09	3,00	1,00	0,96	0,90	0,94	0,96	0,89
France	2,50	2,47	2,40	2,47	2,39	2,32	0,90	0,86	0,84	0,91	0,90	0,87
Germany	2,78	2,94	2,76	2,84	2,78	2,68	0,95	0,89	0,89	0,93	0,94	0,92
Greece	2,94	2,53	2,59	2,38	2,07	2,19	0,71	0,73	0,75	0,88	0,89	0,89
Hungary	2,73	2,59	2,52	1,85	1,75	1,70	0,74	0,72	0,65	1,09	1,06	0,96
Ireland	3,94	4,29	3,85	4,00	4,14	3,68	1,00	0,95	0,93	0,99	0,99	0,97
Italy	2,64	2,49	2,41	2,63	2,37	2,22	0,92	0,84	0,78	0,92	0,88	0,85
Latvia	2,83	2,86	2,73	2,95	2,75	2,59	1,21	1,00	0,89	1,16	1,04	0,94
Lithuania	2,67	2,50	2,42	2,65	2,44	2,30	1,04	1,00	0,95	1,05	1,02	1,00
Luxembourg	2,12	3,42	3,55	2,19	3,48	3,61	0,81	0,76	0,71	0,78	0,75	0,70
Malta	1,88	1,89	1,81	1,81	1,79	1,70	0,93	0,92	0,88	0,96	0,97	0,94
Netherlands	3,04	2,95	2,96	1,64	1,55	1,53	0,31	0,30	0,31	0,58	0,57	0,60
Poland	2,52	2,48	2,40	2,38	2,43	2,21	1,00	1,00	0,89	1,06	1,02	0,97
Portugal	2,82	2,74	2,60	2,69	2,56	2,40	0,80	0,80	0,76	0,84	0,86	0,82
Romania	3,29	3,19	3,24	2,21	2,38	2,46	0,58	0,67	0,65	0,87	0,89	0,86
Slovakia	2,72	2,48	2,50	2,71	2,33	2,27	1,06	0,96	0,92	1,07	1,02	1,02
Slovenia	3,41	3,56	3,62	3,20	3,28	3,22	0,91	0,90	0,85	0,97	0,98	0,95
Spain	2,81	2,75	2,72	3,10	3,10	2,98	1,10	1,12	1,07	0,99	0,99	0,98
Sweden	4,00	3,96	3,81	3,41	3,11	3,11	0,76	0,68	0,70	0,89	0,87	0,85
UK	3,00	2,97	2,97	2,59	2,30	2,20	0,82	0,65	0,62	0,95	0,84	0,83
UE Average	2,94	2,97	2,90	2,71	2,67	2,60	0,88	0,84	0,82	0,94	0,93	0,90

Source: author's calculations, based on WTTC Country Reports

Note: data for 2023 based on WTTC forecasting

**Multiplier of tourism.** The average multiplier of tourism in 2013 at EU level is 2,97 if GDP and 2,67 for the employed population. Reference value in the literature ( $K = 3$ ) is exceeded by the 10 of the 28 EU members in the case of GDP multiplier and only 8 of 28 in the case of employment multiplier.

The highest values of K GDP are recorded by Ireland (4,29), Estonia (3,97) and Sweden (3,96), the opposite being found in Malta (1,89) and Croatia (2,29). Also for K Employment the EU performer is Ireland, with a multiplier of 4,14, high values were recorded in Estonia (3,8), Bulgaria (3,56) and Luxembourg (3,48). The lowest multiplier effect in employment is registered by Netherlands (1,55), also low values are in Hungary (1,75) and Malta (1,79).

Comparing the K for the two categories (GDP, Employment), we pointed out that in only two EU countries the multiplier effect of tourism in employment is higher than considering the GDP - Spain ( $K \text{ GDP} = 2,75$ ;  $K \text{ Employment} = 3,1$ ) and Luxembourg ( $K \text{ GDP} = 3,42$ ,  $K \text{ Employment} = 3,48$ ).

Instead, the major discrepancies between the values of K GDP and K Employment are registered in Netherlands ( $K \text{ GDP} = 2,95$ ;  $K \text{ Employment} = 1,55$ ), Czech Republic ( $K \text{ GDP} = 3$ ,  $K \text{ Employment} = 2,06$ ), Denmark ( $K \text{ GDP} = 3,74$ ,  $K \text{ Employment} = 2,86$ ) and Sweden ( $K \text{ GDP} = 3,96$ ;  $K \text{ Employment} = 3,11$ ).

At the EU level (Note: in the analysis there are included all the 28 present EU members countries) the multiplier effect of tourism has not know significant variations in the period 2003-2023: K GDP multiplier value increased slightly from 2,94 to 2,97, and K Employment decreased slightly from 2,71 to 2,67. The most significant increase of K GDP was recorded for Luxembourg (from 2,12 to 3,42) and the largest decrease of K GDP for Greece (from 2,94 to 2,53). In the case of K Employment, this also improved the most in Luxembourg (from 2,19 to 3,48), and dropped most in Slovakia (from 2,71 to 2,33).

In the next 10 years there is projected an insignificant decline of K multipliers of tourism on the EU, both for GDP (from 2,97 to 2,90) and Employment (from 2,67 to 2,6). Luxembourg will know the largest increase in K GDP, by 4 percent, from 3,42 to 3,55, and for Ireland K GDP will decrease the most, about 10 percent, from 4,29 to 3,85. The highest increase of K Employment will be 19% in Cyprus (from 2,86 to 3,41), and the most important decrease is going to be recorded in Ireland (from 4,14 to 3,68).

**Tourism industry efficiency.** It can be noticed that, at the EU level in 2013, both total and direct efficiency register values below one, total efficiency of tourism in the economy is higher than the direct efficiency ( $E \text{ direct} = 0,84$ ,  $E \text{ total} = 0,93$ ).

Regarding the direct efficiency of tourism activity, only in Spain (1,12) and Bulgaria (1,09) we can conclude that we have a efficient industry, the lowest values being recorded in Netherlands (0,30) and Czech Republic (0,56). Also in the case of total efficiency of the industry, the Netherlands recorded the lowest value (0,57). In opposition, 7 EU countries have E total higher than 1 - Bulgaria (1,09), Hungary (1,06), Latvia (1,04), Estonia (1,02), Lithuania (1,02), Poland (1,02) and Slovakia (1,02). In only two of the 28 member states direct efficiency is superior to total efficiency of tourism - Spain ( $E \text{ direct} = 1,12$ ,  $E \text{ total} = 0,99$ ) and Luxembourg ( $E \text{ direct} = 0,76$ ,  $E \text{ total} = 0,75$ ). The most important differences between direct and total efficiency are registered in Hungary ( $E \text{ direct} = 0,72$ ,  $E$



total = 1,06), the Netherlands (E direct= 0,30, E total = 0,57), Czech Republic (E direct = 0,56, E total = 0,82) and Romania (direct E = 0,67, E total = 0,89). At the level of EU countries, the average efficiency of tourism fell slightly between 2003 and 2013: direct efficiency from 0,88 to 0,84, total efficiency from 0,94 to 0,93. Although in many present EU members, direct and total efficiency experienced a slight decline, new entrant Croatia had a positive evolution (E direct increased from 0,8 to 0,92, E total increased from 0,83 to 0,93). Romania also experienced increase of direct efficiency by 14 percent, from 0,58 to 0,67, unfavorable evolutions registering UK (E direct decreased by approximately 20%, from 0,82 to 0,65 and E total over 10 percent, from 0,95 to 0,84).

For the next 10 years, the average efficiency of tourism in the EU will experience a similar trend of the previous decade, E direct down from 0,84 to 0,82, and E total from 0,93 to 0,90. The best evolution for the 2013-2023 period will be recorded by Cyprus, direct efficiency will increase by 35% and total efficiency by 9%, so going from values below one (E direct 0,87, E total 0,93 total) to values over one (E direct 1,17, E total 1,01). Tourism industry will become ineffective in Poland, E direct decreasing by 11 percent, from 1 to 0,89, and Latvia, E total decreasing by 10 percent, from 1,04 to 0,94.

### 4.3. Cluster analysis

Using k-means algorithm for cluster analysis in STATISTICA software, the members countries of EU were grouped into three clusters as follows: Cluster 1 – countries with low K GDP and K Employment; Cluster 2 - countries with medium K GDP and K Employment; Cluster 3 - countries with high K GDP and K Employment. Moreover, on cluster 3 the average for K is higher than 3, the reference of multiplier coefficient of tourism.

**Fig. 2. Clusters – Multiplier analysis**

2003		Cluster 1		Cluster 2		Cluster 3	
Exporters	Croatia France Hungary Netherlands	Czech Republic Greece Malta Poland	Austria Italy Lithuania Slovakia Spain	Cyprus Latvia Portugal Slovenia	Bulgaria Estonia Ireland		
Importers		Belgium Luxembourg Romania	Denmark Germany	Finland UK	Sweden		
Mean K GDP		2,62		2,94		3,86	
Mean K Employment		2,18		2,86		3,72	

2013		Cluster 1		Cluster 2		Cluster 3	
Exporters	Croatia France Hungary Lithuania Netherlands Slovakia	Czech Republic Greece Italy Malta Poland	Austria Cyprus Latvia Portugal Spain		Bulgaria Estonia Ireland Slovenia		
Importers		Belgium	Finland Romania	Germany UK	Denmark Luxembourg Sweden		
Mean K GDP		2,52		2,93		3,79	
Mean K Employment		2,16		2,72		3,46	

2023		Cluster 1		Cluster 2		Cluster 3	
Exporters	Croatia France Hungary Lithuania Netherlands Portugal	Czech Republic Greece Italy Malta Poland Slovakia	Austria Latvia Spain		Bulgaria Cyprus Estonia Ireland Slovenia		
Importers		Belgium	Finland Germany Romania UK		Denmark Luxembourg Sweden		
Mean K GDP		2,47		2,86		3,62	
Mean K Employment		2,11		2,64		3,37	

Source: by author, based on STATISTICA software output

Analyzing the composition of clusters in the years 2003, 2013 and 2023 we can see that Bulgaria, Estonia, Ireland and Sweden belong each time to cluster 3, with highest tourism multiplier. Compared to 2003, in 2013 Denmark, Luxembourg and Slovenia have promoted from cluster 2 to cluster 3, but the average K GDP and K Employment have decreased. The composition of the cluster 2 was affected by downgrades to cluster 3 of Italy Lithuania and Slovakia, but also by Romania's promotion from cluster 1. These changes have generated a slight decrease of variables average, more pronounced for K Employment. The number of countries in the cluster 1 increased from 11 to 12, the average K decreasing, more pregnant in the case K GDP. It is noted, in 2003-2023, a significant jump of Luxembourg from cluster 1 to cluster 3.

Projections for 2023 show that Cyprus will climb to cluster, on a background of declining averages of K, while Portugal will increase to 13 the number of countries from the cluster 1, despite the same trend of decreasing multipliers averages.

**Fig. 3. Clusters - Efficiency analysis**

2003	Cluster 1		Cluster 2		Cluster 3	
Exporters	Croatia Greece Portugal	Czech Republic Netherlands	Austria France Ireland Malta	Cyprus Hungary Italy Slovenia	Bulgaria Latvia Poland Spain	Estonia Lithuania Slovakia
Importers	Denmark Romania	Luxembourg Sweden	Belgium Germany	Finland UK		
Mean E Direct	0,68		0,91		1,08	
Mean E Total	0,82		0,96		1,07	
⇩						
2013	Cluster 1		Cluster 2		Cluster 3	
Exporters	Czech Republic Greece Netherlands		Austria Cyprus Hungary Malta Slovenia	Croatia France Italy Portugal	Bulgaria Ireland Lithuania Slovakia	Estonia Latvia Poland Spain
Importers	Denmark Romania UK	Luxembourg Sweden	Belgium Germany	Finland		
Mean E Direct	0,62		0,87		1,01	
Mean E Total	0,81		0,94		1,02	
⇩						
2023	Cluster 1		Cluster 2		Cluster 3	
Exporters	Czech Republic Hungary Netherlands Portugal		Austria France Ireland Latvia Malta Slovakia	Estonia Greece Italy Lithuania Poland Slovenia	Bulgaria Croatia Cyprus Spain	
Importers	Denmark Romania UK	Luxembourg Sweden	Belgium Finland Germany			
Mean E Direct	0,62		0,88		1,07	
Mean E Total	0,81		0,93		1,01	

Source: by author, based on STATISTICA software output

K-means cluster analysis grouped the European Union countries by direct efficiency criteria and total efficiency of tourism, as follows: Cluster 1 - countries with low E Direct and E Total, Cluster 2 - Countries with medium E direct and E total, Cluster 3 - countries with high E direct E total.

Average values for E direct and E total in the case Cluster 3 are over one, suggesting an efficiency tourism industry.

Analyzing the composition of clusters on 2003, 2013 and 2023, it can be observed that in the cluster 2 are the most countries, and their number is increasing chronological - 9 in 2003, 11 in 2013 and 15 in 2023. To the 7 countries with high efficiency of tourism, which were in cluster 3 in 2003 (Bulgaria, Estonia, Latvia, Lithuania, Poland, Slovakia, Spain) Finland and Ireland have been added in 2013, due to a decrease of the average of E direct and E total. Also Croatia and Portugal have promoted from cluster 1 to cluster 2, but in return UK dropped from cluster 2 to cluster 3. E's averages are, to all cases, lower in 2013 than in 2003, showing the general trend of decreasing efficiency of tourism on EU countries.

Forecasts for 2023 show that in cluster 3 the number of countries will decrease to 4: Bulgaria and Spain will remain in the group, and Cyprus and Croatia will join them. Note that the new EU member Croatia have promoted successively from cluster 1 to cluster 3 in the period 2003-2023.

The average of E Direct variable will increase, this being a cause of decreasing the number of components of cluster 3. It is also noted, in the clusters 2 and 3, that E Direct and E Total averages didn't change significant, and but also dropped of Greece (crossing from cluster 3 to cluster 2) and Portugal (pass from cluster 2 on cluster 3).

Another notable thing is that in all 3 the moments (2003, 2013, 2023), only in 2013 we find an importing country – Finland -, in the group of efficient tourism (cluster 3).

**Fig. 4. Clusters – TTCI Analysis**

2008	Cluster 1	Cluster 2	Cluster 3
Exporters	Bulgaria Latvia Lithuania Poland Slovakia	Croatia Cyprus Czech Republic Estonia Greece Hungary Ireland Italy Malta Netherlands Slovenia	Austria France Portugal Spain
Importers	Romania	Belgium Luxembourg	Denmark Finland Germany Sweden UK
Mean A Pillar	4,83	5.31	5.57
Mean B Pillar	3,85	4.71	5.17
Mean C Pillar	4,07	4.40	5.01



2013	Cluster 1	Cluster 2	Cluster 3
Exporters	Bulgaria Hungary Lithuania Slovakia	Croatia Latvia Poland Slovenia	Austria France Netherlands Spain
Importers	Romania	Cyprus Czech Republic Estonia Greece Ireland Italy Malta Portugal	Germany Sweden UK
Mean A Pillar	4,97	5,38	5,55
Mean B Pillar	4,16	4,83	5,13
Mean C Pillar	4,10	4,57	5,28

Source: by author, based on STATISTICA software output

Cluster analysis based on the three pillars of tourism competitiveness generated three groups of countries on the EU: Cluster 1 - countries with low competitiveness, cluster 2 - countries with medium competitiveness, cluster 3 - countries with high competitiveness.

The number of countries with high competitiveness, despite falling averages for variables 2 of 3 (A and B pillars), declined to 7 in 2013, Austria, France, Germany, Netherlands, Spain, Sweden, UK.

Denmark and Finland, tourism importing countries, respectively Portugal, tourism exporter, fell from cluster 3 to cluster 2, and the same trend being registered in Hungary, Slovenia and Croatia, relegating from cluster 2 to cluster 1. Conversely, the only performer is the Netherlands, which has promoted from cluster 2 to cluster 3.

## 5. Conclusions

The analysis of the impact and multipliers of tourism, industry efficiency and competitiveness of the tourism sector, confirms that in European Union we have countries with different internal policies in relation to the tourism industry.

Regarding the direct impact of the tourism industry on economy, Croatia and Malta are among the countries where the industry is a major contributor in the formation of GDP and employment, but on the other hand, in those countries tourism revenues are still low relating to other destinations within the EU. In contrast, high tourism competitiveness of EU countries has as a result important international tourism receipts. Countries such as Austria, Germany and Spain, with leading positions in tourism competitiveness world ranking, have high receipts from visitors.

The cluster analysis for the three categories of variables - the multiplier of tourism industry efficiency and travel & tourism competitiveness-also confirms that EU brings together countries with different performance in tourism.

Looking to the Cluster 3 for all classifications (highest performance) it can be observed that no country is situated on top every time. Bulgaria, Estonia and Ireland are members of cluster 3 for tourism multipliers and efficiency. In those countries tourism has a driving effect in economy and, in addition, in those countries the industry works with efficiency. Sweden and Spain are situated also in 2 of 3 analyzes in the cluster 3: Sweden for tourism multipliers and competitiveness, Spain for efficiency and competitiveness. While Sweden is an importer, Spain is the most important exporter of tourism from EU, and also has the highest receipts from foreign visitors. Therefore, we can not establish a direct link between the status of those countries in international tourist flows and their position within the clusters.

Limitations of this study are related to the method of analysis (k-Means clustering), therefore future research may consider using other algorithms of cluster analysis or discriminant analysis, following a general classification of EU Member States taking into account all the variables used.

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