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Use of Tourism Intensity Indicators for Delimitation in European Union Countries

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Abstract:

Purpose: *This article aims to distinguish homogeneous groups of European Union countries by tourist intensity in 2000 and 2019.*
Design/Methodology/Approach: *An econometric diagnostic process was used to create the EU country rankings. The empirical distribution of tourism intensity measures in the countries studied was taken as the observed regularity. The normative regularity was determined according to the shape of the distribution of the measures in the studied collective. On this basis, the remaining elements of the diagnosis process were determined, and a combined diagnosis of tourism intensity for the EU countries was formulated.*
Findings: *Analysis of the averages of the sub-diagnoses showed that in both 2000 and 2019, only two countries (Malta and Cyprus) were in group one – the best from the point of view of the phenomenon under study. In 2019, the number of countries in group two decreased and the group of countries that were at best average increased. There was also an emergence of group four, in which only Romania qualified.*
Practical Implications: *The method presented in the article is useful in the process of diagnosis and discrimination of objects. It provides the possibility of unambiguous diagnosis in the case of one assessment criterion (indicator) at a given moment of time and combined diagnosis according to several assessment criteria (multiple indicators).*
Originality/Value: *This article contributes to recent European and global scientific discussions on the need for tourism research.*

Keywords: *Econometric diagnostic process, tourism indicators, EU countries*.

JEL classification: *C38, Z32.*

Paper Type: *Research study.*

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1. Introduction

The globalisation processes currently characterising the world's economic system are leading to increasing integration of financial and goods and services markets. One of those fields of activity that is succumbing spectacularly to the processes of globalisation is the tourism economy (Lew, 2011; Rasool, 2021; Tourism, 2023). The tourism economy is defined as all the means and facilities that serve tourism. The tourism industry in the EU (traditional holiday and travel providers) consists of 2.3 million businesses, mainly small and medium-sized, employing an estimated 12.3 million people.

In 2018, the 'travel and tourism' sector directly contributed 3.9% to the EU's GDP and accounted for 5.1% of the total workforce (corresponding to approximately 11.9 million jobs). Considering the close links with other economic sectors, the figures for the tourism sector increased significantly (10.3% of GDP and 11.7% of total employment, corresponding to 27.3 million workers) (Functioning of the European Union (TFEU)). Globalisation processes are not only observed in the economic sphere of tourism.

These phenomena lead to an increase in international mobility and tourist traffic. Tourist traffic – as a social phenomenon – is subject to globalisation processes, which is manifested by the inclusion of more and more countries and regions of the world within its scope (Kowalczyk, 2000; Mika and Faracik, 2007). To a large extent, this results from a constantly growing demand for tourism services. Tourism in the countries of the European Union is facing numerous challenges, mainly consisting of the global economic crisis, increasing competition among tourist destinations and the consequences of climate change.

Europe is one of the main tourist destinations in the world. However, within the global sector, it is not the fastest-growing region, and its market share, in terms of international tourist arrivals and receipts, is shrinking (Juul, 2015).

The tourism industry needs to adapt to societal changes that would affect tourism demand; on the other hand, it has to face the constraints of the current structure of the sector, its specific characteristics, and its economic and social context Nicula *et al* (2013). The study of tourism traffic is arduous due to the impossibility of comprehensively recording the phenomenon Alejziak (2010), Dziedzic (2010), Matczak (1992).

Data collected by public statistics cover only the registered accommodation base, while any data on the structure of the participants in this movement are obtained using partial surveys with limited representativeness due to the specific nature of the population surveyed. Consistent data on tourism in the EU are primarily collected and published by Eurostat.

However, currently available data from Eurostat have limited spatial and temporal resolution, making it challenging to characterise tourism across the EU at accurate spatial and temporal scales Batista *et al* (2018), Batista *et al* (2021). Other data used in tourism surveys from institutions/facilities or obtained at events that concentrate tourism in an area are fragmentary and can only illustrate the phenomenon under study in a piecemeal manner.

In 2019, international tourist arrivals reached 1.5 billion (+4%) internationally and 745 million in Europe, or 50% of the market. The COVID-19 pandemic has created uncertainty about the travel ban and sanitary obligations and is now the most severe challenge for the future of the tourism sector Helnarska (2022), Lapko and Hacia (2021), Rowinski (2020). Over the past sixty years, tourism has been one of the fastest-growing economic sectors in the world Peeters *et al* (2018).

Tourism continues to be an important area of interest for the financial world and governments, as it is one of the primary industries driving economic growth. The quality of tourism services, the degree of tourism development and the accessibility of tourism depend on some factors intrinsically linked to the functioning of the economy, among which globalisation and the world economic situation deserve particular importance Adamopoulos and Thalassinos (2020), Seghir *et al*. (2015), Kulyk and Brelik (2019). It is essential to emphasise that such factors have a long-term impact on local, regional and global tourism.

The study of tourist traffic in a specific area requires the application of a comprehensive research methodology considering many methods and using data from many complementary sources. At the same time, such a study requires expert experience and knowledge of the specifics of tourist traffic in a given area. The intensity of tourist traffic influences the volume of tourism demand, with which the volume of tourism goods and services is closely related Zdon-Korzeniowska, Rachwał (2011).

Given the intense competition in the international travel market, tourism entrepreneurs are constantly developing strategies to increase tourist traffic to specific destinations. Although many studies on tourism can be found in the literature, there is a lack of up-to-date research of a general, cross-sectional nature.

The studies deal with selected, narrow issues undertaken in a small area and over a short time. The authors formulated a combined tourism intensity diagnosis for EU countries to fill this gap. This article aims to distinguish homogeneous groups of European Union countries in terms of tourism intensity in 2000 and 2019. The research used an econometric diagnostic process. The empirical distribution of tourism intensity measures in the countries studied was taken as the observed regularity. The normative regularity was determined according to the shape of the distribution of the measures in the studied population.

On this basis, the remaining elements of the diagnosis process were determined, and a combined diagnosis of tourism intensity for the EU countries was formulated.

2. Statistical Material and Method

Indicators of intensity have been used to describe tourism phenomena in European Union countries, which provide information on the degree of development of the tourism function of the studied objects (countries, regions, localities), the intensity of tourism traffic, tourism development, etc. (Rapacz, 2004). These include:

W_1 – the Defert index, which shows the number of beds per 100 permanent residents in an administrative unit,
W_2 – Schneider index, which measures the number of overnight stays per 100 permanent residents,
W_3 – Charvat index, calculated as the number of nights provided per 100 permanent residents,
W_4 – the accommodation capacity utilisation rate, which measures how many days per accommodation unit was occupied during the year,
W_5 – the accommodation development index, calculated as the ratio of the number of tourists to the number of beds,
W_6 – the tourism density index, indicating the number of tourists per km^2,
W_7 – accommodation density indicator, showing the number of beds per 1 km^2 of the country.

All indicators are stimulants, i.e. the higher their value, the more developed the tourism function of the country and the better the use of existing accommodation.

The indicators determined can be used to formulate a combined diagnosis of tourism intensity in EU countries in the years 2000 and 2019. The process of econometric diagnosis used to formulate assessments (making diagnoses) in the process of controlling socio-economic phenomena, has been defined by Hozer and Zawadzki (1990) as a process consisting of the following elements:

- observed regularity,
- normative regularity (norm),
- deviation from the norm,
- tolerance of a deviation from the norm.

In this paper, the distribution of tourism intensity measures across the European Union countries is taken as the observed regularity. Therefore, the remaining elements of the diagnostic process are going to be determined by classical or positional parameters of the structure. The values of the position parameters (mean, median, dominant) should be the norm, while the absolute parameters of variation (standard deviation, quarter deviation) are to determine the deviation and tolerance of deviation from the norm.

The choice of the parameter type depends on the shape of the empirical distribution – for symmetric or near-symmetric distributions, classical parameters are used, and for asymmetric distributions – positional parameters (Wawrzyniak, 2000).

3. Results

At the outset of the diagnosis process, the basic parameters of the community structure were calculated to determine the shape of the empirical distribution (Table 1). Table 1 shows that the indicators adopted for the study are characterised by high variation (from 20.11% to 297.78%) and high asymmetry, except for indicator W_4.

Table 1. *Essential descriptive characteristics of tourism measures in European Union countries in 2000 and 2019*

	Average		Median		S(x)		Vs (w %)		As	
	2000	2019	2000	2019	2000	2019	2000	2019	2000	2019
W_1	2,75	2,20	2,03	1,72	2,48	1,40	90,43	63,75	1,83	0,90
W_2	105,18	206,76	76,66	168,93	78,75	152,75	74,87	73,88	1,14	1,25
W_3	378,98	499,97	359,33	361,72	214,13	405,11	56,50	81,03	1,02	2,13
W_4	126,95	146,51	120,53	151,88	34,29	29,46	27,02	20,11	0,48	-0,03
W_5	65,66	79,49	33,10	58,28	126,04	79,73	191,94	100,31	4,91	2,33
W_6	253,47	531,41	96,89	176,80	698,72	1582,42	275,67	297,78	5,13	5,21
W_7	7,39	89,59	2,51	34,85	23,65	264,22	319,94	294,94	5,22	5,21

Source: *Own research based on GUS database.*

With high heterogeneity and asymmetry, classical measures lose their cognitive meaning and, therefore, positional parameters (Table 2), i.e. median (M) and quarter deviation (Q), were used to determine the elements of the diagnosis process. Based on these, five typological groups were determined:

- group 1: index value above $M + 2Q$ – the value of the indicator exceeds in plus the deviation tolerance,
- Group 2: value of the indicator in the range $(M + Q; M + 2Q\rangle$ – the value of the indicator exceeds in plus the deviation from the norm but does not exceed in plus the deviation tolerance from the norm,
- Group 3: value of the indicator in the range $\langle M - Q; M + Q\ \rangle$ – the value of the indicator is within the range of deviation from the norm,
- Group 4: value of the indicator in the range $\langle M - 2Q; M - Q)$ – the value of the indicator exceeds in minus the standard deviation but does not exceed in minus the standard deviation tolerance,
- Group 5: index value below $M - 2Q$ – the value of the indicator exceeds the minus deviation tolerance,

where: M – median (norm), Q – quarter deviation (deviation from the norm).

***Table 2**. Elements of the diagnosis process for the patterns observed in 2000 and 2019*

Metters	Norm (M)		Range of deviation from the norm (M ± Q)		Deviation tolerance range (M ± 2Q)	
	2000	2019	2000	2019	2000	2019
W1	2,03	1,72	[0,99;3,08]	[1,00;2,44]	[0; 4,13]	[0,28; 3,15]
W2	76,66	168,93	[36,34;116,98]	[70,19; 267,66]	[0; 157,30]	[0; 366,40]
W3	359,33	361,72	[244,34;474,31]	[197,25; 526,19]	[129,35; 589,30]	[32,79; 690,66]
W4	120,53	151,88	[97,17;143,89]	[132,85;170,92]	[73,81; 167,25]	[113,81; 189,96]
W5	33,10	58,28	[19,08;47,12]	[40,55; 76,00]	[5,06; 61,14]	[22,83; 93,72]
W6	96,89	176,80	[9,55;184,24]	[57,80; 295,80]	[0 ; 271,58]	[0 ; 414,80]
W7	2,51	34,85	[0,74; 4,27]	[10,63; 59,08]	[0; 6,04]	[0; 83,31]

***Source:** Own research based on GUS database.*

Structured in this way, the elements of the diagnostic process have a simple interpretation. Countries classified in the first discriminatory group are in the best situation, while countries in group five are in the worst situation. A positive diagnosis can be formulated for countries in group two, while a negative one can be formulated for those in group four. The EU countries in group three can be described as average.

This procedure was carried out for each measure separately, which made it possible to formulate sub-diagnoses. The overall diagnosis for a country was formulated as the average of the sub-diagnoses. The results of the calculations are presented in Tables 3 and 4.

***Table 3.** Sub-diagnoses and cumulative diagnosis of tourism intensity in European Union countries in 2000*

Countries	W_1	W_2	W_3	W_4	W5	W_6	W_7	Average
Austria	1	1	3	3	3	2	1	2,00
Belgium	3	3	4	3	2	2	2	2,71
Bulgaria	3	3	4	5	3	3	3	3,43
Croatia	1	2	3	4	3	3	3	2,71
Cyprus	1	1	1	1	3	1	1	1,29
Czechia	3	3	2	3	3	3	3	2,86
Denmark	3	3	3	2	2	3	3	2,71
Estonia	3	3	5	3	1	1	3	2,71
Finland	3	3	3	3	3	3	4	3,14
France	3	2	4	3	2	3	3	2,86
Germany	3	4	1	3	4	3	2	2,86
Greece	1	2	3	3	3	3	2	2,43
Hungary	3	4	3	4	3	3	3	3,29
Ireland	2	1	3	1	2	3	3	2,14
Italy	2	3	3	3	3	2	1	2,43
Latvia	4	3	5	3	1	3	4	3,29
Lithuania	4	4	3	4	3	4	4	3,71
Luxembourg	2	1	4	4	2	1	2	2,29
Malta	1	1	1	1	3	1	1	1,29

Netherlands	3	3	3	1	2	2	3	2,43
Poland	4	1	5	3	1	2	4	2,86
Portugal	3	2	3	2	2	3	3	2,57
Romania	4	4	3	4	3	3	3	3,43
Slovakia	4	4	2	3	3	3	3	3,14
Slovenia	3	3	3	2	3	3	3	2,86
Spain	2	4	2	1	3	3	3	2,57
Sweden	3	3	3	3	3	3	4	3,14
UK	3	3	1	1	3	3	2	2,29

Source: *Own research based on GUS database.*

Table 4. *Sub-diagnoses and cumulative diagnosis of tourism intensity in EU countries in 2019*

	W_1	W_2	W_3	W_4	W5	W_6	W_7	Average
Austria	3	2	1	3	3	2	2	2,29
Belgium	3	3	3	3	3	2	3	2,86
Bulgaria	3	3	3	5	3	3	3	3,29
Croatia	3	1	2	3	1	2	3	2,14
Cyprus	3	2	1	1	3	1	1	1,71
Czechia	2	3	3	4	4	3	3	3,14
Denmark	4	3	3	3	1	2	3	2,71
Estonia	3	3	3	3	4	1	2	2,71
Finland	1	4	3	4	4	5	4	3,57
France	3	3	3	3	3	3	3	3,00
Germany	1	4	3	3	5	3	3	3,14
Greece	2	2	1	4	4	3	2	2,57
Hungary	4	1	3	3	1	1	3	2,29
Ireland	3	3	2	2	3	3	3	2,71
Italy	1	4	3	4	5	3	2	3,14
Latvia	4	1	3	3	1	3	4	2,71
Lithuania	3	3	4	4	3	5	4	3,71
Luxembourg	3	3	3	5	3	2	3	3,14
Malta	3	1	1	1	3	1	1	1,57
Netherlands	3	3	3	2	3	1	2	2,43
Poland	4	3	4	3	1	3	3	3,00
Portugal	3	3	2	3	3	3	3	2,86
Romania	3	4	4	5	3	5	4	4,00
Slovakia	1	4	3	5	5	5	3	3,71
Slovenia	3	3	3	4	3	3	3	3,14
Spain	3	3	1	2	3	3	3	2,57
Sweden	2	3	3	3	4	5	4	3,43
United Kingdom	1	4	3	5	5	3	2	3,29

Source: *Own research based on GUS database.*

The cumulative diagnoses determined as averages of the sub-diagnoses were used to create a linear ordering of countries and to separate typological groups with similar tourism intensity (Table 5). Three typological groups were obtained for the year 2000 and four for the year 2019. The first group refers to countries for which the sub-diagnoses for most indicators allowed them to be classified in the first discriminatory group. The second group included countries defined as positive from

individual indicators' perspectives. Counties in the third group are characterised by, at most average values of tourism intensity indicators, and the fourth typological group included facilities that received negative sub-diagnoses due to some indicators.

***Table 5**. Ordering of EU countries by a diagnosis of total tourism intensity in 2000 and 2019*

	2000			2019		
	Country	$\bar{x}$	Group	Country	$\bar{x}$	Group
1	Cyprus	1,29	I	Malta	1,57	I
2	Malta	1,29		Cyprus	1,71	
3	Austria	2,00	II	Croatia	2,14	II
4	Ireland	2,14		Austria	2,29	
5	Luxembourg	2,29		Hungary	2,29	
6	United Kingdom	2,29		Netherlands	2,43	
7	Greece	2,43		Greece	2,57	
8	Italy	2,43		Spain	2,57	
9	Netherlands	2,43		Denmark	2,71	
10	Portugal	2,57		Estonia	2,71	
11	Spain	2,57		Ireland	2,71	
12	Belgium	2,71		Latvia	2,71	
13	Croatia	2,71		Belgium	2,86	
14	Denmark	2,71		Portugal	2,86	
15	Estonia	2,71		France	3,00	III
16	Czechia	2,86		Poland	3,00	
17	France	2,86		Czechia	3,14	
18	Germany	2,86		Germany	3,14	
19	Poland	2,86		Italy	3,14	
20	Slovenia	2,86		Luxembourg	3,14	
21	Finland	3,14	III	Slovenia	3,14	
22	Slovakia	3,14		Bulgaria	3,29	
23	Sweden	3,14		United Kingdom	3,29	
24	Hungary	3,29		Sweden	3,43	
25	Latvia	3,29		Finland	3,57	
26	Bulgaria	3,43		Lithuania	3,71	
27	Romania	3,43		Slovakia	3,71	
28	Lithuania	3,71		Romania	4,00	IV

***Source:** Own research based on GUS database.*

Based on the research, conclusions can be drawn about the intensity of tourism in individual countries and groups of the best and worst countries can be distinguished in terms of the phenomenon studied. In both surveyed years, the range of sub-diagnoses was from 1 to 5, within 2000 only due to the Charvat index (W_3) and the accommodation capacity utilisation index (W_4); some countries were included in

group 5, i.e., with the worst situation in terms of the phenomenon surveyed. In 2019, a sub-diagnosis of 5 was found for three indicators: the accommodation capacity utilisation rate (W_4), the accommodation development rate (W_5) and the tourism density rate (W_6).

An analysis of the averages of the sub-diagnoses showed that in both 2000 and 2019, only two countries (Malta and Cyprus) were ranked in group one – the best from the point of view of the phenomenon under study. In 2019, the number of countries in group two decreased and the group of countries that were at best average increased. Group four has also emerged, with only Romania qualifying. This country only received an average rating (3) due to two indicators (W_1 – Defert Index and W_5 – Accommodation Development Index). The remaining indicators were assessed negatively (score 4 or 5).

When comparing the cumulative diagnosis for individual countries in the years under review, one sometimes notices significant changes in their position. It is particularly evident in the case of Hungary, which in 2000 reached an average level for five measures and, due to two indicators: the Schneider index (W_2) and the accommodation capacity utilisation index (W_4), was placed in group four, i.e., received a negative diagnosis, while in 2019 the country was promoted to group two with an average score of 2.29. The situation is similar for Latvia, whose average sub-diagnosis score (3.29) in 2000 ranked it 25th among the member countries (group 3), while in 2019, the country was promoted to the second group with an average score of 2.71 and twelfth in the ranking.

4. Conclusions

The article attempts to distinguish homogeneous groups of EU countries in terms of the intensity of tourist traffic in 2000 and 2019. The research shows that in 2019, compared to 2000, there was a deterioration in the situation of tourist traffic in many countries. It was influenced by the deterioration of the tourism accommodation base (a decrease in the number of establishments and beds) and by a decrease in tourism intensity, particularly the number of tourists visiting a country.

Changes in the value of the measures have changed elements of the diagnosis process, both the norms and the deviations from them. It, in turn, has, in numerous instances, contributed to the widening of deviation ranges and deviation tolerances from the norm.

The method presented in the article appears to be helpful in the process of diagnosis and object discrimination, and its main advantages include simplicity of calculation, clear interpretation, the possibility of unambiguous diagnosis for a single assessment criterion (indicator) at a given time, and the possibility of combined diagnosis according to several assessment criteria (multiple indicators).

However, it should be borne in mind that the elements of the diagnosis process determined empirically may change over time. This fact should be considered when formulating the final conclusions concerning the partial and combined diagnoses of the phenomenon under study Bak, Wawrzyniak (2007).

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