
Selected Aspects of Sustainable Tourism in the European Union Countries from the Point of View of the Implementation of the Sustainable Development Goals

Submitted 17/07/21, 1st revision 11/08/21, 2nd revision 27/08/21, accepted 15/09/21

Iwona Bąk¹, Małgorzata Kurtz²

Abstract:

Purpose: The article aims to show which European Union countries deviate in plus and minus from the average level of selected variables characterizing the level of sustainable tourism and the links between countries from the point of view of the analyzed variables.

Design/ Methodology/ Approach: The correspondence analysis based on a complex matrix of markers and Ward's method was used in the study. The research covered the 27 current members of the European Union and the United Kingdom, which only in 2021 formally left the European Union.

Findings: The research shows that EU countries are very diverse in terms of sustainable tourism, as evidenced by, among others, indicators of the quality of the natural environment and the intensity of tourist traffic used by the research. This diversity is related to the general socio-economic development of countries, the level of industrialization, the degree of urbanization, having natural assets, etc. No groups of countries would differ significantly in plus or minus from the average of all analyzed variables in the EU.

Practical Implications: The presented results are important for individual countries as well as for global organizations. They can be helpful for entities involved in the development of tourism and, consequently, increase the innovativeness and competitiveness of economies that are at least partly based on tourism. Sustainable tourism, which preserves cultural integrity and biological diversity, can become an excellent alternative to mass tourism.

Originality/Value: The article contributes to the most current European and world scientific discussions on the importance of sustainable tourism and highlights the most exciting problems and dilemmas that may become the subject of further research.

Keywords: Sustainable development, tourism, EU countries, multiple correspondence analysis.

JEL classification: A13, C38, Z32.

Research Type: Research study.

¹West Pomeranian University of Technology in Szczecin, Poland, iwona.bak@zut.edu.pl;

²West Pomeranian University of Technology in Szczecin, Poland, malgorzatakurtz1@gmail.com;

1. Introduction

Changing the model of life and a more significant amount of free time make tourism an increasingly important branch of the global economy. The increase in the number of travelers translates into an increase in the share of income generated by tourism in the overall GDP (Kowalczyk, 2013; Bąk, 2013; Bąk and Szczecińska, 2020). However, tourism development is increasingly analyzed from the perspective of losses or threats to potential tourist destinations involved in such a development. Spontaneous, unplanned tourism development on the modern market is unacceptable because its functioning is inextricably linked with the natural environment. According to the survey, most tourists look for places to spend their free time that provide peace, clean air, and the possibility of communing with nature.

However, the use of nature for tourism purposes may have adverse effects on the environment. Tourism on a mass scale is a threat to this environment comparable to the impact of some industries. The excessive concentration of tourism in time and space, an incorrectly located tourist base, wrong forms of organizing recreation, and the lack of tourist culture are the main reasons for the emergence of threats. Increased tourist traffic contributes significantly to air pollution (motorization, heating technologies used in tourist facilities), water and soil pollution (sewage, garbage), the impoverishment of the landscape (the urbanization of tourist areas), and often irreversible damage to animate nature (the destruction of vegetation, scaring birds and animals).

The global change in the mentality of modern man, colloquially known as the “return to nature,” can be considered a phenomenon, especially at the end of the 20th century. The first discussion on the need to change the approach to tourism development occurred at the international forum. The terms of “gentle and sustainable tourism” appeared at that time, which “refers to the broadly understood concept of environmentally friendly tourism development in rural regions and cities, in small tourist centers and large entertainment and leisure centers, etc., a concept that applies to all known types of tourism after their appropriate “greening” (Zaręba, 2000).

The study aims to show which European Union countries deviate in plus and minus from the average level of selected variables characterizing the level of sustainable tourism and the links between countries from the point of view of the analyzed variables. The correspondence analysis based on a complex matrix of markers and Ward’s method was used in the study. The research covered the 27 current members of the European Union and the United Kingdom, which only in 2021 formally left the European Union.

The added value of the considerations presented in the paper is the approach proposed by the authors to the evaluation of sustainable tourism in the European Union countries, using not only the information describing the current level of this tourism but also information on factors that may affect the level of the phenomenon under

study, including the information on the quality of the natural environment and the use of tourism accommodation.

The structure of this article includes an introduction (Section 1) that presents the primary purpose of the research and explains the most important motivations of the authors to study sustainable tourism. In the next part of the work, the research on the studied phenomenon was reviewed (Section 2). Then, the statistical data used in the study were presented, and the research procedure was described (Section 3). The article ended with presenting the research results (Section 4), discussion, and conclusions resulting from the research (Section 5).

2. Literature Review

The balance between social, economic, and environmental interests is presented in the theory of sustainable development. Sustainable development has been the subject of many analyzes and studies for years (Borys, 2005; 2011; 2016; Pisani, 2006; Kozłowski, 2007; Ciegis, Ramanauskiene, and Martinkus, 2009; Płachciak, 2011; Poskrobko, 2013; European Commission, 2015; Cheba, 2019; Szopik-Depczyńska *et al.*, 2018; Khoshnava *et al.*, 2019; Bąk and Cheba, 2020). The growing interest in sustainable development is also visible in the number of publications referring to this term, indexed in the Web of Science (WoS) database between 1987 and 2015. The results of that research were published in 2017 by Zhu and Hua (2017). In that period, as many as 59 926 papers on sustainable development, published by authors from 49 countries, were identified in the WoS database. Also, as many as 149 categories of connections with other research areas have been identified.

Both “sustainable growth” and “sustainable tourism” have become widely used terms, although their meaning is unclear. (Daly, 1990). Piontek and Piontek (2005) give one of the definitions, claiming that it is “a permanent improvement in the quality of life of modern and future generations by shaping the right proportions between three types of capital: economic (E), human (L), and natural (P).” Usually, the abbreviation 3xP is given, which comes from the words, planet, people, and profit. This sequence suggests the emphasis on preserving the Earth’s resources, not endangering the environment, and only at the very end is the profit sought (Papuziński, 2006). There are also other translations in the literature: eco-development, ecological development, permanent development, integrated development, sustainable growth (Rosicki, 2010).

The very concept of sustainable development was born during a discussion to define the principles of international environmental policy. It results from the work of politicians, the business world, and economists (Rosicki, 2010). Sustainable development is undoubtedly a multidimensional problem that requires inter- and multidisciplinary research. For this reason, it is of interest to representatives of many scientific disciplines, mainly economic, legal, political sciences, and pedagogy (Papuziński, 2006). Its essence is to meet the needs of the present generation without diminishing the chances of future generations to meet them. (Latoszek, Proczek, and

Krukowska, 2016) In other words, the need for responsibility to future generations was noticed, which was called intergenerational justice (Rosicki, 2010).

The current stage of the evolution of the idea of sustainable development is, predominantly, its concretization, the aim of which is to work out the theoretical foundations of the new development paradigm and its integration with other areas of research, including such directions as sustainable transport (Ajanovic, 2014, Vashisth, Kumar, and Sharma, 2018), sustainable agriculture (Altieri, 2018), sustainable logistics (Kiba-Janiak, 2015), sustainable finance (Fullwiler, 2015; Zioło *et al.*, 2019; Filipiak *et al.*, 2019), sustainable tourism (Bramwell and Lane, 1993; Ritchie and Crouch, 2003; Kowalczyk, 2010).

Despite its origins in the general concept of sustainable development, the topic of sustainable tourism seems to have evolved, primarily in isolation from the ongoing debate on the importance of the former. There are also voices that such isolation has resulted in an overly simplified and inflexible paradigm for sustainable tourism that does not consider specific circumstances (Hunter, 1997). The concept of sustainable tourism refers to the broader concept of sustainable development, emphasizing the need to rationalize natural environment resources (Butowski, 2013). One aspect that influenced the need for a sustainable tourism strategy is that tourism has a significant impact on nature, locally, regionally, and globally. Increasing tourism entails many threats to the inhabitants and the natural environment of areas with a dominant tourist function. Initially, the development of mass international tourism did not raise any concerns in this respect. Tourism was seen as an environmentally friendly activity.

The situation began to change only in the 1960s when the public's interest in the subject of the environment increased (Nowak and Franczak, 2013). It was then that the search for solutions allowing to obtain a high level of tourist satisfaction without harming the environment began. The concept of sustainable tourism was created based on the idea of sustainable development, the origins of which can be traced back to 1969, when the then Secretary-General of the United Nations, U Thant, presented a report at the 23rd General Assembly of the United Nations entitled "The problems of the human environment." The official definition and assumptions of sustainable development, which translate directly into tourism, were included in the document "Agenda 21", prepared as the 1st World Earth Summit in Rio de Janeiro (Barwicka, 2018; Thant, 1969). In the following decades, scientists who dealt with this topic noticed that given the likelihood of tourism becoming the largest sector of world trade, its potential to meet sustainable development objectives is critical (Hunter, 1997).

According to Butler (1999), the profound and rapid changes in the world in the 1980s and 1990s were reflected in changes in tourism. Global political and economic reorganization led to the expansion of tourism both in terms of space and a significant increase in the tourism market size. Butler understands sustainable tourism as one that is developed and maintained in each area (community, environment) in such a way and on such a scale that it remains viable for an indefinite period and does not degrade

or change the environment (human and physical) in which it exists to such an extent that it enables other activities and processes to thrive.

According to Pender and Shalper (2008), the sustainable development of tourism is based on the pursuit for an optimal distribution of benefits achieved by tourists (survival), enterprises (profit), and residents (socio-economic development) while reducing the impact of tourism on the environment. The implementation of the principles of sustainable development positively influences the improvement of the image of the tourist area, the promotion of a given region as a tourist product, and the development of various forms of tourism, including spa tourism and agritourism. However, there are many situations in which the lack of control, the lack of development strategies, and poor tourism management in the region result in considerable losses - especially in terms of the natural environment (Królikowska-Tomczak, 2011). Hence, sustainable tourism must refer to the broader concept of sustainable development, which emphasizes the need for rational management of natural environmental resources.

Monitoring changes in the environment, society, and economy using appropriate indicators is crucial when looking for solutions beneficial to the quality of life, economic growth, and improving the quality of the natural environment. Due to the multidimensionality of sustainable development, the constructed systems of measures are usually quite extensive. There are also different typologies of sustainable development indicators. As a dynamically developing sector of the economy, tourism should be included in the monitoring system based on specific indicators. However, a review of the indicators used to assess the sustainability of tourism (Griffin, Morrissey, and Flanagan, 2010; Kowalczyk, 2011; Torres-Delgado and Palomeque, 2014; McLoughlin and Hanrahan, 2016) shows the lack of a generally accepted method for monitoring sustainable tourism.

3. Research Methodology

The empirical analyzes presented in the paper are based on two groups of indicators. The first one concerns the indicators used by the European Commission to monitor progress in the implementation of the 2030 Agenda for Sustainable Development in the European Union countries. In the data sets provided by Eurostat, there are currently 100 indicators describing 17 goals of the 2030 Agenda (51 of them is part of a global list of indicators of the United Nations-the UN, the other were selected to enable monitoring the direction of changes under the relevant policies and initiatives of the EU). For the research, the indicators used to assess sustainable tourism in the EU countries were selected. They mainly refer to the quality of the natural environment. The set of diagnostic variables includes indicators whose higher values indicate a better level of the studied phenomenon (stimulants) and those whose lower level is desirable (de stimulants). Most of the variables included in the study are de stimulants; only five were considered stimulants (X5, X7, X8, X11, X12). The study included:

- X_1 - Generation of waste-by-waste category (in tonne) per capita,
 X_2 - Population reporting occurrence of crime, violence, or vandalism in their area percentage,
 X_3 - Final energy consumption in tonnes of equivalent per capita,
 X_4 – Primary energy consumption in tonnes of equivalent per capita,
 X_5 – Share of renewable energy in gross final energy consumption %,
 X_6 – Greenhouse gas emissions - tonnes per capita,
 X_7 – Recycling rate of municipal waste %,
 X_8 – Share of busses and trains in total passenger transport %,
 X_9 - Generation of waste excluding major mineral wastes in kg per capita,
 X_{10} - Circular material use rate%,
 X_{11} - Surface of terrestrial sites designated under Natura 2000 (km²) as% of total area.
 X_{12} - Share of forest area%.

The second group of indicators adopted for the study concerns tourist accommodation facilities and their use. They occupy a special place in the statistical description of tourist phenomena and inform about the degree of development of the tourist function of the studied objects, the intensity of tourism, tourist development, etc. (Rapacz, 2004; Bąk and Wawrzyniak, 2008; 2009). They comprise:

- W1 – Defert index, showing the number of bed places per 100 permanent residents of a given administrative unit,
W2 – Schneider index, specifying the number of tourists accommodated per 100 permanent residents,
W3 – Charvat index, calculated as the number of nights spent per 100 permanent residents,
W4 – accommodation capacity utilization rate, which measures how many days during the year one bed was occupied,
W5 – accommodation base development index, calculated as the quotient of the number of tourists to the number of bed places,
W6 – tourism density indicator, specifying the number of tourists per 1 km²,
W7 – accommodation base density indicator, showing the number of bed places per 1 km² in the country.

To achieve the aim of the study, i.e., to show which European Union countries deviate *in plus* and *in minus* from the average level of selected variables characterizing the level of sustainable tourism and what are the links between countries from the point of view of the studied variables, a multiple correspondence analysis was applied using a complex matrix of markers. The procedure was followed in the following steps (Greenacre and Hastie, 1987; Goodman, 1986; Lebart, Morineau, and Warwick, 1984; Stanimir, 2005):

- 1) The preparation of a complex matrix of markers;

In this matrix, the number of rows was equal to the number of researched units (EU countries), while the number of columns was twice the number of researched

variables. This number of columns resulted from the essence of the marker matrix, in which the elements take only the values 1 and 0. Therefore, each of the studied variables was changed to a zero-one variable according to the following rule:

$$\begin{aligned} \text{for stimulant:} \quad X_{S_i} &= \begin{cases} 1 & \text{ gdy } X_i \geq Me \\ 0 & \text{ gdy } X_i < Me \end{cases} \\ \text{for destimulant:} \quad X_{D_i} &= \begin{cases} 1 & \text{ gdy } X_i \leq Me \\ 0 & \text{ gdy } X_i > Me \end{cases} \end{aligned}$$

The adoption of the median (Me) as the border value resulted from the type of distributions of the examined variables, most of which were characterized by very high differentiation and strong asymmetry.

- 2) Determining the dimension of the actual space of coexistence based on the formula:

$$K = \sum_{q=1}^Q (I_q - 1) \tag{1}$$

where:

I_q – number of variable q categories ($q = 1, 2, \dots, Q$),

Q - number of variables;

3) checking to what extent eigenvalues (principal inertions) of spaces with lower dimensions explain the total inertia (λ), which is the sum of K eigenvalues, where K is the dimension of the real coexistence space. For this purpose, the Greenacre criterion was used, according to which the main inertia greater than the reciprocal of the number of analyzed variables ($\frac{1}{Q}$) are considered significant for the study;

- 4) Increasing the quality of the mapping by modifying the eigenvalues according to Greenacre's proposal (Greenacre, 1984; 1993):

- 5)

$$\tilde{\lambda}_k = \left(\frac{Q}{Q-1}\right)^2 \cdot \left(\sqrt{\lambda_{B,k}} - \frac{1}{Q}\right)^2 \tag{2}$$

where:

Q - the number of analyzed variables;

$\lambda_{B,k}$ - k -th eigenvalue ($k = 1, 2, \dots, K$);

- 6) The graphical presentation of results using classification methods.

4. Results and Discussion

The study began with determining seven tourism development indicators in the European Union countries (Table 1). The Defert index best demonstrates the importance of individual administrative areas in fulfilling the tourist function, i.e., the number of beds per 100 permanent residents of a given administrative unit. This indicator is relatively low for towns

with little tourism development and poorly developed tourist visits (1-100). According to this criterion, the actual tourism function begins to develop only when the indicator reaches the value of 100, i.e., when the capacity of the tourist (accommodation) base is equal to the number of dwellings of the permanent population. With an index of 100–500, tourism functions are generally well developed. However, it should be remembered that such an interpretation applies to purely tourist destinations, i.e., those where many tourists correspond to a low number of people living in the studied area, most often in a small area. In the case of EU countries, this indicator will have much lower values. As shown in Table 2, it ranged from 1.81 to 28.41. Croatia, Greece, and Austria had the relatively best-developed accommodation base, while Romania, Poland, and Latvia had the worst-developed one.

Table 1. Tourism development indicators in European Union countries in 2019

Country	W1	W2	W3	W4	W5	W6	W7
Austria	11.72	466	1444	123	40	501	12.6
Belgium	3.45	158	371	107	46	596	13.1
Bulgaria	4.88	117	388	80	24	75	3.1
Croatia	28.41	480	2237	79	17	349	20.7
Cyprus	10.30	370	2006	195	36	351	9.8
Czech Republic	6.98	207	535	77	30	285	9.6
Denmark	7.51	143	591	79	19	197	10.4
Estonia	4.60	286	526	114	62	87	1.4
Finland	4.66	225	419	90	48	41	0.8
France	7.59	260	665	88	34	319	9.3
Germany	4.33	223	526	122	51	530	10.3
Greece	12.58	319	1339	106	25	265	10.5
Hungary	4.24	138	340	80	32	15	0.5
Ireland	4.24	243	664	157	57	173	3.0
Italy	8.65	220	730	84	25	447	17.6
Latvia	2.91	149	287	99	51	46	0.9
Lithuania	3.88	145	320	82	37	64	1.7
Luxembourg	10.20	190	465	46	19	480	25.8
Malta	9.74	410	2008	206	42	6322	150.3
Netherlands	8.18	266	714	87	32	1363	41.9
Poland	2.17	94	246	113	43	116	2.7
Portugal	6.54	271	755	116	42	305	7.3
Romania	1.81	68	154	85	38	58	1.5
Slovakia	3.78	115	316	84	30	130	4.3
Slovenia	8.97	299	757	84	33	309	9.3
Spain	7.75	288	1001	129	37	270	7.3
Sweden	8.05	312	618	77	39	8	0.2
United Kingdom	5.92	176	551	93	30	484	16.3

Source: Own elaboration.

The levels of the Schneider and Charvat indexes prove the differentiation of the tourist traffic load in individual regions. The most popular country visited by tourists was Croatia, where there were 480 tourists per 100 permanent residents, which is even several times more than in some other countries—followed by Austria and Malta, where the Schneider index exceeded 400. Croatia was the most heavily laden with

tourism, with 2,237 overnight stays per 100 permanent residents. The Charvat index above 200 was also recorded in Malta and Cyprus. In three countries (Romania, Poland, Latvia), the value of this indicator did not exceed 300, which proves that there is little tourism in these regions.

The Member States were also analyzed regarding the number of beds and the number of visiting tourists related to their area. For this purpose, the accommodation density indicators were determined, which show the number of bed places per 1 km² of the city's area, and tourism density indicators, which define the number of tourists per 1 km². In 2019, there were four-bed places per 1 km² of the area of the EU. For most countries, the level of this indicator was much higher, even several dozen times. Its highest value was recorded for Malta (150) and the lowest for Sweden (0.2) and Hungary (0.5). Countries having a small area were characterized by the highest density of tourism. In Malta, there were 6322 tourists per 1 km², and in the Netherlands - 1363. In eight countries, this indicator did not exceed the value of 100.

The accommodation capacity utilization rate, measured by the number of days a year during which one bed was occupied, amounted to 99 days for the entire accommodation base in the EU countries. In sixteen countries, the indicator did not exceed this figure. It achieved the highest value in Malta and Cyprus, where one bed was occupied by 206 and 195 days.

The accommodation base development index, which determines the number of tourists per accommodation in 2019 for the entire EU, was 34. It was below this level in eleven countries. The highest value of this measure was recorded in Estonia (62) and then in Ireland (57).

The next stage of the research is the correspondence analysis, carried out according to the stages discussed in the previous chapter. The module Correspondence analysis programmed in the Statistica 13.0 package was used for the calculations and graphical presentation of the results. In the set of analyzed variables, apart from nineteen binary variables (indicators from X 1 to X 12 and from W1 to W7), the following variable was included: European Union countries, which had 28 variants. Therefore, the dimension of the actual space of coexistence was 36 - formula (1). Then, it was checked to what extent the eigenvalues of spaces with lower dimensions explain the total inertia ($\lambda = 0.3427$). Principal inertia greater than $\frac{1}{Q} = \frac{1}{20} = 0.05$ were considered significant for the study according to Greenacre's criterion. Table 4 shows that these are inertia for K assuming values up to and including 19. The table omits the results for $K > 19$ because for these dimensions, the principal inertia was not higher than 0.0476, so these dimensions were insignificant in the study.

In the next step, the values of the measure τ_k , which determines the share of inertia of the selected dimension (λ_k) in the total inertia (λ), were analyzed, and it turned out that the degree of inertia in two-dimensional space is 20.7751%, and in three-

dimensional space, 28.5608%. To improve the quality of the mapping in two-dimensional space, the eigenvalues were modified according to the formula (2). The original and modified eigenvalues and the degree of explaining the total inertia are given in Table 2.

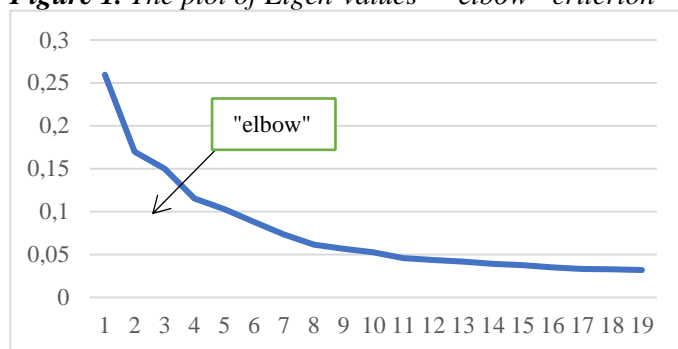
Table 2. Eigenvalues and singular values with the characterizing the distribution of the variables studied the degree of explanation of total inertia in the original and modified versions

K	Singular values γ_k	Eigenvalues λ_k	Percentage of inertia λ_k/λ	Cumulative percentage τ_k	Eigenvalues $\tilde{\lambda}_k$	Percentage of inertia $\tilde{\lambda}_k/\tilde{\lambda}$	Cumulative percentage $\tilde{\tau}_k$
1	0.527223	0.277964	12.08539	12.0854	0.2252	16.7746	16.7746
2	0.447062	0.199864	8.68975	20.7751	0.1556	11.5865	28.3612
3	0.423166	0.179069	7.78562	28.5608	0.1373	10.2252	38.5863
4	0.372491	0.138750	6.03259	34.5934	0.1023	7.6196	46.2059
5	0.361214	0.130475	5.67285	40.2662	0.0952	7.0918	53.2977
6	0.339139	0.115016	5.00068	45.2669	0.0821	6.1135	59.4112
7	0.313122	0.098046	4.26285	49.5297	0.0679	5.0536	64.4647
8	0.292851	0.085762	3.72878	53.2585	0.0577	4.2977	68.7624
9	0.281700	0.079355	3.45021	56.7087	0.0525	3.9079	72.6703
10	0.273896	0.075019	3.26169	59.9704	0.0490	3.6462	76.3165
11	0.259779	0.067485	2.93413	62.9045	0.0429	3.1957	79.5122
12	0.253087	0.064053	2.78492	65.6895	0.0402	2.9926	82.5048
13	0.249337	0.062169	2.70300	68.3925	0.0387	2.8817	85.3865
14	0.243823	0.059449	2.58476	70.9772	0.0366	2.7224	88.1089
15	0.240485	0.057833	2.51448	73.4917	0.0353	2.6282	90.7370
16	0.233990	0.054751	2.38050	75.8722	0.0329	2.4496	93.1866
17	0.228809	0.052353	2.27623	78.1484	0.0310	2.3116	95.4982
18	0.227465	0.051740	2.24957	80.3980	0.0306	2.2765	97.7747
19	0.225491	0.050846	2.21070	82.6087	0.0299	2.2253	100.0000
					$\tilde{\lambda}_k$ = 1.3427		

Source: Own elaboration.

As a result of the modification, the degree of explanation of the total inertia has significantly increased. The first two eigenvalues account for 28.3612% of the modified total inertia, and in three-dimensional space, the degree of inertia explaining is 38.5863%. In order to precisely determine the dimension of the mapping space, a graph of eigenvalues was additionally drawn up, and, using the “elbow” criterion, it was found that the space for presenting the coexistence of variable variants should be four-dimensional (Figure 1).

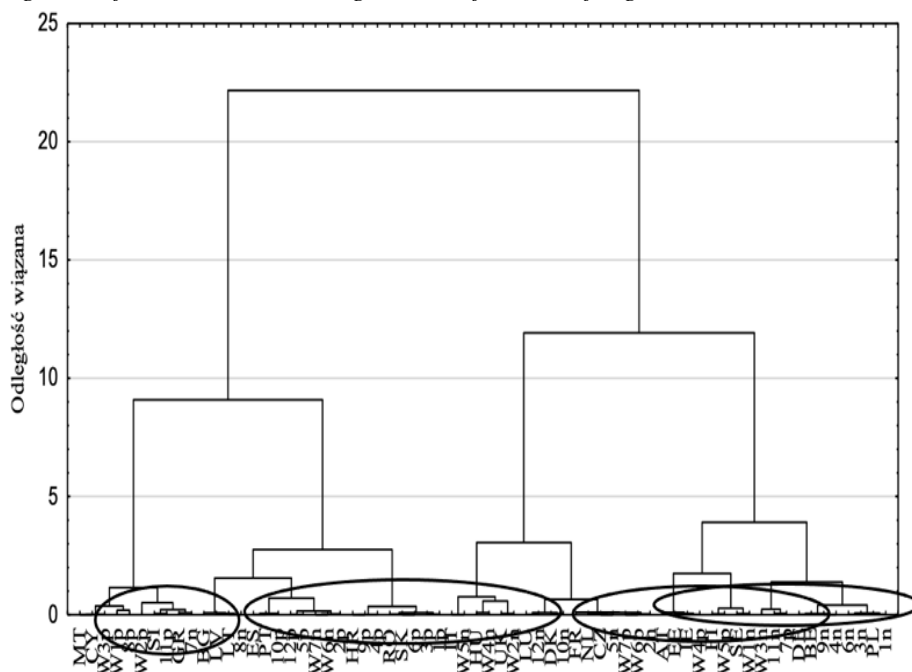
Figure 1. The plot of Eigen-values - “elbow” criterion



Source: Own elaboration based on Table 2.

Due to many analyzed variables and their variants, interpreting the results obtained in the four-dimensional space is practically impossible. In order to make a more unambiguous interpretation of the results, Ward’s method was used, which made it possible to identify the relationships between the variants of the variables. In Figure 2, showing the joining of categories into classes, the stage in which the joining of classes was interrupted is marked with a horizontal line. The results of the segmentation of the EU countries are presented in Table 3.

Figure 2. The presentation of the results of correspondence analysis concerning all categories of variables, including the modification of eigenvalues



Source: Own elaboration.

Table 3. *Characteristics of the level of sustainable tourism in the European Union countries in 2019*

Group	Country	Characteristics
I	Malta, Cyprus, Greece, Slovenia	This group includes countries in Southern Europe with a well-developed tourist function, i.e., well-prepared tourist accommodation facilities and eagerly visited by tourists. They were positively assessed due to the share of land areas designated under Natura 2000 in the country's total area and negatively due to the municipal waste recycling rate.
II	Bulgaria, Latvia, Lithuania, Spain, Portugal, Croatia, Romania, Slovakia, Italy	Countries in this group are characterized by a low density of accommodation and tourist traffic, except for Croatia and Italy. The share of buses and trains in total passenger transport and greenhouse gas emissions in tonnes per capita were also assessed negatively. On the other hand, indicators related to waste generation and primary and final energy consumption were positively assessed. The values of these variables were below the average for the entire EU. In turn, the indicators related to the share of renewable energy in gross final energy consumption and the share of forest area in the country's total area were above average.
III	Hungary, United Kingdom, Luxembourg, Denmark, France, Netherlands, Czechia	Countries in this group can be assessed negatively in terms of crime, the share of renewable energy in gross final energy consumption, and indicators: Schneider's indicator, the accommodation capacity utilization rate, and the development of accommodation facilities. The tourism density and accommodation base indicators (except for Hungary) are above the EU average.
IV	Austria, Estonia, Ireland, Finland, Sweden, Germany, Belgium, Poland	In these countries, the following were above average in the EU: the municipal waste recycling rate, the accommodation capacity utilization rate, and the accommodation base development rate. On the other hand, the generation of municipal waste per capita and primary and final energy consumption were above the average level for all the examined units (negative assessment). The natural attractiveness, measured as the share of the land area designated under Natura 2000 as% of the total area, was also assessed negatively.

Source: Own elaboration.

5. Conclusion

Tourism development of a given area contributes to the development of various sectors of the national economy. It leads to an increase in the level of employment of the local community, an increase in income, and creates many benefits for local authorities. Each country that cares about comprehensive development should encourage tourists to multiple visits through a well-organized and promoted tourist product. However, the interests of tourists, the local economy, and the environment are often conflicting. The development of tourism can bring about many positive changes, such as increasing the inhabitants' quality of life or the inflow of capital, but it can also cause negative changes. In particular, they are visible in the pollution of the environment, its overexploitation, and the lack of respect for the culture and history of the region. Currently, sustainable development is crucial for the effective management and positioning of individual sectors of the economy, especially tourism (Popiel, 2015). Sustainable tourism will meet tourists' and residents' needs while preserving and protecting material and non-material resources.

The study aims to show which European Union countries deviate in plus and minus from the average level of selected variables characterizing the level of sustainable tourism and the links between countries from the point of view of the analyzed variables. Identifying groups of countries characterized by the same set of variables deviating from the average values in the set of member countries was possible thanks to the multiple correspondence analysis and Ward's method for the final interpretation of the results.

The research shows that EU countries are very diverse in sustainable tourism, as evidenced by indicators of the quality of the natural environment and the intensity of tourism used in the study. This diversity is related to the general socio-economic development of countries, the level of industrialization, the degree of urbanization, having natural assets, etc. No groups of countries would differ significantly in plus or minus from the average of all analyzed variables in the EU. Noteworthy are the countries included in the first group (Malta, Cyprus, Greece, Slovenia), which were assessed negatively only in one variable. The most significant number of deviations in minus from the average value in all EU countries can be observed in the countries belonging to the third and fourth groups. Countries from the third group were positively assessed only in terms of two variables concerning accommodation facilities and tourism density. However, eleven variables significantly deviated from the median (three variables plus eight variables in minus).

The obtained results may be helpful for national governments and local authorities, and entities dealing with the development of tourism and, consequently, contribute to increasing the innovation and competitiveness of economies based at least partially on tourism. Sustainable tourism, which preserves cultural integrity and biological diversity, can become an excellent alternative to mass tourism.

References:

- Ajanovic, A. 2014. Promoting environmentally benign electric vehicles. *Energy Procedia*, 57, 807-816. DOI: doi.org/10.1016/j.egypro.2014.10.289.
- Altieri, M.A. 2018. *Agroecology: the science of sustainable agriculture*. CRC Press, Taylor and Francis.
- Bąk, I. 2013. *Statystyczna analiza aktywności turystycznej seniorów w Polsce [Statistical analysis of the tourist activity of seniors in Poland]*. Wydawnictwo Uczelniane Zachodniopomorskiego Uniwersytetu Technologicznego w Szczecinie.
- Bąk, I., Cheba, K. 2020. *Zielona gospodarka jako narzędzie zrównoważonego rozwoju [Green economy as a tool of sustainable development]*. Warszawa, CeDeWu.
- Bąk, I., Szczecińska, B. 2020. *Global Demographic Trends and Effects on Tourism*. *European Research Studies Journal*, 23(4), 571-585.
- Bąk, I., Wawrzyniak, K. 2008. *Segmentacja europejskiego rynku turystycznego [Segmentation of the European tourism market]*. *Wiadomości Statystyczne*, 4, 70-78.
- Bąk, I., Wawrzyniak, K. 2009. *Skalowanie wielowymiarowe jako narzędzie segmentacji rynku turystycznego w podregionach Polski*. *Prace Naukowe UE*, 65, *Ekonometria*, 25, 58-68.
- Borys, T. 2005. *Wąskie i szerokie interpretacje zrównoważonego rozwoju oraz konsekwencje wyboru [Narrow and broad interpretations of sustainable development*

- and the consequences of choice]. In: A. Papuziński (Ed.) *Zrównoważony rozwój. Od utopii do praw człowieka*. Bydgoszcz: BRANTA.
- Borys, T. 2011. Interdyscyplinarność ekonomii zrównoważonego rozwoju. In: Poskrobko, B. (Ed.). *Teoretyczne aspekty ekonomii zrównoważonego rozwoju*. Białystok: WSE.
- Borys, T. 2016. Aksjologiczne podstawy zrównoważonego i inteligentnego rozwoju. *Ekonomia i Środowisko*, 3(58), 33-46.
- Bramwell, B., Lane, B. 1993. Sustainable tourism: An evolving global approach. *Journal of sustainable tourism*, 1(1), 1-5.
- Brawicka, K. 2018. Ekologiczne i humanistyczne aspekty turystyki zrównoważonej. *Gospodarka Rynek Edukacja*, 19(2), 5-11.
- Butler, R.W. 1999. Sustainable tourism: A state-of-the-art review. *Tourism Geographies, Department of Management Studies*, 1(1), 8-25. DOI: 10.1080 / 14616689908721291.
- Butowski, L. 2013. Długookresowy model turystyki zrównoważonej [Long-term model of sustainable tourism]. *Zeszyty Naukowe Uczelni Vistula*, 32, 5-28.
- Cheba, K. 2019. Zrównoważona międzynarodowa konkurencyjność krajów Unii Europejskiej [Sustainable international competitiveness of the European Union countries]. *Studium teoretyczno-empiryczne*. Warszawa: CeDeWu.
- Ciegis, R., Ramanauskienė, J., Martinkus, B. 2009. The concept of sustainable development and its use for sustainability scenarios. *Engineering Economics*, 62(2), 28-37.
- Daly, H.E. 1990. Commentary Toward Some Operational Principles Of Sustainable Development. *Ecological Economics*, 2(1), 1-6. DOI: doi.org/10.1016/0921-8009(90)90010-R.
- European Commission. 2015. Sustainable Development in the European Union 2015. Monitoring Report of the EU Sustainable Development Strategy. Brussels: Eurostat.
- Fullwiler, S.T. 2015. Sustainable Finance: Building a More General Theory of Finance. Working Paper 106, Binzagr Institute for Sustainable Prosperity.
- Goodman, L.A. 1986. Some useful Extensions of the Usual Correspondence Analysis Approach and Usual Log-Linear Models Approach in the analysis of Contingency Tables. *International Statistical Review*, 54(3), 243-270. doi.org/10.2307/1403053.
- Greenacre, M. 1984. *Theory and Applications of Correspondence Analysis*. London, Academic Press.
- Greenacre, M. 1993. *Correspondence Analysis in Practice*. London: Academic Press.
- Greenacre, M., Hastie, T. 1987. The geometric Interpretation of Correspondence Analysis. *Journal of the American Statistical Association*, 82(398), 437-447.
- Griffin, K., Morrissey, M., Flanagan, S. 2010. Implementation of the DIT-ACHIEV Model for Sustainable Tourism. Destination Management: Killarney, Ireland. A Case Study. Vienna: BEST Education Network Think Tank X: Networking for Sustainable Tourism, Modul University.
- Hunter, C. 1997. Sustainable Tourism As An Adaptive Paradigm. *Annals of Tourism Research*, 24(4), 850-867.
- Khoshnava, S.M., Rostmi, R., Zin, R.M., Streimikiene, D., Yousefpour, A., Strielkowski, W., Mardani, A., 2019. Aligning the Criteria of Green Economy (GE) and Sustainable Development Goals (SDGs) to Implement Sustainable Development. *Sustainability*, 11(4615), 1-22. DOI: doi.org/10.3390/su11174615.
- Kiba-Janiak, M. 2015. A Comparative Analysis of Sustainable City Logistics among Capital Cities in the EU. *Applied Mechanics and Materials*, 708, 113-118. DOI: 10.4028/www.scientific.net/AMM.708.113.
- Kowalczyk, A. 2010. *Turystyka zrównoważona*. Warszawa: Wydawnictwo Naukowe PWN.

- Kowalczyk, M. 2011. Wskaźniki zrównoważonego rozwoju turystyki. Człowiek i Środowisko, 35(3-4), 35-50.
- Kowalczyk, M. 2013. Turystyka zrównoważona w małych miastach w świetle badań ankietowych. Człowiek i Środowisko, 37 (1-2), 83-96.
- Kozłowski, S. 2007. Nowa strategia rozwoju zrównoważonego Unii Europejskiej. Problemy Ekologii, 11(3), 115-125.
- Królikowska-Tomczak, A. 2011. Możliwości rozwoju ekoturystyki w Wielkopolsce. In: Deluga, W., Dyczkowska, J. (Eds.) Marketing terytorialny – konkurencyjność regionów, przedsiębiorstw a ochrona środowiska. Koszalin: Wydawnictwo Politechniki Koszalińskiej.
- Latoszek, E., Proczek, M., Krukowska, M., 2016. Zrównoważony rozwój a globalne dobra publiczne w teorii i praktyce organizacji międzynarodowych. Warszawa: Dom Wydawniczy Elipsa. DOI: 2012/07/B/HS4/00309.
- Lebart L., Morineau, A., Warwick, K.M. 1984. Multivariate Descriptive Statistical Analysis. Correspondence Analysis and Related Techniques for Large Matrices. New York: John Wiley and Sons, Inc.
- McLoughlin, E., Hanrahan, J. 2016. Local Authority Tourism Planning in Ireland: An Environmental Perspective. Journal of Policy Research in Tourism Leisure and Events, 8(1), 1-20. DOI: 10.1080/19407963.2015.1043918.
- Nowak, S., Franczak, A. 2013. Regionalne strategie rozwoju a realizacja koncepcji zrównoważonej turystyki. In: Nowak, S. (Ed.). Ekonomiczno-organizacyjne problemy działalności turystycznej w regionach, 63-75. Katowice: Wydawnictwo Akademii Wychowania Fizycznego w Katowicach.
- Papuziński, A. 2006. Filozoficzne aspekty zrównoważonego rozwoju – wprowadzenie. Problemy Ekorozwoju, 1(2), 25-32.
- Pender L., Shalper, R. 2008. Zarządzanie turystyką. Warszawa: PWE.
- Piontek, F., Piontek, B. 2005. Alternatywne koncepcje wdrażania rozwoju i ich skutki dla kategorii kapitał. Nierówności Społeczne a Wzrost Gospodarczy, 6, 69-100.
- Pisani, J.A. 2006. Sustainable Development - historical roots of the concept. Environmental sciences, 3(2), 86-96. DOI: doi.org/10.1080/15693430600688831.
- Płachciak, A. 2011. Geneza idei zrównoważonego rozwoju. Ekonomia, 5(17), 231-248.
- Popiel, M. 2015. Znaczenie turystyki zrównoważonej w rozwoju społeczno-gospodarczym na przykładzie Chorwacji. Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego, 29(3), 67-82.
- Poskrobko, B. 2013. Paradygmat zrównoważonego rozwoju jako wiodący kanon w badaniu nowych obszarów ekonomii. Ekonomia i Środowisko, 3(46), 10-24.
- Rapacz. A. 2004. Współpraca i integracja w turystyce w euroregionie Nysa w perspektywie członkostwa w Unii Europejskiej. Wrocław: Wydawnictwo Akademii Ekonomicznej we Wrocławiu.
- Ritchie, J.R.B., Crouch, G.I. 2003. The competitive destination; a sustainable tourism perspective. Cambridge: CABI Publishing.
- Rosicki, R. 2010. Międzynarodowe i europejskie koncepcje zrównoważonego rozwoju. Przegląd Naukowo - Metodyczny, 4, 44-56.
- Stanimir, A. 2005. Analiza korespondencji jako narzędzie do badania zjawisk ekonomicznych. Wydawnictwo Akademii Ekonomicznej im. Oskara Lanego we Wrocławiu.
- Szopik-Depczyńska, K., Cheba, K., Bąk, I., Stajniak, M., Simboli, A., Ioppolo, G. 2018. The study of relationship in a hierarchical structure of EU sustainable development indicators. Ecological indicators, 90, 120-131. DOI:

-
- doi.org/10.1016/j.ecolind.2018.03.002.
- Thant, U. 1969. Problems of the human environment. New York: United Nations Economic and Social Council.
- Torres-Delgado, A., Palomeque, F.L. 2014. Measuring sustainable tourism at the municipal level. *Annals of Tourism Research*, 49, 122-137. DOI: 10.1016/j.annals.2014.09.003.
- Vashisth, A., Kumar, R., Sharma, S. 2018. Major Principles of Sustainable Transport System: A Literature Review. *International Journal for Research in Applied Science and Engineering Technology*, 6(2). Retrieved from: https://www.researchgate.net/publication/323336900_Major_Principles_of_Sustainable_Transport_System_A_Literature_Review.
- Zareba, D. 2000. *Ekoturystyka, Wyzwania i nadzieje*. Warszawa: Wydawnictwo Naukowe PWN.
- Zhu, J., Hua, W. 2017. Visualizing the knowledge domain of sustainable development research between 1987 and 2015: a bibliometric analysis. *Scientometrics*, 10, 893-914. DOI 10.1007/s11192-016-2187-8.
- Zioło, M., Filipiak, B., Bąk, I., Cheba, K. 2019. How to Design More Sustainable Financial Systems: The Roles of Environmental, Social, and Governance Factors in the Decision-Making Process. *Sustainability*, 11(20)56041, 1-34. DOI: doi.org/10.3390/su11205604.
- Zioło, M., Filipiak, B., Bąk, I., Cheba, K., Tırca, D.M., Novo-Corti, I. 2019. Finance, Sustainability and Negative Externalities. An Overview of the European Context. *Sustainability*, 11(15), 1-35. DOI: doi.org/10.3390/su11154249.