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TOURISM INTEREST AND THE EFFICIENCY OF ITS UTILISATION BASED ON THE EXAMPLE OF THE EU COUNTRIES

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Abstract. This article discusses the subject of the efficiency of the transformation of tourism interest defined as arrivals in tourist accommodation establishments into outputs, such as collective tourist accommodation establishments and GDP per inhabitant in the EU countries. For the measurement of efficiency the DEA method was used and the following models were assumed: CCR, BCC, NIRS. As a result was confirmed that significant similarity in the efficiency of the transformation of the inputs above referred to into outputs was only observed in the group of richer countries (GDP > average for the EU) or in the group of poorer countries. The analysis conducted proved that richer countries achieved higher PTE, while poorer countries achieved higher SE.

Key words: DEA, European Union, efficiency, tourism, tourism interest

INTRODUCTION

Tourism, though requiring the incurring of outlay, may be a source of numerous benefits in the economic and social spheres [Andereck et al. 2005, Kwon, Vogt 2010].

The tourism interest referred to in the article may be defined and measured in many ways. Accepting the basic assumption that tourism interest is indicated by the number of tourists travelling to a given destination, we may use, for the purpose of such a definition, for example the Schneider tourism traffic intensity indicator or the Defert tourism function indicator. Considering the fact that the presence of tourists may constitute a stimulus to the development of accommodation facilities, we may also use the density of accommodation facilities as an index of accommodation facilities [Lozato-Giotart 1992, Duda-Gromada et al. 2010] for same purpose, that is for coining a proper definition of tourism interest. Considering the availability of international statistical data, for the needs of this article, tourism interest was assumed to be the number of arrivals in tourist accommodation establishments.

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The primary objective of these considerations was the evaluation of the efficiency of the transformation of tourism interest, in respective European Union countries, into such outputs as: increase in the number of business entities directly providing tourism services (collective tourist accommodation establishments) and increase in gross domestic product (GDP) per inhabitant. It should, however, be pointed out that such a definition of the outputs of tourism interest was coined on the basis of the availability of uniform statistical information and it shall not mean that the analysed outputs were solely caused by tourism interest. In view of the methodology of this article, it was, yet, assumed that tourism interest might be regarded as a certain potential for development of tourism function in a given country, and that due to the effects of the tourism multiplier, a GDP growth may also be stimulated.

Thus, the article poses the hypothesis which states that the EU countries are characterised with a similar efficiency in the transformation of the inputs referred to herein into outputs.

In order to characterise the tourism interest in the EU countries, an analysis of the dynamics of the change in the number of arrivals in tourist accommodation establishments in the years 2007–2009 was carried out. The dynamics of the change was calculated on the basis of chain indices, and then, with the use of the arithmetic mean, the average rate of change was calculated. The results are shown in Table 1.

It should be emphasised here that tourism interest, though to a certain extent created by the marketing activity of respective countries [Alvarez 2010, Bornhorst et al. 2010, Cox, Wray 2011], is, to a significant extent, determined by such factors, as trends, economic conditions or location, and even by emergency conditions, such as natural disasters or terrorist attacks [Sausmarez 2007, Alsarayreh et al. 2010, Visser, Ferreira 2011].

As reported by United Nations World Tourism Organization [2011] tourism's contribution to the worldwide gross domestic product (GDP) is estimated at 5%. For advanced, diversified economies, the contribution of tourism to GDP ranges from approximately 2% for countries where tourism is a comparatively small sector, to over 10% for countries where tourism is an important pillar of the economy. For the economic development of a given country, not only is the number of tourists that visit the country significant, but also the volume of their spending. Furthermore, for the tourists' spending habits to become a significant stimulus to the development of the entire economy, such economy shall be in possession of financial, human and social resources. Only with the possession of the essential minimum of the resources referred to the transformation of tourism interest into long term and multifunctional national development possible.

MATERIAL AND METHODS

Among the generally applied methods of evaluating efficiency the following should be mentioned: the indicator approach (e.g. indicators of indebtedness, financial liquidity), the parametric approach (e.g. Stochastic fronier approach) and the non-parametric approach in which the linear programming procedure is used, the influence of random factors (e.g. data envelopment analysis DEA) shall be neglected.

Table 1. Average numerical dynamic of change (arrivals in tourist accommodation establishments) in the years 2007–2009

Country	Average dynamic change
Slovenia	111.0
Malta	105.3
Cyprus	105.3
Belgium	103.5
Poland	103.2
Greece	103.1
Austria	103.0
Portugal	102.7
United Kingdom	102.4
Italy	101.0
France	100.9
Slovakia	100.1
Germany	100.1
Sweden	100.0
Ireland	99.8
Finland	99.5
Netherlands	99.4
Hungary	98.8
Bulgaria	97.8
Czech Republic	97.4
Spain	97.1
Denmark	96.8
Luxembourg	96.7
Romania	95.2
Estonia	89.6
Lithuania	85.8
Latvia	77.0

Source: Own elaboration.

The application of the DEA method in the article is supported with the productivity concept worked out by Debreu [1951] and Farrell [1957], which was further developed by Charnes, Cooper and Rhodes [1978], enabling its application in a situation in which there is a plurality of inputs and more than one output. This method has been subject to numerous modifications [Sexton et al. 1986, Doyle, Green 1994, Zhu 2006, Liang et al. 2008].

Classification of DEA models typically applies two criteria simultaneously: type of returns to scale and also model orientation. Use of the returns to scale criterion has allowed for the division of the DEA models into those assuming constant returns to scale (CRS – constant returns to scale) and those assuming variable returns to scale (VRS – variable returns to scale). In the VRS group, the following models are distinguished: DRS – decreasing returns to scale, NIRS – non-increasing returns to scale, IRS – increasing returns to scale or NDRS – non-decreasing returns to scale. At the same time the model orientation indicates whether inputs are minimised or whether outputs are maximised.

The analysis of the efficiency based on the DEA method examines the finite number of decisive units (defined as DMU with identically defined inputs and identically defined outputs). Efficiency is defined as the quotient of the weighed sum of the outputs to the weighed sum of inputs and then, referred to the best units in a set. In order to designate the index of efficiency of a given decisive unit, appropriately formulated non-linear programming task, read as a linear task, is respectively solved. A research group is assumed to include *n* decisive units. Each unit uses *m* of the same inputs (in different quantities) and renders *s* of the same outputs (of different levels).

$$\sum_{r=1}^{S} u_r y_{rj} \div \sum_{i=1}^{m} \upsilon_i x_{ij}$$

where: u_r – means weight connected with *r* output;
v_i – weight connected with *i*-inputs;
x_{ij} – *i*-inputs used by *j* decisive unit;
y_{rj} – *r* output obtained by *j* unit;
while: $i = 1. 2..., m$; $j = 1. 2..., n$; $r = 1. 2. ..., s$.

Units located in envelopes are considered to be effective, and their relative efficiency equals 1 (or 100%). Whereas ineffective units are located outside the envelope, and their efficiency is less than 1. In the DEA method the measure of inefficiency is the distance between the empirical point characterising a given unit, and the estimated edge of the set of production capacity options [Shepard 1953]. Detailed mathematical formulae of the applied method are included in the study elaborated by Cooper, Seiford and Zhu [Cooper et al. 2004].

The assumptions of the DEA method enable its application also in reference to those issues, in which the outputs or inputs are not expressed in cash. Thus, the group of decisive units, being the scope of the said analysis, may be composed of production, trading, service providing enterprises as well as of public sector units, such as e.g. hospitals, schools or local government units. In reference to the analysis of public sector efficiency, the efficiency of management of the specified and available resources is of fundamental significance, and this may not always be translated into the appropriate financial value.

Research works that apply the DEA method for the analysis of the efficiency of units of varying industries and sectors are relatively numerous. This method was applied, in reference to banks and also to other financial institutions, among others by Bradley and others [Bradley et al. 2006, Thoraneenitiyan, Avkiran 2009, Holod, Lewis 2010]. The method was also widely applied with reference to analysing the efficiency of schools and higher educational establishments [Reichmann 2004, Johnes 2006, Leitner et al. 2007, Thanassoulis et al. 2011], as well as to the agricultural sector [Galanopoulos et al. 2006, Anriquez, Daidon 2010]. Selected examples of applications of the DEA method are shown in Table 2.

For the requirements of the article, publications concerning the efficiency of the management of territorial units are of particular value.

Extensive research in this area has been conducted in Finland, where the efficiency was assessed in 353 towns (constant returns to scale model – CCR), for the assessment purposes inputs were assumed to be all the expenses of the town incurred on health

Table 2. Characteristics of chosen examples of the application of the DEA method

Literature	Units	Inputs	Outputs
Hwang, Chang (2003)	45 Taiwan international hotels	(1) number of full-time employees (2) guest rooms (3) total area of meal department (4) operating expenses	(1) room revenue (2) food and beverages revenue (3) other revenue
Barrows (2005)	43 ENATUR's hotels	(1) full times workers (2) cost of labour (3) rooms (4) surface area of the hotel (5) book value of property (6) operational costs (7) external costs	(1) sales (value in euro) (2) number of guests (3) nights spent
Chiang (2006)	24 Taipei international hotels	(1)hotel rooms (2) food and beverages capacity (3) number of employees (4) total operating cost	(1) yielding index (2) food and beverages revenue (3) miscellaneous revenue
Barrows, Dieke (2008)	12 Luanda hotels	(1) total costs (2) investment inputs	(1) revenue per room
Botti et al. (2009)	16 France hotel chains	(1) costs (2) territory coverage (3) chain duration	(1) sales
Yan, Zongguo (2010)	45 cities	(1) electricity consumption (2) water consumption	(1) GDP (2) non-agricultural product (3) green area (4) wastewater (5) sulphur dioxide (6) solid waste
Köksal, Aksu (2007)	24 travel agencies	(1) number of staff (2) annual expenses (3) having service potential	(1) number of customers served
Barros et al. (2011)	22 French regions	(1) accommodation capacity (2) arrivals	(1) nights slept

Source: Own elaboration.

services, social services and education and outputs were defined among others as the number of days spent by children in preschools, number of visits to outpatient clinics, number of books borrowed from public libraries. As a result of the analysis conducted it was proved that the majority of the effective towns were situated in southern Finland [Loikkanen, Susiluoto 2005]. Whereas the assessment of the efficiency of inputs in 24 districts of Sofia showed that 14 of them did not operate effectively, of which the majority were small, low budget districts. It should be mentioned that the researchers for the structuring of the assessment model assumed eight initial variables, such as: size of population, length of roads, area of lawns, parks and gardens, number of pupils in primary and secondary schools, number of beds in hospitals, number of libraries within the area of the town [Michailov et al. 2003].

From the point of view of the subject of these considerations, inclusion of the results of analyses conducted in 103 Italian regions on the basis of the output oriented CCR model seemed fully grounded. The outputs comprised the following: the number of accommodation places in relation to the number of inhabitants of particular regions, at the same time the investment input was defined here as: the number of cultural heritage facilities per inhabitant, share of tourism school graduates in the working age population, share of those working in the tourism sector in the total number of the employed [Cracolici, Nijkamp 2006]. The conducted analysis showed that only seven regions among those examined operated effectively in the analysed scope. These regions included Rimini, Oristano, Trento, Bolzano, Venice, and Siena. The average technical efficiency for the 103 Italian tourism regions amounted to barely 0.29 and 43% of the regions examined did not even achieve average efficiency. In the opinion of the authors of the study the low efficiency of regions with a significant number of cultural objects (regions focused on cultural tourism) may result from "over investment" in cultural tourism assets in comparison to the outputs the tourists can generate for a given region.

The review of the subject related reference literature unambiguously indicates that the data envelopment analysis (DEA) is widely applied in the analysis of efficiency not only of business entities, but also of other institutions, organisations and units whose scope of business does not necessarily focus primarily on profit.

RESULTS AND DISCUSSION

The DEA method based on linear programming was used for the verification of the presented hypothesis. The selection of the method was principally dictated by the fact that this method may be applied to the estimation of efficiency of various units, including commercial firms and also state and regional economies. Thus, in this example, the decision making units were all the EU member states. The efficiency of transformation of inputs into outputs was calculated for these countries, in the calculations the arrivals in tourist accommodation establishments were regarded as inputs (X_1), and collective tourist accommodation establishments were regarded as outputs (Y_1), and GDP per inhabitant as outputs (Y_2). The selection of inputs and outputs was the result of the necessary verification of the hypothesis put forward in the introduction stating that the EU countries are characterised with similar efficiency in the transformation of the earlier referred to inputs into outputs.

Furthermore, for the elimination of accidental deviation of data, mean values recorded for the years 2007–2009 for the calculations were used. The statistical information was obtained from Eurostat. The observations and the variables used ensure the application of the DEA convention which assumes that the minimum number of DMUs is greater than three times the number of inputs plus output [$27 \geq 3(1+2)$] – Raab and Lichty 2002. The characteristics of input and output data are presented in Table 3.

In the calculations the output-oriented approach was applied. In this approach the target is the maximisation of outputs at given inputs. The model is oriented on output based on the assumption that countries should pursue continuous economic development, also in the utilisation of tourism potential, this, in turn, is contrary to the assumptions of

Table 3. Characteristics of the inputs and outputs in the UE country (average for years 2007––2009)

Variables	Units	MaxIMUM	MinIMUM	Mean	SD
		Outputs			
Collective tourist accommodation establishments	Number	18 602	896.6	5 298.296	4 377.201
Gross domestic product at market prices	Euro per inhabitant	78 633.33	4 433.3	23 665.4	15 372.7
		Input			
Arrivals in tourist accommodation establishments	Number	104 207 756.3	60 519	18 096 567.6	28 042 517.3

Source: Own elaboration.

the input-oriented model, whose target would be to obtain the same outputs at a reduced number of arrivals in tourist accommodation establishments. Furthermore, the choice of the model orientation was based on the assumption that the EU member state might only to a limited extent decide upon the number of arrivals in tourist accommodation establishments, since this parameter is, to a significant extent, determined by the climatic and spatial conditions.

In order to verify the hypothesis set forth, the models on the basis of the assumption of CCR model, BCC model, and NIRS model calculated were in the DEASolverPro program with regard to the benefits of the scale proposed by the program.

For the purpose of the considerations described below, the following terms were introduced: poorer countries and richer countries, where the differentiating factor in this instance was the average value of GDP per inhabitant for the years 2008–2009 calculated for all countries of the EU. Thus, whenever this articles refers to poorer countries, it shall mean the countries in which the GDP is lower than the value of the average GDP for all countries of the EU, and in the event of countries designated herein as richer countries, the term shall mean the countries where the GDP for the given country reached a value higher than average.

The CCR model calculated at constant returns to scale in the analysed example shows that the growth of GDP per inhabitant and the increase in the number of collective tourist accommodation establishments should be proportional to the increase in the number of arrivals in tourist accommodation establishments. Such a situation in reality would not be an entirely positive phenomenon, as it might indicate a strong economic dependence on tourism leading to a tourism monoculture. Furthermore, in a free-market economy, we have to assume that both the increase of GDP and also the increase in the number of collective tourist accommodation establishments is conditioned by many endogenous factors, among others, such as: the taxation system, the legal system (specifically regarding the labour law), internal competition and exogenous factors (e.g. trends in global economy or the image of a given country as a tourism destination). Having regard to the already stated, it is necessary to bear in mind that total technical efficiency (TE) indicates only the technical capacity of a given country for the transformation of tourism interest into such outputs, as collective tourist accommodation establishments and gross domestic product per inhabitant. Results received in the CCR model differ significantly from the results received in the other models, such difference must certainly result from the fact that the countries do not function in the same market conditions. Therefore, it may be assumed that the constant returns to scale model structure is not properly suited to the group of units under the research and shall not be analysed in detail. Varying economic conditions, financial and technological limitations justify the necessity of decomposition of total technical efficiency (CCR model), into pure technical efficiency (variable returns to scale model – BCC model) and scale efficiency (SE model). Such an approach enables us to define which element (inappropriate scale of the phenomenon or inappropriate manner of transformation of inputs) is the principal cause lying behind the lack of full efficiency in the case of each of the analysed countries. Additionally, it may be assumed that the richer the country and the more diversified the economy, the more relevant the account for the variable returns to scale model shall be at the determination of efficiency of the transformation of inputs into outputs.

In the case of the BCC variable returns to scale model, countries with a high GDP and/or an established position among European tourism destinations recorded the highest efficiency. Bearing in mind earlier deliberations, the values determined with the application of this model may be deemed as the best suited to variable operating conditions of the analysed countries, as they reflect the actual state of affairs to a greater degree. For that reason the results obtained via the application of the said model shall be the scope of further analyses. Table 4 presents efficiency according to the values obtained in the BCC model.

The category of pure technical efficiency, despite the great usefulness of the evaluation process of transformation of inputs, is only one of the elements constituting the technical efficiency of a country. The second factor is the scale efficiency – SE, which shows the possibility of improvement of efficiency through the change of scale of the phenomenon (or production). Scale index defines to what degree the analysed unit is efficient in relation to the optimum that is to the maximum efficient use of inputs. High efficiency scale (SE) is typical for poorer countries, where the dynamic tourism development is observed only at present (Latvia, Estonia, Lithuania), and where current GDP is relatively low. Whereas richer countries, with an established tourism destination position (Germany, France, United Kingdom, Italy) achieve low scale efficiency (SE) for another reason being namely the market substantial saturation with tourist accommodation establishments, therefore the tourist arrivals do not represent such a powerful stimulus for the development. Furthermore, a vast majority of the analysed countries operate in a declining scale calibration, which suggests that the positive effects of tourism development (defined in these deliberations as number of collective tourist accommodation establishments and gross domestic product per inhabitant) increase slowly in relation to the increase in the number of arrivals in tourist accommodation establishments. It is a common phenomenon, with one of the reasons behind it being the investment process in tourism.

For the purpose of better adjustment of the BCC model to the differing circumstances, in which the analysed countries function, the values of the model shall be the subject of further analyses. Spearman's rank correlation was used in order to define the factors, which influence the efficiency of the transformation of arrivals in tourist accommodation

Table 4. DEA technical efficiency scores for EU countries in 2007–2009

DMU	Technically efficient, constant return-to-scale index (CCR model)	Technically efficient, variable return-to-scale index (BCC model)	Non-increasing return-to-scale (NIRS)	Technically efficient scale index (SE)	Return -to-scale
Luxembourg	1.000	**1.000**	1.000	1.000	Constant
Malta	1.000	**1.000**	1.000	1.000	Constant
Cyprus	0.256	**1.000**	1.000	0.256	Decreasing
Austria	0.011	**0.881**	0.881	0.012	Decreasing
Ireland	0.016	**0.752**	0.752	0.021	Decreasing
Denmark	0.013	**0.635**	0.635	0.020	Decreasing
Spain	0.001	**0.597**	0.597	0.002	Decreasing
Netherlands	0.003	**0.583**	0.583	0.005	Decreasing
Sweden	0.003	**0.575**	0.575	0.005	Decreasing
Italy	0.001	**0.536**	0.536	0.002	Decreasing
France	0.001	**0.503**	0.503	0.001	Decreasing
Finland	0.005	**0.495**	0.495	0.010	Decreasing
United Kingdom	0.001	**0.482**	0.482	0.001	Decreasing
Greece	0.007	**0.467**	0.467	0.015	Decreasing
Germany	0.0004	**0.467**	0.467	0.001	Decreasing
Belgium	0.006	**0.438**	0.438	0.013	Decreasing
Slovenia	0.037	**0.362**	0.362	0.101	Decreasing
Portugal	0.005	**0.355**	0.355	0.015	Decreasing
Czech Republic	0.005	**0.299**	0.299	0.018	Decreasing
Estonia	0.033	**0.262**	0.262	0.124	Decreasing
Slovakia	0.009	**0.205**	0.205	0.044	Decreasing
Hungary	0.004	**0.186**	0.186	0.024	Decreasing
Latvia	0.025	**0.153**	0.153	0.161	Decreasing
Poland	0.001	**0.150**	0.150	0.006	Decreasing
Bulgaria	0.007	**0.144**	0.144	0.050	Decreasing
Lithuania	0.014	**0.126**	0.126	0.111	Decreasing
Romania	0.002	**0.099**	0.099	0.016	Decreasing
Mean	0.091	**0.472**	0.472	0.112	×
SD	0.261	**0.270**	0.270	0.262	×

Source: Own elaboration.

establishments into outputs: number of collective tourist accommodation establishments and GDP per inhabitant. In order to determine the factors having the highest influence on the said efficiency in the analysed countries, the analysis of reverse stepwise multiple regression was used. The factors, whose influence on the efficiency was the scope of this research, were as follows: harmonised indices of consumer prices (HICP), hourly labour cost (HLC), unemployment rate. For the analysis of all the three factors we used mean values for the years 2008–2009. The extent of the influence and its direction of the correlation of these three factors is shown in Table 5.

Table 5. Correlation in order of Spearman grades ($p < 0.05$)

Variable	R-Spearman	p
BCC, HICP	–0.66	0.0002
BCC, HLC	0.68	0.0001
BCC, Unemployment rate	–0.42	0.0285

Source: Own elaboration.

The presented results indicate that HICP and unemployment rate are de-stimulants, whereas positive correlation can be observed in the case of efficiency and HLC. This may be explained with the fact that greater efficiency at variable returns to (BCC model) is typical for the richer countries, in which labour costs are higher. Next, for the purpose of grouping countries with regard to efficiency, the Ward's method, based on the similarities of taxonomic objects showing a number of characteristic features, being one of the agglomerative clustering methods, was used. The countries were grouped into clusters with the k-means method (Table 6). This method was used for the purpose of defining the most homogenous clusters, which, at the same time, would differ from one another to the maximum extent. Clustering of the countries was preceded with data standardisation. Figure 1 clustering of the countries with the k-means method (graph showing mean values of each cluster).

Analysis of the results received enables us to state that on one hand the cluster of the countries characterised with a low level of efficient use of tourism interest (cluster 2) comprises exclusively those countries whose GDP per inhabitant is lower than average GDP of the EU countries. On the other hand, l' of the countries showing high efficiency are the countries with GDP per inhabitant higher than the average GDP value of the EU countries.

The selection of variable inputs and outputs may give rise to disputes thereon. Such a selection, however, was mainly carried out in view of the availability of statistical information for all the 27 states, recorded in the years 2007–2009. Therefore, it must be emphasised here, that the outputs analysed in the study are not solely determined by the number of arrivals in tourist accommodation establishments. Considering the referred to limitations, we may, however, assume that indices of efficiency evaluated with the use of the DEA method may be the basis for further analyses. Furthermore, the research into other factors determining the efficiency of the transformation of tourist interest into such outputs, as collective tourist accommodation establishments and GDP per inhabitant, is fully grounded. Also opportunity to measure the changes in the efficiency recorded in time in respective EU countries with the use of the Malmquist productivity index opens up a broad perspective for further research.

Table 6. Membership of particular countries to concentrations

Country	Concentration number	Country	Concentration number
Austria	1	Bulgaria	2
Belgium	1	Czech Republic	2
Cyprus	1	Estonia	2
Denmark	1	Hungary	2
Finland	1	Latvia	2
France	1	Lithuania	2
Germany	1	Poland	2
Greece	1	Romania	2
Ireland	1	Slovakia	2
Italy	1		
Luxembourg	1		
Malta	1		
Netherlands	1		
Portugal	1		
Slovenia	1		
Spain	1		
Sweden	1		
United Kingdom	1		

Source: Own elaboration.

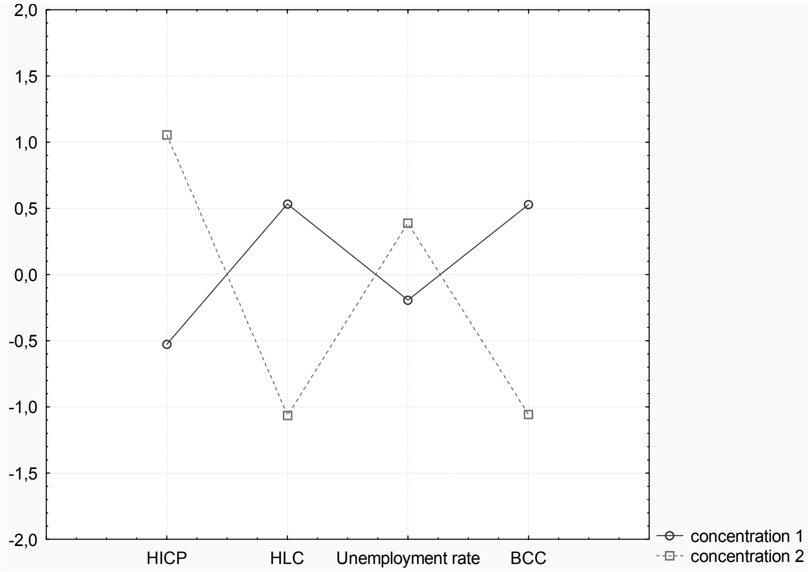

Fig. 1. Grouping of countries by the k-means method

CONCLUSIONS

In conclusion of the earier stated, the initial hypothesis, stating that the EU countries are characterised with similar efficiency in the transformation of the inputs referred to into outputs must be dismissed. Significant similarity in the efficiency of the transformation of arrivals in tourist accommodation establishments into collective tourist accommodation establishments and GDP per inhabitant is only observed within the cluster of richer countries or within the cluster of poorer countries.

Furthermore, the conducted analysis proved that richer countries achieved higher pure technical efficiency (PTE) and poorer countries achieved higher scale efficiency (SE). This may be explained, among others, with the fact that investment is essential for the development of tourism, which in turn is connected with the possession of funds. Thus, in poorer countries the efficiency can be improved through the change of scale of the same phenomenon, however, richer countries face fewer opportunities for the improvement of efficiency with the application of the same solution as proposed for the poorer countries as their tourism services are already highly developed.

Decomposition of technical efficiency into pure technical efficiency and scale efficiency showed that in the case of poorer countries the faulty tourism management strategy at national level relatively low value in BCC model or lack of capital essential for the transformation of inputs into outputs constituted principal causes of inefficiency. In the case of richer countries the low scale efficiency may be caused by the already well-established role of tourism in the national economy, which would result in limited and slow growth of efficiency, if any.

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ZAINTERESOWANIE TURYSTYCZNE A EFEKTYWNOŚĆ JEGO WYKORZYSTANIA NA PRZYKŁADZIE KRAJÓW UE

Streszczenie. W artykule została podjęta tematyka efektywności przetwarzania przez kraje UE zainteresowania turystycznego definiowanego jako (X_1) przyjazdy do obiektów zbiorowego zakwaterowania, w efekty, takie jak (Y_1) liczba turystycznych obiektów zbiorowego zakwaterowania i (Y_2) PKB na mieszkańca w krajach UE. Do pomiaru efektywności zastosowano metodę DEA, wykorzystując modele CCR, BCC i NIRS. W wyniku czego stwierdzono, że znaczne podobieństwa w efektywności przekształcania wspomnianych nakładów w efekty występują jedynie w grupie krajów bogatszych (PKB > średniej dla UE) lub biedniejszych (PKB < średniej dla UE). Ponadto przeprowadzona analiza wykazała, że kraje bogatsze osiągają wyższą czystą efektywność techniczną (pure technical efficiency – PTE), a kraje biedniejsze osiągają wyższą efektywność skali (scale efficiency – SE).

Słowa kluczowe: graniczna analiza danych, Unia Europejska, efektywność, turystyka, zainteresowanie turystyczne

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