EVALUATION OF THE ENVIRONMENTAL DIMENSION OF SUSTAINABLE DEVELOPMENT IN THE EU COUNTRIES

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Abstract

Sustainable development is considered as a multidimensional concept. Sustainable development affects many spheres of countries life and development. In general, it consists mainly of the economic, social and environmental dimension. The relationships between the dimensions are, towards sustainability, quite complicated. The aim of this paper is to assess the environmental dimension of sustainable development in European Union countries using the selected indicator. Indicator using the we will evaluate the sustainable development is Environmental Performance Index "EPI", which can be considered as representative indicators of environmental dimension.

Keywords: *sustainable development, dimensions of sustainable development, environmental dimension, Environmental Performance Index*

Clasificare JEL: *Q01, Q56*

1. Introduction and context of the study

Sustainable development is now perceived as a general concept applicable in all spheres of economic life (Huttmanová, 2015). Sustainable development is defined as such development that provides meeting the needs of present generations, without limited of meeting the needs of future generations (Barrow, 2006); (Demo et al., 2007). Without knowledge of past and current production and consumption models and accurately quantifying current needs is not possible to predict the needs of future generations.

Sustainable development is explained, or normatively defined, as a balance among so-called pillars of sustainable development (Demo et al., 2007); (Dušek, Pána et al., 2010): economic (oriented to economic growth and development), social (oriented the quality of life) and environmental (oriented do quality of environment) (Chovancová, 2015), sometimes completed also with the fourth, cultural pillar, and another pillar, i.e. a good public administration (Nováček, 2011); (Jeníček, 2010); (Huttmanová, 2015). The system of three pillars is possible to derive from the fulfilment of the condition of the basic definition of sustainable development according to Brundtland, who considers the pursuit of human needs to be the purpose of sustainable development (Jeníček, 2010); (Lačný, 2012); (Nováček, 2011). There are several ways of quantifying sustainable development (Maier et al., 2012); (Moldan, 2009); (Nováček, 2011); (Rusko et al., 210); (Huttmanová, 2015). Sustainable development or its dimensions can be quantified using the economic indicators (Adamišin, Tej, 2012); (napr. HDP per capita; The energy intensity of the economy…) social indicators (unemployment rate, life expectancy,…) and environmental indicators (Greenhouse gas emissions, Waste production …) as well as using the various combinations of these indicators (Adamišin, Kotulič, 2013); (Adamišin, Vavrek, 2015). In practice, there are synthetic and comprehensive indicators used for the evaluation of sustainable development (eg: Environmental Performace Index, Index of Sustainable Economic Welfare, etc.)

2. Material and methods

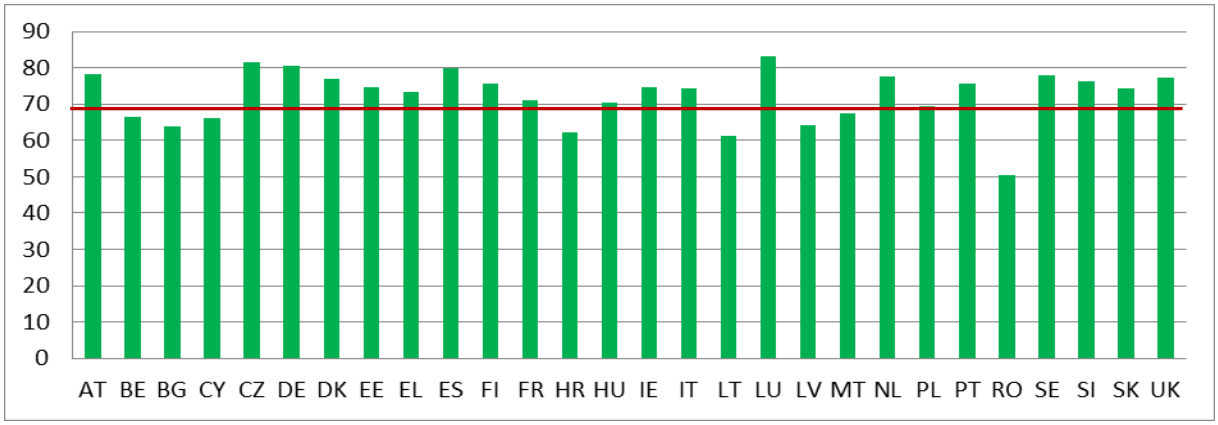
The aim of this paper is to evaluate the measure of similarity of sustainable development in the European Union countries through indicator Environmental Performance Index characterizing environemntal dimension of sustainable development. The data were processed with the help of statistical software Statistica 12. Evaluation is realized by the method of cluster analysis. From among various methods of cluster analysis, we applied hierarchical cluster methods resulting, in graphic representation, in a tree diagram called dendrogram. For the measurement of distance among individual points, Euclidean distance and the method of the nearest neighbour, which are the most frequently applied in cluster analyses, were used.

3. Results and discussion

We watched a similarity of individual EU countries using the indicator Environmental Performance Index (EPI) and its selected sub-indicators. EPI index replaces ESI (Environmental Sustainability Index). Indicator EPI was created to:

- recognize the environmental problems
- capture trends in pollution control and natural resource management
- identify priority environmental issues
- identify where current policy achieves good results, as well as bad results
- provide a base for comparison between countries and sectors
- find similar countries and identify leaders and lagging countries
- and to identify the best measures and successful policy models.

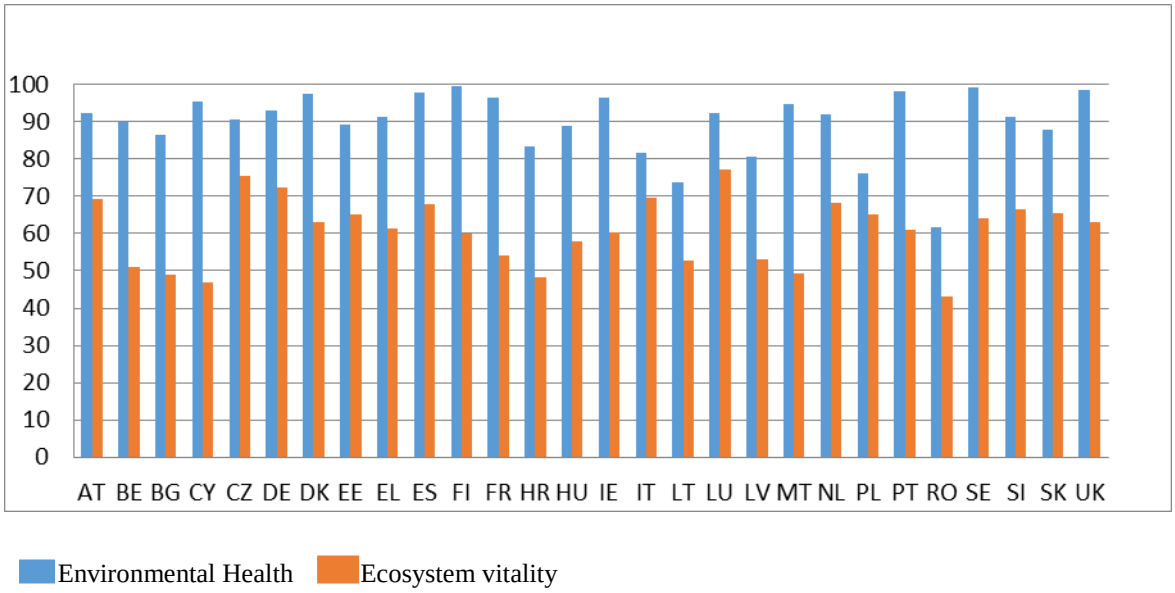
Environmental Performance Index (EPI) is also referred to as an index of the impact on the environment is designed by calculation and aggregation of selected indicators representing data in the field of environment at the national level. These indicators are combined into nine categories, each of which is assigned to one of two main objectives. EPI values are expressed on a scale of 0 to 100 in a simple arithmetic calculation, where 0 is the farthest from the target (the worst value) and the value of the 100 best reflects the observed value (a value close to the target). In this sense EPI is a dimensionless indicator, because it is not expressed in standard units of measurement. EPI values achieved in the EU-28 for the assessment period are shown in the graph no. 1.



Graph no. 1 Achieved value of the indicator EPI in the EU (and the average value of the indicator for the EU-28) in 2014

Source: own processing of data from Yale Center for Environmental Law and Policy

The graph no.1 shows that the highest value of the Environmental performance index and the least negative impact on the environment achieves Luxembourg, followed by Czech Republic and Germany. The most among the EU-28 of required values index departs Romania.



Graph no. 2 EPI indicator values achieved at the level of the fundamental objectives of the EU countries in 2014

Source: own processing of data from Yale Center for Environmental Law and Policy

The evaluation of individual fundamental objectives of this index (graph no.2), it is obvious that EU countries perform better results in the field of Environmental Health that in category vitality of ecosystems. Based on the obtained values EPI it can be concluded that the countries of the European Union have the best elimination of the negative impacts on air quality, water, sanitation and health impacts in the area.

In assessing the partial results (graph no.2), the highest value in the category of Environmental Health, was achieved in Finland and Sweden, and conversely the lowest in Romania. In the evaluation of the objective Vitality of ecosystems can be seen that the EU countries have lower values than the previous objective, which could indicate problems with ensuring the quality of the environment just in the field of ecosystems quality. The highest values of ecosystems Vitality achieved Luxembourg, Czech Republic and Germany, which is also reflected in the overall evaluation of EPI. Furthest away from the setpoint values in the objective Ecosystem vitality again reaches Romania. The average value achieved in the objective Environmental Health in the EU-28 is almost 90 and in the objective Vitality ecosystems 60.7. The Slovak Republic has the total value of EPI at 74.45 (in the objective of Environmental health reaches index value of 87.9, and in the objective Vitality of ecosystems value 65.5).

Based on the above it can be concluded that the Slovak Republic reaches the value of EPI index, based on its overall assessment as well as based on its partial objectives, the level of average EU-28th.

Using EPI we also evaluate the degree of similarity in the European Union. Cluster analysis we realized at the level of the main categories of Environmental performance index (Figure no.1).

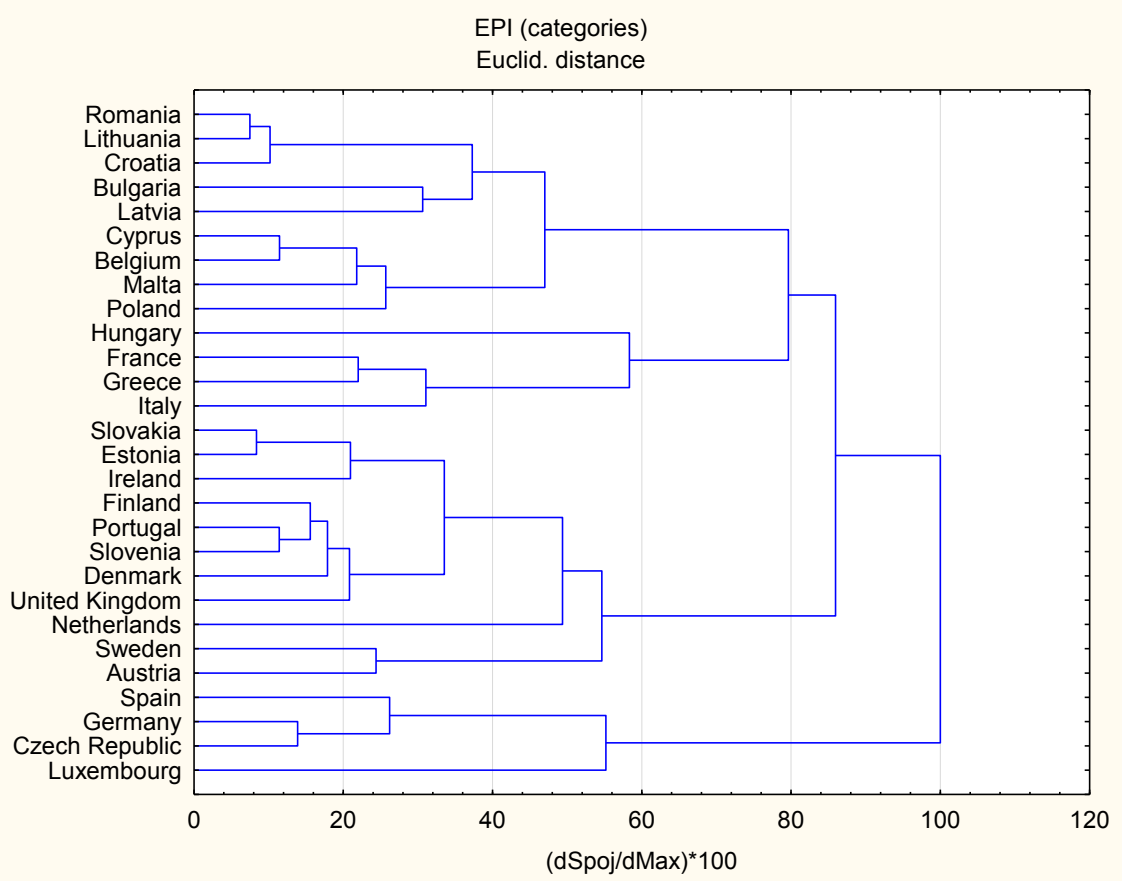


Figure no. 1 Dendrogram – EPI (categories level) in the EU countries (year 2014)
Source: own processing

Table no. 1 Clusters of EU countries evaluated by EPI (categories level)

Clusters rank according to EPI score	**Countries**	**EPI score**
1.	Spain, Germany, Czech Republic, Luxembourg	81,26
2.	Slovakia, Estonia, Ireland, Finland, Portugal, Slovenia, Denmark, United Kingdom, Netherlands, Sweden and Austria	76,36
3.	Hungary, France, Greece, Italy	72,24
4.	Romania, Lithuania, Croatia, Bulgaria, Latvia, Cyprus, Belgium, Malta, Poland	63,54

Source: own processing

Realized evaluation shows that within the European Union there are four relatively independent groups of countries that achieve a certain degree of similarity in environmental performance. These clusters of countries are listed in Table no.1. Slovak Republic in this evaluation shows a high degree of similarity with Estonia.

4. Conclusions

Way to sustainability achieving is long and so complicated. Similarly, it is also complicated the relationship between economic growth and environmental quality. On the one hand it is clear that long-term economic growth requires the use of natural resources (often limited and exhaustible

resources). It leads to environmental degradation. On the other hand, economic growth enables the reduction of environmental pollution, and creates conditions for environmental problems solutions. Therefore it is understanding and evaluation of the environmental dimension of sustainable development a necessary part of sustainable development evaluatio, as well as searching for balance between environmental, economic and social dimension of sustainable development. Without conformity of these dimensions sustainable development can not be realized. Ensuring of dimensions compliance is part of the sustainability management and providing long-term and sustainable development.

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