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PERFORMANCE OF THE VISEGRAD COUNTRIES COMPARED TO THE EU-27 COUNTRIES, BASED ON THE SUSTAINABLE DEVELOPMENT INDICATORS OF THE EUROPEAN UNION

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The aim of our study is to compare Visegrad countries and the other EU member states regarding sustainable development, based on the system of Sustainable Development Indicators of the European Union. We provide a brief overview of almost two decades of elaborating the Sustainable Development Strategy of the Community, review the structure and the main elements of the strategic document, and – using the method of cluster analyses – we group the member states comparing them on the basis of specific headline indicators. Our goal was not a deep investigation, but a compact, thought-provoking analysis; this is the reason why we concentrated on the main indicators. As a result of the analysis, our hypothesis seems to be confirmed: the EU-15 countries and the rest of the member states belong to different clusters, which means that there are significant inequalities, especially from the economic and social aspects of sustainability.

Keywords: sustainable development, strategy, indicators, Visegrad countries

Introduction

The concept of sustainable growth and development is likely parallel to the school of nihilist thinkers. Mankind has evolved into a nature-shaping and forming factor (Tóth and Goda, 2009). In the European Union, the endeavours leading to the strategic management and measurement of sustainability began after the 1992 United Nations Conference on Environment and Development, and as the core document of the conference, Agenda 21 declared: "Countries at the national level and international governmental and non-governmental organizations at the international level should develop the concept of indicators of sustainable development in order to identify such indicators" (UNCED, 1993).

History

The first Sustainable Development Strategy (SDS) of the European Union was elaborated in 2001, and declared the necessity of the annual review of the dimensions of sustainability, and – in line with the general and specific objectives of the strategy – stressed the need to extend the system of indicators which was approved to monitor the Lisbon Strategy, consisting of 127 structural indicators which led to the establishment of the Working Group on Sustainable Development Indicators (European Commission, 2001). Between 2002 and 2005 experts, researchers and officials of 16 countries worked in the task force set up by the Statistical Programme Committee to define the system of sustainable development indicators being consistent with the European Statistical System (Eurostat, 2005).

Since 2004, the European Commission has been publishing annually 10 headline indicators on the state of the environment of the member countries, in terms of climate change, transport, energy intensity, electricity produced from renewable energy sources, biodiversity (bird populations), fishing, farming, organic farming, urban waste, air emissions and urban air quality, presenting besides the prevailing trends the distance from the objectives pursued (European Commission, 2006).

In 2005, the European Commission approved the EU's first set of sustainable development indicators, consisting of 155 sustainable development indicators (SDI), 98 of which form the basis of Eurostat's first sustainable development monitoring report released at the end of 2005 (Eurostat, 2005). In the same year, the Joint UNECE/Eurostat/OECD Working Group on Statistics on Sustainable Development was established to support governments and international organisations in the creation of sets of sustainable development indicators, providing the conceptual framework and a small number of initial indicators (UNECE, 2009).

The SDS was renewed in 2006. The new strategy called on the European Commission to monitor the progress of the community and to develop a comprehensive system of indicators in relation to sustainable development. In the meantime Eurostat, the Working Group on Sustainable Development Indicators and the EU Directorate-General for Research have been continuously working on the development of the set of sustainable development indicators.

As a part of the first progress report of the SDS, the – still unchanged – revised set of the Sustainable Development Indicators was published in 2007, serving as the basis of the monitoring report on the strategy issued in 2009. The 2009 progress report of the strategy published by the European Commission clearly assigned the system of indicators coordinated by Eurostat as the basis of monitoring, and urged its further development (European Commission, 2009).

The structure of the strategy

The EU's Sustainable Development Strategy – renewed in 2006 – consists of 10 clearly structured chapters which include each of the main elements of the strategy, from the guiding principles to the concrete objectives and target areas, including monitoring, with numbering spanning over the sections. These chapters are the following:

1. Commitment to sustainable development.
2. Key objectives.
3. Policy guiding principles.
4. Making use of synergies between the EU SDS and the Lisbon Strategy for growth and jobs.
5. Better policy-making.
6. Key challenges.
7. Cross cutting policies contributing to the knowledge society.
8. Financing and economic instruments.

Table 1 The 7 key challenges formulated in the EU SDS and the associated general objectives

Challenge	Overall objective
Climate Change and clean energy	❒ to limit climate change and its costs and negative effects to society and the environment
Sustainable Transport	❒ to ensure that our transport systems meet society's economic, social and environmental needs whilst minimising their undesirable impacts on the economy, society and the environment
Sustainable consumption and production	❒ to promote sustainable consumption and production patterns
Conservation and management of natural resources	❒ to improve management and avoid overexploitation of natural resources, recognising the value of ecosystem services
Public Health	❒ to promote good public health on equal conditions and improve protection against health threats
Social inclusion, demography and migration	❒ to create a socially inclusive society by taking into account solidarity between and within generations and to secure and increase the quality of life of citizens as a precondition for lasting individual well-being
Global poverty and sustainable development challenges	❒ to actively promote sustainable development worldwide and ensure that the European Union's internal and external policies are consistent with global sustainable development and its international commitments

Source: own edition based on Council of the European Union (2006)

9. Communication, mobilising actors and multiplying success.
10. Implementation, monitoring and follow-up.

The 2nd chapter presents that the EU SDS is based on four major objectives (key objectives):

Environmental protection:
- ❒ to safeguard the earth's capacity to support life,
- ❒ to protect biodiversity,
- ❒ to respect the limits of the planet's natural resources,
- ❒ to ensure a high level of protection and improvement of the quality of the environment,
- ❒ to prevent and reduce environmental pollution,
- ❒ to promote sustainable consumption and production to break the link between economic growth and environmental degradation.

Social equity and cohesion:
- ❒ to promote a democratic, socially inclusive, cohesive, healthy, safe and just society,
- ❒ to enforce respect for fundamental rights and cultural diversity,
- ❒ to promote equal opportunities and combat discrimination in all its forms.

Economic prosperity:
- ❒ to promote a prosperous, innovative, knowledge-rich, competitive and eco-efficient economy,
- ❒ to ensure high living standards,
- ❒ to ensure full and high-quality employment throughout the European Union.

Meeting our international responsibilities:
- ❒ to encourage the establishment and defend the stability of democratic institutions across the world, based on peace, security and freedom,
- ❒ to actively promote sustainable development worldwide,
- ❒ to ensure that the European Union's internal and external policies are consistent with global sustainable development and its international commitments.

Chapter 3 includes the basic principles (policy guiding principles), during the creation and implementation of which the criteria and directions of the measures and actions to be taken were determined. The 10 basic principles are the following:
- ❒ Promotion and protection of fundamental rights.
- ❒ Solidarity within and between generations.
- ❒ Open and democratic society.
- ❒ Involvement of citizens.
- ❒ Involvement of businesses and social partners.
- ❒ Policy coherence and governance.
- ❒ Policy integration.
- ❒ Use best available knowledge.
- ❒ Precautionary principle.
- ❒ Make polluters pay.

The preamble of Chapter 6 reads: "Keeping in view the ever-worsening environmental trends, the EU's social and economic challenges, the pressure of competitiveness weighing on it and new international responsibilities, the EU SDS identifies 7 key challenges and corresponding targets, operational objectives and actions" (Table 1).

Materials and methods

The aim of our investigation is to compare the four Visegrad countries and the rest of the member states of the European Union (excluding Croatia due to the lack of data) in the light of the community-level challenges defined in the Sustainable Development Strategy. Our research is thus based on the quantitative analysis of the member states' sustainable development performance, which is based on the headline indicators of the system of Sustainable Development Indicators (SDI) coordinated by Eurostat. In other words, member states constituted the test objects, 'cases' to be analysed, while the comparison criteria, i.e. variables or attributes were the sustainable development headline indicators. The countries were grouped by cluster analysis, with the help of SPSS software package.

The only hypothesis of our research is that – according to the system of indicators – the 'western' EU-15 countries belong to a more sustainable cluster, while the 'eastern' countries, including the Visegrad countries (or even Mediterranean island states) which joined in 2004 and 2007, belong to a less sustainable developing cluster. The reason of our assumption is that in the latter group of states, various welfare indicators are in general less favourable, which is also the perception of the public opinion concerning these countries (allowing some stereotypes).

The Eurostat's database of Sustainable Development Indicators contains a total of 155 indicators grouped in 10 main themes and 28 sub-themes, of which 34 indicators cannot be produced and 11 are replaced by proxy indicators. Practically, the 10 main themes originate from the decomposition and expansion of the 7 key challenges outlined in the strategy: social inclusion and demography now form a separate topic, and socio-economic development as well as good governance are also included. The system of indicators is arranged in a three-level hierarchy: the 10 so-called 'headline' indicators assign 1–2 indicators to the main themes, providing a comprehensive view of sustainable development, especially for

Table 2 The main topics of SDI and the corresponding headline indicators

SDI topic	Headline indicator
Socio-economic development	❒ real GDP per capita in EUR capita^{-1} year^{-1}
Sustainable consumption and production	❒ resource productivity in EUR kg^{-1}
Social inclusion	❒ persons at-risk-of-poverty or social exclusion in %
Demographic changes	❒ employment rate of older workers in %
Public health	❒ healthy life years and life expectancy at birth, by sex in years
Climate change and energy	❒ greenhouse gas emissions 1990 = 100 ❒ primary energy consumption in %
Sustainable transport	❒ energy consumption of transport relative to GDP in %
Natural resources	❒ common bird index
Global partnership	❒ official development assistance as share of gross national income in %
Good governance	❒ [no headline indicator]

Source: own edition based on Eurostat (2011)

the general public and high-level policy-making. The second level contains 45 indicators covering subthemes, and its target audience are parts of central policies and more interested everyday users. The third level including the remaining 98 indicators provides specific indicators for a more detailed understanding of each area, so these data are rather for expert use. The main themes and headline indicators are grouped in Table 2.

Within the thematic area of natural resources, the indicators concerning bird species and fish population are only available in the database at community level, and – according to the Eurostat – in the theme of good governance none of the indicators can be considered as sufficiently robust or policy-relevant to provide a comprehensive image of the concept of good governance. In our opinion, the headline indicator of global partnership (Official development assistance as share of gross national income) is not able to characterize the sustainable development of a country, as the developments are not utilized locally, and there is no information about the real substance of these developments, so we cannot be sure that they serve sustainability either at local or at global level.

First, in order to find the extreme values, we used the 'nearest neighbour' method, which merges a small number of large and many small groups based on the closest distance. Luxembourg and Sweden were merged only in the last steps, so they form a separate cluster (Cluster 0), and they had to be excluded from further analysis. The 'icicle' diagram also shows the protrusion of Luxembourg and Sweden, as the line between them is the shortest (Figure 1).

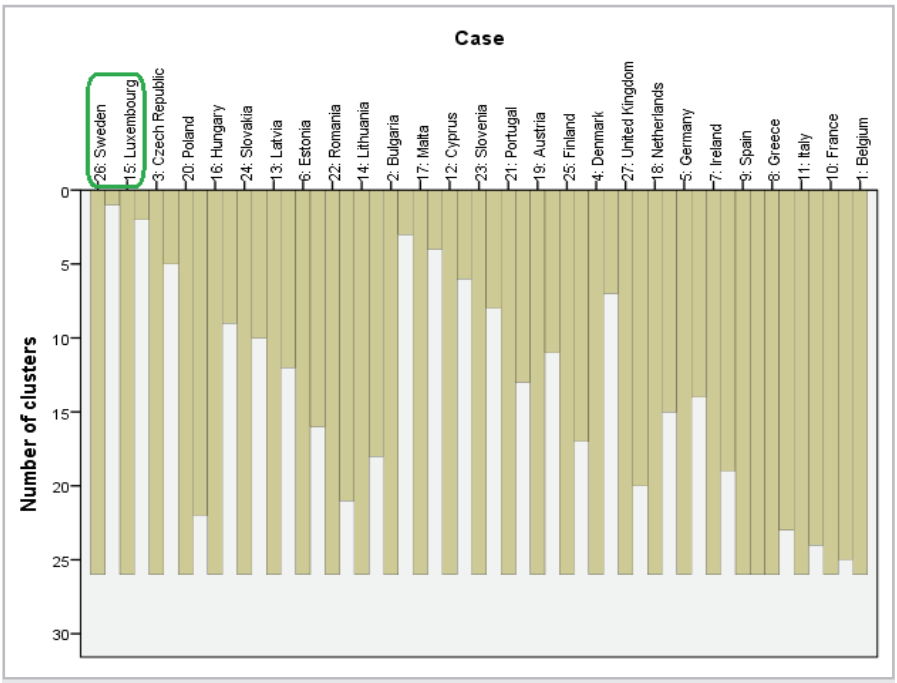

Figure 1 Icicle diagram of the 'nearest neighbour' method
Cluster 0 circled in green

Since the number of items is small and the result is more dependent on the extreme values, we have chosen the hierarchical cluster algorithms. We created clusters using 'Ward' method which results in the smallest internal variance. Based on the merging table, two or three clusters should be created, as the bigger jump in distance happens at the penultimate and the last merging.

In order to relieve our uncertainty over the number of clusters, we ran the process again, saving more solutions, with minimum of two and a maximum of three clusters enabled. The average gives the cluster centre; the standard deviation characterizes the homogeneity of the groups. Unfortunately, the value of deviation is too high for many of the variables, which is not favourable for the creation of homogeneous groups. In our opinion, the two clusters solutions separate the countries best.

Results and discussion

With the two-cluster solution, a 16 and a 9 element clusters were formed (Figure 2) and – for the sake of illustration – they received a smiling green or a sad red emoticon in Table 3, based on their average values, depending on whether a higher or lower value of the actual indicator was more favourable.

It can be seen that the countries belonging to Cluster 1 have an overall better performance than the countries of Cluster 2, their results are better for each economic and social indicator, but are worse in relation to environmental

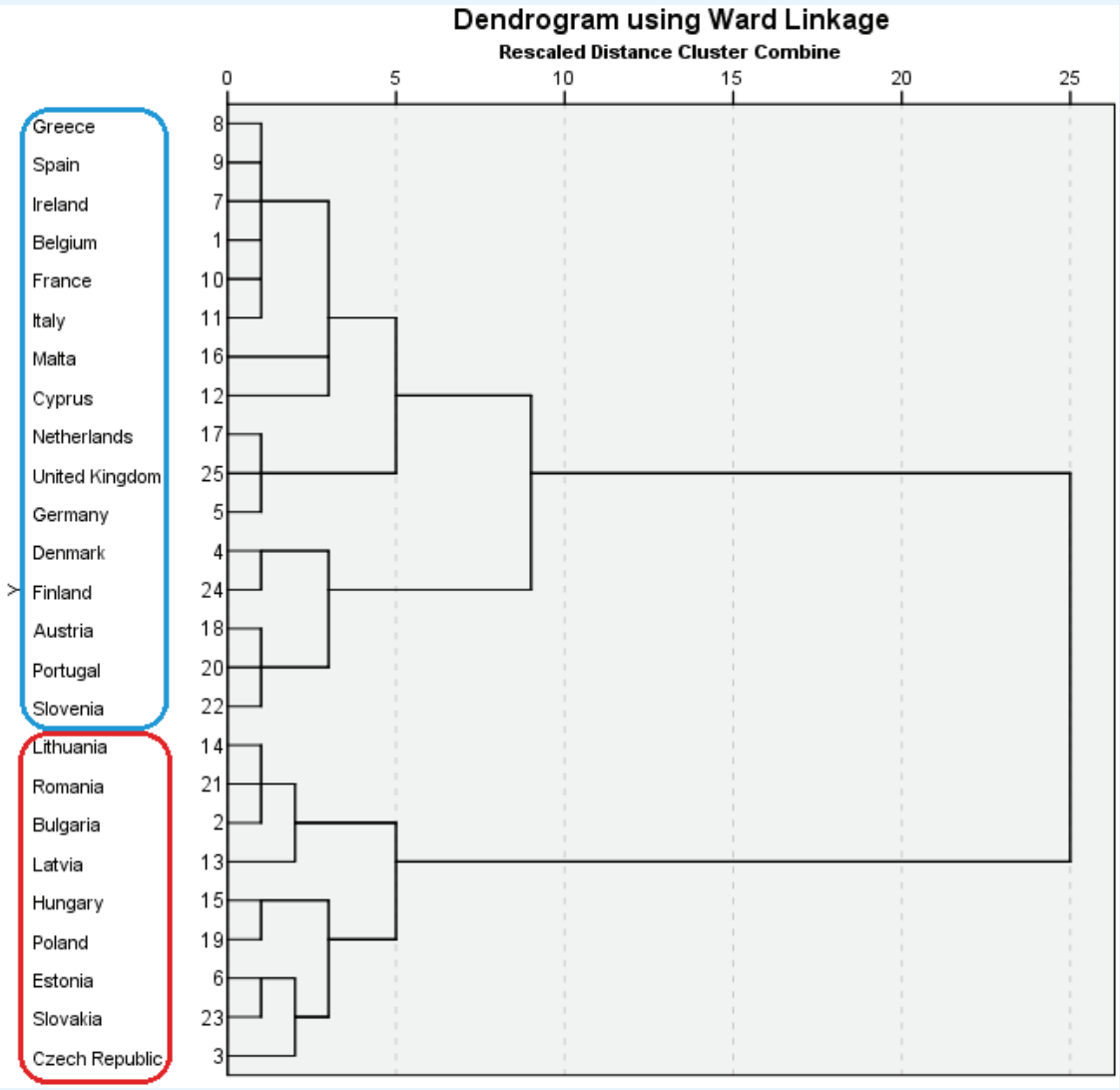

Figure 2 Dendrogram of the second run of Ward method, enabling 2 clusters
Cluster 1 circled in blue, Cluster 2 in red

sustainability with the exception of one indicator.

Cluster 2 contains only non-EU-15 countries indeed, so they all joined the EU in 2004 or 2007. This cluster includes all four Visegrad countries. However, not all of the 'eastern' countries fell into the second cluster: Cyprus, Malta and Slovenia, with regard to sustainable development – at least on the basis of headline indicators – were able to catch up with the 'West'. Our hypothesis has therefore largely been met.

Table 3 The two big clusters in the light of individual parameters

	Cluster 1	Cluster 2
Real GDP per capita in EUR capita^{-1} year^{-1}	higher ☺	lower ☹
Resource productivity in EUR kg^{-1}	higher ☺	lower ☹
Persons at-risk-of-poverty or social exclusion in %	lower ☺	higher ☹
Employment rate of older workers in %	higher ☺	lower ☹
Healthy life years in years	higher ☺	lower ☹
Male life expectancy at birth in years	higher ☺	lower ☹
Greenhouse gas emissions (1990 = 100)	higher ☹	lower ☺
Primary energy consumption in %	lower ☹	higher ☺
Energy consumption of transport relative to GDP (2000 = 100)	lower ☺	higher ☹

Source: own edition

A frequent observation concerning the SDI system of the EU is that the total amount of indicators is too large, which makes it difficult to capture the essence of the processes and assess the real 'state' of sustainable development. This criticism is usually accompanied by the explanation that the SDI took over too many social and economic indicators from the indicator systems of the UN, the OECD, the Cardiff process or the EEA, or even from the structural indicators of the Lisbon Strategy. According to its critics this leads to the fading of the significance of sustainable development as a problematic issue of the ecological system (Bálint, 2013).

Related to our research, the opposite extreme of the quantitative issue raised in the previous paragraph is whether the 11 headline

indicators of SDI are enough to describe sustainable development, especially taking into account that two indicators of environmental dimension, related to biodiversity, are not available at national level and the timeliness of the data is also problematic. Of course, the answer is obviously 'no', and not just concerning the headline indicators(!), since the environmental dimension itself could provide a couple of important indicators, such as the amount of natural capital, biodiversity and the flow of material and energy, but the economic and social dimensions as well, with regard mainly to sustainable production and consumption patterns. On the other hand, as it turns out from time to time during the attempts to characterize complex processes with statistical data, the continuous increase of the number of indicators is a dead end as well (Bálint, 2013).

Conclusion

The cluster analysis confirmed our hypothesis according to which the non-EU-15, relatively newly democratizing and marketizing Central Eastern European countries are still lagging behind Western Europe in terms of welfare and sustainable development, assuming that the headline indicators – in accordance with the official roles assigned to them – are able to give a comprehensive picture of the main directions of sustainable development.

For the Visegrad countries, but also for the entire community we recommend the further refinement of the conceptual framework of sustainable development, the strengthening of the scientific approach opposed to policy-driven concepts, a tighter treatment of the environmental, social and economic indicators in the systems of sustainable development indicators, and the production of composite indicators to capture the more complex topics (if it is justified by easier handling and better communication). We propose to investigate the tools and scientific background of measuring the national, regional and local level of sustainable development, make comparative analyses of different spatial levels and develop a system of feedbacks to the lowest levels, to ensure a broad exchange of experience.

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