Piotr Szkudlarek[1]

SUSTAINABLE DEVELOPMENT IN THE SELECTED EU MEMBER STATES

The principal aim of this article is the classification of the CEECs which became full members of the European Union in 2004 by the criterion of implementation of the sustainable development concept. The article presents the general issues of sustainable development, the key aspects of policy development within the European Union and the research results on the assessment of the implementation of the sustainable development concept in a selected group of countries.
Keywords: *sustainable development; economic policy; members of the EU.*

Пьотр Шкудларек

СТІЙКИЙ РОЗВИТОК В ОБРАНИХ КРАЇНАХ ЄС

У статті представлено класифікацію країн Центральної та Східної Європи, що стали членами ЄС у 2004 р., за критерієм імплементації концепції стійкого розвитку. Представлено основні позиції самої концепції стійкого розвитку, ключові аспекти розвитку політики стійкого розвитку в ЄС та проаналізовано конкретні результати в цій сфері у зазначених країнах регіону.
Ключові слова: *стійкий розвиток; економічна політика; члени Євросоюзу.*
Форм. 6. Рис. 1. Табл. 2. Літ. 23.

Пётр Шкудларек

УСТОЙЧИВОЕ РАЗВИТИЕ В ИЗБРАННЫХ СТРАНАХ ЕС

В статье представлено классификацию стран Центральной и Восточной Европы, которые стали членами ЕС в 2004 г., по критерию имплементации концепции устойчивого развития. Представлены основные позиции самой концепции устойчивого развития, ключевые аспекты развития политики устойчивого развития в ЕС и проанализированы конкретные результаты в данной сфере по исследуемым странам региона.
Ключевые слова: *устойчивое развитие; экономическая политика; члены Евросоюза.*

Introduction. Striving for fast economic growth rate is one of the major objectives of country's economic activity. Unfortunately, an approach to the economy only from this perspective has a variety of serious negative consequences for environment and society, e.g. environmental degradation, over-exploitation of natural resources or increased income inequality. On the other hand, it seems obvious that economic growth should respect the principles of environmental protection while ensuring the most efficient employment of non-renewable resources and reducing the impact of factors leading to social exclusion. Meeting these requirements is essential to the concept of sustainable development. It refers to ecological philosophy and social ecology, where it has been proved that humans are obliged to perform economic activity in a way which respects the fundamentals of life and development for the sake of both contemporary and future generations. Undoubtedly, such an approach to economic activity poses a challenge to individual countries and regions and as such it seems worthy of exploration as a research problem. The major aim of this study is to develop a classification of the CEECs which became full members of the European Union in 2004 by the criterion of implementation of the sustainable development concept. Individual sections of the text address the following issues: sustainable development

[1] University of Szczecin, Poland.

as one of the paradigms of the contemporary economy, key aspects of sustainable development in the EU policy, research methodology and assessment of the implementation of the sustainable development concept in the selected group of countries and their classification. The study is based on the Eurostat data for the years 2005 and 2011. Conclusions are provided in the final section.

Sustainable development: selected theoretical issues. The sustainable development concept encompasses a wide range of ecological, economic and social issues addressed in programmes or strategies concerning, inter alia, efficient employment of natural resources, fighting poverty, social justice or innovativeness.

The term "sustainable development" was coined during the UN Conference in Stockholm in 1972. It was not until the proceedings of the UN World Commission on Environment and Development in 1987 and their final report entitled "Our Common Future" (or the Brundtland Report) that a new global development model was proposed. The report defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The next two Earth Summits – the United Nations Conference on Environment and Development held in 1992 in Rio and the 2002 Summit on Sustainable Development in Johannesburg gradually increased the range of problems addressed by sustainable economy from those purely ecological to economic and social, such as global income inequalities, democratisation of social life or threats to international peace and safety (Kialczewski, 2011). It inspired a multitude of new definitions of sustainable development in the literature on the subject (Carroll, 2002). At the core of the disputes concerning the term "sustainable development" is its scientific explanation rather than a linguistic perception (as observed by V.I. Danilov-Danilian, V.K. Levashov, M.M. Maksimova, N.N. Moiseyev, O.S. Pchelincev), which reflects both the complexity of the term itself and the difference of opinions among representatives of various scientific disciplines, business or politics. It may be, therefore, concluded that the majority of definitions are, in fact, paraphrases or synonyms of the definitions provided by the Brundtland Report (Morozova, 2009).

Sustainable development strives, first and foremost, to provide better quality of life and find solutions to contemporary civilisation problems related to transition from the uncertainty of nature to social dynamics in the global dimension (North, 2003). Elevated economic, ecological and socio-cultural standards should fit the limits and capacity of natural environment, on the one hand, and respect the principles of intra- and intergenerational justice on the other (Rogall, 2010). Raising well-being is understood not only in terms of higher GDP or per capita GDP, but also in terms of quality and abundance of natural environment (Sadowski, 2006). These green and social aspects of GDP are, therefore, at the core of the sustainable development concept. It is a certain counterbalance to the approach to well-being in line with the mainstream economics where negative effects of industrial expansion such as income inequality or environmental degradation are disregarded (Sadowski, 2006), as the classical production function formulae do not pose any limits of social or environmental nature. As a consequence of this approach, the manufacturer enjoys the benefits generated by the factors of production as long as their marginal productivity remains positive thus maximising profit (or income), without any regard to social interests or environment. The essence of the problem here is considering economic

efficiency as a private good whereas ecological efficiency is understood as a public good (Runowski, 2004).

The literature on the subject lacks agreement in the assessment of the sustainable development concept as such. The process of translating the concept into practice in itself poses difficulties (Berke and Conroy, 2000). R.N. Andrews indicates that the rhetoric of sustainable development is symbolic as each new definition is formulated in line with political programmes of certain socio-political interest groups instead of serving as a fundamental of policy development (Andrews, 1997). Furthermore, the opponents of the sustainable development concept argue that maintaining balance between economic growth and environment is impossible, and stable growth is an illusion as balance can be achieved only provided that economic growth is negative or zero (Piatek, 2002). Certain doubts are also raised over the social and demographic issues addressed by the advocates of the sustainable development concept. Nonetheless, it seems that the objections stem from the misinterpretation of the sustainable development concept.

Sustainable development in the EU policy. The concept of sustainable development is implemented across the European Union in its broad sense. Next to the issues related to the balance between economy and environment, it encompasses also the problems related to the quality of social life and the quality of institutions. Two documents are vital to this policy: Europe 2020 – the socioeconomic development strategy, and the Energy Roadmap 2050. The first of these documents states that all member states need to take action towards returning to the growth path through efforts aimed at raising innovativeness and competitiveness of the EU economy. Action needs to be taken to reduce the negative impact of demographic tendencies and efforts are required to increase the efficiency of employment of the member states' resources.

The latter of the documents, i.e. the Energy Roadmap 2050, which completes "A Roadmap for moving to a competitive low carbon economy in 2050" is extremely important in the context of environmental protection. According to this document, by the year 2050 the EU should reduce greenhouse gas emissions by 80–95%. The aim of this EU initiative is become a leader in low carbon economy. This objective may, however, become too ambitious with existing technologies and potential of individual states. The implementation of this plan implies complete redefinition of the functioning of the energy market in the EU states where the production of energy is nowadays based mostly on carbon. It refers in particular to Poland where the plan is a guarantee for energy independence and energy costs reduction. In the author's opinion the foundations of the EU economic policy should be brought up for discussion; be it reindustrialisation policy aimed at increasing the share of industry in the EU GDP based on cheap energy or the environmental policy aiming at protecting the environment, particularly climate, from harmful consequences of CO_2 emissions. The author believes both aspects can be incorporated into one "green reindustrialisation", i.e. strengthening the industry while respecting the environment. The policy should be highly flexible, i.e. environmental aspects should not pose threat to competition in either the industry, or the entire EU economy. It is of particular importance to emerging markets, including those which became full member states of the Community in 2004. It should be stressed that it is this group of countries which con-

tributed the most to the reductions of the greenhouse gas emissions. The Energy Roadmap 2050 cannot become a barrier to their development or else, the term "the Old Continent" will no longer be used only in the geographic, cultural or tourism-related context but will also reflect the continent's demographic and economic problems.

Research methodology. To achieve the research objective defined in the introduction – next to the descriptive method and the growth rate – a synthetic development measure is employed. It belongs to stochastic methods of result analysis, and replaces the description of objects by means of multiple diagnostic attributes with an aggregate measure. The starting point in this method is to define a set of variables X_{ik} which describe a certain characteristic – in this case, sustainable development. It is essential for diagnostic variables to meet the information criterion (Stasiewicz, 1998). In the paper the set of 38 variables included in the so-called EU set of sustainable development indicators is proposed. These represent the following themes: Socioeconomic development, Sustainable consumption and production, Social inclusion, Demographic changes, Public health, Climate Change and Energy, Sustainable transport, Global partnership, Good governance. The study is based on the data from the years 2005 and 2011, i.e. the first full year of the EU membership of the analysed countries and the most recent year for which the data for the entire set of diagnostic variables is available, respectively (Table 1).

The set of diagnostic measures comprised both stimulants (S) and destimulants (D), as shown in Table 1. They were not expressed as weighted figures.

In the next step of the analysis, the coordinates of the development pattern $P_0 = (X_{01} + X_{02} + \ldots + X_{0m})$ were determined. X values reach the maximum when they refer to stimulants and the minimum when they refer to destimulants. In this case the pattern consists of the best values of individual diagnostic measures for the countries in question.

In order to standardise the order of magnitude of the diagnostic measures a procedure was adopted, which yielded variables with the mean of 0 and variance equal 1. The following formula was employed:

$$X_{ik(z)} = \frac{X_{ik} - \overline{X_k}}{S_k}, \tag{1}$$

where $X_{ik(z)}$ – standardised variable; $\overline{X}_k$ – mean for individual variables X_k ($k = 1, 2, \ldots, m$); Sk – standard deviation for individual variables X_k ($k = 1, 2, \ldots, m$).

The standardised and comparable variables were next used to estimate the distance to pattern for all the objects, given the defined development pattern P_0 and using the following Euclidean distance formula[2]:

$$c_{io} = \left[\sum_{s=1}^{n} \left(X_{wk(z)} - X_{ik(z)} \right)^2 \right]^{\frac{1}{2}}, \tag{2}$$

where X_{wk} ($k = 1, 2, \ldots, m$) – standardised pattern values; $X_{ik(z)}$ ($k = 1, 2, \ldots, n$) – standardised values of individual variables.

[2] There are other methods of measuring the distance between individual objects (Grabinski, Wydumus and Zelias, 1989).

Table 1. **Diagnostic measures**

Specification	
Real GDP per capita, growth rate, %, S	Total fertility rate, Number of children per woman, S
Investment by institutional sectors, % of GDP, S	At-risk-of-poverty rate of elderly people, %, D
Labour productivity per hour worked, Euro per hour worked, index 2005 = 100, % change over previous year, S	General government gross debt, % of GDP, D
Total R&D expenditure, % of GDP, S	Duration of working life, years, S
Energy intensity of the economy, Gross inland consumption of energy divided by GDP (kg of oil equivalent per 1000 EUR), D	Old-age-dependency ratio, in %, D
Total employment rate, %, S	Healthy life years, males, year, S
Unemployment rate, %, S	Suicide death rate 15 to 19 years, Crude death rate per 100 000 persons, D
Resource productivity, EUR per kg, S	Proportion of population living in households considering they suffer from noise, %, D
Ecolabel licenses number, S	Greenhouse gas emissions, base year 1990 = 100, D
Area under organic farming, %, S	Share of renewable energy in gross final energy consumption, %, S
People at risk of poverty or social exclusion, % and 1000 persons, D	Electricity generated from renewable sources, % of gross electricity consumption, S
People at risk of poverty after social transfers, % and 1000 persons, D	Share of renewable energy in fuel consumption of transport, %, S
Inequality of income distribution, Income quintile share ratio, %, D	Combined heat and power generation, % of gross electricity generation, S
Long-term unemployment rate, %, D	Average carbon dioxide emissions per km from new passenger cars, gram of CO_2 per km, D
At-risk-of-poverty-rate, by the highest level of education attained, %, D	Official development assistance as share of gross national income, %, D
Life-long learning, % of persons aged 25 to 64, S	E-government online availability, %, S
Public expenditure on education, % of GDP, S	E-government usage by individuals, %, S
Employment rate of older workers, %, S	Level of citizens' confidence in institutions, %, S
Life expectancy at age 65, males, years, S	

Note: S – stimulants; D – destimulants.
Source: Eurostat, 15.08.2013.

Having obtained the distance-to-pattern vector, the mean $(\bar{c})$ and the standard deviation (S_0) of these distances were next calculated, and finally c_0 values were estimated by the following formula (Hellwig, 1985):

$$\bar{c} = \frac{1}{w}\sum_{i=1}^{w} c_{i0}; \tag{3}$$

$$c_0 = \bar{c} + 2S_0; \tag{4}$$

$$S_0 = \sqrt{\frac{1}{w}\sum_{i=1}^{w}\left(c_{i0} - \overline{c_0}\right)^2}. \tag{5}$$

The final taxonomic measure is calculated as follows:

$$d_{i0} = 1 - \frac{c_{i0}}{c_0} \tag{6}$$

for $i = 1, 2, ..., n$.

The values of the d_{i0} development indicator range from 0 to 1. The closer the value is to 1, the greater is the similarity between a given object and the pattern (Jajuga, 1990; 1993). The countries subject to analysis were arranged in order by the value of this measure, which reflected their sustainable development level.

Empirical evidence. The accession to the EU requires from the analysed group of countries implementing sustainable development policy. The extent of this implementation can be assessed, among others, with the set of selected sustainable development indicators published by the Eurostat.

In the theme "***Socioeconomic development***" clear negative tendencies were observed for real GDP growth rates and investments made by the institutional sector in the countries in question. Poland was the only country where the dynamics of changes was positive, yet the level of GDP growth itself was the lowest in the group. The highest GDP growth rates were reported in Lithuania and Estonia, whereas the highest investments were made in Czech Republic and Slovakia. Positive changes were observed for the next two indicators – labour productivity and R&D expenditure. The situation at the labour market was found to be unfavourable in most of the countries, particularly Latvia and Lithuania. It should be pointed out that substantial diversity was found for individual countries. A much better situation was observed for the group "***Sustainable consumption and production***", although the figures varied considerably for individual countries. Particular attention should be paid to the improvement in the indicator "Area under organic farming", which informs that the countries in question intensified their involvement in ecological use of land. It is noteworthy to observe that "***Social exclusion***" indicators show a clear improvement in the analysed period, and their considerable diversification. In 2011, for instance, social exclusion in Czech Republic referred to 14.4% of the society, whereas in Lithuania – to as much as 33.4%. Negative tendencies, in turn, were found for long-term unemployment rate and at-risk-of-poverty rate among people with the highest level of education attained. The data in the theme "***Demographic changes***" are inconclusive. The most important tendency in this aspect is the increasing life expectancy in all the analysed countries, particularly Slovenia. Negative tendencies, however, were observed for General government gross debt as % of GDP; moreover, they were accompanied by significant differences in individual countries. For instance, in 2011 the general government gross debt accounted for only 6.7% of Estonian GDP, and as much as 81.8% of Hungarian GDP. Furthermore, in 2011 all the countries in the group reported deterioration in their old-age-dependency ratio in relation to 2005. In the theme "***Public health***", the proportion of the population living in households considering they suffer from noise was the only indicator which improved. Unfortunately, much worse performance was observed for the suicide death rate. Here, too, there was a substantial variation between the countries. Among the indicators in the group "***Climate Change and Energy***" all the analysed countries reported improvements in the share of renewable energy in gross final energy consumption and the electricity gen-

erated from renewable sources. The values were, however, significantly diversified. For instance, the preceding indicator for Latvia in 2011 exceeded 32% whereas for Hungary it amounted to merely 8.6%. As far as the second indicator is concerned, Latvia reported 48%, whereas Poland – less than 7%. Apart from these indicators, positive changes were found for carbon dioxide emissions.

In 2011 positive tendencies (as compared to 2005) were observed on "***Sustainable transport***", particularly all the indicators describing harmful gas emissions. On the one hand, it was, undoubtedly, a consequence of the requirement imposed by the EU to implement solutions reducing harmful environmental impact, and on the other it was related to economic slowdown. No clear improvement in the general economic situation undermined the citizens' trust in the EU institutions. In the context of information society development, particular attention should be paid to the indicators of "***Good governance***". E-government online availability and e-government usage by individuals can be assessed as the areas of positive changes. Estonia, Slovenia and Latvia were the best performers among the countries subject to analysis, whereas Czech Republic and Slovakia reported the worst statistics on that.

It should be pointed out that all the analysed countries demonstrated positive tendencies in most of their sustainable development indicators in 2011 as compared to 2005. Bearing that in mind, it could be concluded that all of them are on the right track towards sustainable development, even though in 2008 the EU went into the phase of recession and it was not until 2011 that its economy began a slow recovery process. This impact turned out to be significant and affected many areas of socioeconomic life. Czech Republic and Slovakia stand out in this context. In these countries 74% of the indicators analysed improved. Poland was slightly behind with positive changes reported for 71% indicators. The worst situation was observed in Latvia and Slovenia. In both countries only 58% of the indicators improved. Major difficulties they experienced concern the socioeconomic development and demographic changes. In the case of Slovenia, it was also the area of public health.

The employment of the descriptive method and growth rates to assess individual groups of indicators does not allow a synthetic assessment of the implementation of the sustainable development concept in individual EU states, nor their classification. Such an opportunity is offered, however, by the d_{i0} measure. Its values for individual member states estimated for the years 2005 and 2011 are shown in Figure 1.

The research evidence shows the substantial differences among individual countries in terms of the scale of implementation of the sustainable development concept. Low values of the d_{i0} synthetic measure indicate great variation of individual diagnostic measures for individual countries. None of the countries can boast stable above-average performance in all the aspects. The findings show that in 2005 the highest d_{i0} level was reported for Slovenia, followed by Czech Republic. The 2011 results were similar – the two countries remained leaders although they swapped places in the general classification. Latvia was undoubtedly the worst performer in the group. In 2005 it came second to last whereas in 2011 it was ranked the lowest. The order of individual countries by performance is shown in Table 2. The order according to the Human Development Index classification is provided additionally for comparison and contrast. In general, it confirms the results and classification developed on the basis of the d_{i0} indicator.

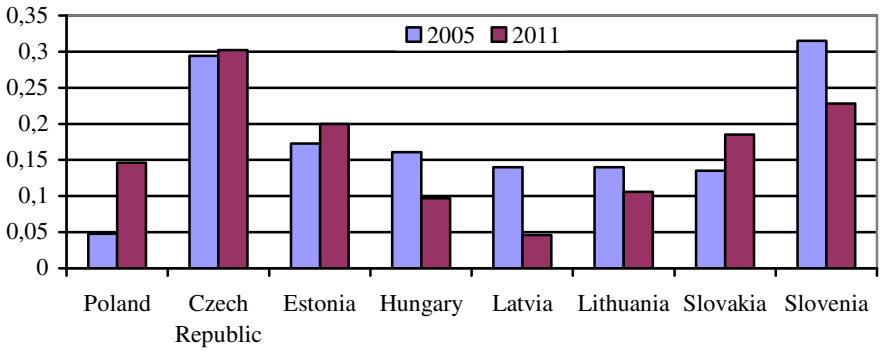

Figure 1. d_{i0} **values for the selected EU member states in 2005 and 2011,** *own study based on the Eurostat data*

Table 2. **Classification of the countries by** d_{i0} **values in 2005 and 2011,** *own study*

Place	1	2	3	4	5	6	7	8
d_{i0} 2005	Slovenia	Czech Republic	Estonia	Hungary	Lithuania	Slovakia	Latvia	Poland
d_{i0} 2011	Czech Republic	Slovenia	Estonia	Slovakia	Poland	Lithuania	Hungary	Latvia
HDI 2005	Slovenia	Czech Republic	Estonia	Hungary	Slovakia	Lithuania	Poland	Latvia
HDI 2011	Slovenia	Czech Republic	Estonia	Slovakia	Hungary	Poland	Lithuania	Latvia

Individual countries differ in terms of the dynamics of changes in d_{i0}. Of all the countries under analysis, Poland reported the highest growth rate of the d_{i0} indicator in 2011 as compared to 2005. As a result, it was ranked 5th in 2011 whereas in 2005 the country was the worst performer. Moreover, increases in d_{i0} values were also reported for Slovakia, Estonia and Czech Republic. The greatest falls, on the other hand, were noted in Latvia and Hungary – both in terms of figures and ranks in the general classification.

In the context of the above-mentioned positive tendency concerning sustainable development indicators in the group of countries under analysis, it should be stressed that is not only determined by diagnostic measures of a given country but also indirectly affected by the performance of peer countries which in turn determine the development pattern.

Conclusion. Of key relevance to the concept of sustainable development is to provide efficient mechanisms reducing the destructive effects of economic processes on the society and natural environment. The question concerning sustainable development policy should not be "whether" it should be adopted but "how" to implement it.

To assess the scale of implementation of the sustainable development concept in the selected EU member states, two approaches are adopted in the study. The first one is based on the set of indicators describing selected areas of sustainable development. The second one involves the development of the synthetic d_{i0} index. The findings

show differences among the selected EU member states in terms of the scale of implementation of the sustainable development concept. It refers both to individual groups of diagnostic measures and the synthetic measure d_{i0}. In the period under analysis this group of countries experienced significant improvement in the indicators referring directly to environmental protection, e.g. those related to greenhouse emissions. It was undoubtedly related to the less intense economic activity on the one hand, and on the other to the necessity to implement the strategy of reducing gas emissions, as indicated, for instance, in Energy Roadmap 2050. The general slowdown in the EU economy contributed in most of its member states under analysis to negative changes in public finance and/or labour markets. As far as the demographic dimension is concerned, two major tendencies should be emphasised: longer life expectancy and ageing of the society. The society's reaction to the crisis and the way the crisis was managed have affected the citizen's confidence in the EU institutions. Bearing in mind, however, that a vast majority of indicators showed moderately positive changes in 2011 in relation to 2005, it may be assumed that the selected EU countries followed the path of sustainable development. The analysis of d_{i0} results reveals substantial differences among the countries in terms of sustainable development concept implementation. Slovenia and Czech Republic were unquestionable leaders, whereas Latvia's performance was the worst. It is noteworthy to observe that these countries reported low synthetic measures d_{i0} which reflect substantial diversification of individual diagnostic measures. The reason behind is the unique features of each country – their social, economic and environmental problems. It may suggest that there is a need for a more detailed system of social development indicators corresponding with the features and profile of each country or region.

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Стаття надійшла до редакції 14.01.2015.