

COMPARATIVE ANALYSIS OF SUSTAINABLE DEVELOPMENT OF ŠIAULIAI, TELŠIAI COUNTIES AND THE REPUBLIC OF LITHUANIA

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Abstract

The paper analyses sustainable development situation in Šiauliai and Telšiai counties between 2004 and 2013 and compares it with respective situation in the Republic of Lithuania. In order to provide an integrated assessment of the situation, the analysis employed the method of calculating sustainable development indices, close to the Compass method, often applied in research practice all over the world. The calculated indices of economic and social development and environmental state in Šiauliai and Telšiai counties and in Lithuania have shown changes in sustainable development during the period of 10 years. Integrated sustainable development indices, obtained by summing up economic and social development and environmental state indicators demonstrated that sustainable development situation in Šiauliai and Telšiai counties and the Republic of Lithuania between 2004 and 2013 was very similar. Due to the first EU investments between 2005 and 2007, a huge improvement of economic and social situation took place, environmental protection also improved. However, the global economic crisis of 2008 – 2010 decreased the sustainable development of Lithuania and the mentioned counties. In 2011 – 2012, the sustainable development situation started improving again, however, not in such big proportions as in 2005 – 2007. Recession in 2013, in fact, brought the level of sustainable development of Lithuania, Šiauliai and Telšiai counties down to the level of 2004. Conclusions provide generalisation of the research outcomes and possible sustainable development trends for Šiauliai and Telšiai counties.

Key words: sustainable development, county, social, economic and environmental state indicators.

Introduction

The term *sustainable development* was validated in Lithuania in the National Strategy for Sustainable Development approved by the Government of Lithuania in 2003 and renewed in 2009. This term has been known and used in the world since the 50s of the 20th century; however, it was first documented in the Report of the World Commission on Environment and Development *Our Common Future* in 1987.

In 1992, at a UN Conference on Environment and Development in Rio de Janeiro, the heads of 172 states confirmed the provision that sustainable development is the main long-term ideology of the development of society. It adopted *Agenda 21*, encompassing the Global Action Programme on Sustainable Development, Declaration on Environment and Development, and Principles of Sustainable Forest Management. *Agenda 21* defines the hierarchy of implementation: local authority foresees, implements and sustains economic, social and ecological infrastructure; it controls, plans and develops local environment protection policy and sets the order; it helps to implement national and regional environment protection policy (Čiegis, Dilius, & Mikalauskienė, 2014).

In 2001, the European Council adopted the first EU strategy for sustainable development, and renewed it in 2006. The Strategy sets the key goals and policy principles of sustainable development in Europe; it establishes 7 challenges and respective tasks, the aims and objectives of activities.

In 2013, the European Commission confirms already the *Seventh Environmental Action Programme*,

called *Living well, within the limits of our planet* for the period to 2020.

The aim of the paper is to compare the sustainable development situation in Šiauliai and Telšiai counties and the Republic of Lithuania between 2004 and 2013. The period of 10 years has been chosen in order to analyse the sustainable development indicators from the year of Lithuania's accession to EU in 2004 until the end of the second planning period of 2007 – 2013.

The subject of the research is sustainable development in Šiauliai and Telšiai counties and the Republic of Lithuania.

Research problem. Sustainable development indicators and indices that comprise them are meant to define the general sustainability of the country; only a small part of them is provided for the smaller units of the territory – counties and municipalities. Besides, separate indicators do not reflect general sustainable development of the country; that is why researchers group them into indices, which are used to measure and evaluate general sustainability of the development of the country. Not many research works are dedicated to the assessment of the sustainable development of separate territories of the country. The paper assesses the sustainability of the development of two Lithuanian counties (Šiauliai and Telšiai) and compares it with the sustainable development of Lithuania.

The research problem can be generalised by the following *problem questions*: 1) What is sustainable development situation like in Šiauliai and Telšiai counties? 2) How does the sustainable development situation in Šiauliai and Telšiai counties compare

with sustainable development of the Republic of Lithuania?

Theoretical basis of the research. The concept of sustainable development has two main goals: 1) to ensure proper, safe and good life for all the people – the development aim, 2) to live and work with regard to the limits of biophysical environment – the sustainability aim. The concept reflects both anthropocentric and ecocentric views on sustainable development. The essence of the anthropocentric or domination view is an attitude that man is above nature and can rearrange it at his own discretion to make it as much useful to him as possible (Seghezze, 2009). Ecocentric view treats man as an inseparable part of the living nature, in which all kinds of living organisms are important. Here the holistic understanding of the world predominates, when the world and the man are treated as one, when they make integrated wellbeing (Holden, Linnerud, & Banister, 2014; Balsiger, 2011). Blowers, Boersema and Martin (2012) emphasise that society has the duty of taking care of the planet and pass it over to the future generations in a good state.

There are three main dimensions of sustainable development: environmental protection (nature), social environment (society) and economics. Rio de Janeiro Conference in 2012 established the need for the fourth sustainable development dimension – institutional (political), which is understood as the governing one for the other three (Angelevska-Najdeska & Rakicevik, 2012). Institutional dimension encompasses inter-state and inter-governmental activity processes in implementing sustainable development strategies; it expresses opportunities for all the interested parties to be involved in order to implement the sustainable development goals (Szell, 2014). Besides, it is important to decentralise governance and to have institutions creating and helping to implement sustainable development and not only blindly implementing programmes (Kardos, 2012).

Materials and Methods

Integrated measurements of sustainable development. The main idea of calculating the integrated sustainable development indicators is to include all dimensions (environmental, economic and social). The most often used group of such indicators is the ecological footprint. Canadian researchers Rees and Wackernagel (1994) were the first to use the concept of ecological footprint and defined it as the area of land or ocean necessary to provide one person with natural resources, necessary for the production of goods or services and to absorb the resulting pollutants. To establish the ecological footprint area for one person, over 50 kinds of different foods, the demand for energy for the production of 100 most widely used

goods and the area of land necessary to grow forest were assessed. In 2012, the ecological footprint of the countries of North America was 6 ha (in USA – 7.2 ha), in India – 0.9 ha. In European Union countries, the average ecological footprint per person was 4.7 ha, in the Netherlands and Finland it was 6 ha. Lithuanian ecological footprint was 4.4 ha per person. General global ecological footprint should be no more than 2.3 gha by 2030, which means that many countries have to decrease the usage of natural resources for public needs (Holden, Linnerud, & Banister, 2014).

Schmidt-Bleek (1993) suggested using another integrated sustainable development index – material intensity per service unit, which includes dematerialisation of production and consumption. Here the focus is on five categories of resources: water, air, raw materials (minerals, organic fossil fuel), biologic resources (plants and animals) and soil. Evaluation includes not only resources taken from nature but also those returned to it (e.g. pollutants). The analysis of the material flow intensity has demonstrated that developed countries have to reduce their intensity at least 10 or more times by 2050.

The United Nations Development Program Agency has been using the Human Development Index, including economics and society, since 1990. Three key indicators predominate here: average life expectancy, the level of education, and GDP per person. In 2013, the list of 187 countries was led by Norway, Australia, Switzerland, the Netherlands and the USA, while Lithuania occupied the 35th position.

Environmental Sustainability Index, compiled by the researchers of Yale and Columbia universities has 76 indicators, including environmental systems, environmental impact, vulnerability of society, social and institutional potential, and international collaboration. According to the data of 2014, Lithuania occupies the 49th position among 178 countries, Latvia – the 40th, while Switzerland, Luxemburg, and Australia are at the head of the list (Yale university calculations..., 2014).

The Compass method consists of four groups of categories, corresponding to the first letters of the directions on the compass: Nature, Economy, Society, and Wellbeing. Sustainability index is calculated by establishing the average value of each category and calculating their weighted average by providing 0.25 materiality coefficient for the evaluation of every average category (AtKisson & Lee Hatcher, 2005).

There are about 500 ways of calculating sustainable development indicators and indices, we mentioned only the most popular ones here. Although the names of indicators and indices are very different, their essence remains the same; most often they can be consolidated into general systems according to the areas, corresponding to the sustainable development

dimensions (Rasoolimanesh, Badarulzaman, & Jaafar, 2012).

Although the variety of indicators is great, every indicator should be: 1) important; 2) easily understandable; 3) reliable; 4) useful; 5) measurable by conventional units; 6) allowing for changes and supplements (Irimie, Gal, Dumitrescu, 2014). Besides, it has to be universal, sensitive, constant, and to have enough data in terms of time. The improvement of the value of the indicator should be possible to implement in real life and allow using it for public needs (Moldan & Dahl, 2007).

Researchers often encounter the problem that when data is collected at the national level, not all of them are presented also at the regional or municipal level. In such a case, the evaluation becomes less meaningful at the level of local self-government (Graymore, Sipe, & Rickson, 2008).

This problem is also important in Lithuania. The National Strategy for Sustainable Development (2009) allocates 17 indicators for the dimension of environmental protection, 31 are for economic dimension and 27 for social dimension. It singles out the development indicators of 9 territories, showing the situation in counties and municipalities. However, not all indicators can be found on the website of the Department of Statistics or other websites; besides, some indicators are provided only at the national level, without breaking them into those of counties or municipalities.

Selection of indicators. Six experts on sustainable development were given a list of 75 indicators of social, economic and environmental dimensions of sustainable development of Lithuania; they were asked to rate the indicators of every dimension in terms of their importance. According to these ratings, 5 most important indicators were singled out in each dimension.

The 5 most important economic development indicators are as follows: GDP per person (EUR); Material investments per person (EUR); Direct foreign investment per person (EUR); Percentage of the unemployed of the total number of working age population (%); Number of individual cars per 1000

population (units).

The 5 most important environmental state indicators are as follows: The amount of gas and liquid materials, sulphur dioxide, nitrogen oxide, volatile organic compounds per person (t); Emission of atmospheric pollutants from stationary sources per 1 km² (t); Discharges of agricultural, manufacturing and household waste water into surface water (purified according to the norms) (mln. m³); Use of groundwater (mln. m³); Forestation (%).

Calculating sustainable development indices. Indices of all three sustainable development dimensions are aggregated according to the selected 5 most important indicators: $I_m = \sum_{i=1}^5 a_i R_i$, where R_i is 5 indicators making up the respective index, i changes from 1 to 5, a_i is the weight of the indicator making up the respective index, equalizing the dimensions of indicators in such a way that the contribution of every indicator R_i to index I_m makes 20 percent ($m=E, S, N$).

The integrated sustainable development index sums up three sustainable development dimensions – economic, social and natural: $I = I_E + I_S + I_N$, where I_E , I_S and I_N are the indices of economic, social environment and natural state (Čiegis & Ramanauskienė, 2011).

Sustainable development indices in Šiauliai and Telšiai counties and in Lithuania were calculated in the period between 2004 and 2013. Tables 1-3 present examples of calculating the development index when coefficients a_i were chosen in such a way that the basic values of all 5 indicators in 2004 were 6.67, while their total index was 33.33. In the following years, either an increase or a decrease of the basic values of the 5 indicators and index can be observed depending on the actual values of the 5 indicators. Having added up basic values of indices I_E , I_S and I_N in 2004, the value of the integrated sustainable development index $I = 100$ is obtained, the changes of which in the following years show the increase or a decrease of the general level of sustainability. Such methodology of calculating indices essentially corresponds to the conception of the Compass method.

All statistical data have been taken either from the website of the Department of Statistics or websites

Table 1

The Dynamics of the Environmental State Index

Environmental state index	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Šiauliai County	33.33	57.30	25.89	38.40	29.59	36.97	38.45	31.46	40.08	30.53
Telšiai County	33.33	32.08	31.38	37.02	40.99	35.83	33.77	34.34	35.57	35.06
Republic of Lithuania	33.33	35.69	32.22	37.14	32.88	36.10	34.08	32.94	34.40	34.32

Table 2

The Dynamics of the Economic Development Index

Economic Development Index	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Šiauliai County	33.33	40.71	43.50	39.44	34.60	28.51	31.03	40.93	34.20	35.02
Telšiai County	33.33	54.96	45.98	41.27	27.57	31.59	32.29	40.46	35.27	33.36
Republic of Lithuania	33.33	42.61	40.59	39.43	32.84	27.98	30.58	38.12	36.00	34.71

of the respective ministries. The causes of changes in the statistical data have been explained by the six sustainable development experts.

Results and Discussion

Environmental state. Table 1 shows that in 2005 Šiauliai county stands out, with the environmental state index much bigger than that of Telšiai county or Lithuanian average. The greatest influence on the leap of the index was substantial growth of the indicator of discharges of agricultural, manufacturing and household waste water into surface water (purified according to the norms); the same indicator had an impact on the environmental state index in 2010 and 2012. In 2006, the index in Šiauliai county was lowest during the whole period under observation because of the discharge of gases and liquid materials, sulphur dioxide, nitrogen oxide, volatile organic compounds and other pollutants into atmosphere from stationary sources. In 2008, the index of Telšiai county stands out, the increase of which was determined by the figure reflecting discharges of agricultural, manufacturing and household waste water into surface water (purified according to the norms). The comparison of the environmental state index of 2004 and 2013 shows that in Šiauliai county the environmental state substantially worsened (by about 8.4%), while it improved in both Telšiai county (by about 5.2%) and in Lithuania (by about 3%).

Economic development. Table 2 shows that, differently from the environmental state index, in 2005 it is not Šiauliai but Telšiai county that stands out

in economic development. Such a leap was caused by a marked growth in direct foreign investment. After Lithuania's accession to EU, European funds were made use of and more investments were attracted in 2005. Besides, in Telšiai county the greatest part of foreign investment was attracted by Polish oil processing plant AB 'ORLEN Lietuva', operating in Mažeikiai region. From 2008 to 2010 there is a pocket in both counties as well as in Lithuania because Lithuania was part of the global economic crisis and as a result economic development has slowed down. The comparison of the economic development indices of 2004 and 2013 shows that during the decade economic development in Šiauliai county grew a lot (about 5%), while in Telšiai it remained almost the same, and in Lithuania it increased substantially (about 4.1%).

Social development. In Table 3, the increase of the social development index in Telšiai county in 2005 stands out; it was determined by a positive change in the natural demographic trends. In 2009 the same county had the lowest index, caused by the increase of the level of unemployment and a negative change in the natural demographic trends. In 2012, the improvement of these indicators caused growth of the social development index; however, in 2013 a substantial decrease of the indicator of the natural demographic trends determined the decrease of the index of the whole Telšiai county. It can be argued, that social development both in Lithuania and Šiauliai and Telšiai counties during the decade was most consistent, because the values of the social development index did not have such great leaps as economic development

Table 3

The Dynamics of the Social Development Index

Social Development Index	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Šiauliai County	33.33	32.50	34.67	35.66	34.15	30.02	29.46	35.32	33.29	34.42
Telšiai County	33.33	41.35	36.12	34.29	33.15	27.17	30.87	34.58	36.91	30.60
Republic of Lithuania	33.33	33.42	35.09	35.15	32.39	30.13	30.15	35.01	34.76	33.71

and environmental state indices. The comparison of the values of social development indices in 2004 and 2013 shows that during the decade social situation according to the 5 key social indicators in Šiauliai county has improved (by about 3.3%), while in Telšiai county it has substantially worsened (by about 8.2%), and in Lithuania it slightly improved (by about 1.1%).

Figure 1 shows that Šiauliai county integrated sustainable development index fluctuates a lot, especially during the period of 2004 and 2008. Between 2008 and 2010, Šiauliai county as well as Lithuania was affected by the economic crisis, followed by the recovery and the growth of the index, but in 2013 the index plunged again by 7.6%. In 2005, compared to 2004, the integrated index of Šiauliai county increased by even 30.5%, while in 2006 it decreased by 19.8%. In 2007, the index grew by 9.1%, but in 2008 it again fell down by 13.4%. The comparison of the value of sustainable development

index in 2004 and 2013 shows that during the decade the value of sustainable development index in Šiauliai county essentially remained the same.

As can be seen in Figure 2, Telšiai county integrated sustainability index in 2005 in comparison with 2004 (base year) increased by even 28.4%, while in 2006 it decreased by 11.6% and kept decreasing until 2009; after the economic crisis having an impact on the whole of Lithuania it started growing again, however, since 2012 it has been decreasing. In 2013, a sharp drop of 8.8% can be seen again. The comparison of the value of sustainability index between 2004 and 2013 shows that during the decade Telšiai county sustainability index decreased by 1%.

As is demonstrated by Figure 3, the integrated sustainability index of the Republic of Lithuania is fluctuating a lot; an especially sharp fall is noticed during the global economic crisis between 2008 and 2010, which was relatively worse than in Šiauliai and

Sustainability Index of Šiauliai County

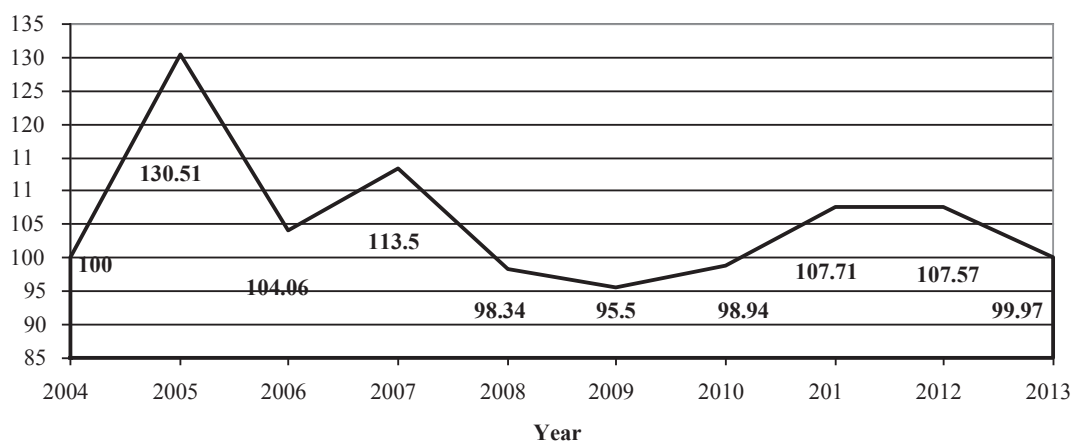


Figure 1. Integrated sustainability index of Šiauliai County in 2004 – 2013.

Sustainability Index of Telšiai County

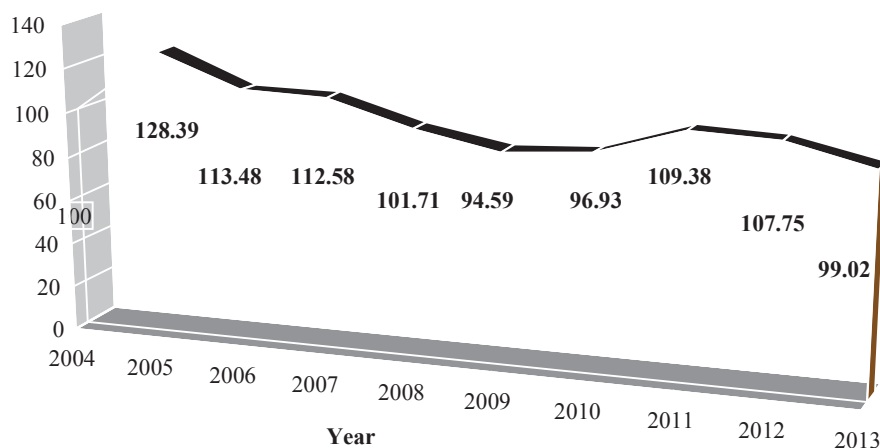


Figure 2. Integrated sustainability index of Telšiai County in 2004 – 2013.

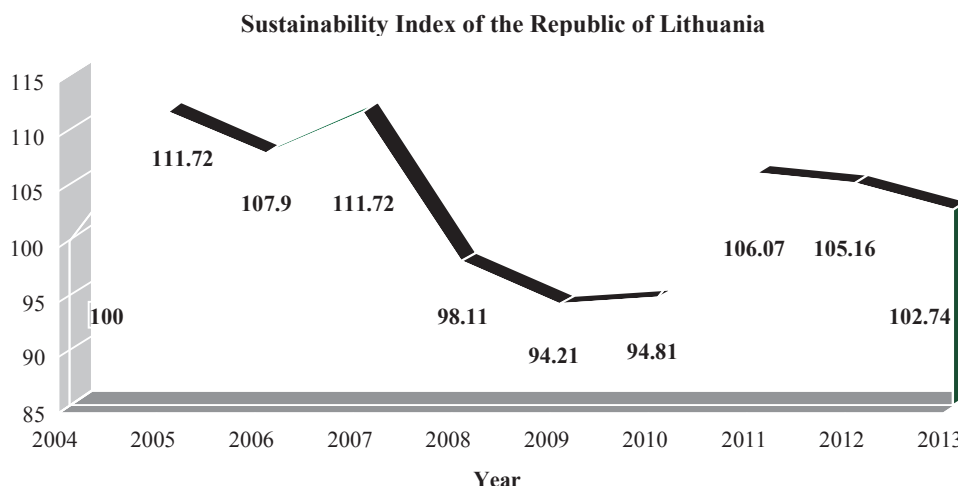


Figure 3. Integrated sustainability index of the Republic of Lithuania in 2004 – 2013.

Telšiai counties. In 2005, the index for the country increased by 11.7%, while in 2008 it decreased even by 12.2%. In 2011, the increase reached 11.9%, but it was followed by a decrease again. The comparison of the values of sustainability index between 2004 and 2013 shows that during the decade the value of the sustainability index of the Republic of Lithuania increased by 2.74%.

Summing up the outcomes shown in Figure 1 – Figure 3, it can be stated that sustainable development of Šiauliai and Telšiai counties and the Republic of Lithuania during the period 2004 and 2013 was very similar. Due to the first EU investments in 2005 – 2007 there was a substantial improvement of economic and social situation, environmental protection was improving as well. However, the global economic crisis of 2008 – 2010 interfered with the sustainable development of Lithuania and mentioned counties. In 2011 – 2012 the situation with sustainable development started improving again, but not as much as in 2005 – 2007. In 2013 the recession in fact brought sustainable development of Lithuania, Šiauliai and Telšiai counties back to the level of 2004.

Conclusions

Sustainability indicators are most often measured at the national level, less often at the level of separate territories of the country. Usually the research literature views it as a drawback and recommends providing more indicators for separate cities and regions of the country. The situation is the same in the Republic of Lithuania: the Department of Statistics of Lithuania provides only a part of values of the indicators for all 60 municipalities of the country out of the list of 84 indicators compiled by the National Strategy for Sustainable Development. Somewhat more sustainability indicators are provided for the ten counties of Lithuania. However, some sustainability indicators are provided by the Department of Statistics

of Lithuania only at the national level. The values of separate indicators for municipalities can be obtained from the information provided by various ministries of the Republic of Lithuania.

The analysis of integrated sustainability indices has shown that sustainable development trends of separate counties (Šiauliai and Telšiai) are essentially the same as those of the Republic of Lithuania. Besides, as has been stated by most of the interviewed experts, measuring some sustainability indicators below the national level is inappropriate because their values in smaller territories are similar to those at the national level. This is typical not only of the environmental state indicators (air, water pollution), but also of some economic and social indicators. That is why it can be concluded that the tradition of measuring sustainability indices and providing information about them in the Republic of Lithuania is optimal and practically justified.

As has been shown by a more detailed statistical analysis of sustainability indicators and expert views, there is a tendency for the air pollution in the form of particulate matter to increase in Šiauliai county, especially during the cold period of the year. While in Telšiai county the indicators of water and forestation are improving due to the new wastewater (sludge) treatment plants and EU investments to increase the area of the forest. Direct foreign investments in Šiauliai county have the tendency to increase, while in Telšiai county they are on the decrease. It is known that export-oriented companies attract most foreign investment. Municipalities can contribute by allocating funds for the improvement of the infrastructure. Material investments in both counties are below the national average. In Telšiai county, road haulage and passenger transport is very low, the number of tourists and accommodation places is also inadequate. The indicator of the natural population replacement is negative not only in the analysed

counties but in the whole country. The number of students in higher or tertiary education in Telšiai county is very low, Šiauliai county also lags behind in these terms from Kaunas and Vilnius counties. These numbers respectively cause the lower level of qualifications of the working population.

The research has shown that the trends for development of sustainability in Telšiai and Šiauliai counties could be as follows: 1) more investments should be allocated for the decrease of air pollution by employing EU investments and municipal funds for the implementation of the projects; 2) it is necessary to perform detailed feasibility studies of the counties in order to attract more investments and tourists by emphasising the originality of the region; 3) it is

important to take good care of the road infrastructure, to provide better conditions for the establishment of more export-oriented companies, to make a more efficient use of internal resources of municipalities for the stimulation of economic processes; 4) to improve the indicators of natural population replacement, more attention should be paid to the development of educational and health care systems, to providing better conditions for living, work, development and making families; 5) to make a more efficient use of the opportunities to train and update professionals in demand for the region; 6) to essentially increase the preparation of projects to attract EU investments in the counties in order to implement the goals set in their strategic development plans of 2014 – 2020.

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