

ECONOMICS*Sociology*

Jermolajeva, E., Rivža, B., Aleksejeva, L., Šipilova, V., Ostrovska I. (2017). Smart Growth as a Tool for Regional Convergence: Evidence from Latgale Region of Latvia. *Economics and Sociology*, 10(4), 203-224. doi:10.14254/2071-789X.2017/10-4/16

SMART GROWTH AS A TOOL FOR REGIONAL CONVERGENCE: EVIDENCE FROM LATGALE REGION OF LATVIA

Elita Jermolajeva,
Latvia University of Agriculture,
Jelgava, Latvia,
E-mail:
elita.jermolajeva@gmail.com

Baiba Rivža,
Latvia University of Agriculture,
Jelgava, Latvia,
E-mail: baiba.rivza@llu.lv

Ludmila Aleksejeva,
Daugavpils University,
Daugavpils, Latvia,
E-mail: ludmila.aleksejeva@du.lv

Viktorija Šipilova,
Daugavpils University,
Daugavpils, Latvia,
E-mail: viktorija.sipilova@du.lv

Inta Ostrovska,
Daugavpils University,
Daugavpils, Latvia,
E-mail: inta.ostrovska@du.lv

ABSTRACT. One of the basic principles of the European Union functioning is even and balanced regional development. However, considerable socioeconomic disparities can be still observed across the regions in Latvia, with its monocentric, i.e., capital city-oriented, distribution of people and economic activities instead of a polycentric one. This factor negatively affects the development of the country's regions. According to the NUTS classification of the European Union, Latvia represents a NUTS 3 region, yet there are five planning regions and six statistical regions in country, and the overall situation along with internal processes in these regions are radically different. Within the framework of the Latvian National Programme EKOSOC-LV, the present paper focuses on smart growth as a tool for regional convergence to be applied in the context of regional development. A new Smart Development Index was created and the Analytic Hierarchy Process was employed to analyse one of the regions in Latvia – Latgale and its 19 municipalities focusing on the expansion of local entrepreneurial activity and the important role of innovative high-tech enterprises in it.

Received: March, 2017
1st Revision: July, 2017
Accepted: October, 2017

DOI: 10.14254/2071-
789X.2017/10-4/16

JEL Classification: O18, R11 **Keywords:** regional development, smart development and specialisation, Latgale rural municipalities of Latvia.

Introduction

Monocentric development is characteristic of Latvia, thus, there are significant socioeconomic disparities among the five planning regions of this country. For this reason,

researchers analyse the current situation and the internal processes in order to identify the best and most effective ways how to achieve balanced regional development. Furthermore, there are disparities not only among the regions but also across 119 municipalities (9 cities and 110 municipalities with rural territories – further “rural municipalities”).

For several years already lasts the discussion about smart regions in Latvia, it is based on a new approach to regional development theories. There are different challenges in this process: theoretical background which includes new terminology and new comprehension of terms among scientists; information on national and municipal institutions; new competences (knowledge, skills) of entrepreneurs and society as a whole. People wish to live in a space, which is people-friendly – this means having a job, decent living conditions, active cultural life and beautiful/ tended nature. Such spaces nowadays are named *smart territories*, *smart cities*, *smart regions* (Smart, 2007).

One of the tools to develop such smart regions in Latvia is the implementation of National Research Programme (since 2014) No. 5.2 ‘Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV), which includes 10 interdisciplinary projects (Valsts, 2014). The programme envisages research on current public developments in the fields of economy, demography, administration, law, regional development, environmental protection and other areas, with a particular focus on economic transformations, innovation processes and environmental safety. The research aim of the project Processes of Latvian Rural and Regional Development and Possibilities within the Framework of the Economy (No. 5.2.3) is to create the models of smart regional development for Latvia. The specific research task of the present paper is to analyse the current situation and possible smart development in one of the planning regions of Latvia – Latgale, and in relation to its rural municipalities specifically.

The structure of the paper includes the following key elements: 1) regional development of Latvia; 2) performance results in the municipalities of Latgale region based on the Smart Development Index and the Analytic Hierarchy Process (AHP) method; 3) performance of high-tech (HT) enterprises. Since the present research is very large in size and the research findings have been partly published, the authors are going to make necessary references and not focus on the already disseminated information. Instead, the authors will introduce the readers to unpublished data only.

Research methods used in this study include: monographic methods, logical construction, the Smart Development Index, the AHP.

1. Literature review

As regards regional development, the Regional Development Guidelines are one of the key documents in Latvia; it is a medium term policy document that defines national regional policies in the period from 2013 to 2019. The Guidelines are a document intended for the introduction of spatial development measures defined in the Sustainable Strategy of Latvia until 2030, which prescribes particular medium-term activities and objectives and details the priorities, activities and objectives set in the National Development Plan 2014-2020 (Reģionālās, 2013). One of the basic principles of functioning of the European Union is even and balanced regional development; however, there are still considerable socio-economic disparities across the regions in Latvia, and a monocentric, i.e. capital city-oriented, distribution of people and economic activities instead of a polycentric one is typical of the country, which negatively affects the development of the other regions.

One of the latest papers written ‘under’ the Regional Studies Association is ‘Towards Cohesion Policy 4.0: Structural Transformation and Inclusive Growth’, where indicated that „inequalities in economic growth and development across the EU are now accounted for by differences *within* rather than *between* countries” (Bachtler *et al.*, 2017, p. 18).

For this reason, researchers seek new opportunities to change the current regional development processes in Latvia and to identify what the regions themselves should do to contribute to their prosperity. One of the ways how to change the existing situation is to realise the European Commission suggestion that smart specialisation is essential for balanced and sustainable development (European Commission, 2012).

In the case of Latvia, the introduction and implementation of a smart specialisation strategy are based on a relatively small number of research works that have analysed the specifics of application of this approach in small rural territories when moving towards a polycentric development model. The researchers mainly focused on the analyses of urban areas, stressing their potential for contributing to a smart specialisation (e.g. Di Leo and Salvia, 2017; Sinkiene *et al.*, 2014; Casado, 2014) or analysing problems regarding the efficient supply of services (e.g. Arcelus *et al.*, 2015) and dependence on subsidies (e.g. Partridge *et al.*, 2015). For this reason, researchers in Latvia have increasingly focused on examining a smart specialisation strategy for small rural territories in Latvia (e.g. Zvirbule *et al.*, 2016; Šipilova *et al.*, 2017a, 2017b, 2016; Kreslins and Stefenberga, 2016; Melbarde and Ore, 2016).

As the majority of European residents live in urban areas (European Union, 2011), this leads to a situation that small rural territories have limited possibilities to introduce and assess a smart specialisation. It could be explained by the fact that small rural territories are usually sparsely populated, their populations have a relatively low education level and there is a long distance to “knowledge centres” (e.g. Steiner & Mossbock, 2014; Chmielewska & Horváthová, 2016; Straka *et al.*, 2015), while the introduction of “smartness” and an assessment of it are based on such indicators as innovations, technologies and patents introduced and creation of a new knowledge, which are quite difficult to obtain for the small rural territories in statistical databases (Rutkauskas *et al.*, 2014).

Based on the findings available in the scientific literature, the research authors consider that any opinion on the application of potential of every territory expressed within the new development paradigm (e.g. Vanthillo & Verhetsel, 2012) explicitly indicate the opportunities for small rural territories to engage in the smart specialisation process. After summarising the experience of Europe and the USA in contributing to smart development Šipilova *et al.* (2017b) concluded that small rural territories too had vast opportunities to develop a smart specialisation and that a focus on some specific indicators could result in a wrong understanding of the potential of the small rural territories for engaging in this process.

The next problem is associated with the possibility to contribute to smart development in very diverse rural territories (Naldi *et al.*, 2015). Scientists stress various smart specialisation introduction strategies that could be appropriate for rural territories, e.g. a specialisation in agriculture (Sandu, 2014), eco-innovation activities (Álvarez *et al.*, 2014), sustainable infrastructure (Molavi and Shapoorian, 2013) etc. A potential solution to the introduction of a smart specialisation in small rural territories could be found by applying the so-called place-based regional development approach, which provides the implementation of every territory’s potential (e.g. McCann and Rodriguez-Pose, 2011; Habánik *et al.*, 2016).

2. Methodological approach

Addressing the issue under research, the authors applied several scientific methods for refreshing stereotypes of the region and detecting key factors driving regional development in

small municipalities in Latgale in the framework of the place-based approach. The choice to test the place-based approach finds roots in aims of regional development in Latvia according to regional development strategies.

The authors partly used EDORA Cube – European Development Opportunities for Rural Areas – principles according to Copus and Noguera (2010) for refreshing stereotypes of intermediate and predominantly rural regions. A new typology, offered by the authors, is based on the regional development process, which is understood as growth rates of entrepreneurship. The methodology and some methods of the EU ESPON project were used as well (ESPO, 2013). The new typology was created based on the processes of regional development (Šipilova *et al.*, 2017a, 2017b; Zvirbule *et al.*, 2016).

Municipalities are divided into groups by using data on economically active statistical units: market sector and individual businesses. Smart and sustainable territory development takes place in the areas with: 1) an innovative and knowledge-based economy; 2) educated, active, creative population; 3) sustainable use of natural resources; 4) high-quality local management, which actively involves inhabitants; 5) developed IT infrastructure and skills.

A quantitative assessment was based on scientific and practical experience, taking into account the spatial and socio-economic specifics of development of the regions and municipalities of Latvia that demonstrated development levels and growth rates of the municipalities in combination with regional socio-economic disparities. In the result, an integral indicator – a smart development index – was developed after processing a lot of statistical data; the index encompassed four dimensions: *Resources*, *Population*, *Economy*, *Governance* (in some papers and/or presentations of the research: Administration or Management) and shows the special features of smart development of municipalities. *Resources*: effective use (tended agricultural lands (TAL), Rural Support Service (RSS) expenditures); available resources (forestland, the amount of mineral resources); infrastructure (road network density). *Population*: knowledgeable (higher education, primary sector employees); skilful (the long-term unemployed); active (the number of NGOs). *Economy*: innovative (the proportion of enterprises in the total number of companies, turnover, the number of employees); active (the number of the self-employed). *Governance*: competent (the amount of funding attracted); inclusive (electoral activity); modern (e-index changes and NGN zones (next generation network)).

The AHP (Analytic Hierarchy Process) method (Saaty, 1990; Zvirbule *et al.*, 2016) and experts representing various spheres were used for every region. Mathematical and statistical methods: correlation analysis, which reveal the link between the regional population dynamics (the dependent variable) and the key variables in different combinations in municipalities depending on the data on the regional development process.

The EKOSOC-LV research involves a quantitative and qualitative sustainability assessment of 19 municipalities of Latgale region based on the smart specialisation concept. The smart specialisation concept emerged along with the change of the modern regional development paradigm, which contributed to the understanding of every region's potential and the role of endogenous factors. Since an issue regarding the opportunities for very diverse territories to ensure their sustainable development became very topical at the same time, the research scientifically and practically offers to tackle local problems using local uniqueness and comparative advantages.

3. Conducting research and results

3.1. Regional development in Latvia

There are still considerable socio-economic disparities across the regions in Latvia, which are observed within the EU as well. According to the data of Eurostat, GDP per capita for NUTS level 3 regions in Latvia was the lowest among the EU Member States (43.3%), and the most unbalanced regional development was reported in Latvia for several years earlier. In 2014, the GDP per capita in Latvia was still less than 75% of the EU-28 average (GDP).

Latvia is the central country of the Baltic States in North-eastern Europe, on the east coast of the Baltic Sea. The size of the country is 64.6 thousand km² – it's five times smaller than Germany and twice as large as Belgium. Latvia borders on Estonia, Lithuania, Russia and Belarus. There are five planning regions in Latvia: Riga (the capital of Latvia and its surroundings), Latgale, Kurzeme, Vidzeme, Zemgale.

Explicitly monocentric socio-economic development, i.e. capital city-oriented, instead of a polycentric distribution of people and economic activities is typical of Latvia, given the fact that enterprises and, consequently, jobs are concentrated in Riga and its vicinity, transport infrastructure there is better than in the rest of the country and a broader, more diverse and higher-quality assortment of services is available there as well. The other development centres of international and national significance currently lack a critical mass of resources (including for the implementation of a specialisation and cooperation with other development centres and rural territories) that would make them strong regional growth drivers, and their positive effects on the surrounding territories are insufficient. Of the total, 83% of urban scientific institutions, 83% of high technology enterprises and 70% of top 500 enterprises were concentrated in Riga; enterprises located in Riga contributed to 60% of the country's exports (CSP).

In 2010, Riga – the capital city of Latvia – and the areas adjacent to it – Riga region – contributed to 66.9% of the country's GDP, while the contributions of the other regions to the GDP were in the range of 6.7-10.3%; in 2014, the disparity was even greater, 69% and 6.4-8.9%, respectively (CSP). The significantly different economic activity level and availability and accessibility of services create different life quality standards and employment opportunities for residents in these territories and promote the outflow of the population from less developed to more developed territories, which reduces growth opportunities for the less developed territories that lose the human resources as well as tax revenues to be invested in their territorial development.

In the period 2000-2015, the number of residents increased only in the territories around the capital city, whereas in the rest of the country the population decreased; in some remote municipalities a decrease in population reached even 25-30% (CSP). To reduce the outflow of residents from the regions to Riga and/or its surrounding municipalities (as well as to other countries), it is necessary to increase the economic role of the other regions and their attractiveness for entrepreneurship and residence. The development potential of rural territories is insufficiently used to respond to the effects caused by demographic changes (the diversification of the rural economy through efficient use of local resources, innovative solutions to the provision of services in low-population-density territories etc. are required).

The most important problem of regional development, which is characteristic of the entire territory of Latvia, is significant socio-economic disparities among the regions, and it has a number of reasons. The first reason is low entrepreneurial activity and poor prerequisites for increasing the activity. Data show that the territories outside Riga and its surrounding territories attracted significantly less nonfinancial investment, e.g. in 2011 in Riga planning region, the nonfinancial investment per capita totalled EUR 2307, while in Latgale planning region it was

twice as low – EUR 1108; in 2015, the disparity was even more than two times higher, EUR 3429 and EUR 774, respectively (CSP).

In 2011, more than half (54.8%) of economically active market sector statistical entities operated in Riga planning region – there were 51.9 individual merchants and commercial companies per 1000 capita, while in the other planning regions the figure was 2-3 times lower. In 2015, almost 60% of economically active market sector statistical entities were registered in Riga planning region. However, it has to be noted that in the other regions the proportions of self-employed persons and individual merchants (40-52%) were higher, while in Riga planning region it was 24% (CSP). The data allow concluding that in the other regions there were fewer employers or there was even a lack of them.

Another related problem is the low proportion of innovative enterprises that produce high value-added goods and services, efficiently and creatively exploit local resources and thus make a larger contribution to economic growth in the entire country and the regions and to raising the standard of living of the population. Only 29.9% of enterprises in Latvia were active with regard to innovation, which was the third lowest rate in the EU (the EU average was 52.9%) (Eurostat).

The significant disparities in economic activity directly affect tax revenues collected by the local governments of Latvia, as the municipalities where the economic activity is lower (higher unemployment etc.) the tax revenues (personal income tax revenues, which is the key revenue source of local governments, in particular) are lower. The tax revenue disparities are partly reduced by subsidies from the Municipal Finance Equalisation Fund for the local governments collecting lower tax revenues (in 2015, 90 local governments were subsidy recipients), but their per-capita budget sizes after receiving the subsidies were very different anyway. In 2016, for example, the estimated per-capita municipality tax revenues ranged from EUR 1353 in Garkalne municipality (Riga planning region) to EUR 307 in Aglona municipality (Latgale planning region) – the highest figure was more than four times higher than the lowest one (Pašvaldību). The tax revenue disparities do not mean that very different amounts of funding are at the disposal of local governments to be invested in development and the provision of services to residents. Most of the local governments actually lack funding for the provision of services at high quality and the expansion of supply of services, while the significant disparities in the provision of services make part of the municipalities less attractive as places of residence.

Latgale is one of the regions of Latvia, and its area is 14.5 thou. km² or 22.5% of the total area of the country (Latgales, 2017). The region lies in the eastern part of Latvia; it borders on the Republic of Lithuania, while its border with the Russian Federation and the Republic of Belarus is also the EU external border. Agriculture, food processing, forestry, wood processing, tourism, metal working, mechanical engineering, transport, communications and logistics are considered to be the conventional industries of Latgale region. Renewable energy and energy efficiency, which are mainly based on agriculture and forestry, as well as creative industries, recreational and healthcare service develop in the region as relatively new and prospective industries.

The development strategy and other policy documents of Latgale region stress the following key values of the region (Latgales, 2010a, 2010b): educated, cultured and socially, economically and politically active residents; a clean natural environment and cultural and historical values; Latgale region is geographically situated by the eastern border of Latvia and transit corridors cross the region.

There are some researches related to Latgale region have been in Latvia, for example, potential and directions of the development of Southern Latgale (Jermolajeva, Cingule-

Vinogradova, 2012), but they had not so long period and in-depth research as during EKOSOC-LV project.

3.2. Territory Development Index

Every year the State Regional Development Agency of the Republic of Latvia calculates the Territory Development Index (TDI), and it has been used for the assessment of development of different territorial units (Territory). It is a generalised indicator which is calculated with determined weight coefficients by summing up standardised values of the most important basic indicators of statistics which characterise the development. It demonstrates higher or lower development of the territories from the average social economic development level of the state in the relevant year.

There is a TDI for Latgale region developed by EKOSOC-LV data (see *Table 1*). All the 19 rural municipalities of Latgale were divided into four groups by population. The maximum population was set at 27395 (max), while the minimum population was set at 1112 (min) $((27395-1112)/4=6570)$; in the result, Cluster 1 had a population of $1112+6570$, Cluster 2 – $1112+6570+6570$ etc.

Table 1. Territory Development Index (TDI) and the clusters of population for the municipalities of Latgale region

Municipalities	PR* IM** PU***	Development level (TDI), 2013		Ranking of cluster	Cluster of population
		Index	Group		
Livani	IM	-0.625	high (max)	low	below average
Preili	IM	-0.810	high	low	below average
Balvi	IM	-0.821	high	below average	below average
Daugavpils	PU	-0.877	high	above average	high
Ludza	IM	-0.951	high	low	below average
Ilukste	PR	-0.964	high	below average	low
Varkava	PR	-1.017	high	high	low
Rugaji	PR	-1.023	high	below average	low
Kraslava	PR	-1.035	high	low	low
Vilaka	PR	-1.188	low	low	low
Riebini	PR	-1.121	low	low (min)	low
Aglona	PR	-1.258	low	below average	low
Dagda	PR	-1.268	low	below average	below average
Baltinava	PR	-1.308	low	low	low (min)
Cibla	PR	-1.352	low	above average	low
Rezekne	PU	-1.141	low	low	high (max)
Karsava	IM	-1.424	low	below average	above average
Zilupe	IM	-1.487	low (min)	above average (max)	low
Vilani	PR	-1.530	low	low	low

** PR – predominantly rural,

** IM – intermediate,

*** PU – predominantly urban.

Source: own compilation based on EKOSOC-LV data; SRDA, 2010, 2011, 2012; RDIM, 2015.

The largest number of municipalities (11 out of 19) belonged to the group of small populations, i.e. the number of residents was less than 7682. Besides, in terms of the proportion

of rural residents, most of them or 12 out of the 19 municipalities were predominantly rural (more than 50% were rural people) and six intermediate (IM) (15 – 50% rural people). Only two municipalities near the large cities – Daugavpils and Rezekne – were predominantly urban (up to 15% were rural people). Only in three municipalities the population was above the average of the region – they were: Rezekne municipality (Cluster 4), Daugavpils municipality (Cluster 4) and Kraslava municipality (Cluster 3).

It is essential that in view of the expert survey results (see below) that revealed that the key factor affecting smart development was the population-based development scenario. In view of the relatively small population, the region has to focus on enhancing the quality of its human resources, i.e. the development of smart people, which was also stressed by the surveyed experts.

Despite the relatively small population, a number of the municipalities of Latgale region demonstrated a high development level or a high growth rate. This indicates that some stimulation measures have been implemented at a currently small population size. For example, ‘backward territories’ with a low development level and a low growth rate had a large population (Rezekne municipality) and a small population (the municipalities of Riebini, Vilaka and Vilani) or even a minimum population (Baltinava municipality). Several municipalities were the so-called ‘retreating territories’, i.e. they exhausted their growth increase opportunities. It is important for also the mentioned municipalities to identify new smart growth-based resources and funds as well as opportunities for future growth to a new development level.

3.2. Smart Development Index

The diverse indicator values for municipalities, including the above-mentioned Territory Development Index, do not give comprehensive insight into the current situation and the potential of development; therefore, it is necessary to employ integral indicators and assessments or the so-called expert opinion-based data. For this reason, an integral Smart Development Index (SDI) that includes a number of indicator groups (see the section Theoretical background) was developed within the EKOSOC-LV project. During the research, the authors analysed each component of the Smart Development Index for all the 110 rural municipalities of Latvia (*novadi* – in Latvian).

An overall analysis of the indicators revealed that 60 municipalities had a positive index value, among them 13 had a value of above 10, whereas 50 municipalities had a negative index value and among them seven had a value of below -5. Latgale region had the largest number of municipalities with a negative index value among all the regions. Zilupe municipality (Latgale region) had the minimum index value of -8.8 nationally, while Kraslava municipality had the maximum index value of +1.7 among the municipalities of Latgale region, yet it was 10 times lower than the maximum index value nationally (see *Table 2*).

Table 2. The best- and the worst-performing municipalities of Latvia according to the Smart Development Index (SDI)

Best-performing municipalities, SDI		Worst-performing municipalities, SDI	
1	2	3	4
Saulkrasti	16.888	Zilupe*	-8.752
Carnikava	16.606	Skrunda	-8.651
Marupe	16.540	Ludza	-6.771
Garkalne	14.041	Nereta	-6.633

1	2	3	4
Adazi	13.564	Vainode	-6.339
Ikskile	13.083	Cibla*	-6.287
Ropazi	12.518	Daugavpils*	-5.311
Babite	11.711	Aglona*	-4.610
Rucava	11.609	Naukseni	-4.469
Mazsalaca	11.432	Vilani*	-4.169

* Municipality of Latgale region.

Source: own compilation based on EKOSOC-LV data.

The results of the Smart Development Index in Latgale region divided its 19 municipalities into two similar groups: 10 municipalities had positive index values and 9 municipalities – negative index values. It is essential that in 2014, 62.31% of the population of Latgale region lived in the group of municipalities with positive index values, which was a positive trend for smart development. However, in the group of municipalities with positive Smart Development Index values, a low or below-average pace of development was reported in all the 10 municipalities.

The authors of the research analysed also all the dimensions of the Smart Development Index. The data showed the relevance between the SDI and its dimension *Resources* – the highest standardized value was in Saulkrasti municipality of Riga region (6.171), while the municipalities of Latgale region were not in TOP 10. The following four municipalities of Latgale region were in TOP 10 worst municipalities: Zilupe (-3.119), Varkava (-2.931), Ludza (-2.608) and Livani (-1.983).

The data showed (see *Table 3*) that the most effective use of tending agricultural lands (TAL) was in Tervete municipality (Zemgale region); available resources: forestland – in Garkalne municipality (Riga region) and mineral resources – in Saldus municipality (Kurzeme region); Rural Support Service (RSS) expenditures – Tukums municipality (Kurzeme region); infrastructure (road network density) – in Saulkrasti municipality (Riga region). As regards the lowest values, the situation was not so negative in Latgale region because there was only one municipality – Varkava – with the min value. At the same time, the max value of this indicator (RSS) was 144 times higher than the min value.

Table 3. Relevance between the Smart Development Index and its dimension Resources

Indicators	Tended TAL out of the total TAL, %	Forestland, %	Mineral resources, thousand m ³	RSS expenditures, EUR	Road network density, km/km ²
Average	0.82	0.45	5 530	37 508 297	0.94
MAX	0.98 Tervete	0.73 Garkalne	63 735 Saldus	179 171 094 Tukums	4.76 Saulkrasti
MIN	0.36 Garkalne	0.14 Rundale	0 (19 municipali- ties)	1 246 003 Varkava*	0.30 Ventspils
Difference	0.62 (2.7x)	0.60 (5.3x)	63 735	177 925 091 (144 x)	4.76

* Municipality of Latgale region.

Source: own compilation based on EKOSOC-LV data.

The situation was similar with regard to the next dimension *Population* – the municipalities of Latgale region were not in TOP 10 (the highest standardized value of 9.847 was in Garkalne municipality, Riga region), but there were six in TOP 10 worst municipalities – Riebini (-5.453), Varkava (-4.832), Vilani (-4.407), Baltinava (-4.039), Varaklani (-3.891) and Zilupe (-3.878).

The indicators had (see *Table 4*) the highest values: higher education and NGOs per 1000 inhabitants in Garkalne municipality (Riga region), primary sector employees in Naukseni municipality (Vidzeme region) and only one (negative) indicator value – the share of the long-term unemployed – was in Karsava municipality (Latgale region). The min values were in two municipalities of Latgale region – Riebini and Zilupe.

Table 4. Relevance between the Smart Development Index and its dimension *Population*

Indicators	Higher education, %	Primary sector employees, %	Share of the long- term unemployed,%	NGOs per 1000 inhabitants
Average	16	13	37	9
MAX	41 Garkalne	31.23 Naukseni	71.21 Karsava*	15.73 Garkalne
MIN	9.50 Rucava. Riebini*	1.03 Stopini	8.09 Ikskile	1.89 Zilupe*
Difference	31.50 (4.3x)	30.21 (30x)	63.12 (8.8x)	13.84 (8.3x)

* Municipality of Latgale region.

Source: own compilation based on EKOSOC-LV data.

The next dimension of the Smart Development Index is *Economy* – the situation was a little better compared with the previous dimensions: the municipalities of Latgale region were not in TOP 10 (the highest standardised value of 12.515 was in Mazsalaca municipality, Riga region), but there were „only” two in TOP 10 worst municipalities – Baltinava municipality (-3.129) and Daugavpils municipality (-2.610).

The max values (see *Table 5*) were only in one municipality of Latgale region – Varkava –, but the min values were in Baltinava municipality which was the smallest municipality of the region and also of the whole country.

Table 5. Relevance between the Smart Development Index and its dimension *Economy*

Indicators	Innovative enterprises				Self-employed per 1000 inhabitants
	Share, %	Share of turnover, %	Share of employees, %	Turnover per employee	
Average	15	6	11	159 488	30
MAX	34.82 Garkalne	58.73 Rucava	60.13 Strenci	11 113 800 Mazsalaca	81 Varkava*
MIN	0 Baltinava*	0 Baltinava*	0 Baltinava*	0 Baltinava*	8 Mersrags
Difference	34.82	58.73	60.13	11 113 800	73

* Municipality of Latgale region

Source: own compilation based on EKOSOC-LV data.

The last dimension is *Governance*. The best-performing territory was Nica municipality in Kurzeme region (10.234). The performance results of Latgale region municipalities with regard to the dimension *Governance* were quite different compared with the dimension *Economy*, for example, Baltinava municipality performed the worst, but here it was in the 5th place of TOP 10 (6.529). Besides, only two municipalities of Latgale region were in TOP 10 worst municipalities – Zilupe (-3.814) and Ludza (-2.212).

The max values (see *Table 6*): EU funds for development – in Incukalns municipality (Riga region); electoral activity – in Mersrags municipality (Kurzeme region); changes in the e-index of the region – in Aloja municipality (Vidzeme region), and only Varkava municipality (Latgale region) showed the max value with regard to EU funds for agriculture. But not a single municipality of Latgale region had the min value.

The dominant index dimension for each municipality was determined based on the four dimension values of the Smart Development Index in the municipalities of Latgale region, and it was concluded that it was difficult to single out some dimension because different dimensions dominated in the group of municipalities with positive index values. The dimension *Governance* dominated in the group of municipalities with negative index values.

The Smart Development Index shows a moderate but relatively steady pace of development in Latgale region if compared with that in the other regions.

Table 6. Relevance between the Smart Development Index and its dimension *Governance*

Indicators	EU funds for development, EUR per 1000 inhabitants	EU funds for agriculture, EUR per 1000 inhabitants	Electoral activity, %	Changes in the e-index of the region	Next Generation Network (NGN) zone
Average	1 201 176	2 500 970	46	0.17	0.68
MAX	3 924 477 Incukalns	7 448 282 Varkava*	63.55 Mersrags	1.15 Aloja	2
MIN	113 019 Garkalne	48 675.31 Garkalne	33.02 Talsi, Bauska	-0.35 Vainode	0
Difference	3 811 457	7 399 606	30.53	1.50	2

* Municipality of Latgale region.

Source: own compilation based on EKOSOC-LV data.

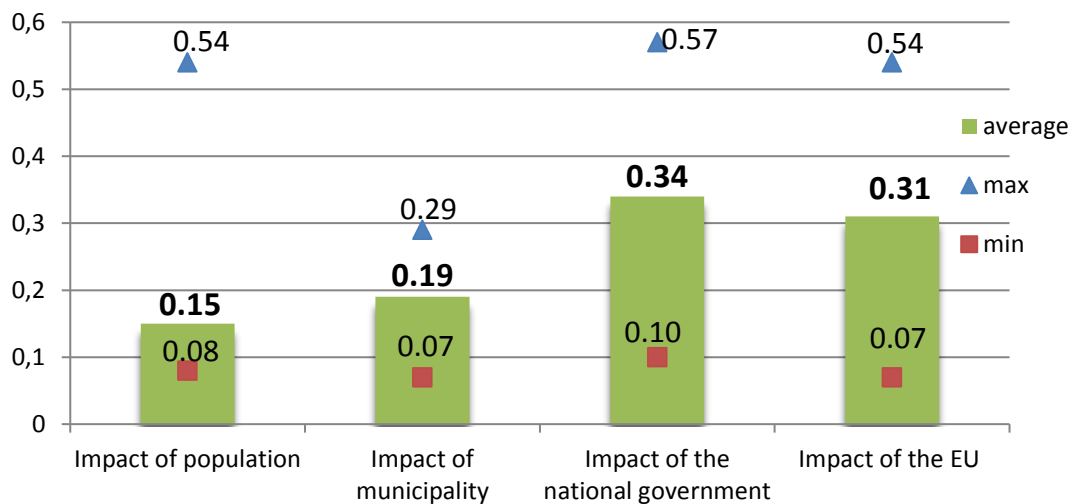
To some extent, the coefficients of correlation between the Smart Development Index and its dimensions explain the overall development level of Latgale region. As pointed out by the experts of the EKOSOC.LV project, a decrease in social capital and the exploitation of natural resources were observed in Latgale region, mainly producing low value-added products, which was not a positive fact because the dimensions *Population* and *Resources* dominated in the smart development of the region.

3.3. Results of applying the AHP (Analytic Hierarchy Process) method

To some extent, the dominance of the dimension *Population* over the other dimensions in Latgale region could be associated with such a negative trend observed in the region as depopulation; for this reason, the value of human resources increases. The AHP method was employed to analyse scenarios for the formation and development of a smart territory. There were selected 16 assessment criteria that were grouped according to target group interests

(resident, local government, national and EU interests). Performing a hierarchy analysis, every expert's ratings were processed individually and then summarised, and global priority vector values were calculated for every criterion. The overall indicators allowed constructing an integral vision on the formation and development of a smart territory in Latgale region (Zvirbule *et al.*, 2016; Šipilova *et al.*, 2017b).

The formation and development of a smart territory is affected by four groups of factors: influence of residents, influence of local governments, influence of the national government and influence of the EU. According to the experts (n=6), the most significant factor group in Latgale region (see *Graph 1*) was the influence of the national government (0.34). The influence of the EU was overall rated slightly lower. In contrast, the highest agreement among the experts was for the influence of local governments, which was overall rated almost two times lower than the influence of the national government. It is understandable in view of the fact that the interests of Latgale region were disregarded for a long time in favour of national interests and those of the other regions (mainly Riga region).



Graph 1. Overall and minimum and maximum ratings of Level 1 factor groups for Latgale region by the experts (n=6)

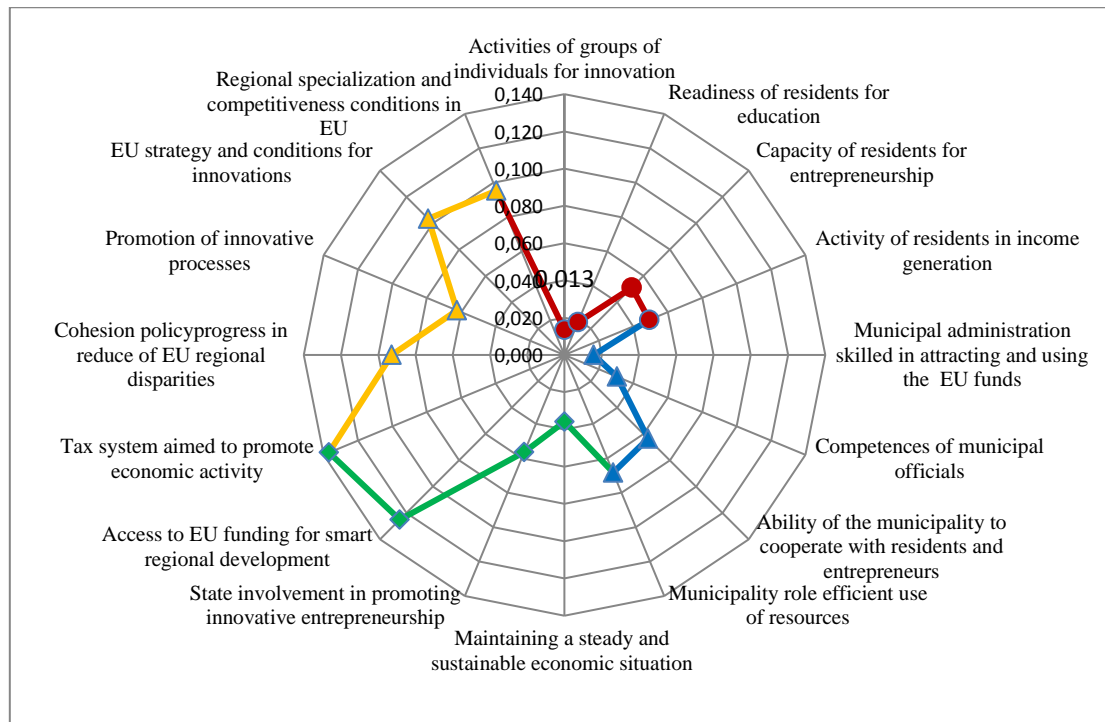
Source: own data based on EKOSOC-LV.

The influence of each factor group was subdivided into components (factors) (see *Graph 2*). Among the factors of influence of the national government, financial equalisation and successful implementation of the tax policy (0.137) and availability of EU funding for the promotion of a smart specialisation in the regions (0.125) were rated the highest, and the mentioned factors were also rated the highest among all the 16 factors. The lowest rating among the factors of influence of the national government was given to maintaining a stable and sustainable economic situation in the country (0.036).

However, the lowest overall ratings were given by the experts to the following factors: activities of groups of individuals aimed at learning and spreading innovative changes and ideas (0.014) and municipal administration skilled in attracting EU structural funds and effectively using the funds (0.016) (see *Graph 2*).

Each factor group had relatively high ratings. For example, in the group of factors for the influence of residents, a criterion associating the activity of residents with entrepreneurial activity was rated the highest at 0.38; among the group of factors for the influence of local governments, the ability of the municipality to cooperate with residents and entrepreneurs was rated the highest. Based on their research experience, the authors can assert that to date the

above-mentioned factors have been the weaknesses in the regional development of Latgale region.



* Red colour (●) – impact of population; yellow colour (Δ) – impact of the EU; green colour (◆) – impact of the national government; blue colour (▲) – impact of municipality

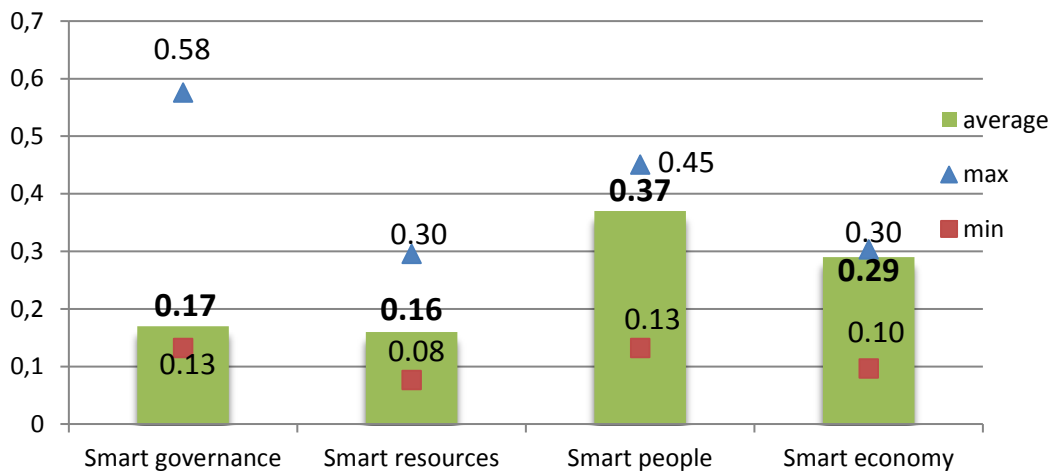
Graph 2. Factors for the formation and development of a smart specialisation in Latgale region* (weighted average of criteria)

Source: own data based on EKOSOC-LV.

Afterwards the experts identified the effects of the factors on the formation and development of a smart territory and a scenario for regional development. Four directions were selected: smart governance, smart resources, smart residents and a smart economy. The experts rated an **education, enterprise, creativity, active civic engagement-based conception** for Latgale region the highest (0.37), which scored the most points. Besides, this scenario acquired the highest maximum score. Among the directions, a smart economy had the second highest overall rating (0.29), while smart resources (0.16) were the least preferred direction (see *Graph 3*). Assessing the effects of the dimension *Population* on the smart development of the region, the experts admitted that the population's initiatives and activities played an essential role in contributing to the smart specialisation of the region, yet the local institutional environment was the most important.

The experts stressed the following factors in the model of smart residents: the role of the local government in the effective use of resources (1.462), followed by the ability of the municipality to cooperate with residents and entrepreneurs (0.875). The use of resources being at the disposal of residents in income generation was ranked third with 0.474.

The factors of influence of residents (0.41) played a larger role in the model of smart residents than in the other scenarios for the formation and development of a smart territory. The experts also emphasised the factors of influence of local governments (0.23).



Graph 3. Overall ratings of alternative directions for the formation and development of a smart specialisation in Latgale region by the experts (n=6)

Source: own data based on EKOSOC-LV

A positive fact is that Latgale was the only region of Latvia for which the experts advised a resident-focused scenario. This is a supportable idea also because the experts were representatives of the region and several of them represented a local government or an enterprise in particular. This suggests that these and perhaps other entrepreneurs and municipal officials would place a greater focus on the development of human resources. This means that an important factor for sustainable development is the attraction and retention of residents and the use of their potential in municipalities and in the region, which was referred to as the key way of development for Latgale region.

Combining the quantitative assessments of trends in smart development in Latgale region and the experts' (qualitative) assessments of the role of Smart Development Index dimensions in smart development in Latgale region, it is possible to characterise the identified trends in smart development. The most explicit trend in smart development in Latgale region could be attributed to the fact that the dimensions *Resources* and *Economy* were not among the dominant ones neither in the quantitative nor the qualitative assessments. This could be explained by the well-known negative trends in Latgale region in relation to its resources and economy, which the experts were aware of. Low entrepreneurial activity (attributable to the dimension *Economy*) and the exploitation of natural resources to produce low value-added products (attributable to the dimension *Resources*) were among these negative trends. Being aware of the commitment of municipalities to progress towards knowledge-based development, it is understandable that the dimension *Population* takes the leading role; however, in view of the fact that in terms of economic development Latgale region lags behind the other regions, a greater focus has to be placed on the dimensions *Economy* and *Resources* too, as well as the performance of municipalities with regard to the dimension *Governance* has to be made more equal across the municipalities.

3.4. Characteristics of knowledge-based enterprises (KBE)

The expansion of entrepreneurial activity in the rural territories of Latgale region tended to increase, as the number of new enterprises (+60.81%), the number of employees (+10.73%) and net turnover (+51,02%) rose. An analysis of the data on the numbers of enterprises and their employees leads to a conclusion that mostly micro- and small enterprises emerged in the

municipalities of Latgale region, which is a very supportable initiative in rural areas. A positive trend is an increase in the efficiency of new entrepreneurial activities, as an increase in net turnover was five times an increase in the number of employees.

Table 7. Expansion of entrepreneurial activity in the rural territories of 19 municipalities in Latgale region in the period 2009-2015, %

	Economy as a whole	KBE segment	
		High and medium high technology industries	Knowledge intensive services
Number of enterprises	60.81	116.67	75.89
Number of employees	10.73	90.91	18.28
Net turnover	51.02	115.81	24.39

Source: own compilation based on Lursoft data.

To comprehend trends in smart development in detail in the rural territories (municipalities) of Latgale region, it is necessary to examine the so-called knowledge-based economy (KBE) segment that includes high and medium high technology manufacturing and knowledge-based services. An analysis of the increase in entrepreneurial activity in the KBE segment allows noting that the increase was higher in high and medium high technology manufacturing than in the economy as a whole. The increase in the indicators of the KBE segment (see Table 7) demonstrates that a greater focus was placed on high and medium high technology manufacturing (the number of enterprises increased by 116.67%) rather than services (the number of enterprises increased by 75.89%), while changes in the efficiency of the sectors were quite similar. The calculation results allow stressing that the influence of residents on smart development mainly manifested itself through the knowledge intensive services sector, as the number of enterprises rose by 75.89%, the number of employees increased by 18.28%. This indicates the potential of the knowledge intensive services sector for engaging rural human resources in smart development through micro- and small service enterprises.

The trends observed in the KBE segment contributed to changes in the economic structure of the rural territories of Latgale region – the share of the KBE segment slightly increased in terms of both the number of enterprises (+0.99) and the number of employees (+1.2%). However, not only quantitative but also qualitative changes have to be considered because, in contrast to the trend in the numbers of enterprises and employees, the share of net turnover of the KBE segment in the total economy insignificantly decreased (-0.25), which did not demonstrate efficient economic activity (see Table 8).

Table 8. Change in the shares of industries in the economy of 19 rural municipalities in Latgale region in the period 2009-2015, %

	Manufacturing	Agriculture, forestry and fisheries	Services	Other industries	KBE segment
Number of enterprises	-1.93%	+10.75%	-7.70%	-1.12%	+0.99%
Number of employees	-0.53%	+5.53%	-2.65%	-2.35%	+1.2%
Net turnover	+6.01%	+9.31%	-12.57%	-2.75%	-0.25%

Source: own compilation based on Lursoft data.

Despite the positive trends in the KBE segment, the role of agriculture, forestry and fisheries in the economy of Latgale region explicitly continued increasing, which, on the one hand, is a positive fact for the preservation and expansion of traditional economic activities of the region and for employment, whereas on the other hand it makes only an insignificant contribution to the smart development of rural territories (e.g. through higher efficiency in agricultural activity, organic farming). The increase of the KBE segment, which was very moderate, in the economy of 19 municipalities of Latgale region was determined by the very diverse performance of the municipalities not only in relation to the economy as a whole but also in relation to the KBE segment (see *Table 9*).

Table 9. Change in entrepreneurial activity in the economy as a whole and in the KBE segment in 19 rural municipalities of Latgale region in the period 2009-2015, %

Municipalities	Number of enterprises		Number of enterprises		Number of enterprises	
	<i>Economy as a whole</i>	<i>KBE segment</i>	<i>Economy as a whole</i>	<i>KBE segment</i>	<i>Economy as a whole</i>	<i>KBE segment</i>
Aglona	106.67	33.33	124.64	37.50	398.35	86.97
Baltinava	77.78	0.00	62.50	0.00	147.42	0.00
Balvi	50.96	50.00	8.11	29.90	27.26	85.03
Cibla	100.00	100.00	26.06	200.00	157.94	1247.18
Dagda	97.56	100.00	12.17	128.57	53.09	130.20
Daugavpils	43.46	94.44	-6.06	-16.07	-14.39	-51.61
Ilukste	77.97	75.00	9.99	17.46	87.77	59.14
Karsava	95.45	333.33	33.56	70.00	45.48	55.62
Kraslava	57.03	50.00	14.53	-4.18	103.78	8.79
Livani	49.69	69.57	2.62	133.33	36.07	95.27
Ludza	47.97	55.56	-1.01	-12.41	11.11	12.74
Preili	58.91	100.00	1.61	-18.50	78.27	-16.28
Rezekne	60.82	121.43	26.42	75.00	74.65	146.37
Riebini	106.67	600.00	-33.77	366.67	-15.64	168.79
Rugaji	83.33	-50.00	59.69	85.71	69.22	602.41
Varkava	500.00	100.00	69.49	20.00	42.71	130.40
Vilaka	39.29	100.00	29.59	100.00	40.09	100.00
Vilani	57.58	-10.00	32.84	42.31	63.22	30.02
Zilupe	62.50	0.00	19.72	-38.78	61.00	-26.87
<i>AVERAGE</i>	<i>93.35</i>	<i>101.19</i>	<i>25.93</i>	<i>64.02</i>	<i>77.23</i>	<i>150.75</i>

Source: own compilation based on Lursoft data.

An increase in entrepreneurial activity in the economy as a whole and in the KBE segment was reported in the rural municipalities of Latgale region. According to the calculations, the municipalities of Latgale region could be divided into five groups by increase in the number of KBE segment enterprises. Group 1 includes the municipalities where a decrease or a zero increase was reported (Rugaji, Vilani, Baltinava and Zilupe), Group 2 – where an increase was below the average for Latgale region (Aglona, Balvi, Kraslava, Ludza, Livani and Ilukste), Group 3 – where an increase was close to the average for Latgale region (Daugavpils, Cibla, Dagda, Preili, Varkava and Vilaka), Group 4 – where an increase was above the average for Latgale region (Rezekne) and Group 5 with the municipalities with a considerable increase (Karsava and Riebini). According to the data, excellent performance was demonstrated by only three municipalities – Rezekne, Karsava and Riebini.

The second aspect to be assessed is efficiency. In view of the ratio of increase in the number of employees to increase in net turnover, it has to be pointed out that the three mentioned leading municipalities – Rezekne, Karsava and Riebini – did not demonstrate an increase in economic efficiency, as the net turnover increase was lower than an increase in the number of employees in two of them (Karsava and Riebini).

In general, a comparison of the increases in the number of employees and in net turnover in the KBE segment reveals efficiency-oriented growth, as a larger increase in net turnover at a smaller increase in the number of employees was reported in seven municipalities, and in two cases an increase in net turnover occurred at a decrease in the number of employees. This means that in 9 out of 19 municipalities of Latgale region, economic growth in the KBE segment in rural areas could be called efficient. However, the acquired results regarding growth in the KBE segment have to be analysed in connection with the Smart Development Index, as a similar trend in the KBE segment was observed in the municipalities of various smart development levels. In Latgale region, for example, no growth in the KBE segment was reported in Baltinava municipality, which was ranked seventh (2.857) in the Smart Development Index and Zilupe municipality, which was ranked last in the SDI.

The acquired results allow concluding that no strong causal relationship between growth in the KBE segment and a rank in the Smart Development Index was observed. It is a quite logical outcome, even despite the experts' opinions on the essential role of the dimension *Economy* in smart development in rural areas in Latgale region, as a relationship between this dimension and the Smart Development Index in Latgale region was weak in comparison with that in the other regions (Šipilova *et al.*, 2017).

Overall, one can note that there were positive trends in the KBE segment in the rural territories of Latgale region, and the next step aimed at contributing to smart development in the region should be associated with, on the one hand, more efforts to engage residents in economic activity and, on the other hand, achieving higher efficiency; besides, this process has to be quite homogenous across the municipalities within the segment.

An analysis of the groups of municipalities showed that a higher level of activity could be observed in the municipalities with a lower development level and diverse growth paces, and a particularly positive fact is that this trend was observed even in sparsely populated municipalities (see *Table 10*).

In the group of municipalities with a high development level but a low growth rate, which includes four municipalities (Kraslava, Livani, Preili and Ludza), KBE segment growth (according to enterprise data) was below the average for Latgale region, although it was significant and ranged from +50% in Kraslava municipality to +100% in Preili municipality. An analysis of economic efficiency in terms of increase in the number of employees and net turnover allows concluding that the KBE segment grew differently across the municipalities of this group. For example, the highest growth was reported in the municipalities of Kraslava and Ludza where an increase in net turnover was similar to that in the number of employees. On the other hand, one could note a positive trend in employment. For example, the number of individuals employed in the KBE segment in Livani municipality rose by +133.33%, which was two times higher than the average for Latgale region.

Table 10. KBE segment growth in the municipalities of Latgale region by growth rate and by development level in the period 2009-2015, %

(I) LOW RATE	(II) RATE BELOW AVERAGE	(III) RATE ABOVE AVERAGE	(IV) HIGH RATE
High development level			
Municipalities: Kraslava <i>Enterprises</i> +50.00 <i>Employees</i> – 4.18 <i>Net turnover</i> +8.79	Municipalities: Balvi <i>Enterprises</i> +50.00 <i>Employees</i> +29.90 <i>Net turnover</i> +85.03	Municipalities: Daugavpils <i>Enterprises</i> +94.44 <i>Employees</i> – 16.07 <i>Net turnover</i> – 51.61	Municipalities: Varkava <i>Enterprises</i> +100.00 <i>Employees</i> +20.00 <i>Net turnover</i> +130.40
Municipalities: Livani <i>Enterprises</i> +69.57 <i>Employees</i> +133.33 <i>Net turnover</i> +95.27	Municipalities: Rugaji <i>Enterprises</i> – 50.00 <i>Employees</i> +85.71 <i>Net turnover</i> +602.41		
Municipalities: Preili <i>Enterprises</i> +100.00 <i>Employees</i> – 18.50 <i>Net turnover</i> – 16.28	Municipalities: Ilukste <i>Enterprises</i> +75.00 <i>Employees</i> +17.46 <i>Net turnover</i> +59.14		
Municipalities: Ludza <i>Enterprises</i> +55.56 <i>Employees</i> – 12.41 <i>Net turnover</i> +12.74			
Low development level			
Municipalities: Baltinava <i>Enterprises</i> 0.00 <i>Employees</i> 0.00 <i>Net turnover</i> 0.00	Municipalities: Dagda <i>Enterprises</i> +100.00 <i>Employees</i> +128.57 <i>Net turnover</i> +130.20	Municipalities: Cibla <i>Enterprises</i> +100.00 <i>Employees</i> +200.00 <i>Net turnover</i> +1247.18	Municipalities: –
Municipalities: Rezekne <i>Enterprises</i> +121.43 <i>Employees</i> +75.00 <i>Net turnover</i> +146.37	Municipalities: Karsava <i>Enterprises</i> +333.33 <i>Employees</i> +70 <i>Net turnover</i> +55.62	Municipalities: Zilupe <i>Enterprises</i> 0.00 <i>Employees</i> 0.00 <i>Net turnover</i> 0.00	
Municipalities: Riebini <i>Enterprises</i> +600.00 <i>Employees</i> +366.67 <i>Net turnover</i> +168.79	Municipalities: Aglona <i>Enterprises</i> +33.33 <i>Employees</i> +37.50 <i>Net turnover</i> +86.97		
Municipalities: Vilaka <i>Enterprises</i> +100.00 <i>Employees</i> +100.00 <i>Net turnover</i> +100.00			
Municipalities: Vilani <i>Enterprises</i> -10.00 <i>Employees</i> +42.31 <i>Net turnover</i> +30.02			

Source: own compilation based on EKOSOC-LV data; SRDA, 2010, 2011, 2012; RDIM, 2015.

It has to be noted that the municipalities with higher KBE segment growth (Rugaji, Riebini and Cibla) belonged to the group with low growth rates and the smallest populations. This finding has to be viewed from two aspects: first, it is a positive fact that sparsely populated rural areas experienced strong KBE segment growth; second, it has to be also mentioned that

despite the KBE segment growth, the growth rates were low in these municipalities. However, weaker KBE segment growth in the groups of municipalities with larger populations and stronger growth has to be mentioned as a negative trend.

Conclusions

1. The most important regional development problem, which is typical of the entire Latvia, is the significant disparities in socio-economic development levels among regions nationally and municipalities not only nationally but also regionally.

2. Latgale region is the least developed region in Latvia. The EKOSOC.LV research results identified a *resident-focused scenario* as the most important one because an important factor for sustainable development is the attraction and retention of residents and the use of their potential in municipalities and in the entire region.

3. Despite the problems of infrastructure and depopulation in Latgale region, an increase in entrepreneurial activity occurred owing to the activity of residents, smart governance and knowledge-based entrepreneurial potential.

4. The analysis of KBE segment growth by group of municipalities, taking into consideration the development level, growth rates and the number of residents, revealed that there was a weak causal relationship between the Smart Development Index and the KBE segment growth in the rural territories of Latgale region, yet the analysis allowed identifying the potential for further KBE segment growth in the rural territories of Latgale region.

Acknowledgement

The authors are thankful to the Latvian National Research Program 5.2. 'Economic Transformation, Smart Growth, Governance and legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)'. The research was conducted within the Project 5.2.3. 'Processes of Latvian rural and regional development and possibilities within the framework of economy' of the EKOSOC-LV.

References

- Arcelus, FJ, Arocena, P., Cabases, F., Pascual P. (2015). On the Cost-Efficiency of Service Delivery in Small Municipalities. *Regional Studies*, 49(9), 1469-1480.
- Álvarez, M. J., Fernández, R. I., Romera, R. (2014). Is eco-innovation a smart specialization strategy for andalusia? One approach from the multivariate analysis (Es la eco-innovación una estrategia in-teligente de especialización para Anda-lucía? Una aproximación desde el análi-sis multivariante). *Revista de Estudios Regionales*, 100, 1 May 2014, 171-195.
- Bachtler, J, Martins, J. O, Wostner, P., Zuber, P. (2017). Towards Cohesion Policy 4.0: Structural Transformation and Inclusive Growth RSA Europe. Brussels. *Regional Studies Association*, 86 p.
- Casado, H. (2014). How to boost innovation from public administration. (Cómo impulsar la innovación desde la Administración Publica). *Revista de Obras Publicas*, 161(3550), 31-34.
- Chmielewska, B., Horváthová, Z. (2016). Policy levelling economic and social inequalities between rural and urban areas. *Journal of International Studies*, 9(2), 103-111.

- Copus, A., Noguera, J. (2010). A Typology of intermediate and Predominantly Rural NUTS 3 Regions. The ESPON 2013 Programme Applied Research Project 2013/1/2. EDORA (European Development Opportunities for Rural Areas). Version 4, 17 September 2010. CSP [Data of Central Statistical Bureau of Latvia]. Retrieved during the June-August, 2017, from <http://data.csb.gov.lv>.
- Di Leo, S., Salvia, M. (2017). Local strategies and action plans towards resource efficiency in South East Europe. *Renewable and Sustainable Energy Reviews*, 68, 286-305.
- European Commission (2012). *Connecting Smart and Sustainable Growth through Smart Specialization*. A practical guide for ERDE managing authorities.
- European Union. General Directorate for Regional Policy (2011). Cities of Tomorrow – Challenges, Visions, Ways Forward. Retrieved July, 12, 2017, from http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/citiesoftomorrow/citiesoftomorrow_final.pdf, DOI:10.2776/41803.
- Eurostat, 2008-2010. *Seventh Community Innovation Survey: Highest proportions of innovative enterprises in Germany, Luxembourg and Belgium*. Retrieved July, 20, 2017, from http://europa.eu/rapid/press-release_STAT-13-5_en.htm.
- ESPON (2013). *Programme Applied Research Project 2013/1/2. EDORA (European Development Opportunities for Rural Areas)*. Version 4. Retrieved July 7, 2017, from http://www.nordregio.se/Global/Research/EDORA/EDORA_2.22.pdf.
- GDP at regional level. Retrieved 7 July 2017 from http://ec.europa.eu/eurostat/statistics-explained/index.php/GDP_at_regional_level#Regional_GDP_per_capita.
- Jermolajeva, E., Cingule-Vinogradova, S. (2012). Potential of Latgale Region and Directions of the Development. 'Economic Science for Rural Development' *Proceedings of the International Scientific Conference. Integrated and Sustainable Development*, No.27.
- Habánik, J., Kordoš, M., & Hošták, P. (2016). Competitiveness of Slovak Economy and Regional Development Policies. *Journal of International Studies*, 9(1), 144-155.
- Kreslins, K., Stefenberga, D. (2016). Analysis of Kurzeme region development in the context of smart specialization strategy: Preliminary results. *Engineering for Rural Development, 2016*, January, 1224-1229.
- Latvijas reģionu ekonomikas attīstības perspektīvas un virzieni 2010.-2011. Autoru kolektīvs Latvijas Zinātņu akadēmijas Ekonomikas institūts, 303 lpp. Retrieved July 13, 2017, from http://www.varam.gov.lv/lat/publ/publikacijas/reg_att/?doc=13880.
- Latgales plānošanas reģions. Retrieved June 12, 2017, from <https://lpr.gov.lv/lv/padome-12f3/#.Wa1ToPNJbIU>.
- Latgales programma 2010-2017 (2010a). Rīcības programma, 97 lpp. Retrieved June 12, 2017, from https://lpr.gov.lv/wp-content/uploads/2011/lpr-planosanas-dokumenti/Latgales-programma_01.12.2010_apstipr.LPR.pdf.
- Latgales stratēģija 2030 (2010b). 20 lpp. Retrieved June 12, 2017, from https://lpr.gov.lv/wp-content/uploads/2011/lpr-planosanas-dokumenti/Latgales_strategija_2030_apstiprinata_01.12.2010.pdf.
- Lursoft (Database of enterprises in Latvia), www.lursoft.lv.
- McCann, P. and Rodriguez-Pose, A. (2011). 'Why and When Development Policy Should Be Place-Based?' *OECD Observer* 14. 2011: Building Resilient Regions for Stronger Economies, 203-213.
- Melbarde, V., Ore, M. (2016). Influencing factors of rural areas development: Vidzeme region case analysis. *Proceedings of the New Challenges of Economic and Business Development*, 484-495.
- Molavi, J., Shapoorian, B. (2013). Sustainable infrastructure: A framework for sustainable municipality. *ICSDEC 2012: Developing the Frontier of Sustainable Design*,

- Engineering, and Construction – Proceedings of the 2012 International Conference on Sustainable Design and Construction, pp. 335-342.
- Naldi, L., Nilsson, P., Westlund, H., & Wixe, S. (2015). What is smart rural development? *Journal of Rural Studies*, 40, 90-101. doi: <http://doi.org/10.1016/j.jrurstud.2015.06.006>.
- Partridge, MD, Rickman, DS, Olfert, MR, Tan, Y. (2015). When Spatial Equilibrium Fails: Is Place-Based Policy Second Best? *Regional Studies*, 49(8), 1303-1325.
- Pašvaldību budžeta kapacitātes rādītāja aktuālās vērtības. Valsts Reģionālās attīstības aģentūra, Retrieved August 4, 2017, from <http://www.vraa.gov.lv/lv/publikacijas/pbkr>.
- Reģionālās politikas pamatnostādnes 2013.-2019.gadam (informatīvā daļa) (2013.), Rīga, p. 5 (pp. 95).
- Rutkauskas, A. V., Raudeliuniene, J., & Racinskaja, I. (2014). Integral Knowledge, Innovation and Technology Cluster Formation Nurturing the Universal Development Sustainability in the Context of Globalization. *Economics and Sociology*, 7(4), 41.
- Saaty, TL (1990). *The analytic hierarchy process*. McGraw Hill, New York.
- Sandu, A.-M. (2014). Coordinates of the new EU rural development policy. *Quality – Access to Success*, 15(SUPPL.1), 463-465.
- Sinkiene, J., Grumadaite, K., & Liugailaite-Radzvickiene, L. (2014). Diversity of theoretical approaches to the concept of smart city. Proceedings of the 8th International Scientific Conference Business and Management 2014, 15-16 May 2014 (pp. 933-940). Vilnius Gediminas Technical University, Lithuania. DOI: 10.3846/bm.2014.112.
- Smart cities Ranking of European medium-sized cities (2007). Final report, October 2007. Retrieved August 10, 2017, from http://www.smart-cities.eu/download/smart_cities_final_report.pdf.
- State Regional Development Agency (SRDA) (2010). Development of Regions in Latvia 2009. Annex 4: Development Indexes of the Planning Regions and Administrative Territories Existing since July 1, 2009. Available: http://www.vraa.gov.lv/uploads/Development_of_Regions_2009.pdf.
- State Regional Development Agency (SRDA) (2011). Development of Regions in Latvia 2010. Annex 2: Planning Region, Republican City and Novads Territory Development Indexes. Retrieved August 10, 2017, from http://www.vraa.gov.lv/uploads/Development_of_Regions_in_Latvia_2010_web_ENG.pdf.
- State Regional Development Agency (SRDA) (2012). Development of Regions in Latvia 2011. Annex 2: Territorial Development Indices of Planning Regions, Cities and Municipalities. Retrieved August, 17, 2017, from http://www.vraa.gov.lv/uploads/regionu%20parskats/Regionu%20attistiba%20Latvija%202011%20ENG_Q_ia%20kartes%20horizontali.pdf.
- Steiner, M., & Mossbock, J. (2014). How “smart” are rural areas? A case study approach. RSA Winter Conference 2014, 27-28 November 2014, London, UK. Retrieved 20 July 2016, from http://www.regionalstudies.org/uploads/funding/conferences/presentations/Winter_2014_Presentations_/Michael_Steiner_and_Johannes_Mossb%C3%B6ck.pdf.
- Šipilova, V., Ostrovska, I., Aleksejeva, L., Jermolajeva, E., Oļehnovičs, D. (2017a). A Review of the Literature on Smart Development: Lessons for Small Municipalities. *International Journal of Economics and Financial Issues*, 2017, 7(1), 460-469.
- Šipilova, V., Ostrovska, I., Jermolajeva, E., Aleksejeva, L., Oļehnovičs, D. (2017b). Evaluation of Sustainable Development in Rural Territories in Latgale Region (Latvia) by Using the Conception of Smart Specialisation. *Journal of teacher Education for Sustainability*, 19(1), 82-105, DOI: 10.151/jtes-2017-0006.
- Šipilova, V., Aleksejeva, V., Ostrovska, I. (2016). Testing the Approaches of Regional Development in Small Municipalities. *IBIMA Publishing Journal of Eastern Europe*

- Research in Business & Economics*, <http://www.ibimapublishing.com/journals/JEERBE/jeerbe.html> Vol. 2016, Article ID 677185, 17 pages DOI: 10.5171/2016.677185 <http://ibimapublishing.com/articles/JEERBE/2016/677185/>.
- Straka, J., Birčiaková, N., Stávková, J. (2015). Impact of SMEs on Standards of Living of Czech Rural Households. *Economics and Sociology*, 8(4), 51-64
- Territory Development Index. State Regional Development Agency Republic of Latvia. <http://www.vraa.gov.lv/en/reasearch/>.
- Valsts pētījumu programma 5.2. „tautsaimniecības transformācija, gudra izaugsme, pārvaldība un tiesiskais ietvars valsts un sabiedrības ilgtspējīgai attīstībai – jaunas pieejas ilgtspējīgas zināšanu sabiedrības veidošanai (EKOSOC-LV)” (2014). Retrieved June 18, 2017, from http://www.lza.lv/index.php?option=com_content&task=blogcategory&id=249&Itemid=443.
- Vanthillo, T., & Verhetsel, A. (2012). Paradigm change in regional policy: Towards smart specialisation? Lessons from Flanders (Belgium). *Belgeo*, 1-2 (2012), Inaugural Issue. Retrieved 13 April 2016, from <https://belgeo.revues.org/pdf/7083>. DOI: 10.4000/belgeo.7083.
- Zvirbule, A., Rivza, B., Bulderberga, Z. (2016). Determinant Factors for the Formation and Development of a Smart Territory. Springer Nature Singapore Pte Ltd. 2017 E. Lau et al. (eds.), Selected Papers from the Asia-Pacific Conference on Economics & Finance (APEF 2016), 53-63, DOI: 10.1007/978-981-10-3566-1_5.