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COMPARATIVE ANALYSIS OF SMART DEVELOPMENT OF TERRITORIES: THE EXAMPLE OF DAUGAVPILS AND ILUKSTE MUNICIPALITY

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Abstract. Today, the development of a region is characterized by a paradigm shift, as regional growth should be analysed based on the preconditions of sustainable and smart growth, i.e. sustainability, knowledge and interaction among the stakeholders involved in regional development. A region's smart growth, based on knowledge and innovation, is considered to be a driving force for an area's growth. However, the development of an area has to occur in a prudent way, without endangering future generations' opportunities, and combining three dimensions: environmental, economic and social, thereby causing sustainable growth, promoting resource efficiency, reproducing resources and building a more competitive economy. Innovative regional development strategies employ the concept of smart specialization, assuming that the characteristics that ensure the development of a region's competitive advantages have to be identified and made use of. Smart specialization means innovation-oriented growth and identification and development of an area's potential, which contributes to the region's competitiveness.

The research compared smart development between the municipalities of Daugavpils and Ilukste based on a methodology and an index designed and findings made under the national research programme EKOSOC-LV, project 5.2.3 Rural and Regional Development Processes and Opportunities in the Knowledge Economy Context, as well as within the project Challenges for the Latvian State and Society and the Solutions in International Context (INTERFRAME-LV).

Key words: region, area, smart growth, smart specialization.
JEL code:.

Introduction

People want to live in a space that is friendly to society and each individual. The wellbeing of the population requires jobs, good living conditions, an active cultural life and a beautiful and tidy environment. Ensuring the wellbeing of society and eradicating poverty is a guideline for regional development and one of the key objectives at regional and national level, thereby creating favourable changes in the social and economic situation in the whole territory of the country or in some parts thereof. After identifying the specific needs of and development potential for an area, regional development support measures should be designed accordingly in order to promote the creation of equal social and economic preconditions in the entire territory of the country. This is because the development of and growth opportunities for areas differ even within one region due to certain factors. In addition, the socio-economic situation in various areas differs owing to monocentric development that concentrates all growth opportunities in one location. This creates disparities in the level of development across regions, and the viability of rural areas has to be considered as urban areas tend to develop fast.

The legal framework of the Republic of Latvia stipulates that it is necessary to promote and ensure balanced and sustainable national development, taking into account the specifics of and opportunities for the whole area and its parts, reduce unfavourable disparities among them, as well as preserve and develop the natural and cultural characteristics of and development potential for each area. The research intends to give insight into relevant trends in two rural areas of Latvia – the municipalities of Daugavpils and Ilukste.

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Role of smart specialization in regional development

Regional development is a continuous process of short- or long-term social, cultural or demographic developments that make certain spatial effects or cause spatial consequences that arise from the implementation of decisions of individuals, households, enterprises, national and international institutions. Many of the decisions are driven by different interests and are not always linked to regional development. Therefore, regional growth is always spontaneous and unbalanced, as the locations of human and natural resources, as well as infrastructures, differ from area to area. This leads to discussions on regional development assessment mechanisms and the development assessment indicators employed (Capello, 2015).

In recent years, smart specialization has become a guideline for the economic development of any particular area and growth policy or the way of thinking in European circles. The European Commission emphasizes the importance of smart specialization as one of the key factors referred to in the Europe 2020 strategy, which was discussed in the last Communication on the Europe 2020 strategy in relation to the Innovation Union initiative. The conception particularly emphasizes the reform of European cohesion policy, which is currently based on "smart growth", "green growth" and "inclusive growth", as a key element of development. To take advantage of future opportunities, three types of abilities are required: (1) the ability to identify strengths; (2) the ability to coordinate political actions and build critical mass; (3) the ability of any region to create a vision and implement a strategy (Rivza, 2018).

Theoretical aspects of smart development and research approaches

Smart development means consolidating knowledge and increasing innovation, which is the driving force for future growth. It has to raise the quality of education, increase the effect of research results, foster innovation and knowledge transfer across the European Union, make full use of information and communication technologies and ensure that innovative ideas are turned into new products and services that create growth and high-quality jobs and help to deal with global societal challenges. However, to be successful, it has to be combined with business and finance while focusing on user needs and market opportunities (Rivza, 2018).

Focusing on regional disparities in regional intelligence that is called inspiration and determined by the availability of human capital and the development of technological infrastructure, creative workers are considered to be a key element of regional innovation. According to research findings by L. Sleuagens and P. Boiardi, the innovative performance of a region is influenced by the availability of human capital and a well-developed institutional system supporting entrepreneurship, as well as the activities of individuals with higher education taking creative positions and engaged in creative fields (high-tech industries as well as culture) (Sleuwaegen, Boiardi, 2014). L. Sleuagens and P. Boiardi suggest focusing not only on improving the entrepreneurial environment and attracting investment but also on implementing the most appropriate regional innovation policy and instruments for the region (Ostrovska, Sipilova, Aleksejeva, Jermolajeva, Oļehnovics, 2016).

There are common trends in rural development in Europe in relation to the diversification of economic activities, the migration of population and labour away from the outermost and economically weaker regions and the political concentration of resources. Rural areas need to take into account the mentioned macro-level processes and, at the same time, take advantage of micro-level specific opportunities related to both tangible factors (e.g. raw material resources, landscape, physical infrastructure) and intangible factors (e.g. knowledge and skills of local people, business

culture, governance). It is interesting that employing the EDORA cube – a 3 dimensional framework for analysis – reveals that the rural areas of Latvia's regions reflect certain disparities. For example, Riga and Zemgale are sparsely populated but well-accessible regions, while Vidzeme is both sparsely populated and poorly accessible. The population density of Latgale and Kurzeme rural areas is similar, yet among the regions the internal accessibility of Latgale is rated higher. However, since regional competitiveness is also affected by the other two dimensions and the economic performance of the regions of Riga and Kurzeme is higher, the situation in the rural areas of Vidzeme and Latgale is less favourable, and the rural areas of the regions could still be rated as less competitive (Rivza, 2018a).

In 2014, the national research programme EKOSOC-LV was implemented in order to create a knowledge base on sustainable development processes in the state and society by doing interdisciplinary scientific research and a theoretical basis for sustainable development strategies and policies. Under the programme, research was done on current developments in economics, demography, government, law, regional development, environmental protection and other areas, with a special focus on economic transformation, innovation processes and environmental conservation (Latvian Academy of Sciences, 2014).

The goal of project 5.2.3 Rural and Regional Development Processes and Opportunities in the Knowledge Economy Context of the national research programme EKOSOC-LV was to assess rural and regional development processes and opportunities in Latvia in the context of a knowledge economy and design a strategy for further development of rural areas as a systemic component on the way towards a smart regional economy. Project 5.2.3 researchers, based on a number of European research studies, have identified the characteristics of a smart region and divided them into four categories: a smart population, smart governance, a smart economy and smart use of resources. The project created a unique database, which contains data on the number of enterprises operating in all the municipalities of Latvia, the kinds of economic activity the enterprises are engaged in, their turnover and number of employees, road infrastructure and many other indicators. Based on the indicators, the researchers have identified the municipalities where the indicator values were higher than the national average.

In the course of the project, an innovative indicator was developed – the municipality smart development index (Rivza, 2018b). Next, the authors performed a comparative analysis of two municipalities of Latvia – Daugavpils and Ilukste – by using the methodology developed and findings made in the above-mentioned project.

Comparative analysis of smart development of Daugavpils and Ilukste municipalities

Daugavpils municipality is the 4th largest municipality in Latvia (by area) and the 13th largest municipality in Latvia (by population). The area of Daugavpils municipality is 1 872.39 km^2. On 1 January 2018 in Daugavpils municipality, the workforce totalled 15 658 working-age individuals, most of which were men. The over-working-age population was larger than the under-working-age population, which indicated negative natural population growth. The largest rural territory (civil parish) in terms of area was Demene, yet by population – Naujene. In terms of area, Daugavpils municipality with 19 rural territories was larger than Ilukste municipality with six rural territories and two towns. As regards population density, there was a slight difference between the municipalities because in terms of area, Ilukste municipality was two times smaller.

In Ilukste municipality, the total population was 7131, of which: 4614 were at working age, 1713 were over working age and 804 were under working age. The total area was 648.40 km^2.Ilukste municipality lies next to Daugavpils municipality. The research analysed smart development in the two neighbouring municipalities as well as compared the smart development index values and the constituent component values of the index for the municipalities and the advantages of the municipalities. The authors believe that comparative analysis should be applied to areas having at least equal preconditions, e.g. the development of a particular enterprise should be assessed through comparing enterprises within the same industry in order to determine whether the enterprises are efficient and competitive. That is why, based on the data obtained by the project EKOSOC-LV on the development of smart territories, smart development in Daugavpils municipality was compared with that in Ilukste municipality. According to the modern paradigm of regional development, one of the most important drivers of development is the individual (Jermolajeva, Aleksejeva, Ostrovska, Sipilova 2018). Therefore, it is important to examine population density in both municipalities.

Table 1

Population density in Daugavpils and Ilukste municipalities in 2018

Municipality	Population density (inhab./km^2, RDIM data)		
	2016	2017	2018
Daugavpils	13.27	12.82	12.41
Ilukste	12.42	12.03	11.63

Source: authors' calculations based on RDIM (Regional Development Indicator Module) data

Overall, there was a decrease in population density in both municipalities because the municipalities experienced negative natural population growth, which was aggravated by the consequences of migration.

Table 2

Four ranges of growth pace and population size for Latgale region municipalities

(I) SLOW PACE	(II) BELOW AVERAGE PACE	(III) ABOVE AVERAGE PACE	(IV) FAST PACE
population (thou.)			
1112-7686	7686-14256	14256-20826	20826-27396
Municipality: Aglona Baltinava Cibla Rugaji Varkava Zilupe Riebini Vilaka Karsava Ilukste Vilani	**Municipality:** Balvi Dagda Ludza Livani Preili	**Municipality:** Kraslava	**Municipality:** Daugavpils Rezekne

Source: EKOSOC-LV data, RDIM data

The researchers of the EKOSOC-LV Latgale region working group divided Latgale region municipalities by pace of regional development and by population. Most municipalities, i.e. 11 out of 19, had a small population, ranging from 1112 to less than 7682 people. Most of the municipalities represented rural areas, and only three municipalities had a population of above 14 256 and an above-average pace of development: Kraslava, Daugavpils and Rezekne. A causal relationship is observed – more densely populated areas have a better opportunity of achieving a higher pace of development. Conversely, less densely populated areas perform poorly, with a low pace of

development or a pace of below the average, as well as stagnation is observed there – as it is in Ilukste municipality. An expert evaluation, employing the AHP, confirmed that the leading scenario for smart development in Latgale as well as in each individual municipality has to target the population. The smart development index, which encompasses all the dimensions capturing the development of a region (resources, population, the economy and governance), allows identifying new trends in development in Latgale region (Jermolajeva, Aleksejeva, Ostrovska, Sipilova 2018).

Natural resources are considered to be one of the greatest assets of any area; therefore, sustainable and efficient management of resources serves as a guideline for successful economic development. Within the project, smart resources are defined as efficient exploitation and management of natural and other resources.

Table 3

Comparison of smart resource dimension indicators for Daugavpils and Ilukste municipalities

Indicators	Daugavpils municipality	Ilukste municipality
UAA, %	0.79	0.89
Forest area, %	0.34	0.38
Mineral resources, thou.m^3	6661.67	116.18
RSS-administered support per 1000 capita, EUR	55 932 060	11 688 011
Road network, km.km^2	0.82	1.09

Source: authors' calculations based on EKOSOC-LV data

The indicators of the resource dimension are intended for capturing the situation with utilized agricultural land (UAA). The intensity of use of this resource determines whether the resource is used efficiently. It has been observed that in Daugavpils and Ilukste municipalities this resource is particularly important. Compared with Daugavpils municipality, Ilukste municipality has a larger area of natural resources to be managed. This could be explained by the fact that the most important industries in the municipalities are mostly agriculture and forestry.

The smart population dimension shows not only the level of qualification or education of the population but also the quality and quantity of social interaction in the context of municipal non-governmental organizations (NGOs). This aspect was recognized by the EKOSOC-LV experts as one of the most important one in terms of growth and development (Jermolajeva, Aleksejeva, Ostrovska, Sipilova 2018).

Table 4

Comparison of smart population dimension indicators for Daugavpils and Ilukste municipalities

Indicators	Daugavpils municipality	Ilukste municipality
Proportion of population with tertiary education, %	11.7	14.1
Employment in primary sector, %	9.25	14.03
Long-term unemployment rate, %	51.88	47.84
NGOs per 1000 capita	5.7	5.3

Source: authors' calculations based on EKOSOC-LV data

The smart development index for Daugavpils municipality was -0.402. Daugavpils municipality had a high development level, and its pace of development was above the average. For the municipality, an association with the population dimension was stronger, which was mainly characteristic of municipalities with a negative smart development index value. There was an indication that residents as a significant component of smart development were not of sufficient quality and quantity.

A smart economy is characterised by indicators of innovative entrepreneurship in knowledge-intensive service industries as well as in high and medium-high technology industries (Jermolajeva, Aleksejeva, Ostrovska, Sipilova 2018).

Table 5

Comparison of smart economy dimension indicators for Daugavpils and Ilukste municipalities

Characteristics	Indicators	Daugavpils municipality	Ilukste municipality
Characteristics of innovative enterprises	Number, %	8.55	12.12
	Turnover, %	1.73	4.15
	Number of employees, %	5.08	17.31
	Turnover per employee, EUR	11241	11453
Self-employment per 1000 capita		22.96	31.84

Source: authors' calculations based on EKOSOC-LV data

As shown in Table 5, the situation with the number of innovative enterprises was better in Ilukste municipality, which also improved other dimension indicators. One of the most important indicators of economic activity is the number of self-employed individuals per 1000 capita, which was also higher in Ilukste municipality than in Daugavpils municipality. Overall, the indicators of the smart economy dimension for Ilukste municipality were higher than those for Daugavpils municipality.

Political participation, assessment of the quality of services by citizens and administrative performance are part of smart governance. The indicators chosen were as follows: EU funding allocated; voter turnout in local elections; changes in the Latvian e-index: the index captures data and indicators on how actively, under the current circumstances, local governments use the solutions offered by modern information and communication technologies to improve the quality and accessibility of services for citizens and enterprises; and Internet coverage (Jermolajeva, Aleksejeva, Ostrovska, Sipilova 2018).

Table 6

Comparison of smart governance dimension indicators for Daugavpils and Ilukste municipalities in 2017

Indicators	Daugavpils municipality	Ilukste municipality
ES funding for development, EUR per 1000 capita	469 777.49	575 357.67
EU funding for agriculture, EUR per 1000 capita	15 368 288.33	6 367 487.83
Voter turnout, %	36.18	47.94
Change in the e-index, %	47.36	43.23
Internet coverage, zones	1	1

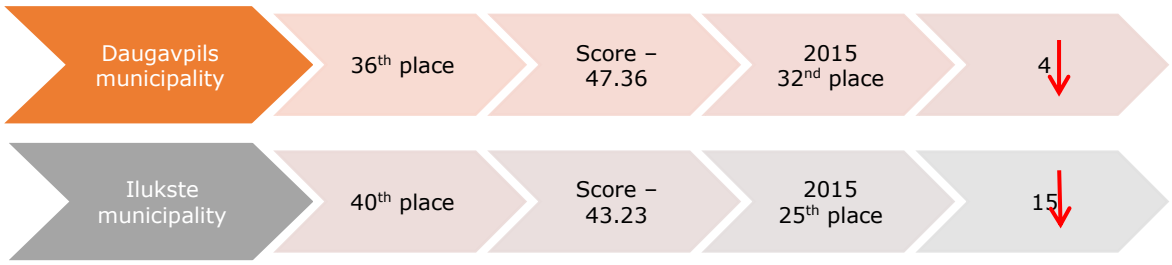
Source: authors' calculations based on RDIM data, Central Election Commission data, e-index

In order to ensure balanced development in the territory of Daugavpils municipality, investments were attracted to and projects were implemented in the municipality in accordance with the policy documents of the municipality, incl. the Investment Plan of the Development Programme for Daugavpils municipality (Daugavpils novada attistibas programma 2012.-2018. gadam). The ESF funding allocated and drawn down for development was larger in Ilukste municipality than in Daugavpils municipality, although, according to the territorial development index, which is used in designing national support programmes for regional development, differentiating the financial support provided by the EU Funds and assessing the effects of financial instruments on the development and economic efficiency of territories, Ilukste municipality was ranked 92nd.

One of the factors of the governance dimension is voter turnout in a territory, which determines whether the municipality has an inclusive administration, or how actively the residents of the

municipality participate in the governance system. In 2017, Daugavpils municipality had 17 060 residents with the right to vote, who were able to decide the future administrative prospects for their municipality, be active and get involved in the administration of their municipality. Voter turnout in Daugavpils municipality was relatively low, only 36.18 % of the total number of eligible residents of the municipality.

The Latvian e-index is an assessment of the e-environment in public administration institutions and local governments. It gives insight into how actively, under the current circumstances, institutions and local governments use the solutions provided by modern information and communication technologies to contribute to the quality and accessibility of the services provided to the population and businesses. The Latvian local government e-index captures the practices implemented by local governments in the field of e-government and e-environment. Participation in the measurement of the practices implemented by local governments is voluntary, and the local governments could use the index to identify their situation, compare what has already been achieved with the performance of other local governments, as well as be inspired by the best practices implemented (Latvijas e-indekss 2018).



Source: authors' construction based on the Latvian e-index

Fig. 1. **Total e-index values for Daugavpils and Ilukste municipalities in 2017**

Figure 1 shows total e-index values for Daugavpils and Ilukste municipalities and the rankings of both municipalities among municipalities with a population of more 7000. The score is an arithmetic mean of the ratings of the e-environment infrastructure, population e-skills, the availability and use of e-services and the convenience and security of computer systems in the municipality.

Summary of smart development trends and proposals

Smart resource dimension. The Sustainable Development Strategy of Daugavpils Municipality for 2015-2030 stipulates that the economic specialization of Daugavpils municipality is based on the following industries: agriculture; forestry and fisheries; mining and quarrying; tourism and recreation; freight transport; and green energy (Daugavpils novada ilgtspejigas attistibas strategija 2015.-2030. gadam). The Sustainable Development Strategy of Ilukste Municipality for 2013-2030 prescribes the economic specialization of Ilukste municipality is based on the following industries: agriculture, especially organic farming; wood processing; and tourism (Ilūkstes novada ilgtspejigas attistibas strategija 2013.-2030. gadam). The strategy makes a proposal: the future prospects of traditional agriculture should be linked to organic farming and the production of organic products in line with the principles of smart development.

Smart population dimension. The Sustainable Development Strategy of Daugavpils Municipality for 2015-2030 states that the driving forces of development are skilled, enterprising as well as socially and economically active. They are innovative, creative-minded residents who would create the development of the region Daugavpils novada ilgtspejigas attistibas strategija 2015.-2030. gadam. The Sustainable Development Strategy of Ilukste Municipality for 2013-2030 states that the

most pressing problem to be tackled in the coming years is unemployment. Promoting the creation of new jobs, support for entrepreneurs and farmers and the development of manufacturing and tourism are essential to ensure the preservation of the population and the development of the municipality (Ilūkstes novada ilgtspejigas attīstības strategija 2013.-2030. gadam). The strategies should take into account that the key to long-term economic development of any territory is considered to be the interaction of science and the economy, which would result in a science-intensive model!

Smart economy dimension. The Sustainable Development Strategy of Daugavpils Municipality for 2015-2030 states that the specialization and economic breakthrough of Daugavpils municipality is based mostly on agriculture, forestry, fisheries, mining etc., which contradicts the Development Programme of Daugavpils Municipality for 2012-2018 prioritizing an innovative and eco-efficient economy focusing on mass creativity and innovation (Daugavpils novada ilgtspejigas attistibas strategija 2015.-2030. gadam; Daugavpils novada attistibas programma 2012.-2018.gadam). A comparison of the indicators of dimension showed that the indicators of Ilukste municipality were higher than those of Daugavpils municipality. In Daugavpils municipality, the knowledge-based economy segment should be significantly developed, which includes high-tech and medium-high-tech industries and knowledge-intensive services. An innovative, knowledge-based economy would create high-tech and medium-high technology and knowledge-intensive services, increasing the value added for the growth of the municipality.

Smart governance dimension. The municipalities need to introduce and improve information and communication technologies and related services. The information technology environment is an essential element for the smart development of the municipality, thereby promoting the expansion and efficiency of business and the use of innovations, developing high-tech and medium-high-tech enterprises and providing knowledge-intensive services to the residents of the municipality.

Conclusions

1) Smart development in Daugavpils and Ilukste municipalities was examined in more detail according to the project EKOSOC-LV methodology focusing on four dimensions of development – a smart population, a smart economy, smart resources and smart governance. It could be concluded that overall, the development of both municipalities was not in line with trends in smart development, which was confirmed by the smart development index and the Sustainable Development Strategies of Daugavpils and Ilukste municipalities, as the prospects for development were not oriented towards smart growth. The Sustainable Development Strategy of Ilukste municipality showed a greater observance of the principles of smart development than the Sustainable Development Strategy of Daugavpils municipality did, as Ilukste municipality had a higher territorial development index and a higher smart development index as well as its strategy emphasized smart development as a future prospect.
2) In essence, the development of the municipalities was focused on the traditional economic development pattern, yet it is necessary to create a science-intensive economic model, in which innovative and flexible management ensure the viability of Daugavpils municipality and Ilukste municipality as rural areas.

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