

RESOURCES OF ENVIRONMENT: ASPECTS OF SMART RURAL DEVELOPMENT

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Abstract. The precondition for a state sustainable development is growth of national economy, rational use of resources, and welfare of population, preservation of high quality environmental and cultural heritage. Smart growth of rural areas supports sustainable development, which is achieved by promoting research, innovation, and knowledge. Vidzeme Planning Region (VPR) is one of the five Latvia's planning regions, in which the authors of the long-term development plan have set the smart specialization fields to be developed to provide a balanced and sustainable development.

Analysis of local resources, their evaluation and proficient use contribute to the ability of businesses to implement creative ideas, to introduce new technologies and raise the competitiveness of the existing products, which are the key preconditions for regional development and the mission of smart specialisation.

The aim of this research was to carry out an evaluation of the available environmental resources in Vidzeme region and their exploitation in order to identify the unnoticed options for smart development of the region. For this reason, the authors carried out analysis of strategic planning documents, focus group interviews, grouping and analysis of data and information.

As the result, the authors identified the VPR potential and possibilities of utilization of environmental resources for the provision of smart development of the region. The theoretical and practical outcomes may be used for development of a joint smart environment concept and strategic planning documents.

Key words: resources of environment, smart environment, rural areas, smart development.

JEL code: R

Introduction

In 2010, the European Union adopted the notion "smart" in its new ten-year growth strategy *Europe 2020* stating that Europe should become a smart, sustainable, and inclusive economy. Smart growth supports sustainable development, which is achieved by promoting research, innovation, and knowledge (Naldi L., Nilsson P., Westlund H., Wixe S., 2016).

The main precondition for sustainable development is implementation of a balanced and polycentric country development model providing balanced development of the area, accessibility of services and growth of national economy. Balanced economic development of a country is possible only with economically strong regions (Melbarde V., Ore M., 2016).

Vidzeme Planning Region (VPR) is one of the five planning regions in Latvia, which is the largest by area according to the data of 2016 (15 220 km²) and the least populated (213 438 residents) (State Regional Development Agency, 2016). The region comprises 26 municipalities, 25 of which are counties and one city of national

importance (Vidzeme Planning Region, 2015). After assessment of competitive advantages of the area and its innovation potential, the development strategy makers have defined smart specialization spheres for VPR which should be developed to provide a balanced and sustainable development (Vidzeme Planning Region, 2015). Smart specialization resource analysis and implementation of smart specialization into practice plays a crucial role in this economic transformation process.

On the basis of the "EDORA Cube" methodology used in ESPON research (ESPO and UHI Millennium Institute, 2011), the researchers have identified the following sustainable and smart area development characteristics: smart economy, smart people, smart governance, smart mobility, smart environment, smart living, pointing out the influencing factors and indicators (Centre of Regional Science, 2007, Bulderberga Z., 2015). For in-depth analysis the authors have chosen a group of smart environmental factors as the search of wise balance between the economic

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development and requirements of environmental protection, estimation, effective and innovative use of the existing environmental resources promotes the ability of regional companies to create new products and raise the competitiveness of the existing ones, which is one of the most important preconditions for regional development and the mission of the smart specialization strategy (Vidzeme Planning Region, 2014).

The aim of this research was to carry out an evaluation of the available environmental resources in Vidzeme region and their exploitation in order to identify the unnoticed options for smart development of the region.

To reach the goal, the following objectives were set: to carry out an analysis of strategic documents and previous researches within the national and VPR environmental policy; to evaluate environmental resources of VPR and their smart exploitation; to elaborate recommendations for an implementation of development directions of smart environment in VPR.

To identify the goals of environmental policy development in Latvia and VPR, as well as the theoretical framework and characterising criteria of the concept "smart environment", initially the authors carried out the analysis of strategic documents and previous research on national and VPR development and environmental policy. It was found that the guidelines of environmental policy documents of Latvia have not defined the concept of "smart environment", as well as there is a lack of common performance indicator system for the goal assessment. On the basis of sustainable and smart development concept expressed in policy document guidelines, the authors propose their own definition of „smart environment“, which is the main scientific novelty in the research. In the context of definition the authors have identified the following main components of smart environmental resources: road and communications infrastructure,

available nature resources and their usage. Relevant statistical data has been chosen to characterize the smart features of the above (road network density, km/km²; forest cover, %; mineral reserves, thousand m³; proportion of cultivated agricultural land, % and financing of Rural Support Service, EUR). Considering that the indicator analysis offers only a general view of environmental resource potential and exploitation in VPR, but it apparently does not indicate the aspects of smart features, the authors carried out focus group interviews in Mazsalaca and Koceni counties in order to characterize the situation more completely and to identify the opportunities and problem areas. The chosen areas have strikingly different indicators of a development pace and level, as well as the location. In order to reach a more extensive view of smart development of the environment, employees of local municipalities, entrepreneurs and representatives of non-governmental organizations were invited to participate in the focus groups. To confirm the possibility of environmental resources exploitation in VPR according to implementation of smart specialization strategy, which provides a balanced and sustainable development of the region, the authors identify VPR examples of good practice in smart exploitation of environmental resources.

Research Results and Discussion

Sub-part 1. Assessment of Strategic Environmental Policy Documents

In 2010 Saeima of the Republic of Latvia adopted sustainable development strategy until 2030 for development of rural areas, which encouraged closer urban and rural interaction including recreation and living possibilities for the urban population; the development of high quality interconnecting transport infrastructure, in particular by improving the quality of roads, electronic communications and public infrastructure, thus creating an attractive living

environment in rural areas (Vidzeme Planning Region, 2015).

The strategy of sustainable management of natural values and services points out the following goal: "To be the EU leader in the preservation, growth and sustainable use of environmental capital." (Saeima of the Republic of Latvia, 2010). Whereas one of the directions in the Latvian National Development Plan 2014-2020 states: "Preserve environmental capital as a basis for sustainable economic growth and contribute to its sustainable use, reducing the natural and man-made risks to environment quality." (Cross-Sectoral Coordination Centre, 2012).

Latvia has elaborated "Environmental Policy Guidelines for 2014-2020" in accordance with long-term national planning documents. Latvia's environmental policy principles, including the principle of sustainable development outcomes from the policy implemented in the country, are based upon international experience and are secured in Latvia's environmental protection laws and regulations. Previously included environmental protection objectives stated in policy planning documents have been achieved, which is also testified by the high environmental rating in environmental performance index by Yale and Columbia Universities (The Environmental Performance Index-EPI) (in 2012 Latvia held the high second place among more than a 100 evaluated countries) and other assessments (UN Convention reports, the European Environment Agency evaluations) where the environment of Latvia is assessed mostly positively (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 2014).

To attain the set objectives and their follow-up supervision, it is necessary to set quantitative goal indicators. With regard to environmental resources for Latvia's sustainable development strategy until 2030, indicators characterizing nature as the future capital and spatial

development perspective were chosen (Saeima of the Republic of Latvia, 2010). On the other hand, indicators in Latvian National Development Plan 2014-2020 are focused on the introduction of new technologies and progress in efficient use of resources, comfortable and safe accessibility of development centres, as well as provision of convenient accessibility in the electronic form (Cross-Sectoral Coordination Centre, 2012).

All VPR municipalities, except three, have developed legitimate strategies of sustainable development, the medium term priorities of which have been assessed by VPR Strategy authors (Vidzeme Planning Region, 2015).

Although the majority of VPR municipalities put a significant emphasis on improvement of entrepreneurial and environmental infrastructure, diversification of businesses and other important aspects of development and introduction of smart specialization sectors, however, too little attention is paid to a number of important tasks, such as strategic partnership, knowledge transfer, and promotion of remote employment.

Sub-part 2. Resources in Vidzeme Planning Region

Exploration of local resources, their evaluation and proficient use contribute to the ability of entrepreneurs to implement creative business ideas, to introduce new technologies and raise the competitiveness of the existing products, which are the key preconditions for regional development and the mission of smart specialization. To analyze the dimension of smart environment, it is important to define what it implies.

Environmental policy documents of Latvia do not accentuate the notion "smart environment". One of the most commonly used indicator systems for smart environment analysis highlights the following indicators: attractiveness of natural conditions, pollution, environmental protection, sustainable resource management (Granath M., 2016). Researchers of the National Research Programme EKOSOC-LV 5.2.3. Project

"Latvian Rural and Regional Development Processes and Opportunities within the Context of Knowledge Economy" selected the following indicators: infrastructure (road network density, km/ km²), available resources (forest cover, %, mineral reserves, thousand m³, 2013) and use of resources (proportion of cultivated agricultural land (UAA), %, and financing of Rural Support Service (RSS) (2001-2015), EUR).

On the basis of sustainable and smart development concept expressed in policy document guidelines, the authors have formulated "smart environment" definition, which is a novelty in research and may serve as a basis for scientific discussion. "**Smart environment** is an innovative ambient system in which a person is willing and able to make effective use of technological and natural resources with an aim to improve the quality of life and competitiveness while ensuring skilful and sustainable use of nature resources satisfying the economic, social and environmental aspects of the present and future generations". On the basis of the definition, the authors have identified the following smart environment aspects: road and communications infrastructure, available nature resources and their usage. The article will deal with more detailed analysis of Vidzeme Planning Region on the basis of assessment of strategic documents and statistical data, earlier research and interviews.

Vidzeme is the European Union border region crossed by several major international transport corridors, ensuring direct contacts with major regional centres in neighbouring countries. In the context of market acquisition and transport of goods, a great role is played by the location of the business. A great part of Vidzeme rural areas is located near traffic flows (Vidzeme Planning Region, 2015).

At present, the competitiveness of the region, accessibility and development of places is largely dependent on high quality **road and communications infrastructure** (Vidzeme

Planning Region, 2015). Since restoration of independence there has not been a year when the state funding for roads could be described as sustainable. In 2019 the EU funding for roads in Latvia will sharply decrease reaching 68.7 million euro in comparison to 2017 with the financing of 127 million euro, but in 2020 there will be no EU financing for roads at all. Due to the poor condition of the roads, the national economy suffers 880 million euro losses every year; it is created by higher vehicle operational costs, longer journey time and the corresponding increase in fuel consumption (Financenet, 2017).

In 2015 the total length of Latvia's roads (without including municipal streets) averaged 0.02 km per capita while in VPR it was 0.05 km. The state and municipal road ratio was 40 %:60 %, while in Vidzeme region it was 45 %:55 %. As regards the road surface, the average indicators in Latvia and Vidzeme are analogous: approximately 20 % of the state and municipal roads are asphalt covered, while the remaining 80 % are crushed stone and gravel covered roads; in addition, the situation has not significantly improved compared to 2010 (18 %:82 %) (Central Statistical Bureau, 2016). According to the information from JSC "Latvian State Roads", 44 % of asphalt covered roads and 43 % of gravel roads are currently in poor or very poor condition. While the condition of asphalt covered roads is gradually improving, the condition of gravel roads is deteriorating (Financenet, 2017). After assessing the indicators of road surface quality, it may be concluded that the quality of roads in Latvia, including VPR, is critical, and the recent years have not seen any significant improvements, which in many cases prevents or hinders implementation of smart specialization in transport of raw materials and finished products and may affect customer satisfaction, for instance, in the smart specialization field of sustainable tourism.

The future development of the region will increasingly be affected by people and transport

flows generated by cross-border cooperation. The main beneficiaries will be the areas located in the immediate vicinity of the traffic flow, thus being able to use various advantages, like better developed transport infrastructure, better job opportunities in the service and recreational sectors. Areas located further off from intensive flows or big cities may develop as niche service areas using the local resources (State Regional Development Agency, 2009). At the same time, we should consider alternative transport options. However, a radical improvement in access to Vidzeme will not be possible even in 20 years' time. The development dependence on transport infrastructure may be partly compensated by promoting the employment of people in their places of residence by focusing more on high-speed internet coverage and developing

knowledge economy spheres in the region (Vidzeme Planning Region, 2011). Research proves that Latvia has the sixth fastest internet in the world, while access to the Internet in Vidzeme Region is relatively better than in other regions of Latvia, except Riga and Greater Riga (Vidzeme Planning Region, 2014). The internet and digital environment allows not only services and information, but also offers remote work and education possibilities while reducing the necessity for transport use and frequency (Saeima of the Republic of Latvia, 2010).

The key **natural resources** are made up by forest land and timber reserves, agricultural land, mineral reserves and drinking water. In Table 1 the authors have compiled the statistical data of smart environment indicators.

Table 1

Smart environment indicators in VPR

	Total road network density, km/km²	Forest cover in the county, %	Mineral reserves, thousand m³	Cultivated UAA from total UAA, %	Financing of RSS, EUR
Average in VPR	1	49	4 208	86	43 921 222
Maximum value in VPR	1.381 Cesis county	65 Lubana county	20 706 Ape county	93 Naukseni, Varaklani counties	153 183 479 Cesis county
Minimum value in VPR	0.364 Lubana county	22 Varaklani county	0 Cesis, Ergli, Ligatne, Lubana, Rujiena counties	77 Amata county	3 726 704 Koceni county
Average in Latvia	0.937	45	5529.75	82	37 508 297
Maximum value in Latvia	4.761	73	63735.43	98	179 171 095
Minimum value in Latvia	0	14	0	36	1 246 003

Source: author's construction based on the Central Statistical Bureau, 2015; Latvian Environment, Geology and Meteorology Centre, 2012; State Regional Development Agency, 2015

Data in Table 1 show that the average road density in VPR is slightly above the average in Latvia, however, it does not describe the quality of infrastructure.

Vidzeme region forest land proportion in 2014 was 55.8 %, which shows that it is the most forested area compared to other regions of Latvia, and this trend is increasing. The tree-type structure does not differ significantly from the

total percentage of coniferous and deciduous trees in the country (Central Statistical Bureau, 2015). Consequently, Vidzeme has great opportunities to develop forestry and recreation in forested areas.

Compared to other regions of Latvia, Vidzeme has limited amount of construction materials (dolomite, gypsum, limestone, sand-gravel, sand, quartz sand, clay) (74 034 thousand m³) and

peat (25 702 thousand tonnes). Raw material resources for construction are mainly found in local deposits, some of them are located in the territory of the Gauja National Park, so the extraction is possible only according to the park regulations. The region has favourable conditions for peat formation processes, however, its utilization for energy purposes is negligible (Vidzeme Planning Region, 2011, 2013, 2014b). According to the data from the Latvian Environment, Geology and Meteorology Centre, the average amount of mineral resources in VPR is smaller than in Latvia, these natural resources are not found in five counties of Vidzeme.

Agricultural land (UAA) in Vidzeme region takes up one third of the total area, including cultivated land, which comprises 86 % (average in Latvia – 82 %) (Central Statistical Bureau, 2015). The share of uncultivated land of about 14 % is a considerable unnoticed opportunity in the situation of rapidly increasing demand for food in the world. The growing impact of intensive agriculture will need a balance with the almost unaffected rural landscape and preservation of small rural farmsteads (Vidzeme Planning Region, 2014b).

The Rural Support Service financing allocated to the region describes the ability of its residents to attract financial resources and their potential in acquisition of agricultural resources.

The Latvian scientists successfully proceed with the research of forest and subsoil resources; it would provide sustainable use of forestry and subsoil resources, rational exploitation of local resources in the global market for production of competitive products, while maintaining sustainability, biological diversity and the social role of forests (Latvian State Institute of Wood Chemistry, 2014). The results of completed research are vital for the development of smart specialization (competitive material from wood (including fast-growing) and creation of innovative niche products, for instance, research of clay properties with an aim to use it in

sunscreens; stabilization of emulsion; obtaining of a new granular sorbent; differential treatment of clay and carbonate containing rocks for development of new ceramic materials; research of peat properties; clay modification solutions; sorption study, etc. (Segliņš V., Bērziņa-Cimdiņa L., Sedmale G., Švinka R., Kļaviņš M., Muter O., 2016).

Needs of the population, increasing demand for comfort, rise of the living standard and freedom of movement significantly and rapidly increase the depletion of natural resources. In its turn, sustainable use of natural resources means high economic achievements, without harming the environment and nature, economical use of all natural resources, especially non-renewable ones, and, where possible, replacing them with renewable natural resources (Latvian Environment, Geology and Meteorology Agency, 2007).

Compared to many regions of the world and the European countries, Vidzeme region has pristine environment, a stable balance of ecosystems and a lower level of environmental pollution. The Gauja National Park and the primeval valley of the Gauja River, North Vidzeme Biosphere Reserve, Teici Reserve and other protected natural objects are integral values of Vidzeme region.

Comparing the average statistical indicators in Latvia and VPR, it may be concluded that, with exception of mineral resource deposits, the other indicators of infrastructure, available resources, and their rational use are higher in VPR than the average in Latvia. This indicates that availability of resources, their rational use and recreation, activities in fund raising are important preconditions for the desirable progress towards smart specialization.

Sub-part 3. Use of Environment Resources in VPR

To identify the VPR environmental resource potential and possibilities for their use in introduction of smart specialization area, the

authors conducted focus group interviews in Mazsalaca and Koceni county research areas.

The county residents evaluate road and communications infrastructure as a critical factor for long-term development. In this respect, Koceni has a considerable advantage as the county is located near a motorway and borders on the largest VPR city Valmiera, which is the centre of administrative and economic development, education, culture and sports in Vidzeme region. The intensive traffic flow on the main national motorway is regarded as a drawback as it increases travel time. Mazsalaca county is located off the major centres and despite the wide road network, the development of the area is hindered. Although the county borders on Estonia, entrepreneurs do not actively use the neighbouring market opportunities where one of the influencing factors is infrastructure. The road quality problem is more acute for residents near the Estonian border than for Koceni residents near Valmiera city. The claims are mainly about the quality of the national road, the maintenance of which is not the competence of the local municipality; yet, as the consequence, the entrepreneurs face additional costs on vehicle maintenance and sometimes also overdue deliveries. Overall, the Internet availability is regarded as good except for remote areas. Yet, it creates problems in some individual cases of remote work in knowledge intensive sectors requiring high-quality communications' infrastructure.

Both research counties may boast of attractive nature **landscapes**; however, it is necessary to promote and advertise this resource to use it in a more versatile way. A positive factor is the growing environmental awareness of the population. The respondents mentioned facts of fast degrading landscape, farmhouses with surrounding tree clusters turning into ruins, there is too little support to the small farms willing to operate in this field. A geologically rich area (Mazsalaca, Rujiena, Naukseni) is not officially

conferred a respective legal status on a national level; it prevents to turn it into a European Geopark, which would attract a particular category of travellers. Residents of Koceni county mentioned a new perspective service – small-scale site supervision and maintenance.

Evaluating the **unnoticed options** of the county economic development, the employees of Koceni municipality admitted minimum use of scientific research potential by the entrepreneurs, which is the key to optimizing business processes and reaching better results. The direction to be developed is professional forest management as poor management skills hinder the use of this resource to the full extent.

Mazsalaca municipality employees believe that sustainable development and smart specialization mean creating maximum comfortable and creative environment to support modern and innovative sectors. The main challenge for Koceni municipality is to create the possibly most creative living and business environment, to find a balance among business, living, social and cultural environment. In both counties, there is a tendency that agricultural companies (especially the small ones) see a perspective in shifting to organic farming in relation to environmental conservation and sustainability. Tourism is indicated as a promising services' industry direction. Entrepreneurs flexibly respond to change; manufacturing enterprises have a great potential for export (woodworking, dairy farming, ceramics, charcoal, pellets, peat extraction). Entrepreneurs are aware of the risk diversification and the role of increase of added value in their economic activity.

VPR has defined the following smart specialization areas to be developed in order to provide a balanced and sustainable development: high value-added wood products; healthy food and beverages; recreation and sustainable tourism; rehabilitation and health care services; the use of biomass for chemical processing and energy; smart materials, information technology;

creative industries; remote professional services. Perspective niche products were identified for each sphere of smart specialization (Vidzeme Planning Region, 2015). Current unsustainable consumption and production models contribute to

depletion of natural resources and threaten the services provided by the ecosystem; therefore, it is necessary to identify examples of good practice, shown in Table 2.

Table 2

Identified examples of good practice of smart specialization in successful exploitation of environmental factors in VPR

Sphere of smart specialization	Example of good practice
Creative industries	Vaidava Ceramics "Rebeka", Ltd. produces a variety of tableware and interior objects from the Latvian red clay. All production waste is re-used. The factory welcomes tourist groups and individual travellers.
Information technologies	"Wunderkraut Latvia", Ltd. deals with development of Web projects on the basis of the open code software.
Environmental awareness and recreation	Foundation "Zeme. Cilveks. Stari" ("Earth. Human Being. Rays") activity is clean-up organization. During its operation 7 hectares of degraded areas have been recovered, creating a unique nature terrain and a nature park, a health trail and a family area.
Production of healthy food and beverages	"Kainazi", Ltd. – birch sap extraction and processing. The manufactured product (sparkling birch sap with a variety of different flavours, birch sap syrup, dandelion wine) is also exported; new technologies are applied in the production. The company supports environmentally friendly farming and welcomes tourists.
High added-value wood products	"Dores", Ltd. example illustrates how collaboration of an enterprise of wooden houses with researchers and architects can bring added value and export capacity. Moreover, the company is socially responsible, emphasizing environmental protection and the importance of local activity in practice.
Use of biomass for chemical processing and energy	Agricultural Services Co-operative "Daiva" has invested in purchase of hot air generator for a grain drying kiln which uses chaff as fuel, thus converting waste into energy which is economically viable and environmentally friendly.

Source: author's construction based on Foundation "Zeme.Cilveks. Stari", 2017; "Kainazi", Ltd., 2017; Rone M., 2016; Vaidava Ceramics "Rebeka", Ltd. 2017; Vidzeme Planning Region, 2015; "Wunderkraut" Latvia, Ltd, 2017

These examples from the practice of VPR entrepreneurs prove that it is possible to successfully develop business by skilful and creative use of environmental resources. An essential issue is that smart specialization does not refer only to high technological innovations, but to non-technological innovations as well.

Conclusions, Proposals, Recommendations

1) Smart rural development is affected by environment. Smart environment is an innovative ambient system in which a person is willing and able to make effective use of technological and natural resources with an aim to improve the quality of life and competitiveness while ensuring skilled and sustainable use of natural resources satisfying the economic, social and environmental aspects of the present and future generations. The authors identify the main environmental

- components: road and communications, available nature resources and their usage.
- 2) State and local government strategic documents use different programming methodology, in some cases there is no indication of a specific action to reach certain goals, a single performance indicator system for goal assessment has not been elaborated, which limits objective assessment of achievements and comparative analysis of moving to sustainable long-term development on a regional, national and international scale. Policy makers should agree upon a single theoretical framework for smart development that would serve as a basis for development of coherent planning documents.
 - 3) The limiting factor for VPR smart development is the road infrastructure quality; the road infrastructure's efficiency and possibilities of its optimization should be re-evaluated; it is necessary to make changes in the financing

model of the national and municipal road maintenance.

- 4) It is possible to reduce the negative impact of the road infrastructure, providing high quality high-speed internet coverage to enhance remote work and education opportunities in knowledge and creative industries.
- 5) VPR has a favourable geographical location. Low population density, pristine unpolluted nature areas are favourable preconditions for recreation and sustainable tourism development and choice of living space or recreation area.
- 6) Forest quantity and quality create good prospects for production of wood products with high added value; forests are an integral part of mosaic landscape and a significant recreational potential. Improving managerial competences and knowledge of forest professionals would positively affect forest productivity and sustainability.
- 7) Vidzeme has relatively limited mineral resources. Rational use of these resources and active collaboration with scientists would

increase added value to the existing products and create new niche products, which is proved by the examples of good practice.

- 8) Entrepreneurs in VPR rural areas flexibly respond to economic changes, they are aware of the importance of environmental resources for manufacturing products with high added value, the importance of business transformation and diversification and the responsibility to the future generations for preservation of environmental resources.
- 9) Limiting factors for smart use of resources in the research area are: insufficient use of scientific potential and caution in attraction of external financing.

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