

The use of the SWOT analysis method to assess the importance of environmental potential in the regional development processes – the case of Lubelskie voivodeship (Poland)

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Abstract: A relatively clean environment is an important growth factor, which typically possess less developed regions. The proper use of this asset can be a lever for a regional development, ensuring prosperity for the residents as well as the advantage over other regions. The aim of the study was to assess the environmental potential for the development of Lublin province, using the SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis method¹. Also, the author's intention was to show how the SWOT analysis method can be used to formulate development strategy of the region. The analysis leads to the conclusion that despite numerous weaknesses and threats, Lubelskie voivodeship is characterized by a relatively good environmental potential creating chances for specialization in those forms of economic activity which are based on the use of natural capital..

Keywords: regional development, environmental protection, competitiveness, the SWOT analysis, Lublin voivodship

1. Introduction

Considering the region as a space in which human activity is located, it can be stated that social and economic attractiveness of a region also depends on the environmental quality.

¹ The author uses the method of SWOT analysis to assess the potential of environment, which is the next stage of research on the environmental competitiveness of regions in Poland, and it is funded by a grant for young scientists (RKO/MN/11).

Processes in ecosystems contribute directly or indirectly to the source of all welfare, which means that the loss of ecosystem services can have a significant impact on the future development opportunities of the region (Małachowski, 2009: 9; Panfiluk, 2005: 344-345; Malovics, 2007).

The Lubelskie voivodeship is one of the cleanest areas in Poland, in terms of the state, environmental pressure and protection indicators. However, despite the relatively favorable situation, there exists numerous environmental threats, the removal or at least reduction of which is necessary to take advantage of the opportunities for the development of the region, which are a result of the relatively high quality of the environment (Kasztelan, 2010b: 367-375). This article presents an assessment on the environmental competitiveness of Polish regions in the years 2010–2013. For the purposes of analysis, 26 indices of the condition and protection of the environment and also pressures placed on the environment were selected. With respect to each index, between 1 and 16 points were attributed to each voivodeship (16 units on the NUTS² 2 level are distinguished in Poland), depending on the degree of environmental impact. Then, the points allocated to the voivodeships for each index were totaled and a ranking of voivodeships reflecting the level of environmental competitiveness was elaborated. The results lead to the conclusion that the Lublin region is characterized by the average level of the environmental competitiveness compared to other provinces in Poland. (Kasztelan, 2013a: 637-648, 2013b: 105-122, 2011: 258-268, 2010a: 77-86).

Optimal management of environmental components requires numerous methods and techniques that are designed to optimize decisions. The SWOT analysis is one of the tools important in the management of the environment. It is also equally important for the comprehensive assessment of the economic development factors, including environmental conditions (Szałata and Zwoździak, 2011: 1105–1114).

Considering the above facts, the SWOT analysis method was used to assess the importance of environmental potential in the development of Lublin province

² Fr. Nomenclature des Unites Territoriales Statistique, ang. Nomenclature of Territorial Units for Statistics.

2. The characteristic of the research method

In the context of the basic principle of the National Environmental Policy, which is the sustainable development (Cao and Piecuch, 2012: 314-328; Pawłowski, 2011: 333-346), it becomes important to identify methods and tools for practical implementation of this principle at the micro-, meso- and macroeconomic levels. One such method is the SWOT analysis which can be applied in all areas of the strategic planning as a universal tool for the first stage of strategic analysis.

This method relies on the segregation of available information about the object of the analysis (such as enterprise or region) into four groups:

1. **S** (Strengths) —characteristics that are an asset or an advantage of the analyzed object over others -,
2. **W** (Weaknesses) — characteristics that relate to a weakness, barrier, or defect of the analyzed object,
3. **O** (Opportunities) —conditions that could exploit the analyzed object of beneficial change,
4. **T** (Threats) —conditions that could cause trouble for the analyzed object of adverse change (Szałata and Zwoździak, 2011: 1105-1114; Mruk et al., 1999: 24-27).

For the regions, the main purpose of the SWOT analysis is the assessment of resources and values, from competitive ability point of view and the position achieved in the national or international level as well as continuous tracking of opportunities and potential risks posed by the surroundings.

A properly carried out SWOT analysis greatly reduces the risk of failure of the development strategy for the region. Moreover, it even allows firstly, to design a unique strategy, which matches with the analysis of the surroundings and specific resources of the region, and, secondly, to make use of its opportunities.

Policy makers responsible for regional policy should identify the main risks and opportunities associated with the development of the region. On the one hand, they should focus on the most likely threats and prepare accordingly. On the other hand, the policy makers should evaluate each opportunity by its potential attractiveness and likelihood of contributing to the success of the region. Taking the opportunities is often inseparably linked to the risk, therefore

before making decisions it should always be borne in mind that the expected benefits justify the risks.

Strengths and weaknesses in the SWOT analysis does not rely on the identification of all the features of the region, but only those related to the so-called critical success factors. Too long a list would lead to lack of concentration and inability to determine the really important features. Also, it should be borne in mind that the strengths and weaknesses should be considered in relative terms. One can be good at something, but this can be a weakness if the competitors (other regions) have an advantage in this field (Kotler et al., 2002: 51-52; Kudłacz, 2006: 206-207).

3. Discussion of the results

The SWOT analysis, carried out by considering the environmental conditions of the Lublin province development, indicates that this region is characterized by a relatively favorable environmental potential (Table 1).

Abundant environmental resources occurring in Lublin region should be treated as a kind of natural capital being at the disposal of the local community. Taking care of the natural environment should not be seen as a barrier, but as an opportunity for economic growth, although the conflict between nature and the economy is in some cases inevitable. Nevertheless, it is necessary to create the perception of environmental values in terms of the public interest (Górnicki, 2010: 26-27).

SWOT analysis at the outset indicates that Lublin province has a preferably shaped settlement structure (Table 1). Being centrally located, Lublin agglomeration is the basis for spatial sustainable development of the region and moreover, there are no natural barriers of development.

Lubelskie voivodeship has a relatively large reserve of minerals. Among the minerals found in the Lublin province, the rich coal resources deserve mention. They form the basis for the development of the mining industry in the region (about 7.6% of domestic production). In addition, there are also natural gas resources, as well as limestone deposits mined for the cement industry in Chełm and Rejowiec Fabryczny. Recent studies also confirm the significant deposits of shale gas.

Table 1. The SWOT analysis of the environmental conditions for Lublin province development

THE USE OF THE SWOT ANALYSIS METHOD TO ASSESS THE IMPORTANCE OF ENVIRONMENTAL POTENTIAL
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Strengths	Weaknesses
<ul style="list-style-type: none"> • A compact region of space and the lack of internal natural barriers for further development • Rich resources of agricultural raw materials, energy resources (including the renewable ones) as well as minerals essential for the development of industrial processing • A high proportion of sites with good and very good soils, especially in the Lublin Upland and Roztocze • Importance of the quality of the natural environment regarding the possibility of the development of tourism, spa treatment, and production of organic food • Biodiversity of the natural environment in the region (many refuges of rare species of fauna and flora, a high proportion of biotic resources of the region in the national and international conservation systems, eligibility of Bug valley to the European System of Ecological Corridors) • Low degree of anthropogenic transformation of the environment, maintained a relatively natural character of the main rivers: Vistula, Bug, and Wieprz • A significant and good quality groundwater resources • A high intellectual and research potential of Lublin with specialized studies in the field of environmental protection • 	<ul style="list-style-type: none"> • A low product, technological, and ecological competitiveness of the firms, combined with the low level of innovation • Poorly developed water and wastewater infrastructure (especially in small towns and rural areas, large disparities in the development of sewerage infrastructure in relation to water supply infrastructure) • Poorly developed waste management infrastructure • Poor technical condition of flood protection infrastructure (especially in the valleys of the rivers: Vistula, Bug, and Wieprz) • Poor surface water resources and their significant pollution • A high level of air pollution from low-emission sources (mainly from inefficient district heating appliances, households, and the increasing volume of traffic)
Opportunities	Threats
<ul style="list-style-type: none"> • Increasing awareness of the authorities and inhabitants of the Lublin region in the field of environmental protection • The use of natural resources for the development of different forms of tourism (inter alia by increasing the communication availability of the touristic attractive areas, especially areas along the Bug, Vistula, as well as Polesie and Roztocze) • Specialization of the region in the niche manufacturing and services sectors (high quality food production, eco-energy) • Exploiting the potential of R&D to increase the competitiveness of the regional economy and to build a macroregion of the knowledge-based economy (e.g., Organic Food Valley) • Use of available EU funds for the expansion and modernization of environmental infrastructure (including comprehensive facilities for lands dedicated for greenfield investments) • The prospect of significant investments in multifunctional development of rural areas (including the protection and maintenance of biological diversity) • The development of international cooperation in the field of environmental protection within the Euroregion Bug and the International Biosphere Reserves such as Polesie Zachodnie and Roztocze Zachodnie. 	<ul style="list-style-type: none"> • Progressive threat to the rich biodiversity in the region (urbanization and chaotic construction of buildings on a number of areas of very high natural values, soil eutrophication and pollution from nutrients, and fragmentation of habitats and ecosystems) • The region's difficulties in meeting the EU norms and standards related to the protection of the environment (in the field of water and wastewater management, waste management with recycling, air, and soil) • Increase of the environmental threats (global warming, extreme weather, deterioration of water balance, transboundary pollution) • Lack of adequate securing of energy needs of the region (the dependence of electricity supply from sources outside the region, a small part in the production of energy from renewable sources) • Intensifying social and environmental conflicts related to the location of key transport investment • Too little protection against soil erosion

Source: Own elaboration based on ZWL, 2009: 8-19; UMWL, 2013: 38-39.

The region also has a significant share of good quality soils used for agriculture, especially under cultivation of wheat, barley, sugar beets and grain legumes. According to the IUNG scale (Puławy), the agricultural production quality index in the Lublin province was 74.1 points, whereas the country average was 66.6 pts. Unfortunately, this potential is not fully exploited because of the small-scale traditional farming (UMWL, 2013: 16).

In addition, a significant share of agricultural land (30.2%) is threatened by hazards such as surface water erosion and wind erosion (35.5%), which causes their gradual degradation due to the decrease of humus content, completely washing off the humus level on the slopes and the leaching of minerals by runoff. Increased risk of flooding is one of negative consequences of erosion, which is additionally intensified by the poor technical condition of flood protection infrastructure (especially in the valleys of the rivers: Vistula, Bug, and Wieprz) (GUS, 2013).

However, factors such as high biodiversity, varied landscape and low environmental pollution favor promoting Lubelskie region for tourism and recreational activities. The most valuable areas of natural significance in the region are Polesie (including Łęczyńsko-Włodawskie Lakeland), Roztocze and the valleys of the Vistula and the Bug. For this purpose, the international cooperation within the Euroregion Bug and other cross-border structures should be developed in the field of environmental protection and tourism.

Promotion of tourism in the province so far led to unordered tourism and excessive urbanization of natural areas, resulting in the degradation of many environmental values. The reason for this was insufficient ecological awareness of local communities (Kasztelan, 2010: 367-375).

Considering the production of healthy food in the Lublin region, high-quality groundwater is an important environmental resource which requires limited treatment processes. Two large aquifers (Lublin Basin and Mazowieckie Basin) are located in the region, secreted within a national strategy for the protection of groundwater. According to data for the year 2013, groundwater resources of the Lublin province accounted for approximately 7,0% of the total national resources (GUS, 2014: 149).

In comparison, Lubelszczyzna is characterized by relatively limited surface water resources. The quality of surface water is influenced by the surface runoff from the land used for agricultural purposes, including nitrogen and phosphorus, which is a remnant of the applied fertilizers (WIOŚ, 2014: 39).

In the context of the characteristics of the water resources, the mineral waters in the vicinity of Nałęczów, Celejów, Krasnobród, and Wólka Biska should also be mentioned, the extraction of which can be a basis for the development of spa services in these localities. The strength of the Lublin province, in the context of the future use of the opportunities resulting from the existing natural capital, is a well-developed scientific and research potential. This is evidenced by success factors, among others, in applying for research grants. Analyzing the areas of the research, the main areas of specialization in the field of science in Lublin can be identified, which are agriculture and environmental protection (UMWL, 2014: 24).

The scientific-research potential indicated above offers an opportunity for the specialization of the region in the niche manufacturing and services sectors (high quality food production, eco-energy), thereby increasing the competitiveness of the regional economy and building a macroregion of the knowledge-based economy.

To use the aforementioned strengths and potential opportunities, it is necessary to take radical action to eliminate or at least reduce the numerous weaknesses and threats related to the environmental factors for the development of Lublin province .

First of all, the main factor hampering the development processes in the region is the low ecological competitiveness of the local firms, combined with the low level of innovation (including the so-called eco-innovation) (Kijek, 2013: 659-670; Kijek and Kasztelan, 2013: 103-112). According to the qualitative model presented by M. Kanerv, A. Arundel and R. Kemp (2009), eco-innovations lead to assumed economic and environmental effects, e.g. in the form of a decrease in production material consumption and a reduction in pollution and greenhouse gas emission.

However, among the three groups of factors considered at the European level, Lublin falls relatively well only in the field of basic determinants of innovation development (among others: level of education, public expenditure on R & D, etc.). However, considering the indicators characterizing innovation activities (e.g. R & D expenditures of the business sector, innovative activity of SMEs, the number of European patents) and the results of the activities (including the share of enterprises introducing new products and services, the value of sales of these products and services, employment in high-tech firms), we can conclude that the Lublin province has the lowest level of innovation in the EU (Mazurkiewicz, 2012: 5-6).

Another barrier to the pro-environmental development of the Lublin province may be poorly developed infrastructure (water, wastewater and waste management). Suffice to mention that only 22% of rural population of the Lublin region benefits from wastewater treatment plants, while in the country this percentage is over 35% (GUS, 2014: 199). There are also large disparities in the development of sewerage infrastructure in relation to water supply infrastructure. This situation shows, that the region still has difficulties in meeting the EU norms and standards related to the protection of the environment.

However, there is an opportunity to improve the current situation, thanks to the new EU financial perspective and related support funds for the province of Lublin. According to the Regional Operational Programme (ROP) for the Lubelskie voivodeship, more than 140 million euros (7% of the total budget of the ROP) is to be allocated for the expansion and modernization of environmental infrastructure.

Opportunity for the development of the Lublin province in the context of environmental dimensions is also the prospect of significant funds for the multifunctional development of rural areas. This mainly applies to funds for the protection and maintenance of biological diversity, protection and remediation of soil, and promoting ecosystem services (RPO WL, 2013: 33). This is all the more important as urbanization and chaotic construction of buildings on a number of areas of very high natural values, soil eutrophication, and fragmentation of habitats and ecosystems pose a threat for the development of the Lublin province. High level of air pollution especially from low-emission sources remains an unsolved problem in the Lublin province; the hierarchical order of the sources being in the following order: surface, linear, (communication), and spotlight. Surface emission of air pollutants come from local coal-fired boilers and individual households furnaces (mostly low efficient). Next to the surface emission, a significant source of emission of air pollutants is transport. On the other hand, point sources are primarily professional power plants and industrial processes (ZWL, 2012: 61–64).

According to the data in the report about the state of the environment till 2013 (WIOŚ, 2014: 9–10), it is estimated that the in the Lublin province emissions from surface sources (~62% of the total emission of gaseous and particulate pollutants come from this source) have a high impact on air quality, followed by communication sources (22%), with the emissions from the point sources having the least impact on air quality (~16%).

Atmospheric pollution significantly impacts the quality of ecosystems and climate change, human health, and also the effectiveness of socioeconomic processes. If we add the frequently occurring extreme weather (strong winds, floods, periodic droughts), deteriorating water balance, and flow of transboundary pollution to the overall growth of environmental hazards which take the form of global warming, we get an overall picture of the environmental determinants of economic development, which we are confronted with not only at the level of the Lublin province.

Giving great importance to air protection leads to more widespread use of renewable energy sources in the regional economy. This is especially important from the viewpoint of energy security of the Lublin province. According to data for 2011, the share of renewables in electricity production in the region was only 1%. Disproportion in electricity production by conventional and renewable sources is higher than the average in the country, where the share of electricity from renewable sources was 4.0% (ZWL, 2013: 32).

In the Lublin province, biomass is considered to be the most promising renewable energy source. It is indicated that, *inter alia*, striving to better use the forestry industry waste; utilize surplus cereals, canola, and corn straw and the dissemination of targeted crops for energy purposes; increase the acreage of rape; and the development of local agrorefineries lead to the development of biomass-based energy.

In addition to biomass, an important source of renewable energy is solar energy. Due to the large potential for useful energy, the central and eastern areas of Lublin region should be favored for the development of solar energy. However, because of the small wind energy resources in the region, there is no opportunity for the production of wind turbines operating on an industrial scale. Most favorable conditions for the location of small wind turbines (within households) are found in the northwestern part of Lublin. However, further development of energy generation from biogas is preferred, particularly through the landfill biogas plants and biogas from fermentation processes (water treatment plants). Currently, biogas energy is used mainly for heating and lighting and in sewage treatment plants (ZWL, 2012: 69–70).

Promoting and systematically increasing the use of renewable energy sources is essential for the sustainable development of Lublin province, which will bring tangible results and benefits, including saving energy resources, environmental improvements, waste reduction, and increase in energy security.

4. Concluding remarks

The aim of the study was to present, how the SWOT analysis can be used to formulate the strategy of regional development. A properly carried out SWOT analysis greatly reduces the risk of the strategy failure. In this context, the method was used to assess the environmental potential for the development of Lublin province.

The SWOT analysis carried out for Lubelskie voivodeship leads to the conclusion that despite the numerous weaknesses and threats, the regional economy has a number of endogenous and environmental potential for development. With appropriate support from external measures, they can greatly enhance the competitive position of the economy of Lublin province and give it a certain profile of specialization.

Given the internal conditions, it seems that the main areas of economic specialization of the Lublin province should be energy generation from renewable sources, tourist and recreational use of the environmental values and production of organic foods.

The implementation of these three main lines of action will not be possible without the appropriate steps to eliminate or at least partially reduce the existing barriers. The key element here seems to be the improvement in the level of innovativeness and hence the competitiveness of local firms. For this purpose, it is still necessary to focus on the development of cooperation between science and business, which allows for rapid diffusion of modern solutions, including eco-innovation.

Under the new financial perspective, the skill of using EU funds for the environmental infrastructure, especially in rural areas, will also be important. It is a key element to further improve the environment in Lublin province and hence for numerous socioeconomic benefits. Using the competitive advantage based on the environmental development factors will be possible, assuming that appropriate marketing actions will be taken. Local governments should promote the ecological image of the region, and thus encourage investors to implement projects using the environmental potential in a sustainable way. It is important to design the external perception of the region in such a way that its strategies, programs and practical activities take into account the objectives of the environmental policy.

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Zastosowanie metody analizy SWOT do oceny znaczenia potencjału środowiska w procesach rozwoju regionalnego – studium przypadku województwa lubelskiego (Polska)

Streszczenie

Relatywnie czyste środowisko naturalne to istotny czynnik wzrostu, którym z reguły dysponują regiony słabiej rozwinięte. Właściwe wykorzystanie tego waloru może stanowić dźwignię rozwoju regionalnego, zapewniając dobrobyt mieszkańcom i uzyskanie przewagi nad innymi regionami. Celem pracy jest przedstawienie wyników oceny środowiskowego potencjału rozwoju województwa lubelskiego, przeprowadzonej przy zastosowaniu metody analizy SWOT. Intencją autora jest również pokazanie, w jaki sposób metoda analizy SWOT może być wykorzystywana do formułowania strategii rozwoju regionu. Na podstawie otrzymanych wyników można stwierdzić, że pomimo licznych tzw. słabych stron województwa lubelskiego oraz występujących zagrożeń, charakteryzuje się ono stosunkowo dobrym potencjałem środowiskowym, tworzącym szanse specjalizacji w tych dziedzinach działalności gospodarczej, które są oparte na wykorzystaniu kapitału naturalnego.

Słowa kluczowe: rozwój regionalny, ochrona środowiska, konkurencyjność, analiza SWOT, województwo lubelskie.