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Eco-innovation performance of Slovakia

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Abstract

The paper deals with the evaluation of the eco-innovation situation in the Slovak Republic. The situation is evaluated in terms of eco-innovation scoreboard which consists of five areas. Different eco-innovations influence environmental, economic and social growth of enterprises, so they positively influence sustainable development. Therefore, it is convenient to identify the eco-innovative performance of Slovakia and its favorable and critical areas through the analyses. Subsequently, results found out information points to the possibilities which have influence on the positive development of the eco-innovation

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1. Introduction

The National Strategy for sustainable development of the Slovak Republic deals with an economic growth focused on the long-term needs of society (NSTUR, 2014). In the framework of sustainable development principles, the strategy is focused on ecological approach. There is taken into consideration the criteria of maintenance and support of biodiversity, vitality and resistance of ecosystems, optimization of spatial arrangement and functional usage of landscape and ensuring its territorial system of ecological stability, maintenance and support of life ensuring systems, maintenance of high quality components of environment, minimization of usage of scarce

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According to Leskova (2009), eco-innovations decrease the demands of materials, they use closed material flows and they create or use new materials. At the same time, they are focused on decrease of energy demands or they create or rather use, alternative sources of energy. They also decrease a total amount of emissions or existing environmental load and health risks while supporting the whole idea of healthy lifestyle and sustainable consumption.

Therefore, eco-innovations mainly support ecological approach of the Slovak National Strategy of sustainable development in cooperation with effective principles. This strategy is connected on the main priorities of the EU, OSN and OECD, which support eco-innovation as well as sustainable development. Eco-innovations are products, processes or organizational innovations that decrease environmental costs, they increase company's acceptance and they contribute to sustainable development (Green Beings, 2015).

Eiadat et al. (2008) and subsequently Hua (2011) identify the equality and a mutual benefit that proceed from the relationship between eco-innovation and a performance of the business.

Furthermore, Picazo-Tadeo et al. (2014) and Fare et al. (1994), state that a change of an environmental performance was dissolved into the result of proportionate eco-efficiency change and also into environmental technical change. This approach is a natural way of identification, respectively, of catching-up with environmental practices, which are the most convenient, and also with eco-innovations or with an improvement of environmental technologies Kammerer (2009), Straka (2013), Supin (2011) a,b. Eco-innovations can serve as a tool through which companies are trying to transform environmental constraints into opportunities of reduction of costs, to obtain better reputation and advantage of new markets. One of the most important interests of consumers is to promote the performance of environmental product innovations, but also to improve the realisation of this innovations (Carillo-Hermossilla et al., 2010; Laperche, 2013; Dzian, 2014; Jelacic et al., 2010; Kaputa, Mat'ova, 2010; Triznova, 2013).

2. Methodology

A basic approach to processing a problematics of eco-innovations situation in Slovakia is the analysis of a state of researched phenomenon using Eco-innovation Scoreboard. Afterwards, there are mutual interactions between areas and their indicators analyzed through descriptive methods, which influence this index. According to Eco-Innovation Observatory (2015) Eco-innovation Scoreboard is a simple index. The Eco-Innovation index is the tool that enables the estimation and interpretation of eco-innovations performance in the member states of the EU. The intention of the scoreboard is to acquire various aspects of eco-innovations. It would be done so by applying 16 different indicators that are grouped into five thematic areas: eco-innovations inputs, eco-innovations activities, eco-innovations outputs, resource efficiency and socio-economic outcomes. Every areas is presented by an index. The eco-innovation index is counted individually for each country, where there are specific figures of a single indicator weighted with the share of population, so the EU average is calculated. Summing up of the underlying data is used for direct calculation of the EU average of indicators that are displayed in absolute numbers. In order to exclude statistical outliers, the 5 % and the 95 % Quantile are introduced as thresholds. Values above or below the thresholds are replaced by the adequate threshold value. The thresholds correct the data that is used for the calculation of the EU average. To normalize different indicators a "Distance-to-reference" method is used, the EU average is defined as the reference and a set is defined as a value of 100. Countries whose figures are higher than the EU average obtain a higher score than 100 and countries whose figures are lower achieve less. The specific value is dependent on the deviation from the EU average. Missing data is not replaced by estimations; when the data of a country is not available, this country does not receive a result for the respective indicator. When calculating the index of the five areas, unweighted mean of the underlying indicators is used. Also, calculation of the overall scoreboard of a Member State of the EU uses the unweighted mean of the 16 sub-indicators.

Basic information is describing the situation in the area of eco-innovation in Slovakia in 2013 (the most current data recorded in the database of Eco-Innovation Observatory) and it studies the causalities and links between its developments.

3. The situation of eco-innovation of the Slovak Republic

Slovakia in 2013, considering the appraisal of the performance in the area of eco-innovation, belongs to the group of economies whose eco-innovation index does not reach high level (figure 1). The best-rated countries are Sweden, Finland, Denmark and Germany. Slovakia is the fourth country nearly with the lowest value of eco-innovation index. This position is most influenced by the low values of indicators in the area of socio-economic outcomes in Slovakia compared with indicators of other areas of eco-innovation index. The low values of indicators were seen in the areas of Eco-innovation inputs and outputs, Resource efficiency outcomes, which had the same impact on the low value of the overall eco-innovative index.

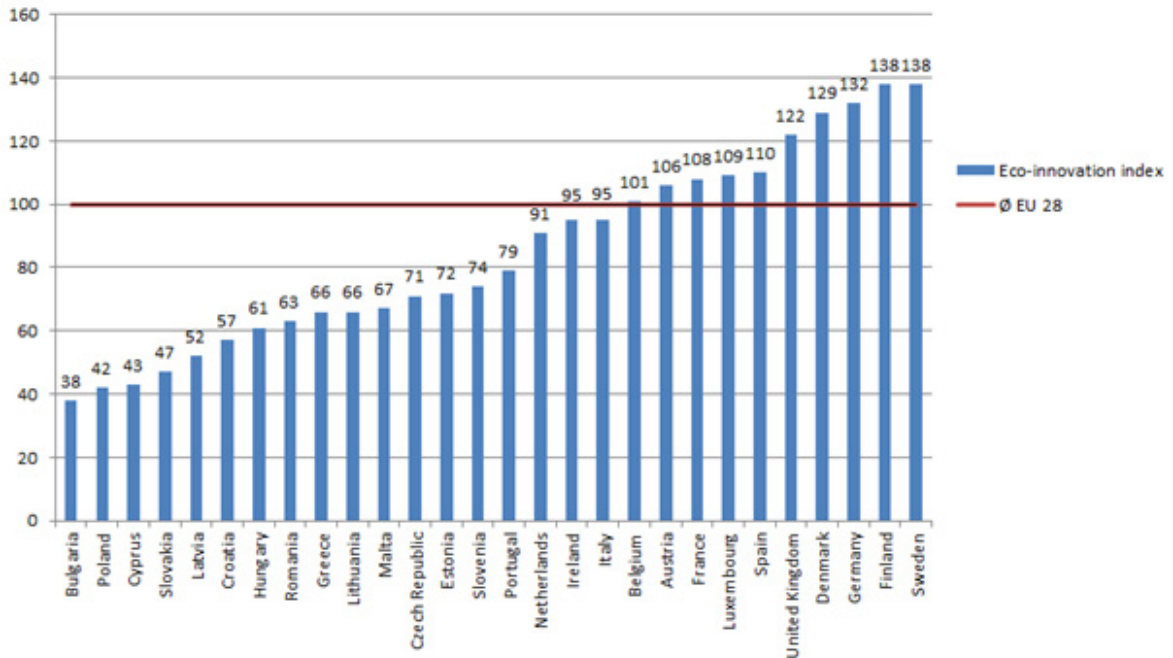


Fig. 1 Eco-innovation scoreboard the EU Member States processed according to Eco-Innovation Observatory Database (2015).

Eco-innovations in Slovakia have a rising tendency, from the perspective of the development during the last four years. Only in 2013, which was the last monitoring year, the value decreased to 47 what was heavily influenced by already mentioned indicators in the area of socio-economic outcomes, it is presented socio-economic outcomes index, where we are studying noticeable decrease in comparison with the last year; figure 2 illustrates this. The decrease of socio-economic outcomes index was caused by decreased values of area indicators as percentage share of export of products in ecological-industrial sector, employment in ecological-industrial sector and turnover in mentioned sector.

The area of eco-innovative activity which has, as the only one, an increasing tendency, has the opposite and so more positively impact on the eco-innovation index. This fact is influenced by implementation of innovation activities, which reduces material inputs per unit of output in companies, implementation of innovation activities for reduction of energy inputs per unit of output in companies and companies that are applying environmental management systems.

Other areas (Eco-innovation inputs, Eco-innovation outputs, Resource efficiency outcomes), that have an impact on Eco-innovation scoreboard of Slovakia, have decreasing trend, even though in the area of Eco-innovation outputs this trend became evident only in the last monitoring period. The development of the values of the index in the area of eco-innovation inputs is influenced by the indicators of government investments in environmental and energy

research and development (R&D), in the investments of green early stage and of total R&D personnel, as it is stated in Eco-Innovation Observatory Database (2015). In the field of Resource efficiency outcomes the influential factors are countries' productivities in material consumption, energy use and water use as well as countries' intensity of GHG emissions.

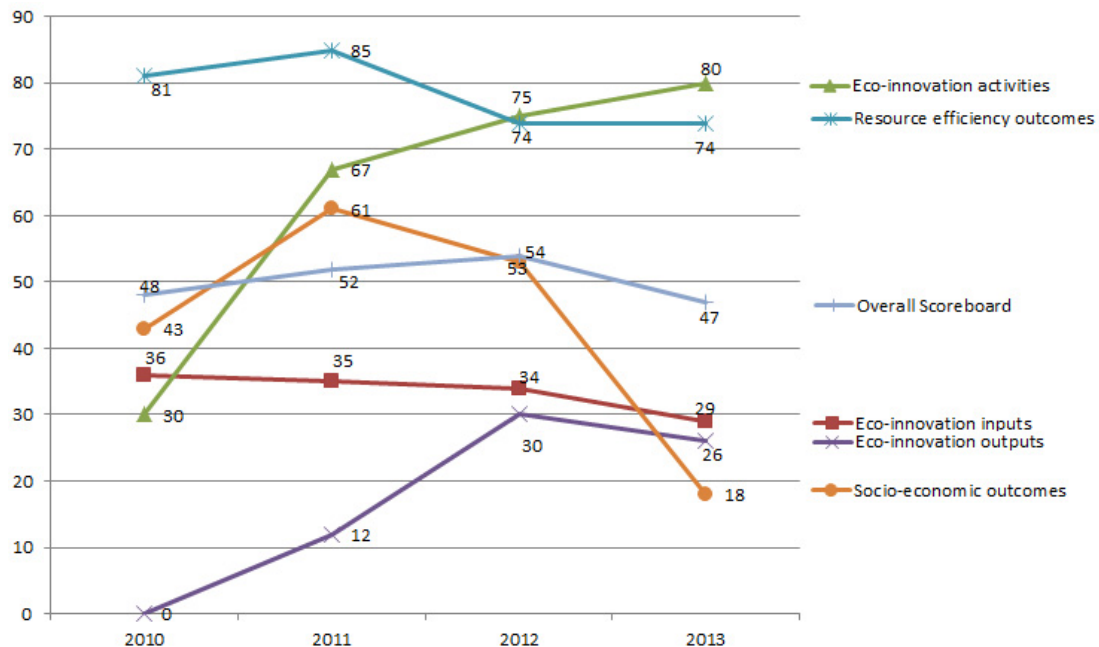


Fig. 2 Development of Eco-innovation scoreboard of its areas in Slovakia processed according to Eco-Innovation Observatory.

Based on the data from Eco-Innovation Observatory (2015) about the complex evaluation of eco-innovation performance we can indicate a low level of eco-innovations in Slovakia. Slovakia is behind in this field also in the comparison with neighbouring countries, such as Czech Republic, Hungary and Austria and except Poland. Favourable development of eco-innovative performance in Slovakia is influenced mainly by the activities performed by the companies that are implementing innovative activities for reduction of material inputs per unit of output, activities for reduction of energy inputs per unit of output and environmental management. However, there is still space for an improvement, as Overall Eco-innovation Scoreboard of Slovakia is below average within the standards of the EU. For achieving the improvement of this situation it is convenient to focus mainly on the support of exports of products from eco-industries, employment in eco-industries, research and development in the area of environment, energy research within the open system of innovations and also research in other areas connected to the environmental policy of Slovakia.

4. Conclusion

Eco-innovations in its essence represent the choice of suitable materials, processes and distribution methods that are used with lower consumption of energy, lower consumption of natural resources, and overall, with lower environmental load. Nowadays, eco-innovations because of an increased interest from the side of consumers are becoming requested innovations for companies not inevitable ones, thereby becoming the tool of business competitiveness. . . The companies, also in Slovakia, are aware of this fact and that is why the activities connected to eco-innovations performed in the companies have the most favorable share on eco-innovation performance of Slovakia. A negative impact studied in the last year of eco-innovation performance of Slovakia is mostly in the area

of socio-economic outcomes, but there are also other areas that are not influencing it positively as areas of eco-innovation index: Resource efficiency outcomes, Eco-innovation inputs and outputs. In order to reverse this situation it is convenient to support export of products from eco-industries, employment in eco-industries, research and development in the area of environment, energy research within the open system of innovations and also research in other areas connected to environmental policy of Slovakia.

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