



## Eco-innovations in the functioning of companies<sup>☆</sup>



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### ABSTRACT

The development of entrepreneurship in the 21st century cannot occur without taking care of the natural environment. The article presents issues related to eco-innovation.

Despite the opportunities offered by eco-innovations, implementation of such initiatives remains to lead to various difficulties. They vary across countries and sectors. The insufficient number of enterprises in Poland and other European countries implement adequate level of eco-innovations. The main aim of this paper is to indicate the causes of this status and activities aimed to develop eco-innovativeness. The benefits and risks connected with implementation of innovative products and technologies were also discussed.

Furthermore, the advantages of and barriers to their implementation into companies were analysed. The entrepreneurs from the least eco-innovative countries emphasize serious barriers, including uncertain demand from the market, uncertain return on investment or too long a payback period for eco-innovation, lack of funds within the enterprise, insufficient access to existing subsidies and fiscal incentive. They are especially afraid of the financial risks, which raises uncertainty and leads to refraining from innovative initiatives. The possibilities were indicated for the entrepreneurs who face problems with the implementation of innovative solutions. Particular attention was paid to the European Union activities for the development of eco-innovations. Numerous programs supporting their implementation were indicated. The article also presents examples of eco-innovation in water and sewage enterprises. It was emphasized that planning of eco-innovative solutions should be based on comprehensive information about actual benefits and possibility of threats to the environment which can be caused by implementation of eco-innovations. The study presents the example of threats resulting from different methods of sewage sludge management.

### 1. Introduction

Economic development is closely related to the higher and higher influence of enterprises on the natural environment. Modern companies should be managed strategically, economically and innovatively. Vast implementation of ecological solutions may help in the restriction of many key issues related to the environmental protection, such as detrimental climate changes, decreasing natural resources, environment pollution or the loss of biological diversity (Levidou et al., 2015).

One of the first definitions of eco-innovation was suggested by Fussler and James (1996) who described it as innovations which bring benefits to both the entrepreneur and the consumer with the simultaneous limitation of the detrimental impact of economy on the environment. Therefore, eco-innovation is a particular type of combination of innovation (novelty, creativity, change) and environmental sensitivity or ecological awareness (Karakaya et al., 2014).

A detailed eco-innovation typology, referring to the division of the

European system of innovations analysis, is suggested by the authors of the report on the MEI Project. It includes the following (Kemp and Volpi, 2008; Kleitz and Hansen, 2014; Eryigit and Özcüre, 2015 (Fig. 1).

Examinations point to a very high variation of the level of eco-innovativeness in individual European countries. An important EU's initiative aimed at eco-innovations is the Eco-Innovation Observatory. (<http://www.eco-innovation.eu/> (15 June 2015)). Numerous indices were used to prepare the Eco-Innovation Scoreboard which evaluates individual countries in terms of eco-innovativeness. Bulgaria, Poland, Cyprus and Malta are the least innovative in terms of the environmental protection, whereas Denmark, Finland, Ireland, Germany and Sweden are leaders among the European member states. This system is closely related with different factors that inhibit development of eco-innovativeness in individual countries.

A substantial majority of studies indicates that the following aspects are crucial for the eco-innovations implementation: the knowledge of

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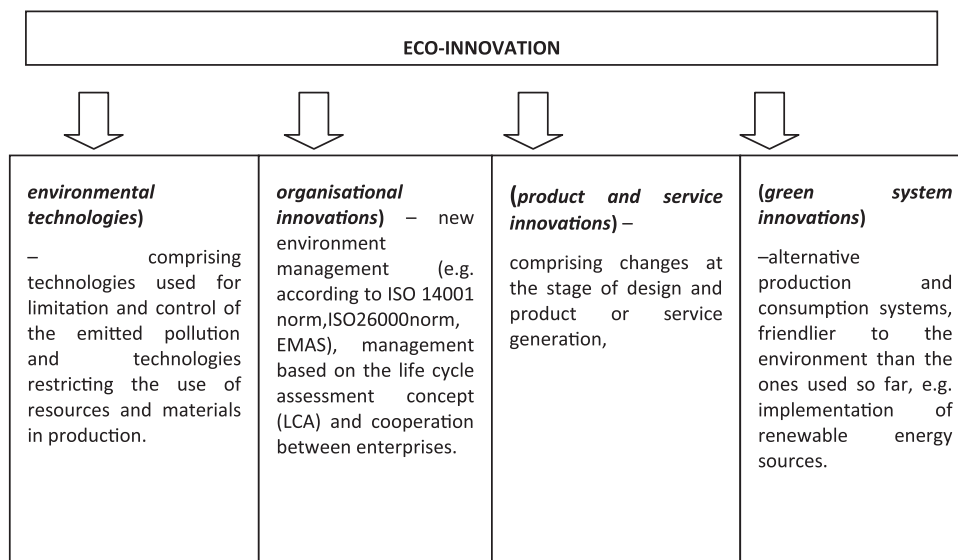


Fig. 1. Types of eco-innovation.

the market, legal regulations and requirements, interfunctional cooperation, innovation-oriented instruction, and current and expected environment protection regulations (Ziółko and Mróz, 2015; Medeiros et al., 2014; Cainella and Mazzanti, 2013; Horbach et al., 2012; Kesidou and Demirel, 2012).

The aim of the work is to signalise the significance of the eco-innovation implementations as necessary in meeting the requirements of environmental protection, and in building the competitiveness of enterprises, indicating the examples of eco-innovative solutions implemented recently in water and sewage enterprises. Furthermore, the study also aims to indicate the importance, benefits and possible threats to the environment, which can result from the use of innovative products or technologies. The paper also analysed the basic barriers to implementation of eco-innovations with the emphasis on the countries where barriers lead to substantial inhibition of the development of eco-innovativeness. Numerous programs developed by the European Union to support eco-innovativeness were also discussed.

## 2. Benefits and barriers of eco-innovation implementation

The introduction of eco-innovation in economic practice means the implementation of new or improved product, service or process, as well as, the implementation of a new marketing or organisation method concerning the organisation of work or relations with the environment (Urbaniak, 2014; Bartoszczuk, 2015). The factors determining the innovative activity of companies may be divided into internal and external. The internal factors comprise: material, capital and human resources, experiences and skills ensuring the ability to implement eco-innovations and gaining the competitive advantage on the market. The external factors influencing the innovative capacity of a company may be classified taking the type of company’s environment into consideration. The types comprise the sector and market within which the company acts, as well as the environmental conditions, scientific, economic and political (Horbach, 2008; González, 2009). An innovation usage should result in the cost reduction and increase of sales, or the improvement of services and meeting more and more restrictive legal requirements concerning the environment protection (Łunarski, 2010). Numerous authors emphasize that the necessary condition for innovations implementation must always be the actual entrepreneurs who are open to non-standard environmental solutions (Arimura et al., 2007; Mickwitz et al., 2007; Rennings and Rexhäuser, 2010; Szpor and Śniegocki, 2012). The Eurobarometer survey, carried out by the Gallup Organisation in small and medium enterprises of the EU, shows that

subjects from Poland find the following pro-eco-innovation incentives crucial: predicted increase in the energy costs (54% indications emphasising how important the factor is), good business partners (43%), high, up-to-date energy costs (43%), high, up-to-date sources costs (42%). Smaller significance was ascribed to, inter alia, the maintenance or increase of the market share (35%), the increasing demand on the green products (33%), expected future regulations (31%) and the current regulations and standards (26%). (Attitudes of European entrepreneurs towards eco-innovation, 2011). Risk is inherent in different types of innovative activities, including those eco-innovative. Risk level for an initiative is directly proportional to its innovativeness. The most basic cause of risks of innovative initiatives is insufficient knowledge and, consequently, uncertainty. One of the most frequent types of risk is financial risk. It is especially high when eco-innovative activities are financed by loans. This risk can be divided into (Godlewska et al., 2015):

- risk of delays in project implementation and, consequently, risk of delay in profit generation
- risk involved in exceeding the expenditures in the phase of investments
- risk of incomes lower than assumed.

Technological risk is also critical. Implementation of eco-innovative technologies can be connected with unpredictable problems connected with their use. Another important risk is also the lack of acceptance of a specific product in the market e.g. deposition of coatings on metal components using Cr(III) is more ecological than in the case of Cr(VI). However, chrome plating using Cr(III) yields a matt surface, whereas Cr(VI) coatings are used to obtain shiny surfaces. Lack of customer acceptance for chrome plating with Cr(III) leads to worse opportunities for using this technology on a broader scale.

Another risk is opportunity to obtain the product with worse specifications (e.g. lower strength) or unpredictable negative impact on the environment (e.g. washing the contaminants through acid rains).

An additional risk in the case of eco-innovations is unexpected changes in the area of legal regulations. Both stricter and more liberal regulations may be unfavourable for a specific eco-innovation.

It has to be emphasized that the above-mentioned determinants and barriers of eco-innovative activity vary according to the company’s scope of action and its size; they also vary across countries. Table 1 presents the most frequent barriers to the development of eco-

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