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ECO-INNOVATION OF PRODUCTS AND SERVICES

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Abstract: The paper deals with the issues of eco-innovation, which are related to the way in which natural resources are used and the way in which we consume and manufacture. Thanks to eco-innovation, enterprises can gain a competitive advantage in the market. Eco-innovations are closely related to the manner in which natural resources are used and the way we manufacture and consume. We can found many definition of eco-innovation. Although nowadays tremendous importance is attached to eco-innovations, they require a system-based approach to reduce consumption of natural resources, emission of pollutants and the amount of waste generated. Special attention is given in the paper to activities supporting the development of this particular form of innovation.

Keywords: eco-innovative products and services, production cycle, environmental protection, innovation index, pro-ecological policy, ecology, European Union

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Introduction

Environmental protection, in addition to its functions of protection and recreation of ecosystems, that have been in place until now, has become a significant component of the global economic policy. It is probably safe to say that in recent years environmental protection has become the second, beside innovation, area of the development policy, particularly emphasized by the European Union. In the opinion of the European Commission, eco-innovations are not only the best way to solve the problem of environmental pollution, but they can also make the whole economies and individual enterprises more competitive.

Environmental protection holds an important place in the policy of the European Union. Its significance was already noted in the Treaty on European Communities, which in Art. 130r enumerates actions of the Community relating to the environment, which have the following objectives:

- to preserve, protect and improve the quality of the environment,
- to contribute towards protecting human health,
- to ensure a prudent and rational utilization of natural resources.

The European Community environmental policy is based on the principles of:

1) foresight,
2) taking preventive actions,
3) rectifying environmental damage at source,

4) the polluter paying the costs of the damage.

The importance of the pro-ecological policy was also confirmed in the Single European Act, setting forth the fundamental priorities of this policy (Kowalik 2015, p. 24). Pro-environmental activity has to be primarily of preventive nature. The principle of eco-development is understood as the development compatible with natural conditions. It involves optimal use of resources, without significant and irreparable depletion. Currently the EU environmental legislation comprises ca. 200 legal acts concerning inter alia water and air pollution, waste and chemical substances management, biotechnics, environmental protection (Piasecki et al. 2001, p. 166).

Principles of environmental protection being in force in the European Union belong to the highest in the world. They are the result of many years of work and embrace numerous issues, including but not limited to fight against the climate changes, protection of rare plant and animal species, elimination of health problems caused by environmental pollution and more rational use of natural resources.

As such great importance is attached to eco-innovation, it is reasonable to ask what exactly is meant by eco-innovation. Many definitions of this term can be found in the literature. According to the generally accepted definition, eco-innovations are new products, management methods, manufacturing methods, ways of service provision and processes of resource exploitation which ensure lower risk of environmental pollution, use fewer raw materials and release fewer pollutants than alternative solutions (Kemp, Pearson 2007, p. 5). Another author defines eco-innovations as "intentional conduct characterized by initiative, comprising the stage of product design and integrated management during its life cycle, which subsequently contributes to pro-ecological modernization of the industrial era's societies, by accounting for environmental issues in the development of products and related processes (Carley, Spapens 2000, p. 157). The above definitions show that eco-innovations are all innovations that attempt to reduce negative impact on the natural environment (Stala 2015, p. 43). The aim of eco-innovations is to improve the condition of the natural environment by reduction of the negative impact of manufacturing activity on the environment and by more rational use of natural resources. Application of eco-innovative solutions undoubtedly fosters development of new technologies and services and thus enterprises become more environment friendly (Knop, Brzóska 2017, p. 89). Apart from the above benefits, somewhat different positive effects of eco-innovations should be also remembered, such as: reduction of business costs or upgrading of the company image. Eco-innovations are closely related to the manner in which natural resources are used and the way we manufacture and consume (Skowron-Grabowska et al. 2017, p. 102). Using eco-innovations which foster development of new processes, technologies and services, owing to which enterprises become more environment friendly, enables optimization of the economic growth potential and also makes it possible to face such challenges as shortage of natural resources, climate changes or disappearing biodiversity.

Eco-innovative products and services

In order to define an eco-innovative product, its innovation should be determined in direct and indirect influence on the environment. It seems that a product is eco-innovative when its innovation or innovation of its production technology exerts lesser pressure on the environment (Flis 2010, p. 101). In other words, eco-innovative products are the goods manufactured with minimal overall impact on the environment. With regard to the place where eco-innovation is to be found in the production cycle, three basic groups can be distinguished:

a) the first group consists of innovations leading to creation of products with entirely new ecological parameters, exerting much lesser pressure on the environment. An example of such eco-innovation is disposable biodegradable tableware or various energy-efficient household appliances, or fuel-efficient cars,
b) the second group comprises innovations leading to generation of products with the same ecological parameters as other products available on the market, but using less energy and raw materials owing to the use of new technologies in the production process,
c) the third groups combines the features of the first two groups, which means that both the product and the technology of its production are eco-innovative.

Services, in turn, are eco-innovative when eco-innovative products are used in the process of service provision or the service provider uses eco-innovative organizational or process solutions. Social services are particularly important because they can have greater implications for the environment than tangible products. Eco-innovative services include inter alia ecological financial products (e.g. investments taking into account ecological criteria), environmental services (e.g. waste management) and services reducing the demand for tangible goods (e.g. car-sharing). Both process innovations and organizational innovations have as their aim inter alia cost reduction by the application of new and more efficient concepts of production, delivery and internal organization. The starting point for the distinction between process innovations and organizational innovations is the type of activity. Namely, process innovations involve mainly implementation of new equipment, software, definite techniques or procedures, whereas organizational innovations apply mainly to people and organization of work in an enterprise. With regard to the manner of use of eco-innovations in the enterprise organization, we distinguish between eco-innovation of services and eco-innovative services. A service provider may perform non-eco-innovative services, but it can be eco-innovative in the manner of its management and organization. Thanks to its internal modernizations the service provider can be environment-friendly or can provide eco-innovative services such as construction of a waste treatment plant. There are many ways in which a business organization can have an impact on environmental protection, although all these ways boil down to as efficient use of energy and raw materials as possible. It is worth noting here that the simplest example of eco-innovation in a business organization is saving office supplies, advocated among staff members. Organizing educational campaigns in companies

improves the employees' knowledge of environmental protection and develops their positive attitude towards that issue.

There is no doubt that development of eco-innovation is determined to the most part by the level of people's awareness, which is reflected by the level of organizational culture. As L. Woźniak points out "it is commonly believed that any manifestations of innovation are connected with tremendous financial expenditures, those innovations, however, constitute a process of creative future-minded thinking, as a result of which almost maximal use of all dormant reserves of the particular environment is achieved, without the necessity of considerable financial outlays. The greatest barrier to social progress is the barrier of people's mentality, hindering any innovative projects which go beyond the traditional model established in the particular society" (Woźniak, Dziedzic, Kud 2005, p. 237).

Determinants of eco-innovation

Environmental protection is now an inseparable component of business operations. Currently businesses are facing numerous challenges connected with the constantly deteriorating condition of the natural environment, climate changes, rising prices of raw materials and legal restrictions. More and more rigorous requirements concerning the manner of conducting business operations are due to the fact that business activities carry serious implications for the quality of the environment. Business operations have unquestionably a significant impact on the condition of the natural environment. Eco-innovation leads to the creation of a product that, with its parameters and purpose, corresponds to similar products offered on the market, however, its production consumed less amount of natural resources and energy.

There are many reasons for introduction of ecological innovations in an enterprise. Those reasons can be divided into two basic groups: internal and external. Internal factors are those related to the specific character of an enterprise: - its size (small enterprises have smaller innovation potential because of their limited financial and organizational capacities), - industry (eco-innovations tend to be implemented in paper, printing and chemical industries, but seem to be rare in such sectors as metal products, food products, machinery production); - company culture (in many companies environmental protection is regarded as an element of their culture because environment-friendly processes and products can improve the market position and general image of the organization) (Urbaniec 2009, p. 57).

Internal factors, therefore, include those features which emerge from inside the enterprise. Those factors include for instance: raising ecological awareness of the entrepreneurs themselves, voluntary commitments, managers' aspirations, environmental policy of the enterprise (Zawada et al. 2015, p. 8).

External factors, in turn, include first of all the government ecological policy, constantly rising raw material and energy prices (Stępień, Łęgowik-Świącik, Kuraś 2017). Growth of social awareness can be also regarded as an external factor. Due to various information campaigns social awareness is significantly rising year by

year. Hence, enterprises should introduce innovations and create new ecological trends to mark their position on the market.

Introduction of innovations depends also on such external factors as institutional support, social expectations and relations with suppliers and customers.

Conclusions

Despite great emphasis on eco-innovative activity in recent years, research shows that more actions of this type are still necessary, both in the European Union and in Poland. Annual data published by the European Commission show that in the field of innovation the European Union states still cannot catch up with other highly developed countries, for instance: the United States, South Korea or Japan. Another alarming phenomenon are growing differences in innovation and research within the European Union itself. It appears that in spite the annual global improvement of innovation indexes, some countries with the already high innovation level, show progress in this field, while no progress is noted in other countries. Based on research taking into account 24 indicators (including but not limited to investments in innovations, investments in "green technologies", level of expenditures on research and development), the EU states have been divided into 4 groups (*Table 1*).

Table 1. Innovation ranking

Group	Criterion of performance assessment	EU Member States
INNOVATION LEADERS	much above the EU average	Germany, Sweden, Denmark, Finland
STRONG INNOVATORS	above the EU average	Netherlands, France, Belgium, Luxembourg, United Kingdom, Austria
MODERATE INNOVATORS	below the EU average	Italy, Spain, Portugal, Czech Republic, Hungary, Lithuania
MODEST INNOVATORS	much below the EU average	Poland, Latvia, Romania, Bulgaria, Cyprus, Malta

Source: (https://ec.europa.eu/)

As can be seen, our country belongs to the last group and cannot boast of too high a score in the Summary Innovation Index. Poland is one of the most poorly utilizing natural resources and least energy-efficient economies of the European Union (*Innowacyjność polskiej gospodarki*, p. 45). The reasons for this situation can be inter alia the overall economic downturn in consequence of the financial crisis which began in 2008, insufficient cooperation between the research sector and the industry as well as numerous administrative hurdles to innovations. Obstacles to innovations in Poland are mainly of economic nature and, as mentioned before, they boil down to: poor system of economic and tax incentives, access to capital, uncertain return on investment or lack of sufficient knowledge of potential economic benefits from implementation of innovations.

It is comforting, however, that in April 2014 Poland adopted the Smart Growth Operational Programme 2014-2020, which was approved by the European Commission, where such fields as reduction of waste, recycling, energy-efficient technologies and sustainable transport were treated as matters of priority. According to the authors' intentions, the Programme supports scientific research, development of new innovative technologies and actions to make small and medium enterprises more competitive. Its basic task is to stimulate the innovation of the Polish economy by increasing private expenditures on research and development and creation of businesses' demand for innovations and research and development works. The Polish government is taking constant actions to reduce burdens imposed on citizens and business entities. Special activity is geared to enterprises. Implemented measures aim to create favourable conditions for enterprise development by inter alia strengthening competitive edges and in effect to achieve stable economic growth in a long-term perspective. The objectives of those measures are first of all to improve the access of businesses to capital, to support entrepreneurial attitudes, to strengthen the business environment institutionally, organizationally and financially and to fill the information gap by providing access to analyses of competitiveness of industrial sectors (Skowron--Grabowska, Mesjasz-Lech 2016). Lastly, the EU funds cannot be overlooked with their positive impact on conduct of business activity in Poland (*Smart Growth …*).

In the coming years the measures taken should bring about improvement in the field of eco-innovation in Poland. It will require, however, implementation of a coherent governmental policy, which on one hand will support the economic development of the country and on the other hand will ensure environmental protection. Environmental protection has become an inseparable element of the functioning of enterprises. Environmental protection is now an inseparable component of business operations. Thanks to eco-innovation, enterprises can gain a competitive advantage in the market. Eco-innovations are closely related to the manner in which natural resources are used and the way we manufacture and consume (Seroka-Stolka, Nowakowska-Grunt 2012, p. 366-371). There is no doubt that a company operating in a market economy that is not innovative may not survive. That is why more and more enterprises are constantly adapting to changes taking place in the environment and introducing new products and services.

Literature

1. Carley M., Spapens P. (2000), *Dzielenie się światem*, Instytut na rzecz Ekorozwoju, Białystok-Warszawa.
2. Flis R. (2010), *Ekoinnowacyjność produktów i usług*, [in:] Woźniak L., Strojny J., Wojnicka E. (red.), *Ekoinnowacje w praktyce funkcjonowania MŚP*, Polska Agencja Rozwoju Przedsiębiorczości, Warszawa, p. 98-112.
3. https://ec.europa.eu/
4. *Innowacyjność polskiej gospodarki*, "Zeszyty Innowacyjne", nr 2, CASE, http://www.case-research.eu/pl/innowacyjno-polskiej-gospodarki (accessed: 24.02.2017).
5. Kemp R., Pearson P. (2007), *Final Report MEI Project about Measuring Ecoinnovation*, UM-MERIT, https://www.oecd.org/env/consumption-innovation/43960830.pdf (accessed: 14.02.2017).

6. Knop L., Brzóska J. (2017), *Regionalne obserwatorium specjalistyczne – narzędzie wdrażania regionalnej strategii innowacji w województwie śląskim*, [in:] Grabowska M., Ślusarczyk B. (red.), *Zarządzanie organizacją. Koncepcje, wyzwania, perspektywy*, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa, p. 87-100.
7. Kowalik J. (2015), *Analiza poziomu innowacyjności państw Unii Europejskiej*, "Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie", nr 19, p. 22-34.
8. Piasecki B., Rogutt A., Stawasz E., Johnson S., Smallbone D. (2001), *Warunki prowadzenia działalności gospodarczej przez MSP w Polsce i krajach Unii Europejskiej*, Polska Agencja Rozwoju Przedsiębiorczości, Warszawa.
9. Seroka-Stolka O., Nowakowska-Grunt J. (2012), *Evaluation of the Eco-Effectiveness and the Individual Environmental Awareness of the Częstochowa Region Businessmen in the Light of the Conducted Survey*, "Polish Journal of Environmental Studies", Vol. 21(5A), p. 366-371.
10. Skowron-Grabowska B., Mesjasz-Lech A. (2016), *Konkurencyjne uwarunkowania zarządzania zasobami kadrowymi w przedsiębiorstwach w kontekście dostępu do rynku pracy*, "Przegląd Organizacji", nr 10, p. 22-28.
11. Skowron-Grabowska B., Seroka-Stolka O., Wójcik-Mazur A., Surowiec A., Pietrasieński P. (2017), *Kultura organizacyjno-innowacyjna a działalność marketingowa przedsiębiorstw*, [in:] Grabowska M., Ślusarczyk B. (red.), *Zarządzanie organizacją. Koncepcje, wyzwania, perspektywy*, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa, p. 101-109.
12. *Smart Growth Operational Programme 2014-2020*, Ministry of Infrastructure and Development, https://www.poir.gov.pl/media/6223/EN_POIR_zatwierdzony_przez_KE_23022015.pdf (accessed: 20.02.2017).
13. Stala K. (2015), *Wpływ ekoinnowacyjności produktów na rozwój przedsiębiorstwa*, [in:] Kościelniak H., Łukasik K. (red.), *Wyzwania i perspektywy przedsiębiorczej organizacji*, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa, p. 41-49.
14. Stępień M., Łęgowik-Świącik S., Kuraś M. (2017), *Wpływ prawa bilansowego i podatkowego na innowacyjność przedsiębiorstw*, "Przegląd Organizacji", nr 1, p. 10-15.
15. Urbaniec M. (2009), *Wpływ innowacji ekologicznych na rozwój zrównoważony*, [in:] Sidorczuk-Pietraszko E. (red.), *Funkcjonowanie przedsiębiorstw w warunkach zrównoważonego rozwoju i gospodarki opartej na wiedzy*, Wydawnictwo Wyższej Szkoły Ekonomicznej, Białystok, p. 57-65.
16. Woźniak L., Dziedzic S., Kud K. (2005), *Ekoinnowacyjność w regionalnej strategii innowacji woj. podkarpackiego na lata 2005-2013*, [in:] Kaszuba K., Targalski J. (red.), *Innowacyjność sektora MŚP. Małopolska i Podkarpacie*, Wydawnictwo Wyższej Szkoły Zarządzania, Kraków-Rzeszów, p. 237-246.
17. Zawada M., Pabian A., Bylok F., Cichobłaziński L. (2015), *Innowacje w sektorze energetycznym*, "Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie", nr 19, p. 7-21.

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Streszczenie: W artykule przedstawiono zagadnienie ekoinnowacji, które są powiązane ze sposobem, w jaki wykorzystuje się zasoby naturalne, oraz z tym, jak konsumujemy i produkujemy. Mimo iż ekoinnowacjom przypisuje się już dzisiaj ogromne znaczenie, wymagają one systemowego podejścia na rzecz zmniejszenia zużycia surowców naturalnych, emisji zanieczyszczeń oraz ilości wytwarzanych odpadów. W artykule zwrócono uwagę na działania wspierające rozwój tej szczególnej formy innowacji.

Słowa kluczowe: produkty i usługi ekoinnowacyjne, cykl produkcyjny, ochrona środowiska, wskaźnik innowacyjności, ekologia, Unia Europejska