

The Potential of Innovativeness and Eco-innovativeness of Small and Medium Manufacturing Companies in Poland

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Abstract: The aim of the paper is to present innovation and eco-innovation in the sector of small and medium manufacturing companies in Poland. Small and medium enterprises constitute a significant part of manufacturing companies, which is highly significant for the economy of the country. The implementation of innovative solutions aiming at the symbiosis of manufacturing companies with the environment is both really necessary and, at present, required from entrepreneurs. Undertaking activities in the field of the environmental protection helps in minimizing losses in the natural environment resulting from the operation of industrial companies.

Keywords: innovation, eco-innovativeness, SME sector

1 Introduction

Nowadays, the significance of the SME sector is essential in the market economy. Therefore, the issue of modernization of this sector is so important. The implementation of modern solutions should include the ecological aspect. Manufacturing companies, most frequently, aim at the implementation of innovation referring to the improvement of effectiveness and profits of the company. At present, the requirements concerning the activities in the field of the environmental protection force entrepreneurs to think ecologically. Eco-innovativeness of manufacturing companies allows for the minimization of their harmful impact on the natural environment.

2 The SME sector

Enterprises acting as business entities, running their activities on the market, are defined depending on many adopted criteria. On national and international markets there are identified a lot of enterprises, from small to the largest ones, which are significant for different types of sectors. The SME sector includes three types of enterprises:

- microenterprises,
- small enterprises,
- medium enterprises.

Each of the listed types of enterprises performs a different function on the market with reference to different requirements set by different groups of clients. While characterizing microenterprises, it should be noticed that these are enterprises employing not more than 9 employees and with the annual turnover not exceeding EUR 2 million. Small enterprises are characterized by the employment amounting to 10-49 workers and the net turnover and the value of assets in the range of EUR 2 - 10 million. On the other hand, medium enterprises employ 50-249 workers and their turnover and value of assets do not exceed EUR 50 million. The data in Table 1 show the criteria which need to be fulfilled by an enterprise to be qualified for the appropriate group.

Criterion	Microenterprise	Small enterprise	Medium enterprise
Average annual employment	0-9	10-49	50-249
Annual net turnover	<2 million euro	<10 million euro	< 50 million euro
Value of assets	<2 million euro	<10 million euro	< 43 million euro

Table 1

Quantitative criteria typical of micro-, small and medium enterprises

Source: Based on: The Act of 2 July 2004 on economic freedom, Journal of Laws of 2004 No. 173, item 1807, codified for 31.03.2009 r.

The criteria presented in Table 1 allow for the classification of business entities with respect to the number of employees, annual net turnover and the value of assets. The total number of the registered entities in recent years is presented in Figure 1.

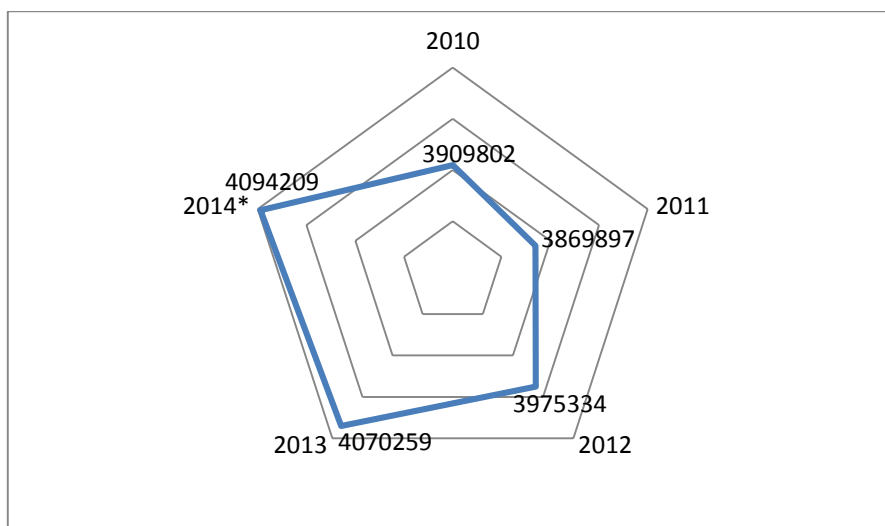


Figure 1.

The entities registered in the REGON registration in years 2010-2014 in Poland

*the data for the first half of 2014

Source: www.stat.gov.pl

Figure 1 presents the total number of the registered enterprises. In 2010 the number of enterprises amounted to 3 909 802, a slight decrease was recorded in 2011. On the other hand, in 2012 there was a significant increase by 105 437 compared to the previous year. Since 2013 there has been recorded a slight but constant increase in the number of the registered enterprises.

In the studied years the situation of the entities registered in the REGON registration of the SME sector with reference to the number of employees is the following (Table 2)

	0-9	10-49	50-249
2010	3 713 677	161 550	29 731
2011	3 674 970	160 851	29 340
2012	3 794 489	146 489	29 787
2013	3 890 686	145 425	29 637
2014*	3 914 195	145 932	29 587

Table 2.

The entities of the SME sector registered in the REGON registration in years 2010-2014

*the data for the first half of 2014

Source: www.stat.gov.pl

The data presented in Table 2 indicate that the number of the registered enterprises, employing up to 9 employees, was steadily growing, from 3 713 677 in 2010 to 3 914 195 in the first half of 2014. The number of the registered entities employing 10 to 49 workers in years 2010 and 2011 amounted to about 161 thousand, whereas in 2012 it went down to 146 489 and in subsequent years it remained stable. No significant changes were observed among medium enterprises, employing 50-249 workers in the studied period, their number remained stable and it amounted to 29 thousand a year.

2.1 Innovativeness of the SME sector

The emergence of innovative solutions in many fields leads to the necessity to modernize enterprises in different areas of activity. Innovativeness is specified as constant readiness to introduce changes. [1] It is the condition of the existence and also the attribute of modern enterprises. The capability of an enterprise for innovativeness appears when it disposes of the resources essential for creating and implementing innovation. [2] Striving for the implementation of innovative solutions by entrepreneurs is becoming more and more common. Innovativeness is also defined as a range of activities: research and development, technological, organizational, trade and finance, based on the implementation of new products and processes. [3] Innovative solutions begin with the emergence of an idea. Nowadays, a lot of innovative solutions remain in the initial stage. This is due to the lack of necessary funds and entrepreneurs' fear of introducing changes. Innovation is a complex and multifaceted phenomenon, occurring at the level of a single enterprise and of the overall market. [4] The implementation of innovation in an enterprise is associated with risk however, not taking it, the entrepreneur cannot develop their enterprise. The owners, before taking a decision on innovation, wonder if the implementation of these changes will bring the assumed benefits and if they will be profitable for the enterprise. Unwillingness to take risk and the lack of interest in creative possibilities of employees are interorganizational barriers threatening the development of business entities. Innovativeness in services and production aims at satisfying clients' needs and going ahead of competition. [5] The introduction of improvements and innovation builds a positive image of the enterprise in the eyes of potential clients. On the whole, innovation can be defined as something new or significantly improved in a certain area.[6] Innovation is also defined as a whole of activities essential for the emergence and practical use of new technological solutions, including new or modernized products, services and processes.[7] The implementation of innovative solutions should lead to an increase in competitiveness of business entities on the market.[8] The differences between enterprises from the SME sector mainly result from the entrepreneur's attitude. In smaller business entities, the owners are afraid of introducing any changes which may pose a risk to the activity of the whole company and its market position. The primary objective of the entrepreneur in small enterprises should be stimulating employees to be creative and preparing the company to implement appropriate

solutions. Due to difficult access to capital, small and medium enterprises should concentrate on introducing the innovation based on excellent knowledge of the market and, to a lesser extent, technologically new solutions. On the other hand, large enterprises, having a possibility to conduct their own research or purchase new solutions, are often forerunners in modern technological solutions. The innovation introduced by the SME sector and large companies is presented in Figure 2.

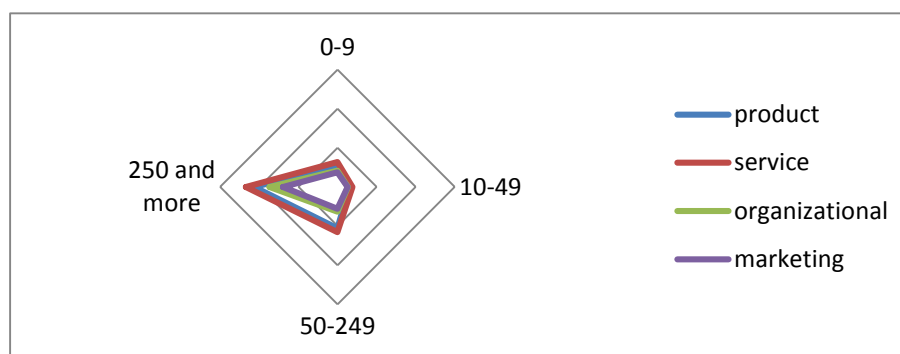


Figure 2.

The share of manufacturing companies implementing innovation in years 2011-2013 in the total number of enterprises.

Source: www.stat.gov.pl

It can be noticed in Figure 2 that, in years 2011-2013, in manufacturing companies, most frequently there was implemented service innovation. Among large enterprises, this factor amounted to 46.9 %, on the other hand, in medium enterprises, this factor amounted to 23.1%. In microenterprises, there was also introduced the most of service innovation. In small and medium enterprises, there was implemented the least of marketing innovation.

Each introduced innovation, irrespective of the kind and number of employees, is favorable for the development of the enterprise and economic development.

3 Eco-innovation in enterprises

Challenges connected with the environmental protection, which the contemporary enterprises face, may be achieved by an increase in eco-innovativeness. The SME sector is predisposed to the implementation of eco-innovative solutions on account of great flexibility of small and medium enterprises and total impact of the sector on the natural environment. It is estimated that the total impact on the natural environment with respect to pollutant emissions coming from British enterprises corresponds to SME and it amounts to 60% of the total carbon dioxide emissions. The estimates made in the Netherlands and Great Britain indicate that industrial

and commercial waste from SME, on average, amounts to 50% of all waste which indicates significant impact of the SME sector on the environment.

In literature, eco-innovation is defined in different ways. The concept of eco-innovation was introduced for the first time by Fussler and James in 1996. Eco-innovation may, therefore, be defined as the innovation used for measuring, preventing, reducing, minimizing and improving environmental damage to water, air, soil, natural resources; it refers to the problems connected with noise and ecosystems. This innovation includes reduction in greenhouse gases and so called energy innovation concerning energy efficiency and renewable energy sources.[9] Eco-innovation is the innovation which improves the effectiveness of the use of natural resources in the economy, reduces the negative impact of human activities on the environment or strengthens the resistance of the economy to environmental pressures.[10] According to L. Woźniak and B. Ziółkowski, eco-innovation also refers to such innovation which consciously aims at reducing the burden of the environment.[11] It is the combination of innovativeness (innovativeness, creativity, change) with the environmental sensitivity and ecological awareness of the organization. The significance of the last feature of eco-innovation has its numerous positive effects on account of an increase in the concern of the sector for the condition of the environment and, consequently, an increase in the extent of some active operations for the benefit of the improvement in the quality of the natural environment. [12] Eco-innovation plays an important role in the process of creating ecological awareness of entrepreneurs. In the Polish and foreign literature there are used different terms for eco-innovation, i.e. ecological innovation, environmental innovation, environmental technologies.

However, the common denominator of all the definitions of eco-innovation is the elimination and minimization of the negative impact on the environment. Implementing eco-innovative technologies, which contribute to reduction in this impact on the environment, allows enterprises to avoid or receive lesser punishment or environmental fees and reduce the cost of acquiring the shrinking natural resources and become independent (more and more significantly) of traditional sources of energy.

Some authors claim that the key element of ecological innovation is *newness* [13]. On the other hand, others state that the term of innovativeness gives up the advantage of *newness* including considerable changes from the point of view of the company. [14] However, it should be noted that innovation does not need to be created by the company itself on its own but it can be acquired from other entities in the diffusion process. The minimum criterion to let the change referring to products or the function of the company be acknowledged as innovation is the fact that it constitutes newness (or significant improvement). The previous research in the field of eco-innovativeness was based on the theoretical solutions. There is more and more evidence that eco-innovation, initially requiring incurring costs for its implementation, in time becomes the basis for competitive advantage of enterprises.

It enables the expansion into new markets and ultimately, it leads to reduction in costs. Therefore, it may constitute the source of strategic innovation. [15]

Admittedly, there was observed an upward trend in the amount of expenditure on fixed assets for the environmental protection which, in 2013, amounted to about PLN 10.9 billion and was higher by 7.1% than in the previous year (Table 3). There was also recorded an increase in the expenditure on fixed assets for water management, which reached the level of about PLN 3.1 billion and was higher by 9.7% compared to the previous year.

	2005	2010	2011	2012	2013
Total in million PLN	46285.8	37881.4	48606.7	36253.7	35183.2
Environmental protection	6570.3	5986.5	10926.2	10127.8	10851.2
Expenditure for fixed assets for the environmental protection and water management	1652.7	1715.8	3565.4	2787.9	3059.3

Table 3.

Expenditure for the environmental protection in years 2010-2013 (million PLN)

Source: Authors' own study based on GUS (Central Statistical Office), Environmental Protection 2014. [16]

Low level of eco-innovativeness of Poland results from insufficient public and private expenditure on green R+D. The situation is similar in case of patents where there is noticeable a high share of technologies connected with the environmental protection among few patent applications.[17] In turn, Polish enterprises introduce not only too little eco-innovation but also innovation in general, although the potential of eco-innovation seems to be larger than the potential of total innovation (Figure 3). The Central Statistical Office, for the first time, to a greater extent, conducted the analysis including eco-innovation, called, for the purposes of the research, the one bringing benefits for the environment, in the framework of the extended edition of the survey on innovation for 2006–2008.[18] The research indicated that in years 2006-2008 the innovation bringing benefits for the natural environment was introduced by 26.5% of industrial companies and 16.1% of the service companies. The most innovative were found to be large enterprises (employing more than 249 workers), where the share of innovation amounted to 57.5% – in industry and 35.0% – in the service sector. In enterprises employing 50-249 workers, the share of eco-innovation amounted to 34.1% in industry and 20.6%

in the sector of services, whereas in enterprises with 10-49 employees - respectively 21.7% and 14.6% (Table 4).

	Industry	Servivces
Total	26.1	16.1
Public sector	35.6	23.3
Private sector	26.1	16.0
10-49 employees	21.7	14.6
50-249 employees	34.1	20.6
More than 249 employees	57.5	35.0

Table 4.
 Enterprises implementing eco-innovation in Poland in years 2006-2008 (% of the total)
 Source: GUS 2010.

In the analyses, there was identified the innovation bringing benefits for the environment which may emerge at the time of the manufacturing of the product or service, and also the benefits for the environment which may arise at the time of the use of the purchased product or service by the end-users. The innovation bringing benefits for the environment at the time of manufacturing a product or service was implemented by nearly every fourth industrial company and 13.4% of enterprise in the sector of services. In industrial companies employing 10-49 nearly every fifth - implemented the eco-innovation of this kind, and in entities with 50-249 employees – 31.6%. For service companies, this share amounted to 11.9% and 17.6% respectively. The innovation bringing benefits for the environment, achieved at the time of using the product or service, was introduced by 17.8% of industrial companies and 11.4% of enterprises in the sector of services. Regarding these indicators with respects to the size of the studied enterprises, in industrial companies with the number of employees amounting to 10-49 it was 14.7%, and with 50-249 employees – 22.4%, whereas in case of enterprises from the sector of services – respectively 10.4% and 13.9%.

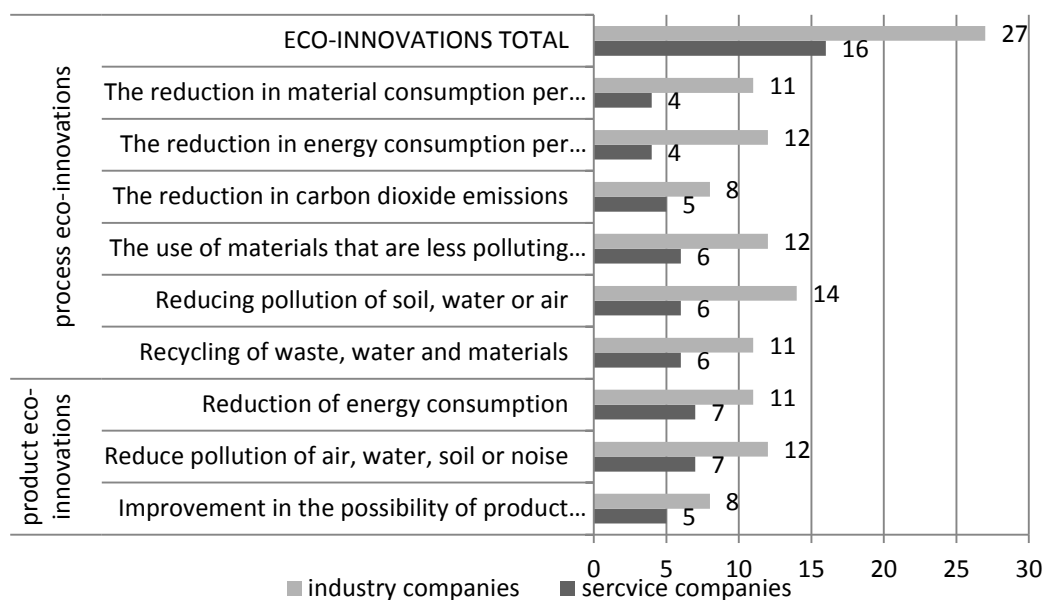


Figure 3.
Enterprises implementing eco-innovation in Poland in years 2006-2008 (% of the total)
Source: GUS 2010.

4 Conclusions

Enterprises, apart from the implementation of their basic objective, which is multiplying the capital, must consider the issues connected with the protection of the natural environment in their activities. The process tool, which may serve enterprises to fulfil the above objectives, may be ecological innovation since the paradigm of eco-innovation assumes that it must bring not only benefits for the enterprise but also for the environment by reducing or eliminating the impact on the environment. Polish enterprises in years 2006-2008 more frequently implemented new environmental-friendly solutions than other process and product innovation. However, the larger enterprises and the ones belonging to the public sector in industry were more eco-innovative.

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