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## **Eco – Innovation in European SMEs: between Limitation and Possibilities**

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**Abstract:** During the recent decades many SMEs have started to use the term eco-innovation to describe the contributions of business to sustainable development while improving competitiveness. According to literature review, eco-innovation can be generally defined as innovation that results in a reduction of environmental impact, no matter whether or not that effect is intended. This paper examines whether using eco -innovation is an opportunity for increasing the competitiveness of SMEs at a European level. An empirical study is carried out using data from 112 European SMEs between May 2014 and December 2014 in the following areas: agriculture, manufacturing, environmental industries and construction. The results of this study show that the eco-innovative barriers and engagement in green innovative activities are strongly related to the SME's adoption performance. Moreover, this paper also provides that eco-innovation is therefore a powerful instrument, combining reduced negative impact on the environment with a positive impact on the economy and society.

**Keywords:** eco-innovation; SMEs; sustainability

**JEL Classification:** O32; O33; Q01

### **1 Introduction**

The term eco-innovation seems to have first appeared in ‘Driving Eco Innovation’, a book by Claude Fussler and Peter James in 1996. The authors defined the concept as “new products and processes that provide customer and business value while significantly decreasing environmental impacts”.

Based on the Oslo Manual and drawing from other authors (e.g. Reid and Miedzinski, 2008; MERIT et al., 2008), eco-innovation can be described as “the implementation of new, or significantly improved, products (goods and services), processes, marketing methods, organisational structures and institutional arrangements which, with or without intent, lead to environmental improvements compared to relevant alternatives”.

Based on literature review, various eco-innovation activities can be analysed along three dimensions: targets (the focus areas of eco-innovation: products, processes, marketing methods, organisations and institutions); mechanisms (the ways in which changes are made in the targets: modification, redesign, alternatives and creation); and impacts (effects of eco-innovation on the environment).

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The application of the eco-innovation concept offers a promising way to move industrial production in a more sustainable direction and respond to pressing global challenges such as climate change. Also, the International Energy Agency (IEA) predicts that the global energy-related CO<sub>2</sub> emissions will increase by 25% by 2030 even under the current best policy scenario (IEA, 2007).

More recently, Governments in OECD countries have supported to help achieve ambitious environmental and socio-economic goals simultaneously, as environmental and innovation policies can reinforce each other. The survey from ten OECD countries (Canada, Denmark, France, Germany, Greece, Japan, Sweden, Turkey, the United Kingdom and the United States) found that an increasing number of countries now perceive environmental challenges not as a barrier to economic growth, but as a new opportunity for increasing competitiveness.

To help companies step up their contribution to create a sustainable society while remaining competitive in the global market, the World Business Council for Sustainable Development (WBCSD) introduced the concept of eco-efficiency, which was put forth as one of industry's key contributions to sustainable development at the time of the UNCED in 1992 (Schmidheiny, 1992).

However, it explores the conceptual relations between sustainable manufacturing and eco-innovation as a means of analysing current initiatives from a broader perspective and spreading good practices in the sectors, especially among supply chain companies and small and medium-sized enterprises (SMEs) (Maxwell et al., 2006). Initiatives and programmes for SMEs that promote eco-innovation are diverse and include both supply-side and demand-side measures.

In the EU, eco-innovation has been considered to support the wider objectives of its Lisbon Strategy for competitiveness and economic growth. In 2004, the Environmental Technology Action Plan (ETAP) was introduced to promote the development and implementation of eco-innovation. Eco innovation now forms part of the EU's Competitiveness and Innovation Framework Programme 2014-2020, which offered EUR 80 billion in funding to stimulate the uptake of environmental products, processes and services especially among SMEs. Eco-innovation is therefore a powerful instrument, combining reduced negative impact on the environment with a positive impact on the economy and society.

The paper is structured as following – firstly we review the relevant literature regarding eco-innovation barriers for European SMEs, then we describe the methodology and the data we employ from the analysis. The sectors involved in the survey are: agriculture, manufacturing, environmental industries and construction. Finally, we conclude and suggest some policy implications of the analysis.

## **2 A Brief Overview Regarding the Barriers Hindering the Adoption of Eco-Innovation in European SMEs**

The primary focus of eco-innovation, as of conventional innovation, has been the development and application of different technologies, but recent evidence suggests that non-technological changes are becoming more important (Reid and Miedzinski, 2008). Also, from a practical point of view, it is important to show that the eco-innovation improves overall environmental conditions.

The emerging opportunities SMEs expanded the scope of intervention from environmental technologies to also include non-technical eco-innovation, a real focus on the global dimension and increased attention to networking. The actions are in two broad areas: additional actions specific to eco-innovation and going beyond the Europe 2020 flagships and global actions.

Rennings and Zwick (2003) define five drivers of eco-innovation: regulation, demand from users, capturing new markets, cost reduction and image. The EC-funded IMPRESS survey found many reasons for introducing eco-innovation besides complying with regulations. They include: improving the firm's image; reducing costs; achieving accreditation; as part of product and service innovations; securing existing markets; and increasing market share.

According with the European Commission in its Environmental Technologies Action Plan (ETAP 2014), five groups of barriers are identified:

- Economic barriers, such as the higher cost of investments in environmental technologies because of their perceived risk, the size of the initial investment or the complexity of switching from traditional to environmental technologies;
- Legislative barriers, when legislation is unclear or too detailed, while good legislation can stimulate environmental technologies;
- Insufficient research efforts, coupled with inappropriate functioning of the research system in European countries and weaknesses in information and training;
- Inadequate availability of risk capital to move from the drawing board to the production line;
- Lack of market demand from the public sector, as well as from consumers.

Another author makes a distinction between the following types of barriers:

- Technological barriers: availability of technology for specific applications;
- Financial barriers: research and development costs of technology;
- Labour force-related barriers: lack of person(s) in charge of management, control, and implementation;
- Regulatory barriers: uncertainty about future environmental regulation;
- Consumer-related barriers: risk of customer loss if output properties change slightly or if product cannot be delivered for a certain period;
- Supplier-related barriers: lack of supplier support in terms of product advertising, good maintenance service, expertise of process adjustments, and so forth;
- Managerial barriers: lack of top management commitment.

The European Council also strongly encouraged an initiative called "Small Business Act" (SBA) for Europe, to further strengthen the sustainable growth and competitiveness of SMEs, and urge its swift adoption. The review of the single market has also insisted on the need for further initiatives to better adapt the single market to the current needs of the SMEs, in order to enable them to achieve better results and more benefits. Thus, the "Small Business Act" aims to improve the overall policy approach to entrepreneurship, to irreversibly anchor the "Think small first" principle in policy making, from regulation to public service, and to promote the growth of SMEs by helping them tackle the remaining problems which hamper their development.

Also, through this document we encourage the Member States and regions to invest in innovation – these investments being sustainable and with a high added value, enhancing economic competitiveness on medium and long term.

Of the principles which aim for the innovation capacity development mentioned in SAB 2020 and place SMEs on an equal footing and improve the legal / administrative environment throughout the European Union, we must note:

- helping SMEs to benefit more from the opportunities offered by the single market;
- promoting the improvement of skills in SMEs and all forms of innovation;

- supporting SMEs to turn environmental challenges into opportunities.

The Romanian Government and Ministry of Environment and Sustainable Development, United Nations Development Programme and the National Centre for Sustainable Development have developed and published the final version of the National Strategy for Sustainable Development in Romania 2013-2020-2030.

This strategy aims to achieve medium and long term strategic objectives, as following:

- Horizon 2020: Reaching the current average level of EU countries in key indicators of sustainable development;
- Horizon 2030: The significant closeness of Romania to the average level of that year of sustainable development of EU countries.

Sustainable strategies to increase Romanian SMEs competitiveness concern:

- elaborating business strategies which include essential aspects of sustainable development aimed at increasing the capacity for research and innovation;
- developing networks / partnerships regarding sustainable development (innovation partnership – public and private sector);
- strategies for stimulating the concentration process of native private capital to increase the role of SMEs in the Romanian economy development;
- supporting national strategies for innovation and technology transfer for sustainable development (Network Centers of “Enterprise Europe Network”, Network ReNITT of Innovation and Technology Transfer Centers, innovation vouchers).

To summarize, in a world where success is almost required it can be said that sustainable development brings “prosperity” for SMEs because its message is consistent with the perspective of eco reconciliation with nature and creating a stimulating business environment for SMEs. Sustainable development requires a new kind of reference to reality and also the development of new forms of specific work organization – “smart economy” (clusters, poles of competitiveness, industrial parks, business incubators, industrial sites, etc.); it is important to develop nationwide voluntary eco-innovation roadmaps to facilitate assimilating the policy by the Member States and to increase confidence in environmental technologies.

### **3 Data and Methodology**

Against this background, research methodology is based on 112 European SMEs between May 2014 and December 2014 considered to be representative stratified sample of EU-28 SMEs (10-249 employees). Sectors involved in the survey are: agriculture, manufacturing, environmental industries and construction. The survey instrument used for this study was a combination between an email questionnaire survey and research interviews. We also used the Likert Scale (1 = almost always, 2=to a considerable degree, 3=occasionally, 4=seldom and 5=never). The questionnaire is divided into two parts: the entrepreneurs’ perception towards eco-innovation and green entrepreneur in European business and the questions focusing on the following hypothesis:

H1: Entrepreneurs having environmental knowledge have an inclination to eco-innovation.

H2: There is a positive relationship between eco-innovation and the financial performance of SMEs.

H3: Eco-innovation can significantly affect a small and medium firm’s competitive advantage.

For the final survey, a total of 88 questionnaires were collected, containing information regarding the entrepreneur's attitude towards eco-innovation and the firm-level financial performance using eco-innovation. Evidence on barriers to innovation has revealed an important aspect that should be taken into account when dealing with data on perceived obstacles to innovation activities.

#### 4 Result

In the internal consistency reliability, Cronbach's  $\alpha$  coefficient is used. This study makes the message number as independent variables and eco-innovation as the dependent variable. Data was analysed using ANOVA.

Table 1 shows the results of ANOVA with participants overall shift to inspect H1. It is shown that there are significant differences regarding the attitudes of European entrepreneurs towards eco-innovation ( $p < 0.001$ ). The results support our predictions of H1.

**Table 1. Attitudes of European entrepreneurs towards eco-innovation**

	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F-Value</i>	<i>P-value</i>
Between	3.821	0.78	3.821	15.024***	0.000
Within	74.750	202.22	0.163		
Sum	78.571	203			

Notes : \* $p < 0.05$  , \*\* $p < 0.01$  , \*\*\* $p < 0.001$

Table 2 shows the results of ANOVA with participants overall shift to inspect H2. It is shown that there are the significant differences between eco-innovation and the financial performance of SMEs ( $p < 0.001$ ) and further analysis of the mean value of SMEs' financial performance. The results support our predictions of H2.

**Table 2. Differences between eco-innovation and the financial performance of SMEs**

	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F-Value</i>	<i>P-value</i>
Between	1.881	1	1.881	5.24*	0.003
Within	35.394	97	0.260	19.75	
Sum	37.275	98			

Notes : \* $p < 0.05$  , \*\* $p < 0.01$  , \*\*\* $p < 0.001$

This data was analysed using one-way ANOVA with participants overall shift to inspect H3. The result shown in Table 3 indicates that eco-innovation can significantly affect a small and medium firm's competitive advantage ( $p < 0.001$ ).

**Table 3. Eco-innovation can significantly affect a small and medium firm's competitive advantage**

	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F-Value</i>	<i>P-value</i>
Between	19.315	1	19.315	51.817**	0.000
Within	28.179	101	0.264		
Sum	47.494	102			

Notes : \* $p < 0.05$  , \*\* $p < 0.01$  , \*\*\* $p < 0.001$

By analysing the results of the survey, eco-innovation brings a large number of socio-economic benefits (over 70% increases in eco-efficiency) both for firms directly involved in its production and society as a whole (over 25% reductions of pollution). Due to the increasing impact of environmental policies and the reducing of the marginal costs of environmental policies by 50%, eco-innovation resulted from introducing innovation technologies is one of the main priorities regarding the strategy European SMEs.

#### **4 Conclusions**

In a sustainable development process there is a basic need of the harmonious, balanced use of three types of capital – economic, social and natural. This is the triple perspective from which there will be analyzed the role of SMEs in the process of sustainable development, in particular the role of marketing communication in ensuring sustainable development aspirations. SMEs will be equally regarded as the originator / generators and beneficiaries of sustainable development, so that we will deal with both the sustainable “offer” (green products, green marketing, etc.) and the sustainable “application” (sustainable consumption, green consumption, etc.), at a micro (SMEs implications and effects), mezo (regional) and macro level (country). A reference document which highlights the relationship between the world of SMEs, innovation and sustainable development is the 2020 Strategy Europe which stimulates a new kind of sustainable growth through: encouraging research and innovation, industry modernization, promoting a more efficient use of energy and resources. The initiative called for the adoption of an “Eco-innovation Action Plan” to bring to the fore the obstacles, challenges and opportunities for achieving environmental objectives through innovation. The Innovation Union aims to improve access to finance for research and innovation, to ensure that innovative ideas can be turned into products and services that can lead to growth, competitiveness and jobs. The results of this study show that the eco-innovative barriers and engagement in green innovative activities are strongly related to the SME's adoption performance. At the same time, not only firms' barriers to eco-innovation can discourage green strategies of European SMEs but they can also hinder the implementation of important EU macro policies.

To sum up, in many cases, small companies have found that what is good for the environment is not necessarily bad for business. In fact, it may lead to a competitive advantage because of better general management, optimisation of production processes, reductions in resource consumption, and the like. Experiences from European initiatives also show that a considerable number of SMEs are increasingly interested in implementing cleaner production to improve their economic and environmental performance. Today, most European SMEs focus on the environmental dimension of sustainable innovation by improving their green products. They are trying to resolve the equation: Eco-Innovation + Sustainable market = New Business Models. Therefore, eco-innovation is a key issue of today that requires a measure approach. Moreover, “going green” is progressively seen as a potentially profitable direction for European SMEs in recent years.

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