

The Impact of Green Innovation on Organizational Performance: Evidence from Romanian SMEs

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Abstract The complexity of economic life in terms of competition imposed by the market economy increases the role of information in decision making. Its quality depends on the quality of current future innovative decisions taken and thus results. Based on the literature review, various innovation activities can be analysed along three dimensions: targets (the focus areas of eco-innovation: products, processes, marketing methods, organizations and institutions); mechanisms (the ways in which changes are made in the targets: redesign, alternatives and creation); and impacts (effects of eco-innovation on the environment). This paper examines whether using eco-innovation is an opportunity to increase the competitiveness of SMEs at a European level in the following areas: agriculture, manufacturing, environmental industries and construction. The results show that eco-innovation is therefore a powerful instrument, combining reduced negative impact on the environment with a positive impact on the economy and society.

Key words Innovation, industry, strategy, technology, company

JEL Codes: L25, Q50, Q55

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1. Introduction

Understanding sustainable development, as a new paradigm is based on the need to address as many issues from a new perspective, to remove in this way the visible shortcomings of the traditional development by generating two big challenges, one of them referring to the large scale development of technology, industry and excessively on differentiation and specialization, becoming highly sophisticated and modern, where sustainable development underlines the need for an integrated approach of the different dimensions of the development, so it is possible to achieve the synergies and win-win solutions; while another paradigm involves an opening to the future, where the goal will not affect the present development opportunities of future generations, but will lead to the establishment of sustainable development in a truly open process (Hwang, et al., 2016; Demirel and Kesidou, 2011).

In the context of sustainable development, the technology can be considered a double-edged blade because it carries with it its own challenges, especially when the pace of change is extremely alert. New technologies and working methods can increase competitive pressures and can force difficult structural adjustments. In return the emerging ones create new opportunities, and in some cases they can induce real problems, but the effects of the enormous rise, leading to the clear an increased production scale and consumption. Consequently it affects safety in terms of pollution in all its aspects and that is why technological advances must serve the interests of sustainable development and action directions of the states in this regard should aim obviously, at "influencing innovation" so that the solutions adopted be a real "win" to strengthen the sustainable development (Adams et al., 2016).

Small and medium private enterprises will continue to be in the coming decades, the most active, dynamic and successful economy of any country. In their own paces, alert or slow, sooner or later, all countries will realize that initiating, developing, supporting even these organizations is not only unavoidable, but will lead to detecting the only alternative, economically efficient creation of new jobs, maintaining permanent organizational flexibility, stimulation of individual expressions of creativity and initiative management (Grunwald, 2011). Outside the already classic elements that stimulate entrepreneurship, a special role in supporting individual initiative goes to the innovation, as a higher form of processing and interpretation of available information to the economy and the society (Horbach et al., 2012).

2. Sustainable development – a major challenge of a world in changing

In order to meet the challenges created by a society undergoing a constant process of change, belonging to the beginning of the XXI century, it is necessary that all its members to change their current mindset focused on the immediate crisis to a state of anticipation of the future, where health and well-being are assured, as the final process of sustainable development

(Albino *et al.*, 2014). Employing the phrase "sustainable development" in the usual speech of economics was an objective necessity imposed by the economic crisis and ecological which that the world at the beginning of the new millennium is going through and it is becoming increasingly a connotation of the constant economic and social policies of each State, known as having "over 60 interpretations" (Castellacci, 2006). In terms of these requirements, sustainable development is a concept "that involves different treatment that level, approach and understanding complex technology and resources which can be appealed to the chances of success, thus acquiring meanings and different meanings depending of time and space" (Habtay, 2012; Mondéjar-Jiménez *et al.*, 2013).

It can therefore be said that sustainable development implies a systemic approach to the relationship: economic-social-ecologic and this is why we believe it is significant that the use of classical methods of analysis and the current system of statistical indicators cannot meet the specific requirements of the current sustainable development (Paraschiv *et al.*, 2012; Peiró-Signes *et al.*, 2011; Petruzzelli *et al.*, 2011). Concerns about sustainable development in each country and thus worldwide are the result of several factors which target poverty amidst the wealthy, degrading of the environment, excluding uncontrolled urbanization, unsafe employment for employment, emigration of youth, inflation, unemployment "studied under the magnifying glass of the economic research" (Aragón-Correa *et al.*, 2008; Qi *et al.*, 2010).

The noteworthy fact, materialized precisely in this "specialization" in setting and implementing sustainable development policies by each country undertakes to collaborate to solve mutual problems with high interconnectedness, confirming thereby the side of common development sustainable. We must not ignore that sustainable development involves different treatment at that level, approach and understanding, technology, resources which can be appealed and likely to succeed. It gains in other words, meanings depending on the time, space and geography. Another meaning is shaped by prof. N. Dobrotă, according to which "Sustainable development implies economic growth - not zero or negative - in accordance with the requirements of ecological balance and preservation of nature as such but with all human development, which means that all aspects of the progress of man and for man are taken into account: culture, civilization, equality and equity among people, ethnicities, nations and peoples" (Brouillat and Oltra, 2012).

Moreover, Jan G. Hagendorf, believes that "the idea of sustainable development is more convincing if it is interpreted in the way in which a specific growth rate may be difficult to be sustained if the environment degrades itself, if growing inequity of incomes leads to revolution or if population growth gets out of control or farmland is fragmented and thus reduces productivity" (Cainelli and Mazzanti, 2013; Schiederig *et al.*, 2012). Monitoring the trends of development using indicators of economic activity precedes the outside of principles of sustainable development and it has been mentioned in parallel with the process of defining sustainable development strategies drawn up under the aegis of the United Nations and respectively the European Union. These objectives that belong to the national strategies for sustainable development should consider: economic growth, stabilization of demographic trends, reducing dependence on classic energy resources and increasing concern at the widespread introduction of the renewable and clean, preserving and expanding the resource base of economic usable, protecting biological resources, improving technologies employed, including those for waste disposal. In this context, the basic principles of sustainable economic and social development are based on organic correlations between the parts and taking into account the various ways in which one can intervene in the resources cycle.

For tracking and verifying the implementation of this National Strategy a national system of statistical indicators of sustainable development will be created and maintained up-to-date, harmonized and congruent with the relevant system of indicators used at EU level to monitor the national progress against the Strategy for Sustainable Development of the European Union. Collecting and processing of reliable, quantified and regularly updated, aggregated as indicators of sustainable development, will enable performance measurement strategy in achieving the targets and accurate reporting on the results [Chang and Chen, 2013]. It shall be considered the operationalization of two types of indicators:

- The national indicators for sustainable development, focusing on key priorities expressed by quantifiable targets that also allow performance comparison with those of national and international partners with the objectives of the EU Sustainable Development Strategy renewed. This set of indicators will be based on the results of the working group UNECE-OECD-Eurostat and will be updated constantly.
- Progress indicators for the National Strategy for Sustainable Development of Romania, covering the entire range of policies that they generate, including those that are not in the EU strategy. In this way, all policies will be subject to monitoring, accountability and enabling public policy makers to assess the success of actions taken.

Measuring the economic and social progress, the vision of sustainable development, requires a system of indicators that take into account the fact that GNP/capita will no longer be able to express one human welfare as the market appreciates efficiency - "it has no organ to hear, to feel or smell, nor justness or viability "and to achieve their wishes, sustainable

development, it must be conceived as "all trade in mental structures and social behaviors that increase the actual product globally and transforms progress in particular generalized social progress" (Brown, 1992).

In this context, there are two opposing viewpoints: one according to which economic indicators state that the world is in a good state, economists believing that technology can overcome any limit and another that the indicators measuring the health of the environment shows a deterioration thereof: waste expand, humus lose arable lands, the number of species of plants and animals is reduced, air pollution threatens human health in areas increasingly wider. Differences between the two views of the world appear more clearly if we compare the main indicators and environmental and economic environment, in which we live [Carrillo-Hermosilla et al., 2010; Triguero et al., 2013]. Compared with the development so far, the vision of sustainable development integrates major new demands, in all national economies and the global system of the world economy, based on four general principles:

- The utilization rate of renewable resources must be under their regeneration rate;
- The utilization rate of non-renewable resources must be under their replacement rate by the renewable resources;
- Emissions in the environment should not exceed the permissible critical limits;
- Irreversible effects must be avoided.

These new demands refer both to the economy-environment relationship, and the multiple issues raised by the growing population, urbanization and industrialism deployed in extremely varied cadences and effects of the different world. The meaning of sustainable development is given precisely by looking endogenous model of reconciliation between man and nature. This does not exclude, of course, the need for international collaboration and cooperation. For instance, the consolidation of the environmental management capacity and implementation of national policies for SMEs will increase their demand for clean technologies that will accelerate the transfer and technological cooperation. Pollution, like other processes such as poverty, cannot be isolated within national boundaries.

The Romanian Government in partnership with the Ministry of Environment and Sustainable Development, the 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 of Romania 2013-2020-2030. The strategy aims to achieve strategic objectives in the medium and long term as follows:

- 2020 Horizon project: Reaching the average level of EU countries in the main indicators of sustainable development of the country;
- 2030 Horizon project: a significant approach to the average level of Romania in that year to the sustainable European Union countries.

The 2020 Horizon project supports SMEs with innovation potential significantly and whose capabilities to bring to market revolutionary technological solutions are visible and also with innovative service solutions by introducing a dedicated funding instrument. "Innovation in SMEs" is a specific activity for SMEs with intense concern for research. Within this activity there are measures to consolidate the innovation capacity of SMEs, such as networking and brokering, and to enable SMEs to benefit from technology, bridging researchers and innovators across Europe.

In innovation field, the objective proposed within this strategy is that, despite the current gaps, the percentage of companies in Romania introducing innovative products and services to get closer to the EU average by the end of the reference period. And for giving a boost to innovation, priority is given to SMEs. In order to promote policies of innovation, a system for transversal coordination to a national level will be introduced, and a portal for businesses, particularly SMEs, will be launched partially subsidized training in the field of innovation management and technology transfer units will be enforced (from patent to product, service or process) within the education units and research units, as a prerequisite for the formation of scientific and innovation clusters. Sustainable strategies to increase the competitiveness of Romanian SMEs aim to:

- developing business strategies with the essential aspects of the sustainable development which aim to the growth of research and innovation;
- developing some networks/partnerships on sustainable development (innovation partnership - public and private sector);
- stimulating strategies regarding the process of the concentration of domestic private capital which shall enhance the role of SMEs in the development of the Romanian economy;

- supporting the national innovation strategies and technological processes for a sustainable development (Centres Enterprise Europe Network, ReNITT Network Centres of Innovation and Technology Transfer, Innovation Vouchers).

We must remember some of the national decisional failures that create barriers to investment in renewable energy:

- Despite adopting EU legislation at the national level there is still uncertainty in terms of legal framework conditions;
- Using renewable energy legislation and trade of "Green Certificates" (2008) have a high degree of incoherence and instability;
- Obtaining licenses creates barriers instead of promoting facilities on licenses. ESCO licenses are almost nonexistent;
- Awareness of the necessity of renewable energy is still scarcely developed;
- Communication between manufacturers, users and decision makers is still in its beginnings;
- The sectorial policy is an artificial one created centrally without substance. There is no concern at the central level to boost any local efforts in the field. Respectively, there is no logistic support for defining local climatic Plans.

3. Methodology of research

This study used quantitative approach with quota- Against this background, research methodology is based on 144 European SMEs between March 2016 and May 2016 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 towards sustainable innovation.

H₂: Eco-innovation is able to stimulate growth 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 110 questionnaires were collected, containing information regarding the entrepreneur's attitude towards sustainable 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. Results and discussions

In the internal consistency reliability, Cronbach's α 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 sustainable innovation ($p<0.001$). The results support our predictions of H₁.

Table 1. Results of ANOVA with participants overall shift to inspect H₁

	SS	DF	MS	F-Value	P-value
Between	4.394	0.92	4.394	15.073***	0.000
Within	85.962	202.22	0.187		
Sum	90.356	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 stimulate 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.

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 2. Results of ANOVA with participants overall shift to inspect H₂

	SS	DF	MS	F-Value	P-value
Between	2.163	1	2.163	5.61*	0.003
Within	40.704	110	0.298	19.83	
Sum	42.867	111			

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

Table 3. Results of ANOVA with participants overall shift to inspect H₃

	SS	DF	MS	F-Value	P-value
Between	22.215	1	22.215	51.824**	0.000
Within	32.406	116	0.304		
Sum	54.621	117			

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.

5. Conclusions

Today, countries with a high development potential in terms of financial, economic, human and technological have multiple chances to project sustainability. Meanwhile, a certain threshold of resistance of the environment, the survival for the entire planet is at stake as well, which determines the necessity of globalization work for sustainable development. From this point, the complex problems of sustainable development acquired a global political dimension addressed at the highest level at the World Conference on Environment and Sustainable Development in Rio de Janeiro (1992), Special Session of the UN General Assembly and adoption Millennium goals (2000) and at the World Conference on Sustainable Development in Johannesburg (2002). They outlined concrete programs of action at a global and local level (Local Agenda 21) according to the saying "think globally and act locally".

For over 20 years, starting with the Stockholm Conference on environment of 1972, the world began to admit that environmental problems are inseparable from the welfare and economic processes in general. In this regard, there has been established the World Commission on Environment and Development of the UN, that concluded the research with a series of recommendations. Up to 1987 identified there have been identified 60 definitions of the concept that was supposed to give that developmental process that does not stop economic growth as mentioned in the first report of the Rome Club nor to generalize the role of the environment as the "Greens" do. In the Brundtland Report, the Commission advocates reconciliation between the economy and the environment, "a new way forward to sustain human progress not only in some places and for some years, but for the entire planet for a long future." Sustainable development, viable and supported from the ecological point of view, is considered a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It can be concluded that there are serious concerns both in theory and in practice, to define and explain new concepts and theories, to achieve a balance between economic growth and environmental protection and overcoming the elements of conflict in the relationship between economy-ecology for achieving a reconciliation between man and nature, a fundamental premise of human continuity within the planetary ecosystem space.

The specialty literature indicates essential changes in the typology and structure of the small and medium enterprises, due to these new developments. In the case of the European Union, particular attention was paid to the following types of small and medium enterprises: SMEs in sectors of peak technical activity that explores the have links due to their nature of business to the Internet and new market developments; SMEs exploiting the opportunities offered by e-commerce especially in the service sector - sometimes called cyber-companies; SMEs integrated into the added - value chains of large companies that are forced to innovate under the pressure of major clients. From those presented above, it can be concluded that, in general, the concept of small and medium enterprises belongs to the sphere of economic policies. From a theoretical viewpoint, this concept meets with particular accents that will undergo a long process of heterogeneity and has the advantage of being easily operational when supporting policies should be implemented. However, there will be some

convergence gradually on the definition of small and medium enterprises, under the impact of scientific activity and the process of globalization.

"Think Small" - is so new principle of European Union summit, promoted at Graz (6-7 April 2006), where EU officials announced they established three priorities over the next three years for small businesses: bureaucracy down by 30%, increased qualification for young people in economic activities, increased direct and indirect Community financing for SMEs by almost 50% between 2007 and 2013. Innovation is a challenge for SMEs, who need to understand the role of this multiple approach, materialised in long-term development goals. Thus, innovation means equally renewal and broadening of the range of services and products that lead to the development of new markets associated with them, as well as a development of new methods of production, supply and distribution and also improvement within the management systems, organization of the production and labour, improvement in the qualification level of the workforce.

In order to encourage investments in environmental processes and technologies, the EU developed a range of tools that focus on innovation and entrepreneurship in the environmental activities. The efforts to mobilize funding for eco-innovation shall continue as part of the multiannual financial framework 2007-2013. "2020 Horizon" Framework Programme for Research and Innovation for 2014-2020 will strengthen the role of eco-innovation and provide adequate financial means to implement the Eco-Innovation Action Plan after 2013. In this context, it is clear that the sustainable development, if it changes our way of being, it must change our way of thinking, of training too. If, in most developed countries, with a sustainable market economy is not regarded as an obstacle to the environmental protection, but rather as a viable means of standard well-being to extend life expectancy, in developing countries the allocation of necessary resources for the environment protection depends directly on the rate of economic growth.

In conclusion, Romania has an infrastructure in the area of sustainable development and small business research, as evident from the fairly large number of chairs and researchers within the field, and the soaring number of dissertations, but also a fragmentation and lack of long-term systematic research within the field. On the other hand, in a world where success is almost mandatory it can be stated that: a sustainable development leads to "prosperity" for SMEs since its message is consistent with the perspective of eco reconciliation with the nature; creating a stimulating business environment for SMEs; sustainable development requires a new type of reference to reality and requires the development of new forms of specific work organization "smart economy" (clusters, competitiveness poles, industrial parks, business incubators, industrial sites, etc.); a nationwide development of the voluntary roadmaps is important regarding eco-innovation in order to facilitate the policy by Member States and to increase the confidence in eco-technologies.

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