Promoting Eco-innovation among SMEs through the involvement of supply chains

Serenella Sala[1], Valentina Castellani[1]

[1] Department of Environmental Science and Technology, University of Milano Bicocca, Piazza della Scienza 1, 20126 Milano, Italy . E-mail contact: serenella.sala@unimib.it

1. Introduction

The necessity of a more sustainable approach to production and consumption patterns has been widely highlighted by international resolutions and directives as a way to promote sustainable development in daily life activities (see, for instance, the EU Strategy for Sustainable Development and the Integrated Product Policy). Final purpose is the definition of instruments and strategies enabling producers to decoupling economic growth and resource exploitation: current European policies for the industrial sector are aimed to develop economic activities characterized by a low level of CO_2 emissions, a sustainable use of natural resources, energy and raw materials and, finally, by the substitution of dangerous substances in the production cycle. Eco-innovation is, thence, based on the ability to develop consumption and production solutions that are energetically efficient, and that assure an optimization of matter cycles, through industrial processes which are reversible and with low energy loss. Indeed, eco-innovation strategies start from a reframing of the production system through its whole lifecycle, promoting life cycle thinking approaches, with special reference to materials, energy and flows (ISO, 1997). Furthermore, recent approaches integrate more features about sustainability (Westkämper, 2001), introducing social issues and consumption patterns (Hertwich E.G, 2005).
Within this context, studies on existing supply chains helps to identify applicable solutions (from the choice of raw materials to the delivery services and recycle or waste processing) and to develop practical guidelines for transferring scientific results to companies, especially SMEs (Small and Medium Enterprises). SMEs represent a relevant part of the whole European industrial sector and therefore should have a relevant role in promoting and implementing eco-innovation; nevertheless, the characteristics of SMEs entail some practical difficulties and limits: the small number of employees, for instance, can determine a limited accessibility to information about innovation policies and instruments (e.g. because there is not a person able to speak foreign languages) and to international and national networks spreading knowledge and promoting best practice. For this reason, it is important to find new ways of involving this kind of enterprises, involving clusters of them (e.g. trade associations or supply chains). Following this approach, the presented case history regards a project to promote eco-innovation that was addressed to a consortium of enterprises involving entrepreneurs of the furniture supply chain.

2. Materials and methods

The Communication released by the European Commission in 2007 “Small, clean and competitive - A programme to help small and medium-sized enterprises comply with environmental legislation”, about SMEs and environmental policy, underlines the role of SMEs as main actor for shifting production patterns to eco-innovation strategies. Condiering that small and medium-sized enterprises represent about 99% of all European enterprises and 57% of economic value added (COM (2005)551), they can generate significant impact on enviornment, even if they are often not fully aware of the environmental impacts of their activities.
Current poor environmental performance of SME’s has been attributed to a wide range of barriers, both internal and external to firms. Among barriers, empirical studies have found a lack of engagement with environmental issues amongst owner-managers, due to: a belief that environmental “footprint” of SME’s is negligible; a lack of expertise and understanding in tackling of environmental issues; a low level of compliance amongst small firms due to a lack of awareness of existing environmental regulation; a low level of uptake of environmental management system due to lack of time, money, technical knowledge (Revell, 2003). Furthermore, some research results and stakeholder consultation surveys show a strong consensus on the main barriers facing SMEs as regards compliance with environmental legislation and making environmental improvements in general. These barriers are:

- lack of awareness and knowledge of environmental problems, impacts and risks;
- lack of awareness of potential benefits of environmental management and lifecycle thinking;
- insufficient access to and local availability of adequate environmental information, tools and training;
- limited financial and human resources/expertise for dealing with compliance;
- relatively short-term planning at company level.

To overcome these difficulties, the involvement of association of firms seems crucial to disseminate properly results and to promote a new culture of business focused on the implementation of life cycle approaches, bridging the gap between scientific results and business choice.
The presented case history refers to a pilot project conducted in Northern Italy, in a furniture district characterized by a high number of SMEs representative of the entire supply-chain: from designer to retailers. The project were undertaken by “Progetto Lissone”, a consortium including over 200 SMEs which is owned for 51% by the municipality of Lissone. The study was performed for identifying how to involve SMEs and

how to disseminate eco-innovationa and life cycle thinking starting from the identification of the most important impacts trough a qualitative LCA of the entire supply chain (from cradle to grave) and a quantitative LCA of a specific piece of furniture. Guidelines were provided to SME's to ensure better approaches for finding solutions inspired by ecodesign principles; for producing reducing environmental impacts; for communicating effectively environmental performance to retails and to consumers. The idea was to support a group of company willing to work on the sustainability concept with environmental knowledge and to put the conveyed knowledge into every-day practice, involving the whole related supply chain and rise awareness among the customers.

Project was developed in seven steps:1. research on market opportunity and market share related to sustainable environmental friendly furniture and products; 2. creation of prototypes by designers; 3. sustainability assessment of prototypes trough LCA, supporting choice of rough materials and best available technologies for the production; 4.realisation of prototypes; 5. guidelines for designers and producers, with schematic approach to overcome main categories of impacts and to use existing user-friendly tools and methodologies; 6. development of a label for retailers and consumers to identify products with higher environmental performance; 7. involvement of retailers.

The analysis of a specific piece of furniture produced by a company associated to the consortium (step 3), helped to highlight relevant impacts generated during the production, use and dismantling phases, and to identify handy solutions, applicable also in similar context. In the furniture sector, details of the existing products are very often based on industrial traditions developed and implemented before environmental concern became an issue. Hence, significant environmental improvements can in many cases be achieved by replacing traditional solutions with new materials or processes or even recovered solutions from the past (Nielsen, 2002). The assessment was performed also with free software (Masoni, 2004) in order to allow designer and SME's to easily try the LCA approach.

Thence, a questionnaire on Eco-innovation were distributed to over 100 SMEs trying to understand company needs and demands to the scientific community. The results highlight the importance of networking firms, of involving the entire supply chain, and of simplifying the tools.

The assessment and the questionnaire results lead to the development of guidelines which are based on scientific results but communicated in a easily way so they can be used by entrepreneurs as a supporting tool for decision making. Furthermore, also retailers were involved in the project due to their role of "translator" of environmental performance to customers. A course about ecodesign and labels was organized, to promote knowledge among retailers, and standards for an eco-label type III were defined, with the aim of communicating environmental performances of companies and products to consumers.

3. Conclusions

The outcomes of the pilot project highlight the importance of a widen involvement of supply chain stakeholders. In this context, the role of a firms' consortium is crucial in promoting and disseminating best practices among associated firms; furthermore, it is necessary to encourage both networks of producers acting in the same sector (e.g. association of furniture producers) and stakeholders of the whole supply chain (designers, producers/craftmen, retailers, consumers).

Moreover, the promotion of sustainable production and consumption patterns requires a set of strategy to simplfy access to methodologies and tool and to their user-friendliness, especially when SMEs are involved: accordingly to questionnaires results, seems that it is important for further tools development to be based on solid research and information, but the key factor for influencing product design decisions is the translation of this information into a usable format for the users, both retailers and consumers.

4. References

[1] ISO/DIS 14040, (1997) Environmental Management – Life Cycle Assessment – Part 1: Principles and Framework.

[2] Westkämper E, L Alting L., Arndt G. (2001) Life cycle management and assessment: approaches and visions towards sustainable manufacturing Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture Professional Engineering Publishing Volume 215, Number 5

[3] Hertwich E.G , (2005) Life cycle approaches to sustainable consumption: a critical review, Environmental Science and Technology 39 (2005) (13), pp. 4673–4684.

[4] Revell, A and Rutherfoord, R. 2003. UK Environmental Policy and the Small Firm: Broadening the focus.*Business Strategy and the Environment* 12: 26-35

[5] Hauschild M., Jeswiet J., Alting L., 2005. From Life Cycle Assessment to Sustainable Production: Status and Perspectives, *CIRP Annals - Manufacturing Technology*, Volume 54, Issue 2:1-21

[6] Hertwich E. G., 2005. Life Cylce Approaches to Sustainable Consumption: A critical review. *Environmental Science and Technology*. Vol 39, no 13: 4673-4684.

[7] Masoni, P.; Sara, B.; Scimia, E., 2004. VerdEE: a tool for adoption of life cycle assessment in small and medium sized enterprises in Italy.*Progress in Industrial Ecology* vol.1, 1-3: 203-28

[8] Nielsen, P. H.; Wenzel H., 2002.Integration of environmental aspects in product development: a stepwise procedure based on quantitative life cycle assessment, *Journal of Cleaner Production*, Volume 10, Issue 3: 247-257

[9] The European Commission Communication 'Modern SME Policy for Growth and Employment' (COM (2005)551).

Acknowledgement - The authors thank the consortium of SME's "Progetto Lissone" for the involvement and the Chamber of Commerce, Industry, Craft Trade and Agriculture of Milano for funding the activities.