

ECO-INNOVATION AND ENVIRONMENTAL BENEFITS

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Abstract

In recent years, resource efficiency has ranged highly on the global business and political agenda. Driven by rising energy and material prices and a limited stock of fossil fuels, climate change and increasing public awareness of environmental issues, reduced resource use is now an issue that is taken seriously by international and national business and by (non-) governmental organizations around the world. This has among other things led to a search for new ways in which energy and resource consumption can be reduced and damaging CO2 emissions curbed. In this paper we tried to summarize the importance of eco innovation and the benefits of innovation for environment and human society. In the last part of this working paper we tried to show how important is to think green and to act in this manner.

Keywords: eco-innovation, eco-innovation mechanisms, food, real estate, transport.

1. INTRODUCTION

In 2008 an OECD report summarized the fact that much attention has recently been paid to innovation as a way for industry and policy makers to achieve more radical, systemic improvements in corporate environmental practices and performance.

Many companies have started to use *eco-innovation* or similar terms to describe their contributions to sustainable development. A few governments are also promoting the concept as a way to meet sustainable development targets while keeping industry and the economy competitive.

However, while the promotion of eco-innovation by industry and government involves the pursuit of both economic and environmental sustainability, the scope and application of the concept tend to differ.

In the European Union (EU), eco-innovation is considered to support the wider objectives of its Lisbon Strategy for competitiveness and economic growth.

The concept is promoted primarily through the Environmental Technology Action Plan (ETAP), which defines eco-innovation as “the production, assimilation or exploitation of a novelty in products, production processes, services or in management and business methods, which aims, throughout its lifecycle, to prevent or substantially reduce environmental risk, pollution and other negative impacts of resource use (including energy)” (OECD, 2008).

The innovation need and role are defined as both natural environment and social conditions.

Natural environmental changes such as limiting / depletion of natural resources, environmental degradation, climate change lead to more expensive

energy and raw materials but also tightening legislation.

Changes in social environment such as: population growth, changes in society (knowledge society), globalization implies increased competition and increased competition but also changing customer demands.

The changes in the natural and social environment leading to the necessity of innovation.

What is ECO-INNOVATION?

Eco-innovation is the production, assimilation or exploitation of

- product
- production process
- service or
- management approach

the nature of a novelty for the organization and leading throughout the entire life cycle, reducing pollution and pressure on resources (including energy), compared with relevant alternatives on the market "OECD, 2007.

2. MATERIAL AND METHOD

Eco-innovation mechanisms refers to the way in which eco-innovation objectives are achieved.

The dimensions of eco-innovation - have identified four mechanisms:

a. Change - adjustment, small changes occurring gradually.

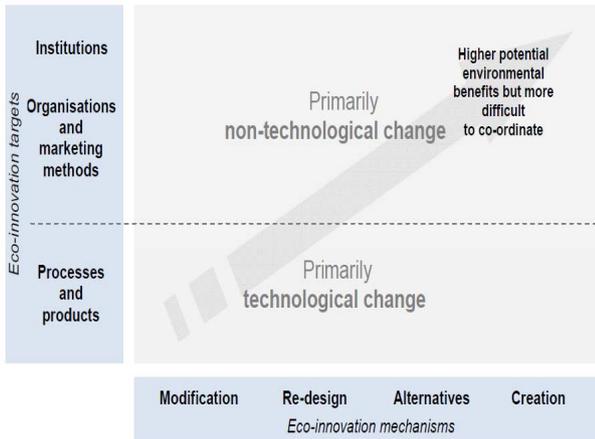
b. Re-design - referring to significant changes in existing products, in processes and organizational structures.

c. Alternatives - such as the introduction of goods and services that can perform the same functions and are used as substitutes for other products.

d. The creation and introduction of entirely new products, processes, procedures, organizations and institutions.

Building upon existing innovation and eco-innovation literature, eco-innovation can be understood and analyzed in terms of an innovation’s 1) **target**, 2) **mechanism**, and 3) **impact**.

Figure 1 presents an overview of eco-innovation and its typology (OECD, 2009):



(After OECD, 2009)

Figure 1. The typology of eco-innovation

The target of the eco-innovation can be technological or non-technological in nature.

Eco innovation in products and processes tends to rely heavily on technological development; eco-innovation in marketing, organizations and institutions relies more on non-technological changes (OECD, 2007).

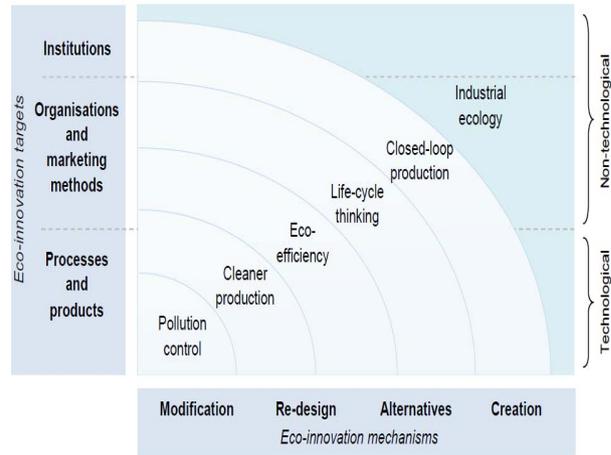
Both industry and government need to better understand and determine how to move towards a sustainable future. Innovation plays a key role in moving manufacturing industries towards sustainable production.

Evolving sustainable manufacturing initiatives – from traditional pollution control through cleaner production initiatives, to a lifecycle view, to the establishment of closed-loop production – can be viewed as facilitated by eco-innovation.

Figure 2 provides a simple illustration of the general conceptual relations between sustainable manufacturing and eco-innovation.

The steps in sustainable manufacturing are depicted in terms of their primary association with respect to eco innovation, with innovation targets on the left and mechanisms at the bottom.

The waves spreading towards the upper right corner indicate the path dependencies of different sustainable manufacturing concepts (OECD, 2009).



(After OECD, 2009)

Figure 2. Conceptual relationships between sustainable manufacturing and eco-innovation

For instance, an eco-industrial park cannot be successfully established simply by locating manufacturing plants in the same space in the absence of technologies or procedures for exchanging resources. In fact, process modification, product design, alternative business models and the creation of new procedures and organizational arrangements need to go hand in hand to leverage the economic and environmental benefits of such initiatives.

This implies that as sustainable manufacturing initiatives advance, the nature of the eco-innovation process becomes increasingly complex and more difficult to co-ordinate.

These complex, advanced eco-innovation processes are often referred to as *system innovation* –an innovation characterized by fundamental shifts in how society functions and how its needs are met (Geels, 2005). Although system innovation may have its source in technological advances, technology alone will not make a great difference.

It has to be associated with organizational and social structures and with human nature and cultural values. While this may indicate the difficulty of achieving large-scale environmental improvements, it also hints at the need for manufacturing industries to adopt an approach that aims to integrate the various elements of the eco-innovation process so as to leverage the maximum environmental benefits. The feasibility of their eco innovative approach would then depend on the organization’s ability to engage in such complex processes.

The current challenges are the following factors:

1. Different perceptions to what is "environmental technologies", "environmental goods and services, both at EU and national level - difficulty in

developing / implementing policies to stimulate their consumption.

2. Insufficient knowledge current situation and the potential market for environmental technologies.

3. Government reticence in adopting green procurement practices (deficiencies in the regulatory framework for public procurement, lack of training of personnel responsible for procurement in the use of environmental criteria in tender documentation, etc.

4. Expertise/experience complexity required to implement policies to stimulate consumption/production of products/environmental technologies.

Environmental technologies include, in general, the use of 'clean' technologies, eg:

- technologies for pollution control (air pollution control, waste management);
- develop and use new technologies - cleaner, manufacture and use of products and services consume less energy (eg. fuel cells) and natural resources
- adoption of better management practices of natural resources (eg water efficient systems, energy-efficient lighting systems, etc)

Environmental benefits of applying technology consist mainly of:

- reducing consumption of raw materials;
- lower emissions of pollutants, and
- waste prevention.

Applying environmental technologies lead to lower operating costs and increase productivity.

3. RESULTS AND DISCUSSIONS

These examples can be given eco-innovation in different fields: food, housing and transport have been identified by the European Commission and European Environment Agency as areas with the greatest impact on the environment.

That means that these sectors accumulate approx. 70-80% of the environmental impact.

The environmental impact of these sectors has given many facets ranging from global warming, acidification and ozone formation, to locate pollution leads to eutrophication (increase in concentration of nutrients in water) or the disappearance of certain species (EEA, CSCP, 2008).

Figure 3 shows the relative size of the environmental impact of the three sectors.

These new sectors will be analyzed and presented below, in terms of eco-innovation.

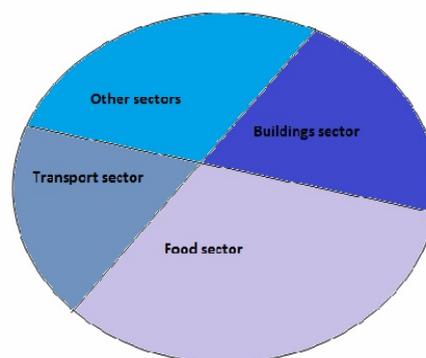


Figure 3. Dimension environmental impact

In the **food sector** we have two major concepts, namely:

- 1. Community supported agriculture (CSA) and**
- 2. Sustainable supply retailers.**

1. Community supported agriculture

The objectives of eco-innovation within the community supported agriculture are:

- Promotion of organic farming practices (reduced use of dangerous fertilizers);
- Decrease in CO² emissions;
- Raising consumer awareness about a healthy lifestyle by eating healthy foods by facilitating dialogue farmers;
- Support biodiversity in a given area by preserving and supporting small farms, which produce a wide variety of crops;
- Creating a sense of social responsibility and management of land among producers and consumers.

2. Sustainable purchasing practices of retailers

The objectives of eco-innovation in the second concept of the food sector are:

- Decrease emissions of CO₂ delivery network
- Reduce maintenance costs of the delivery fleet
- Use of green fuels (eg. bio diesel) and renewable energy in stores and warehouses.

Major concepts in the **real estate sector** are:

- 1. Rehabilitation in depth and**
- 2. Reducing energy consumption**

1. Deep Refurbishment

The objectives of eco-innovation:

- Significant reduction of greenhouse gas emissions from buildings;
- reducing energy consumption in construction materials;
- Implementation of a recycling quotas by using renewable raw materials;

- Improve indoor air quality;
- Reducing health risks caused by construction materials, for example, by building environmental criteria / biological;
- Reducing construction costs by standardizing components insulation of buildings and technical equipment necessary.

2. Smart metering

The objectives of eco-innovation:

- Promote awareness and awareness of energy consumption, energy costs and emissions of greenhouse gases;
- Steering consumers to monitor energy consumption and to take additional measures to save money on energy bills;
- Operating cost reduction metering and billing;
- Developing a technical basis to cope with peak demand challenges.

The concepts of the transport sector are:

1. Green cars

2. Using co-ownership of cars

1. Green electrical cars

Specific objectives of this concept of eco-innovation are:

- Continue on the concept of personal mobility that is growing demand of cars without increasing environmental impact.
- Reducing dependence on fossil fuels and emission of GHG (Greenhouse Gas) by using renewable energies
- Reduce air pollutants.

2. Using co-owned cars

The objectives of eco-innovation in this concept are:

- Reduce maintenance costs for the customer, costs arising from the possession of the vehicle in joint ownership;
- Decreased annual mileage of the car, if car drivers share.
- Reducing the number of privately-owned cars.
- Decreased need for parking space, using the same vehicle for two or more owners.
- Reduce traffic in cities.
- The significant decrease in CO₂ emissions.

4. CONCLUSIONS

The key to competitiveness today and in the future is to create an economy where knowledge and innovation are the primary instruments. This requires greater investment in research and development and measures to ensure that research

results are turned into innovative products and services.

Adapting the economy, so that progress not be detrimental to the environment is not only essential for long-term viability, but also quality of life. It also **provides opportunities for new jobs** requiring new skills.

A **sustainable organic growth** can be measured through **increased productivity, accompanied by a reduction in order to fight climate change**, and an increase in the proportion of energy from renewable sources.

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