



ECO-INNOVATION FOR A SUSTAINABLE FUTURE

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Abstract: *Eco-innovation is any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources. States and governments of the world, different institutions and organizations actively involved and aware in public policies, strategies and actions, reaffirm their commitments and reassess actions in order to achieve a truly sustainable development. In the common vision and the resolutions and other documents of the United Nations Conference on Sustainable Development, Rio+20, the words "environment", "innovation", "green economy" appear very often and almost always along the same context, to achieve the objectives of the sustainable development. The objectives of EU's Europe 2020 strategy for smart, sustainable and inclusive growth, are being implemented through a number of Flagship Initiatives addressing the main challenges, like "Innovation for a sustainable Future - The Eco-innovation Action Plan (EcoAP)". Eco-innovation Observatory developed the Eco-Innovation index, the first tool to assess and illustrate eco-innovation performance across the EU Member States. Like in all fields, in textiles and leatherwork field, eco-innovation is present and there are a lot of tools available that measure environmental damage and help manufacturers and brands become more sustainable. Eco-innovation is not just a trendy concept but a reality and a necessity nowadays, a way to achieve a sustainable future for ourselves and future generations.*

Key words: *environment, innovation, eco-innovation, eco textiles, sustainable development*

1. INTRODUCTION

More and more severe environmental challenges and resource constraints have led to growing worldwide demand for environmental technologies, products and services and have facilitated the emergence of green industries. Appeared a lot of new expressions and concerns, such as eco efficiency, eco smart companies, eco industries, clean production, which put in place, leading to rational and efficient management of resources, reduce energy consumption, increased competition and the number of technological alternatives available, and finally to a better quality of life, to a better and right development for entire society. In this context appeared, the same, the expression "eco-innovation" which is closely linked to the way we use our natural resources and to how we produce and consume.

Eco-innovation is any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources. [1] Today, eco-innovation concept is used worldwide, at all levels, in public politics and strategies, in production and business, research and education, in all fields.

2. UNITED NATIONS CONFERENCE ON SUSTAINABLE DEVELOPMENT

In the common vision and the resolutions (Resolution 1 adopted by the Conference on Sustainable Development, Rio+20, "The future we want") and other documents of the conference, stated:

“We, the Heads of State and Government and high-level representatives, having met at Rio de Janeiro, Brazil, from 20 to 22 June 2012, with the full participation of civil society, renew our commitment to sustainable development and to ensuring the promotion of an economically, socially and environmentally sustainable future for our planet and for present and future generations.”

“We therefore acknowledge the need to further mainstream sustainable development at all levels, integrating economic, social and environmental aspects and recognizing their interlinkages, so as to achieve sustainable development in all its dimensions.”

“We resolve to take urgent action to achieve sustainable development. We therefore renew our commitment to sustainable development, assessing the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development and addressing new and emerging challenges. We express our determination to address the themes of the United Nations Conference on Sustainable Development, namely, a green economy in the context of sustainable development and poverty eradication, and the institutional framework for sustainable development.”

“We affirm that green economy policies in the context of sustainable development and poverty eradication should: ... promote sustained and inclusive economic growth, foster innovation and provide opportunities, benefits and empowerment for all and respect of all human rights”.

“We underscore the importance of supporting educational institutions, especially higher educational institutions in developing countries, to carry out research and innovation for sustainable development, including in the field of education, to develop quality and innovative programmes, including entrepreneurship and business skills training, professional, technical and vocational training and lifelong learning, geared to bridging skills gaps for advancing national sustainable development objectives. [2]

As you can see in these few remarks, the words "environment", "innovation", "green economy" appear very often and almost always along the same context, to achieve the objectives of the sustainable development.

3. EUROPE 2020 - A STRATEGY FOR SMART, SUSTAINABLE AND INCLUSIVE GROWTH

The EU's Europe 2020 strategy for smart, sustainable and inclusive growth was launched by the European Commission in March 2010 and approved by the Heads of States and Governments of EU countries in June 2010. The document sets out concrete targets to be achieved within the next decade in areas such as employment, education, energy use and innovation in order to overcome the impact of the financial crisis and put Europe back on track for economic growth.

The Europe 2020 strategy is about delivering growth that is: smart, through more effective investments in education, research and innovation; sustainable, thanks to a decisive move towards a low-carbon economy; and inclusive, with a strong emphasis on job creation and poverty reduction. The strategy is focused on five ambitious goals in the areas of employment, innovation, education, poverty reduction and climate/energy. Europe 2020, a strategy for jobs and smart, sustainable and inclusive growth, is based on five EU headline targets:

1. Employment:
 - 75% of 20 to 64 year old men and women to be employed
2. Research & Development
 - 3% of GDP to be invested in the research and development (R&D) sector
3. Climate change and energy sustainability
 - reduce greenhouse gas emissions by 20% compared to 1990 levels
 - increase the share of renewables in final energy consumption to 20 %
 - 20% increase in energy efficiency
4. Education
 - reduce the rates of early school leaving to below 10%
 - at least 40% of 30 to 34 year olds to have completed tertiary or equivalent education
5. Fighting poverty and social exclusion
 - reduce poverty by lifting at least 20 million people out of the risk of poverty and social exclusion. [3]

Can see that the environmental protection and innovation through education, research and development are seen as the main way forward for achieving the strategy's targets.

4. THE ECO-INNOVATION ACTION PLAN

The Europe 2020 strategy's objectives are being implemented through a number of Flagship Initiatives addressing the main challenges.

- the *Youth on the move* initiative, to enhance the performance of education systems, non-formal and informal learning, student and researcher mobility, but also young people's entry to the labour market [4]
- the *Innovation Union*, to support the production of innovative products and services, in particular concerning climate change, energy efficiency, health and the ageing population [5]
- the *industrial policy for the globalisation era* initiative, to help businesses to overcome the economic crisis, integrate into world trade and adopt more environmentally-friendly production methods [6]
- the *agenda for new skills and jobs*, to improve employment and the sustainability of social models. The aim is to encourage the strategies of flexicurity, worker and student training, but also gender equality and the employment of older workers [7]
- the *Resource-efficient Europe* initiative, to support the sustainable management of resources and the reduction of carbon emissions, while maintaining the competitiveness of the European economy and its energy security [8]
- the *Partnering in Research and Innovation* initiative, use existing public and private resources for research and innovation (R&I) in a smart way to optimise the contribution of public and private players in achieving sustainable growth. [9]

Another Flagship Initiative, who complements other Europe 2020 Flagship Initiatives, is ***Innovation for a sustainable Future - The Eco-innovation Action Plan (EcoAP)***. The Eco-innovation Action Plan includes targeted actions both on the demand and supply side, on research and industry and on policy and financial instruments. The implementation of the actions will be supported by the partnering approach between stakeholders, private and public sector, and the European Commission.

The Commission will foster key drivers for the market uptake of eco-innovation by:

- using environmental policy and legislation as a driver to promote eco-innovation (Action 1)
- supporting demonstration projects and partnering to bring promising, smart and ambitious operational technologies to the market that have been suffering from low uptake (Action 2)
- developing new standards boosting eco-innovation (Action 3)
- mobilising financial instruments and support services for SMEs (Action 4)
- promoting international cooperation (Action 5)
- supporting the development of emerging skills and jobs and related training programmes to match the labour market needs (Action 6)
- promoting eco-innovation through the European Innovation Partnerships foreseen under the Innovation Union (Action 7). [10]

5. ECO-INNOVATION INDEX

The European Commission's statistical service Eurostat has published the first-ever resource efficiency scoreboard, comparing European countries using a set of 30 indicators covering natural resource consumption. Among the indicators is the eco-innovation index / scoreboard from the Eco-innovation Observatory. This shows that in 2012, the EU eco-innovation leaders were Finland, Denmark and Sweden, while those with most scope to catch up were Lithuania, Poland and Slovakia. [11]

The Eco-Innovation Scoreboard is the first tool to assess and illustrate eco-innovation performance across the EU Member States. The 2012 version of the Eco-Innovation Scoreboard consists of 16 indicators from eight different data sources, grouped into five thematic areas:

1. Eco-innovation inputs
 - 1.1. Governments environmental and energy R&D appropriations and outlays (% of GDP) – EUROSTAT, 2010
 - 1.2. Total R&D personnel and researchers (% of total employment) – EUROSTAT, 2009
 - 1.3. Total value of green early stage investments – Cleantech, 2007-2009
2. Eco-innovation activities

- 2.1. Firms having implemented innovation activities aiming at a reduction of material input per unit output (% of total firms) – EUROSTAT, 2008
- 2.2. Firms having implemented innovation activities aiming at a reduction of energy input per unit output (% of total firms) – EUROSTAT, 2008
- 2.3. ISO 14001 registered organizations (per min population) – ISO Survey of Certifications, 2010
3. Eco-innovation outputs
 - 3.1. Eco-innovation related patents (per min population) – Patstat, 2008
 - 3.2. Eco-innovation related academic publications (per min population) – Scopus, 2011
 - 3.3. Eco-innovation related media coverage publications (per min population) – Metwater, 2011
4. Environmental outcomes
 - 4.1. Material productivity (GDP/Domestic Material Consumption) – EUROSTAT, 2009
 - 4.2. Water productivity (GDP/Water Footprint) – Water Footprint Network, 1996-2005
 - 4.3. Energy productivity (GDP/gross inland energy consumption) – EUROSTAT, 2010
 - 4.4. GHG emissions intensity (CO₂e/GDP) – EUROSTAT, 2010
5. socio-economic outcomes
 - 5.1. Exports of products from eco-industries (% of total exports) – EUEOSTAT, 2011
 - 5.2. Employment in eco-industries (% of total workforce) – Ecorys, 2008
 - 5.3. Turnover in eco-industries – Ecorys, 2008

It thereby shows how well individual Member States perform in different dimensions of eco-innovation compared to the EU average and presents their strengths and weaknesses. The Eco-Innovation Scoreboard complements other measurement approaches of innovativeness of EU countries and aims to promote a holistic view on economic, environmental and social performance. [12]

Table 1: European eco-innovation index 2010 – 2012 [12]

	2010	2011	2012
EU (28 countries)	-	-	-
EU (27 countries)	100	100	100
Belgium	114.2	115.22	117.59
Bulgaria	57.69	66.57	79.61
Czech Republic	73.2	91.46	90.46
Denmark	154.92	138.31	136.21
Germany	138.57	122.88	120
Estonia	55.99	73.86	77.58
Ireland	101.45	118.22	112.85
Greece	54.76	59.32	67.39
Spain	100.74	128.39	118.15
France	96.3	99.41	96.13
Croatia	-	-	-
Italy	97.98	90.18	91.71
Cyprus	63.72	71.31	73.91
Latvia	59.76	77.31	70.69
Lithuania	45.17	52.47	52.78
Luxembourg	93.68	129.93	108.26
Hungary	69.64	82.57	73.3
Malta	65.77	81.5	72.13
Netherlands	110.42	108.67	111.23
Austria	130.97	125.29	111.6
Poland	53.58	50.39	54.39
Portugal	71.57	81.35	83.56
Romania	51.68	67	78.15
Slovenia	74.51	108.97	114.56
Slovakia	48.15	51.93	54.43
Finland	156.45	148.6	149.77
Sweden	128.17	141.73	133.59
United Kingdom	102.68	104.93	100.88
Iceland	-	-	-
Norway	-	-	-
Switzerland	-	-	-

6. ECO-INNOVATION IN TEXTILES AND LEATHERWORK

Like in all fields, in textiles and leatherwork field, appeared, also, in the last years, a lot of new expressions and concerns, such as eco textiles, green textiles, eco fashion, eco-friendly fashion, ecollection, sustainable style. There are a lot of tools available that measure environmental damage and help manufacturers and brands become more sustainable. On WebEcoist: a Global Resource, one of the most popular green websites in the world, in an article, *Eco Fabric: 14 Strange and Amazing Textile Innovations*, are presented some of environmentally friendly fabrics which are already in use, like those made of coconut husks, recycled plastic bottles, wood pulp and corn, while others are strange and futuristic, sourced from hagfish slime, fermented wine, spoiled milk and genetically engineered bacteria. [13] In early 2010, several leading companies producing clothing and footwear in North America, Europe and Asia, along with NGOs and the Environmental Protection Agency in the United States have established a new entity, called *Sustainable Apparel Coalition*, which aims to reduce environmental and social impacts of apparel and footwear products, establishing an index to measure and evaluate sustainability of clothing and footwear products. The Higg Index is a tool to help organizations standardize how they measure and evaluate environmental performance of apparel products across the supply chain at the brand, product, and facility levels. In May 2013 the index covering 150 products from 63 companies. [14]

Greenovate! Europe, an independent expert group dedicated to the development of sustainable business, performed a study, "*Eco-innovation in cluster organisations in the chemical and textile-clothing-leather sectors*" which lead them to the following conclusions: eco-innovation activities are just starting and focus strongly on understanding the issues at stake, providing knowledge and promoting existing eco-technologies; the textiles-clothing-leather cluster organisations were interested in the use of eco-innovation to raise their competitiveness and to improve their image. [15]

To the level of European Union, through the *Eco-Innovation Programme*, since the launch of the programme in 2008, from almost 200 projects, involving more than 650 organisations, 10 projects are in textiles and leatherwork field. [16]

Clothing project to explore the circular economy for textiles

EcoProFabrics will show that the old linear model in textiles, where garments are thrown away after use, can be replaced by a circular economic model, where used textiles are shredded into loose fibres then converted into new textiles without any loss in quality. According to Dutch aWEARness's calculations, compared to standard non-recycled textiles, Returnity can offer energy, water and carbon dioxide savings of 64%, 95% and 73% respectively. It cuts raw materials demand by 61% and, because it is fully recyclable, waste is eliminated entirely. The fabric should also compete on price with standard fabrics, and might even become cheaper if production volumes increase, because the cost of waste recovery will be outweighed by savings in raw material costs. [17]

Recycled footwear products enter the market

The main objective of the project was to analyse if marketable products (from old footwear collected in El Naturalista branded stores) could be produced from waste polymeric material, thus diverting waste from landfill, and reducing the need for production of new polymers. More than 12,000 pairs of shoes with recycled insoles have been sold. [18]

Ecofriendly Leather Tanned with Titanium - TiLEATHER

The main project objective was to introduce into the European market leather produced using environmentally friendly titanium-tanning techniques, which has been registered by INCUSA as SANOTAN® leather, shoes that are comfortable for the wearer and the planet. Through this novel process, chromium salts are replaced. The main environmental improvements achieved over the two years of the project are the reduction of the use of chromium compounds amounting to 25.5 tonnes; reduction of CO₂ emissions by 35 tonnes, and the elimination of chromium contamination in wastewater. [19]

7. CONCLUSIONS

States and governments of the world, different institutions and organizations actively involved and aware in public policies, strategies and actions, reaffirm their commitments and reassess actions in order to achieve a truly sustainable development.

A sustainable future can only be built decreasing waste of natural resources and energy, producing and consuming moderate and responsible. Today's consumers, better informed and becoming more interested in the quality of their lives and their children's, have become sensitive to environmental issues and diminishing resources, demanding, increasingly more bio or eco products.

In these conditions eco-innovation is not just a trendy concept but a reality and a necessity nowadays, a way to achieve a sustainable future for ourselves and future generations.

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