
SUSTAINABLE INNOVATIONS AS SCENARIO FOR REGIONAL DEVELOPMENT

■ **Abstract:**

By 2012 the Earth population is expecting to reach 7 Bln people, and this number is expecting to grow to 9 Bln till 2050. Many recent reports discover the problems of resource scarcity and climate change. Some scenarios anticipate total resources extraction of around 200% of 1980 equivalent by 2020, necessary just to sustain the world-wide economic growth [10]. In order to cope with these challenges on global scale, people need to develop new social behavior and vision for production and consumption.

The present paper aims to overview some emerging innovative practices, leading to social, economic and ecologic development. Largely will be discussed the role of the regions, the concepts of Living labs, regional role for sustainable innovation processes. Finally there will be presented some examples and models, aiming to support and improve the innovation activity.

■ **Keywords:**

Living labs, Regional development, Sustainable Innovations

■ **INTRODUCTION**

Regions become increasingly important in the context of globalization. On one hand, regions represent specific ecological, economic and cultural environment, and on the other hand they propose unique combination of natural resources and human activity. Regions designate geographic area centered within a conglomerate of complex inter-dependent economic and cultural relationships. Regions are focal point in the innovation process, as they form natural geographic borders for transfer of tacit knowledge [1]. In a global multi-cultural and multi-ethnic world, where geographic distance has become obsolete because of intensive air-traffic and information flow, some authors [2] anticipate even bigger role for regions for developing flourishing research and innovations eco-system. Regions represent administrative, political, economic, natural and cultural centers that form local communities,

physical places where people live, work and communicate. The present research investigates how regions can facilitate and promote the process of sustainable innovations.

Sustainability is extending the concept of ecology, including three main components - sustainable environment, sustainable society and sustainable economy [3]. Thus sustainability has to be understood as sound economic term, designating a path for long-term development. Finding appropriate models for further sustainability will provide long-term success and prosperity for next generations. According to recent projections, the dominating economic models can not match with present demographic growth. This means that in the next 40 years human will need the resources of another 5 planets as the Earth, in order to cope with resource scarcity and increased needs of the expected 9 billions people. Beside resource scarcity, some urgent issues as well are the increasing effect of climate changes on natural

and biological eco-systems. Sustainable innovations can propose a path for transformation of companies, consumers and regions to more stable and coherent models for long-term survival. So the present research proposes an overview of factors, leading to development and adoption of sustainable innovations and the role of the regions.

■ **THEORETICAL BACKGROUND AND RESEARCH METHODOLOGY**
 ■ **Overview of concepts behind Sustainable innovations**

One of the main problems with development of sustainable innovations is the lack of common understanding of the term [4]. Sustainable development is defined as political concept in Brundtland Report [5], describing it as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs"(UN 1987). Sustainability goes beyond the ecological aspects and scarcity of natural resources, as it includes as well social and economic stability [6]. Another important term is the eco-innovation defined by [7], stating that eco-innovation is the "creation of novel and competitively priced goods, processes, systems, services and procedures designed to satisfy human needs and provide better quality of life for everyone, with a whole-life-cycle minimal use of natural resources (materials including energy and surface area) per unit output, and a minimal release of toxic substances". [3] Highlights that sustainable innovation is innovation aiming to generate benefits that are collective in terms of the environment, society and economy and reflecting a new out of the box approach often challenging traditional systems. [6] Claims that sustainable innovations is an umbrella term, designating ecologically sustainable development; participatory innovation (including customers, employees, users and the general public); continuous innovation (the ability to continuously regenerate and break boundaries); global innovation (innovation in global cooperation using knowledge distributed everywhere); innovative management (or management encouraging innovation in organizations and society).

Thus many scholars understand sustainable innovations as form of disruptive innovations, changing and threatening existing economic

and social models. This explains why it is extremely difficult for companies and politicians to accept and work for this fundamental change, and why they often prefer to substitute it with eco-efficiency, dematerialization and ecology-friendly production [4]. [8] as well discusses the need for revolutionary change in the innovation system, emphasizing that the old dominant conceptual model for innovations is outdated and has to be replaced by a new one.

Vision for sustainable innovations should reflect the substantial change in individual behavior and in business models. Sustainable innovation is conceptual model of thinking, assessing individual and business choices for achievement of continuous systems and processes. The accent of sustainable innovation has to be put on the daily individual and business choices, leading to informed and responsible for the future decision making. Innovations should not be limited only to business initiatives, because individuals can adopt conceptual models for sustainable development being employees, experts, citizens, customers, parents, members of community, neighbors, etc. Thus sustainable innovation concern the people's way of thinking, living and working, and involve everybody and every decision made in professional or private life.

■ **Research methodology**

The present research aims to discuss the role of regions in the emerging sustainable innovations paradigm. In the centre of our debate is put the innovation process as general approach for coping with global challenges ahead and enabling achievement of sustainability in regional aspect. There will be discussed critical factors and challenges for sustainable innovations, discovering the role of regions as focal point of innovations, transforming from low-cost manufacturers to centres of value-creation, leading to increased well-being and quality of life.

■ **MAIN FACTORS FOR SUSTAINABLE INNOVATIONS**
 ■ **Innovation paradigm**

In order to discuss the regional role for the process of sustainable innovations, an overview is made on the main economic principles and challenges today. In [9] there are analyzed in details the state-of-the-art of the innovation landscape, including recent trends in company innovations, university and research

infrastructure development, demographic and social factors and emerging concepts and innovation paradigms.

Today innovations become part of the every day severe competition in a global scale. Adoption of new technologies, improved products and process functionalities, optimized production and cost-efficiency and improved supply-chain processes become factors for differentiation and often result in shorter product life-cycle and accelerate market dynamics. Innovations are among the key functions of any company. In the knowledge-based economy knowledge become main factor for competitive advantage. So innovations are the measure of new knowledge that company can implement in its products and services and can sell on the market. Thus innovations designate the end-goal of any knowledge-intensive activity.

However in a global plan there are more than 3 bln people living with less than 2 USD per day. On the other hand, developed countries increasingly will suffer from worsening demographic structure because of aging, meaning worse productivity, rising demand for public and health care services, and more pressure on social systems. EU is one of the larger importers of resources in a global scale. Thus competitive advantage of European countries has to be focused on improved resource use, providing more value with less products, exporting more intangible than tangible products and services.

■ **To be or to have**

The concept of sustainable innovations relies on the philosophy of Eric Fromm "To be or to have". While the economic growth following development of new technologies and fast globalization is due on the fact that more people "have" more products and services, sustainable innovations put the focus on the first part - "to be". The main question for companies should not be centered on how to use the concept of sustainability, eco-innovations and eco-efficiency to sell more, but how to increase the value of limited resources. Increasing knowledge and services within products and using wiser resources means delivering more value for customers and allowing customers to spend wiser resources on their turn. Globally natural resources - oil, minerals, metals, fresh water and others, are expected to become more

and more difficult to obtain [10] provide deep analyzes] and this will increase its prices. However, the factors of sustainability are strongly interrelated and can not be examined or anticipated in isolation, focusing only on resource scarcity, climate change and demographics change. One example of this complex eco-system is the recent food crises of 2007-2008, that led to sharp price increase of basic foods and caused political and economical instability and social unrest in both poor and developed nations (Wikipedia). The average world prices for rice rose by 217%, wheat by 136%, maize by 125% and soybeans by 107%. There were identified several groups of factors as climate change - bad weather conditions in main producing regions and natural disasters due to increased ozone effect. However, this crisis situation was severely fuelled by economic factors - as increased demand and production of biofuels, increased consumption in Asia, redistribution of working land, and change in agriculture prices subsidies in developed nations. Finally the prices were influenced as well by large market speculations for commodities on the global stock exchanges, mass declining world food stockpiles and historically imposed trade quotas on countries as Japan, prohibiting it to sell rice on the world market. The complexity of the factors and relationships and its direct influence on the global economy can not be easily forecasted and anticipated. The global financial crisis afterward (2008-2009) was another challenge to the world economy and the recovery is not yet stable.

■ **Rising role of regional knowledge eco-systems**

The raising importance of regions for speeding-up innovations and knowledge transfer is largely discussed in literature. The focus on regional knowledge ecosystem framework is due on increased dynamics of interactions within region, including emerging networks and tacit knowledge flows. Holistic approach of the regional innovation ecosystem, represent one coherent understanding and sustainable management of knowledge processes and not just providing tools and services. Recently, it has been recognized that innovations are localized. Innovations are result of ongoing and prolonged collaboration and interaction between firms and a variety of actors around them within what has

been termed regional innovation systems [11]. This is due on the fact that non-codified, tacit knowledge transfer which play increasingly role in the innovation process largely depends from face-to-face contacts and frequency of interaction among individuals. So geographic distribution explains knowledge production and innovation, but still remain unclear how knowledge spillover matter on the formation of clusters and agglomerations [12]. The regional knowledge ecosystem can foster not only regional balance, but can adopt effective mechanisms to bring local innovations on a global scale. Regions are in the best position to promote new culture and perceptions of sustainable innovation among citizens and local business. Local community is a micro-reflection of the global world - this is what we see daily around us, and this is what makes sense to us. Local authorities can better promote sustainable innovation as it can better assess and evaluate resources, it can better understand citizens, local business, local research institutions and universities, mechanisms of transfer of goods and knowledge inside and outside region.

■ CHALLENGES FOR SUSTAINABLE INNOVATIONS - PERSPECTIVES FOR REGIONS

■ Role and place of regions to support sustainable innovations

Sustainable innovation should be adopted and promoted as public policy, because this new approach fundamentally oppose on the market logic for company development. Instead of producing and selling more new products and gaining bigger market share, companies have to fundamentally change their focus - to produce less material products, to improve production processes, to improve efficiency of resource use, to improve quality and life-cycle of products and services, to limit resources waste. Presently the price is the main base for competition. Thus in order to change the concepts of resource extraction and use, companies will need additional support to redefine production processes, business models and value-creation mechanisms.

Discussing the emerging role of regions, there can be identified the following initiatives and approaches, promoting the concepts of sustainable innovations among companies, citizens, customers and end-users.

- Raise public awareness for sustainable innovation in the framework of local

development. Regions can promote companies and provide local examples and practices for adoption of sustainable policy. Attention should be paid on private companies, but as well on public institutions, producing and selling high-quality products with extended life-cycle, improving service for clients and after-sale policy, developing innovative approaches for limiting resource use and promoting resource efficiency.

- Evaluate sustainable eco-systems. Sustainable innovations stays for innovations, oriented toward ecological balance, better exploitation of resources, better responding on users needs, exploitation of global knowledge. Sustainable innovations can be defined as managerial approach rather than scientific as it stays not for better technologies, but for better managerial practices to incorporate more value in products. Thus innovative business models become increasingly important for any business and for any customer, designating what the offer is and the value for money. Innovative business models can create new sources of competition, changing the model of value creation.
- Changing social models. Contrary on any marketing campaign, in the framework of sustainable innovations, people have to learn to consume less, to taking care for products and resource longer and more efficient use and thinking about any practices and approaches enabling better sustainability in long-term.

OECD has identified several approaches to motivate industry to apply sustainable methods [13]. One factor will be the increased demand for green and fair products, which is function of social demand - through increased education and public awareness campaigns. Another incentive is better information for customers, including communicating low-impact product use, explaining how to reduce the use-phase impact on what customers purchase, decrease energy use, requiring labeling standards and information about resource consumption and energy efficiency status and others. Innovative after-sale services will allow prolonging product life, durability of products and services, and development of take-back regional policy. Regions can foster companies to implement product and service innovations and service-oriented business models, emphasising the fact

that the value-adding process highly involves customer services. Leadership for social change and socially responsible business have to be reinforced and highly estimated in the society.

Table 1 Regional role for promoting sustainable innovations

Challenge	Regional Incentives
Creating demand for green and fair products	Raise regional awareness and knowledge about sustainability and foster demand for green and sustainable products
Communicating for low impact product use	Foster companies to improve information about products extended and efficient use.
Innovative after-sale services	Promote product quality, business models and after-sale support, increasing product life.
Product and service innovations	Improve quality of products and services provided in community
Service-oriented business models	Increase value for clients while providing additional services.
Leadership for social change and socially responsible business	Promote local leaders; raise social recognition for adopting sustainable innovations.

Regional support for sustainable innovations within main business processes

- Innovation process - Regions can foster intensive knowledge transfer processes, fostering cooperation and public initiatives for local eco-system, involving internal and external experts in networks. The role of regions can be to enhance companies and to involve customers, end-clients, experts and administration, in order to increase value for money, proposed in the community. Working with companies, regions can raise questions for longer product life-cycle, improved quality, after-sale service and pay-back policy. Living labs and open innovation framework propose new model for cooperation. Matching supply and demand improve planning, production, storage and logistics and increase productivity and efficiency.*
- Production process - Companies increasingly focus to outsource standard production processes and to specialize in specific tasks. However, many examples prove that sustainable innovations and expert knowledge, applied in the production process can enable companies to discover many new sources for cost optimization, eco-efficiency and increasing value. Regional support can facilitate companies to improve production processes in a whole, supporting explicitly better quality products, resource efficiency, use of efficient working practices as tele-work,*

mobile and flexible work, minimizing rented physical spaces, minimizing transport costs. Regions can describe specific business models appropriate for local context.

- Distribution process - Logistics process is extremely severe problem because of the traffic, oil-dependences and metal use. Thus optimized distribution processes in the region can enable regions to increase safety, to optimize road use, to optimize distribution of products. Shortening production and distribution cycle will mean shorten needs for working capital. Adopting regional supply chains and transportation chains, optimizing packaging, decreasing waste and damages in the logistic process can contribute to local sustainability.*
- Sales - Regions have to raise awareness and motivate users to understand sustainable innovations paradigm - using wiser resources, calculating overall resources consumption, obtaining better value and well being limiting its consumption.*
- After-sale process - Regions have to develop explicit procedures and mechanisms to help users and companies to recycle and buy-back products and resources; Thus companies have to keep closer contacts and relationships with customers.*

Some practices of sustainable innovations

Living labs (LL) is evolving concept, fast spreading around Europe (EnoLL). This is a form of user-driven open innovation ecosystem, based on a partnership which enables users to take an active part in the research, development and innovation process with product conception. It can be defined as “an environments for innovation and development where users are exposed to new solutions in (semi)realistic contexts, as part of medium- or long-term studies targeting evaluation of new solutions and discovery of innovation opportunities” [14].

Benefits of LL can be discussed from various perspectives. Users, citizens and members of the community can be empowered to influence the development of services and products which serve their real needs, and thus jointly contribute to savings and improved processes through active participation in the R&D and innovation lifecycle. SMEs and micro-entrepreneurs can act as providers, developing, validating and integrating new ideas and rapidly scaling-up

local services and products to other markets. Larger company can improve the innovation process, by partnering with other companies and end-users. Researchers, economy and society gain stimulating business-citizens government partnerships and improved technology innovation ecosystems; integrating technological and social innovation in an innovative 'beta culture'; increasing returns on investments in R&D and innovation. Living labs contribute to the reduction of market risk [15]. The authors studied in details 4 cases in LL and summarized that LL reduced uncertainty and risk on personal and team level, increase entrepreneurial role, create experimentation arena and finally develop initial demand. Several examples for sustainable innovations are provided by [16] describing the models how different companies and institutions can promote regional sustainable innovation ecosystem. Wal-Mart requires for example from its suppliers to respond on specific environment standards, and thus raise awareness and directly support regional sustainability. Triodos Bank has raised attention on the sustainability niche, focused to finance only companies and projects, delivering social or environmental benefits. Further, authors propose the metaphor of "Bikini model", designating the trend to "sell less but make more". This is the model of DuPont, changing the focus of sale - from selling final material goods, often customers prefer getting specific service. This can enable companies to optimize production processes, delivering more value for products, saving resources, improving waste etc. Another example is the model of dematerialization, describing development and transfer of digital resources, creating more value with less resource as model of Apple Ipod and Amazon reader.

CONCLUSION

The present research focuses on regional role for emerging complex knowledge eco-system, enabling knowledge transfer and flow of information. Regions have to increasingly promote sustainability among it citizens and companies as companies can not alone promote sustainable innovations. Regions are in the best position to foster local processes, because they can increase information for sustainable innovation on different levels, involving everybody in the process. Regions can successfully influence knowledge flows, networking and cooperation in practices and forms of Living labs and other examples, raising

awareness and better motivating and public recognizing efforts for attaining long-term sustainability. Further research can give more references for emerging business models, fostering sustainability on local level.

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