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REGIONAL INNOVATION STRATEGIES AND SUSTAINABILITY IN SELECTED EU COUNTRIES

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ABSTRACT

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Regional innovation strategies and sustainability in selected EU countries

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This study focuses on regional innovation strategy (RIS) and sustainability aspects in selected regions of European Union (EU) countries. It is known that RIS helps a region to innovate locally and to compete globally and it is considered as one of the main policy tools of the EU for innovation support at a regional level. This study is conducted to explore the existence and adoption of RIS in different regions of selected EU countries, and to highlight and compare regional RIS characteristics. The study is also aimed at identifying the factors that characterise the formulation and implementation of RIS as well as the problems associated thereof. In this study, six regions of EU countries are considered: Päijät-Häme Region (Finland); London Region (United Kingdom); Mid-West Region (Ireland); Veneto Region (Italy); Eastern Region (Poland); and West Region (Romania). Data and information are collected by sending questionnaires to the respective regional authorities of these selected regions.

Based on the gathered information and analysis, RIS or equivalent strategy document serves as a blueprint for forwarding innovative programmes towards regional sustainability. The objectives of RIS in these regions are found to be dependent on the priority sectors and state of the region's development. The current environmental sustainability aspects are focused on eco-design, eco-products, and eco-innovation, although each region also has its own specific aspects supported by RIS. Likewise, regional policies typically follow the RIS yet translated in various sectoral focus or priority areas. The main enhancing factors supporting RIS among selected regions have some similarities and variations; among others, some regions are strongly supported by EU while others have support from own regional agencies, organisations and professional networks. RIS implementation is not without challenges and despite the differences in challenges, almost all of reviewed regions consider financial resource as a common problem. Generally, it is learned from this study that RIS and regional sustainability are reinforcing each other mutually. In this study, the strong focus is given towards environmental sustainability in the regions although regional sustainability also includes economic and social aspects. A well-focused and prioritised RIS is beneficial for regional sustainable development.

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LIST OF ABBREVIATIONS

BEPA	Bureau of European Policy Advisers
CIP	Competitiveness and Innovation Framework Programme
DG XIII	Directorate General for Technology Policy
DG XVI	Directorate General for Regional and Cohesion Policy
ERDF	European Regional Development Fund
ERRIN	European Regions Research and Innovation Network
ETAP	Environmental Technology Action Plan
ETP	European Technology Platform
EU	European Union
EU SDS	European Union Sustainable Development Strategy
FRESH	Forwarding Regional Environmental Sustainable Hierarchies
GDP	Gross Domestic Product
ICT	Information and Communications Technologies
IT	Information Technology
MITKE	Managing of the Industrial Territory in the Knowledge Era
NGO	Non-Governmental Organisation
NSI	National Systems of Innovation
NSS	National Spatial Strategy
OP	Operational Program
PROSESC	Producer Services for European Sustainability and Competitiveness
R&D	Research and Development
RDFP	Research and Development Framework Programme
RDI	Research Development and Innovation
RES	Regional Economy Strategy
RIS	Regional Innovation Strategy
RIS-NAC	Regional Innovation Strategies in Newly Associated Countries
RITTS	Technology Transfer Infrastructures and Strategies
RPG	Regional Planning Guidelines
SD	Sustainable Development
SME	Small and Medium Enterprise

1 INTRODUCTION

1.1 Rationale

In the 21st century, innovation has become a very important and essential part of development. In the recent past, due to the increased attention to development of regional areas, the concept of regional innovation system has become popular. According to Enright (2001), the rise of popularity of such concept has been propelled by the increased intensity of international cooperation in globalising economy, shortcomings of traditional regional development models and policies and the growth of innovation clusters (typically firms and industries) in many regions worldwide.

In the European Union (EU), regional development is strongly supported by the so-called regional innovation strategy (RIS). RIS defines the ways of innovativeness growth in a certain region, using financial support from the EU. RIS helps to use money for R&D more efficiently and rationally and point out how to enhance infrastructure of a region. The strategy also helps small and medium enterprises (SMEs) increase their competitiveness by connecting business and science activities (Regional Innovation Strategies, 2011). The primary aim of RIS is to assist regions to innovate locally and to compete globally. RIS also helps to point out the most significant areas for development in economical and technical ways (Mahdjobi, 1997). RIS helps regions to meet their needs through implementing new initiatives (Innovating regions in Europe, 2009).

RIS is one of the main policy tools for innovation support at a regional level and considered as a powerful driver of economic growth at regional level. RIS also is a tool for establishing the knowledge-based economy which is a basic condition for achieving the Lisbon Strategy objective[1] (Lesáková, 2011). An example of RIS providing a strategic framework to develop policies and to facilitate and enhance the innovation is very well pronounced in businesses in regions. This is because innovation affects regional business sustainability through the development of new or significantly

[1] *Lisbon Strategy objective is to make EU "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" (Lisbon Agenda, 2007).*

improved, products, services, systems and processes (NSW Regional Innovation Strategy, 2010).

For many years, the EU has been emphasising the importance and role of innovation in regional strategy as well as in achieving sustainable development in general. (Courvisanos, 2009). For example, ecologically sustainable innovation (or eco-innovation[2]) has been one of the main components of RIS in many regions in the EU According to Bleischwitz *et al.* (2009) eco-innovation as one of the main constituents of sustainable development has a crucial role to play in putting the EU on the path to a resource and energy efficient economy.

According to the European Commission (2002), the expanding nature and transformation of the EU in response to globalisation is posing a new economic environment. Such new economic environment which is characterised by accelerated technological changes affects the markets and the expansion of the EU. In such new context, many of the traditional regional policy recipes are no longer applicable (Crauser, 2002). Therefore, such new economic development suggests that regional prosperity has to be built on new set of competitive factors which require new regional policy approaches. If regions are to be successful in meeting the challenges of new economic and development landscape, policy response with innovation promotion at the core is undeniably crucial.

The RIS is therefore an EU initiative that is aimed at providing strategic response to the regional need emphasising greater innovation and balance in sustainability spheres. The RIS under the European Regional Development Fund (ERDF) has been supported through various initiatives, projects, financing schemes and even regional network development. In promoting the RIS, the EU takes a flexible approach to regions partaking in the RIS programmes, hence, a broad guidelines and not so straightforward standard methodology of implementation in different regions. This leads to a situation that the result of adopting and implementing the RIS are expectedly very much

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[2] *Eco-innovation is "the creation of novel and competitively priced goods, processes, systems, services, and procedures designed to satisfy human needs and provide a 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" (Reid and Miedzinski, 2008).*

flavoured by characteristic features of a region mainly highlighted by priority sectors and main actors involve in the process. Since many regional authorities in various EU countries are part of this RIS implementation and networks, the result and impacts of their respective initiatives are rather contextual and regional character-dependent. Due to the flexible approach in its implementation, it can also be evaluated in different manners and standards, hence resulting to a case-to-case development and interpretation. As such the potential of transferring the results to other regions (e.g. good practice or technology transfer) as encouraged in the EU can be very challenging. On the other hand, the experience in the region can be very beneficial at learning level, i.e. lessons can be drawn from specific similar circumstances among regions. According to some research, one result on this learning has been the rediscovery of the importance of regional scale and importance of specific and regional resources in stimulating the innovation capability and competitiveness of the regions (Asheim *et al.*, 2003; Cooke, 2001; Wolfe, 2003; Isaksen, 2003). Learning from the experience of the regions, for example, on the emergence of new business clusters or priority-setting for new eco-innovation area, can lead to regional competitiveness (Maskell and Malmberg, 1999). This research points out that the localised nature of RIS success offers good insights on the interplay of innovation, learning and performance of particular regions. Hence, this study is about exploring the importance of regional scale of RIS implementation as it stimulates the creation of innovative policies and programmes in pursuing and achieving a level of regional sustainability. For this purpose, a framework to study this regional scale phenomenon is roughly drawn as shown in Figure 1.

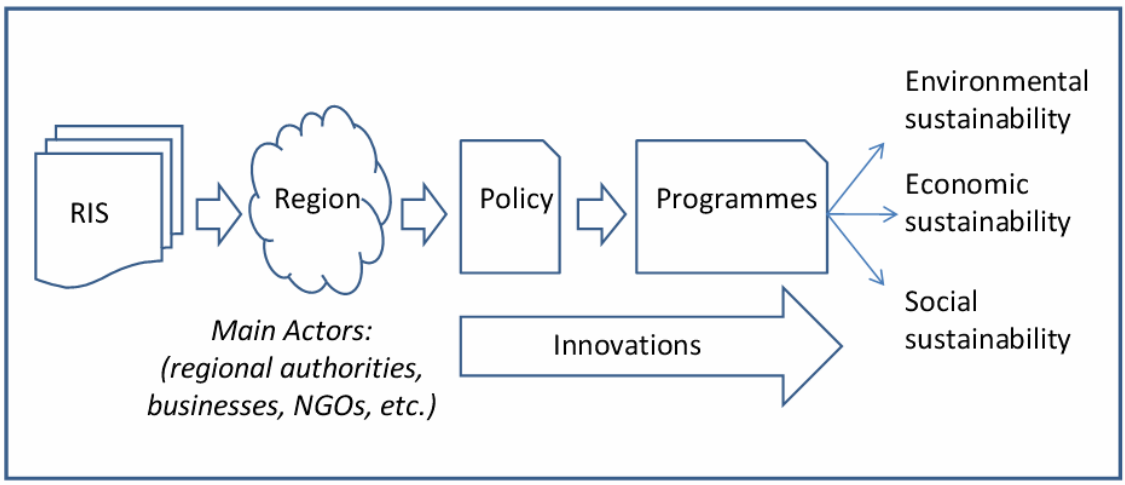

Figure 1. Framework of the study

1.2 Objectives of the study

The call for case-to-case understanding of RIS implementation in the different regions in the EU serves as the motivation for this study. Generally, the objective of this study is to explore the existence and adoption of RIS in different regions of the EU countries. Specifically, the study is conducted to highlight the characteristic features of a region's RIS and to compare the similarities and differences between RIS approaches in relation to region's pursuit of sustainable development imperatives (i.e. economic, environmental and social sustainability) in the region. Additionally, the study aims to identify the factors that affect the success of RIS as well as the problems associated thereof.

1.3 Scope and limitations

The scope of this study covers the RIS of the selected regions in six EU countries. The study did not focus on the details and specific stipulations of a region's RIS but concentrated mainly of the priority sectors and aspects of sustainability. For this case, the main aspect of sustainability emphasised is on environmental sustainability as reflected in the current programmes of the regions.

As to primary data and information, this study relied mainly from the information provided by the respondents from the regional authorities/offices in each region. As such, the provided information are limited and to some extent subjective due to personal interpretation of the respondents. Likewise, the answers of the respondents although taken as facts may reflect some sort of PR-side of reality. Another limitation of this study is the inadequacy of time to make a thorough analysis of the contents of the written RIS documents, hence, the main focus is solely on the results of implementation and presented as streamlined and in general themes.

2 THEORETICAL PERSPECTIVE AND REVIEW

2.1 Innovation theory

Similar to the abundant definitions of innovation, hundreds or volumes of theories on innovation can be found in almost every discipline and aspect of human activities. In a broader sense, innovations include the first-time application of newly acquired know-how, new methods, or new products. The term can also be expanded to include non-technological innovation, such as changes in firm's organisation or the design of a product (Rennings, 1998). On the other hand, a narrow definition of innovation is "*technological novelties*".

From an economic discipline or viewpoint, the definition below serves as useful reference for this study:

> *"Innovation is the process through which productive resources are developed and utilised to generate higher quality and/or lower cost products than had been previously available. Innovation requires the visualisation of a range of potentials that were previously hidden and that are now believed to be accessible. The innovation strategy in its essence, interpretative and therefore subjective, rather than rational and objective" (O'Sullivan, 2000).*

Although Nelson and Winter (1977) noted that market environments are the only one social system within which innovations can occur, this was refuted by many scholars that innovation do happen in non-market environments such as public and voluntary sectors (Hockerts and Morsing, *sine anno*).

According to Mytelka and Smith (2001), there are seven widely-found results concerning theory of innovation. First, innovation is not something that happens only in a relatively small group of hightechnology industries, or something that is driven by a small set of industries or technologies. The new innovation data, particularly from the EU, show clearly that it is distributed right across the system in all European countries. Second, firms invest in a wide range of innovation inputs (e.g. training, acquisition of capital goods, design development, market research, etc.) and the mixes of these inputs

vary quite sharply across sectors. Non-R&D inputs to innovation are of great policy importance in many large sectors of an economy. Third, firms very rarely innovate without technological cooperation or collaboration. Knowledge-creation happens through an interactive process with other firms, organisations, the science and technology infrastructure and so on. Fourth, innovation involves serious uncertainty, both in technological and in economic terms. It is hard to predict the path of innovation even in general terms. This leads to major problems for firms in making investment decisions involving innovation activity. Fifth, clustering appears to be very important in competitive advantage. Horizontal clusters[3] are widely distributed and seem to be associated with better economic performance of firms in the clusters. Vertical clusters[4] can be identified using input-output techniques and reflect country specialisations that often differ widely. There is evidence that cross-border clusters may be becoming more important. Sixth, the idea that innovation by firms cannot be understood purely in terms of independent decision-making at the level of the firm is very persistent in innovation study. The factors shaping the behaviour of firms are: the social and cultural context, the institutional and organisational framework, regulatory systems, infrastructures, the processes which create and distribute scientific knowledge, and so on. All these factors have determinative impact on firm's innovation decisions-making. Finally, the science system is important for innovation and there is a strong interaction between technology and science. Although science does not provide the raw material for innovation, it remains a key element of industry knowledge bases across the economy (Mytelka and Smith, 2001).

2.2 Regional Innovation System

The concept of regional innovation system has been gaining much attention since the early 1990s. The popularity of the concept of regional innovation system is closely related to the emergence of clusters and the surge in regional innovation policies where the region is appeared to be the most appropriate scale for innovation-based learning economies (Doloreux and Parto, 2011).

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[3] *Horizontal clusters – groups of firms in the same line of business*
[4] *Vertical clusters – sustained relationships between firms in different activities*

It is rather hard to pinpoint exactly how the concept of regional innovation system originated but Philip Cooke in the book "Regional Innovation Strategies" by Braczyck, *et al.* (1998) provided a good account of the origins of the concept. Taken as a synopsis here, Cooke (1998) accounted that regional innovation system as a concept was newly deployed since 1992 although there was no direct mention to it as exactly called regional innovation system. As in the discourse of the late 1980s and early 1990s more generally, there was in many other publications (e.g. Malecki, 1991; Bergman *et al.*, 1991) reference to: "regional innovation policies" (Antonelli and Mommigliano, 1981; Cooke, 1985); "innovative milliuex" (Maillat and Vasserot, 1988; Aydalot, 1985); "regional technology policies" (Rothwell and Dodgson, 1991); "regional innovation potential" (Meyer-Krahmer, 1985); and "innovation networks" (Camagni, 1991). Following after all these reference conceptualisations was the development of writings about National Systems of Innovation (NSIs) (Lundvall, 1992, Nelson, 1993). Since then, literature and findings emerged which sought to establish the extent of convergence and divergence among NSIs, owing to the growing attention to the internationalisation of science and technology and R&D. This development of NSIs was of special interest in the European Union given the emergence of a supranational science funding mechanism through technical and scientific support programmes of the Commission. However, research on NSIs, particularly represented by Nelson (1993) concluded that there was no single identifiable model of an NSI and it was difficult to research the systemic dimension of the NSI hypothesis. This was particularly difficult in larger countries but less for the smaller ones where some studies have been conducted (Lundvall, 1992). Coincidentally, in the early 1990s, regional scientists began to put together some of the elements they had been researching separately such as; the existence of regionalised technology complexes (Saxenian 1994) and large-scale technopolis arrangements (Castell and Hall, 1994; Scott, 1994). By then, research on particular regions linked together business networking, technology-transfer and vocational training as key pillars in the system house of regional innovations (Cooke and Morgan, 1998). In 1995, conferences in Stuttgart and Oslo explored various questions about regional innovation and its systemic nature (Brackzyck *et al.*, 1998). Additionally, other research into regional innovation system had been boosted by the growing literature on "post-Fordism" (e.g. Amin, 1994), "industrial clusters" (Porter, 1990) and the "rise of the region state" (Ohmae, 1995).

Since then, the concept of regional innovation system has proliferated and although many variations in contextualisation, the concept is usually understood as a set of interacting private and public interests, formal institutions and other organisations that function according to organisational and institutional arrangements and relationships which leads to the generation, use and dissemination of knowledge. This set of actors produce comprehensive and systemic effects that encourage firms within the region to develop specific forms of capital in order to reinforce regional innovative capability and competitiveness (Doloreux and Parto, 2011).

An account by Doloreux and Parto (2011) provided a modern rendition of the origin of the regional innovation system concept by hinging on two main bodies of theory and research. The first body of literature is systems of innovation. The systems of innovation literature mean innovation as an evolutionary and social process. Innovation is stimulated and influenced by many actors and factors, both internal and external to the firm. The second body of literature is regional science and its focus on explaining the socio-institutional environment where innovation emerges. From a regional point of view, innovation is localised and a locally embedded. A regional innovation system is characterised by co-operation in innovation activity between firms and knowledge creating and diffusing organisations, such as universities, training organisations, R&D institutes, technology transfer agencies, and the innovation supportive culture that enables both firms and systems to evolve over time (Doloreux and Parto, 2011).

The regional innovation system underlines the importance of regions as modes of economic and technological organisation and reflects on the policies and measures aimed at increasing the innovative capacity of all kinds of regions. It is generally conceded that the innovative performance of regions is improved when, for example, firms are encouraged to become better innovators by interacting both with various support organisations and firms within their region. But the diverse variety of regional innovation system types exists and the approach suffers from the absence of a unified conceptual framework (Doloreux and Parto, 2011).

2.3 EU and sustainable development

Often, the needs and goals of society, economy and environment protection differ from each other. For instance, there is a need for clean air, but there is also a need for cars as mode of transportation. Examples of this type show that many problems in societal, environmental and economic systems abound. The problems are even more increasing when the whole global communities are taken into consideration. The concept and implementation of sustainable development agenda was thought of to tackle these challenges.

Traditionally sustainable development is defined as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs… As such it requires the promotion of values that encourage consumption standards that are within the bounds of the ecologically possible and to which all could reasonably aspire."* (Our Common Future, 1987).

Nowadays, sustainable development (Fig.2) plays a key role in the missions of many international organisations, national institutions, corporate enterprises and localities (Kates *et al.*, 2005; Hilchevskaya and Safonov, 1994).

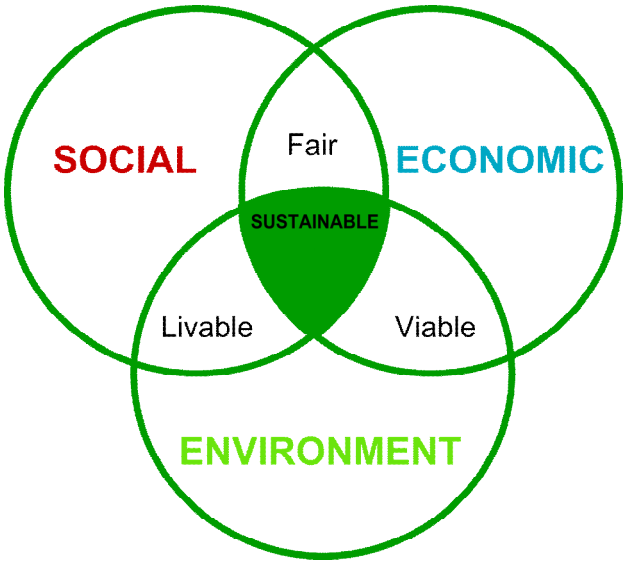


Figure 2. Sustainable development scheme
(Source: Sustainable Development, 2011a)

There are no specific rules for sustainable development. Each country creates its own scheme of development taking into consideration its economy, culture, traditions and other features. However, sustainable development prescribes the integration of social development, economic development, and environmental conservation and protection (Hilchevskaya and Safonov, 1994; Sustainable Development, 2011b). Social development refers to meeting the needs of human beings. Basic needs include food, housing, access to education, health care and employment. Social development also refers to providing public participation in policy and decision-making. It is also about empowering the poor to expand their use of available resources in order to meet their own needs. Special attention is given to equal treatment of women, children, and people with disabilities, and people living in poverty. There are also concerns about cultural preservation and social mobility. Economic development is connected with opportunity of population to support themselves and their families. It includes industrial growth, agricultural growth, services, efficient use of labour and taking part in global economy as a whole. Environmental development is connected with preservation of biodiversity, rational use of natural resources, provision of clean air and water to population and taking care about ecological carrying capacity. Well-being of people is strongly connected with place, where they live and with the resources they use. That is why it is very important to protect and guard the environment and its resources. One of the goals of sustainable development is to improve the living conditions of the humans and provide availability of natural resources for future generations. It can be obtained when economic and social developments are in compliance with environmental development (Hilchevskaya and Safonov, 1994; What is Sustainable Development, 2011).

In the EU, sustainable development has been a fundamental objective since the concept's inception in 1987. In June 2001, the European Council discussed *"A Sustainable Europe for a better world: A European Strategy for Sustainable Development"* proposed by the European Commission. It adopted the first EU Sustainable Development Strategy (EU SDS), which was aimed at enabling to achieve economic growth, greater social cohesion and a better environment (Boissiere, 2009).

The Strategy was complemented with external and global dimension in February 2002 by the European Council in Barcelona. In 2006, the Strategy was renewed in order to

achieve better quality of life through the creation of sustainable communities which was aimed at managing and using resources efficiently and providing prosperity, environmental protection and social cohesion (Boissiere, 2009). Since 2007 and every two years, the Commission issues a progress report on the implementation of the strategy. This report helps to give guidance to the next steps in the implementation of the strategy (Sustainable Development, 2010).

The EU SDS is a comprehensive strategy which covers the following policy areas: climate change and clean energy, sustainable transport, sustainable consumption and production, conservation and management of natural resources, public health, social inclusion, demography and migration, global poverty (Boissiere, 2009).

The EU SD Strategy guides the achieving of good quality of life in EU both for present and future generations through the creation of sustainable regions and communities that are able to use resources efficiently and to tap the ecological and social innovation potential of the economy. Usage of these innovations provides better environmental protection and social cohesion, which leads to the prosperity (Boissiere, 2009).

2.4 Regional Innovation Strategy in the EU

It is obvious that the European Union prospers when its regions prosper. According to Hubner (2006a), it is necessary to generate and use innovations at the regional level to make regions prosperous. Regional level is very convenient for development because all resources for innovation, such as innovative SMEs, research centres and associations, financial institutions are situated in the regions. Nevertheless, cooperation between regions is also important because of the good synergy effects derived from it (Hubner, 2006a).

In 1994, the European Commission published the Regional Technology Plan (RTP) to develop regional policies in the sphere of innovation. Later, it was renamed as Regional Innovation Strategy (RIS). The RTP-RIS pilot project was coordinated together by two departments: DG XVI (Regional and Cohesion Policy) and DG XIII (Technology

Policy). Since then the European Commission has supported the progress of RIS in about 100 European regions (Mahdjobi, 1997).

A RIS is a document which is being created separately for each region with the help of regional authorities, business-related institutions, educational institutions and organisations uniting entrepreneurs (Regional Innovation Strategies, 2011). The two main objectives of the RIS are: (a) each region should develop its own regional innovation strategy; (b) a framework should be created for the benefit of both the region and the European Community and it should improve the regional policy decisions (Mahdjobi, 1997).

According to the Regional Innovation Strategies under the European Regional Development Fund (2002), RIS have four key principles:

- RIS should be based on public-private partnership and consensus (it means close association between the private sector and the key regional players);
- RIS should be demand-led (focus on firms' innovation needs) and bottom-up. 'Bottom up' means that both the private sector and representatives of the regional and national scientific and technological community take a part in the RIS. The aim is to provide strong regional partnership (Mahdjobi, 1997);
- RIS should be action-oriented (new innovation projects and/or new innovation policy schemes as a result); and
- Regions should take part in inter-regional co-operation and benchmarking of policies and methods.

Because of the diversified nature of the regions, the Commission offers flexible and broad guidelines to the regions adopting RIS. Based on Regional Innovation Strategies under the European Regional Development Fund (2002), these guidelines include:

- promotion awareness about innovation and building a regional consensus among key regional actors;
- analysis of the regional innovation system (technology, market trends assessment, technology foresight, benchmarking with other regions);
- analysis of the strengths and weaknesses of regional firms;

- assessment of the regional innovation support infrastructures and policy schemes; and
- definition of a strategic framework – including a detailed action plan and the establishment of a monitoring and evaluation system.

The RIS projects are complemented by the Regional Innovation and Technology Transfer Infrastructures and Strategies (RITTS). RITTS supports local and regional governments and different development organisations. It helps in the analysis and development of the innovation and technology-transfer infrastructure of the region. The aims of RITTS are to support organisations and to assess, enhance and optimise the regional innovation capabilities. RIS and RITTS are both managed by the services of DG XVI (Regional and Cohesion Policy) and DG XIII (Technology Policy) (Mahdjobi, 1997).

The EU has remarkable potential for innovation. But to increase Europe's innovativeness, it is necessary to create strategies, programmes, policies and implement these in appropriate way. RIS is therefore one of those strategies which assists in achieving sustainability, competitiveness and job creation in a region (Innovation, 2010).

2.5 Regional sustainable innovation

The European Commission has supported the building of RIS during the last 15 years. The Commission implements it through different projects and programmes. For 2007-2013 programming period, the EU's strategic guidelines defines that the role of Cohesion Policy in the innovation field is to *"help regions to implement regional innovation strategies and action plans which potentially can have a significant impact on competitiveness, both at regional level and in the Union as a whole"* (Riche, 2010).

For 2007–2013 operational programmes (OPs), the European Commission launched a study covering 14 regions throughout EU. In some regions, the OPs assist in the implementation of the national strategy by funding projects. In other regions, the OP strategy is embedded in a regionally-designed economic/business development strategy.

The main tasks of the OP are to develop strategies, to control regional industrial development and to help promote the regional business environment (Riche, 2010).

As mentioned earlier, the European Commission provides support for innovation through a series of initiatives and actions. These initiatives are financed by the Competitiveness and Innovation Framework Programme (CIP) (Support for innovation, 2010). CIP supports SMEs, innovation activities, provides access to financing and supply business support services in the regions. CIP maintains use of information and communication technologies and develops the information society in whole. It increases the use of renewable energy and energy efficiency (Competitiveness and Innovation Framework Programme, 2011).

There are also other different programmes in EU that promote innovations at regional level. For example, in September 2007, a new regional programme was launched in Central Germany called Hessen Programme. The Hessen operational programme was prepared by the German authorities and the period time of this programme is 2007-13. The programme brings new opportunities for the region. It is a programme promoting innovation in order to create more growths and jobs (Hubner, 2007).

The European Cohesion Policy 2007-2013 was created to improve the European regions economy by promoting innovation and competitiveness. The goal of European Cohesion Policy is to intensify economic and social cohesion to promote sustainable development in the EU. One of the priorities of EU Strategic Guidelines is *"encouraging innovation, entrepreneurship, and the growth of the knowledge economy by research and innovation capacities, including new information and communication technologies"*. This programme promotes regional development through innovation thereby promoting innovation itself (Hubner, 2006b).

In 2001-2004, the Regional Innovation Strategies in Newly Associated Countries (RIS-NAC) projects were launched in Central and Eastern Europe regions to develop regional innovation strategies. Such RIS-NAC projects were undertaken to facilitate the implementation of the strategies and also to provide the access to good practice from other European regions (Support actions to RIS-NAC processes, 2009).

Based on the proceeding discussion, it is obvious that innovation is an inevitable factor of RIS. Innovation promotes regional competitiveness and innovative projects that have leverage affect to other regions. Such effect to other regions is manifested in transfer of knowledge and know-how, access to good practice and learning from each other.

Sustainable innovation means both innovating towards sustainability and sustainable process for innovation. Innovations for sustainability are not a short-term view but activities for achieving future growth and competitiveness. Sustainable innovation is the approach to contribute goodness for the environment and society (Chen, 2010).

In 2004, The European Union's Environmental Technology Action Plan (ETAP) was launched by the Commission with the goal of stimulating eco-innovation and encouraging the development of environmental technologies. ETAP fosters demand for environmental technologies and creates good conditions for eco-innovation. The action plan works hand-in-hand with legislation which also acts to protect the environment and drive innovation (2nd European Forum on Eco-Innovation, 2007; Innovation must do more for the environment, 2007).

The ETAP is intended to boost development and use of environmental technologies to improve European competitiveness. It also helps to overcome barriers which hamper the development of environmental technologies such as transition from traditional to new technologies and funding. Measures to promote eco-innovation and the take-up of new technologies are being taken in order to meet the objectives of the Action Plan. A salient part of the Action Plan is called “Eco-innovation for a sustainable future”. In this part, the priority is given to the following areas (ETAP, 2011):

- Getting knowledge from research to markets;
- Improving market conditions; and
- Acting globally.

ETAP aims to increase research focus and to attract more private and public investment for the development of environmental technologies. The European Technology Platforms (ETPs) – public/private partnerships on specific research areas, are support

platforms for this purpose. These platforms unite all the interested stakeholders to build a long-term vision to develop and promote a specific technology or solve specific problems. Under these platforms that are connected to the environment, the following sectors are included: hydrogen and fuel cells, photovoltaic, steel and water supply and sanitation.

Setting performance targets which are based on best environmental performance is one way to encourage industry to develop and take up environmental technologies. Environmental technologies require that many financial instruments and market conditions be improved. For this purpose, the Research and Development Framework Programme (RDFP) and the demonstration programmes are the source of grants for investments. Additionally, CIP helps to finance eco-innovation. Special market-based instruments were created to improve market conditions for promoting eco-innovation. Green public procurement is potentially powerful economic driver to further the uptake of environmental technologies. Finally, ETAP raises awareness to promote the popularity of environmental technologies

Globally, this ETAP activity includes actions intended to support environmental technologies in developing countries and promotion of foreign investment. It is needed because investment in environmental technologies has the potential to increase employment and economic growth within the EU and to promote innovation, competitiveness and sustainable development at the global level (ETAP, 2011).

Other ETAP actions include (ETAP, 2011):

- creation of a network of technological centres which aim is to validate and promote environmental technologies;
- definition of environmental standards;
- promotion of clean technologies in developing countries to reinforce international research co-operation; and
- distribution of information on environmental technologies to potential investors, particularly in the private sector, to all EU member states, associate states and in third countries.

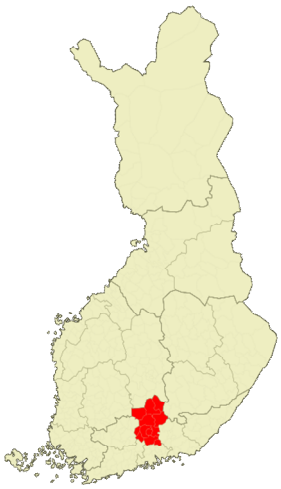
In May 2007, the European Commission published a report on of eco-innovation in the European Union. The report highlighted the priorities and actions that promote environmental technologies and eco-innovation. This was supported and acclaimed by the EU Environment Commissioner Stavros Dimas who pointed out that eco-innovation is a central element in the fight against climate change. The EU commissioner furthered that eco-innovation could bring EU towards meeting the targets of reducing energy consumption by 20% and increasing the use of renewable energy by 20% by 2020 (Innovation must do more for the environment, 2007).

As noted earlier, sustainable innovation addresses both environment and the society. However, in the aforementioned discussion (in this section), sustainable innovation is heavily focused on eco-innovation and mainly technology-based innovation. It should be noted than that on the social front, social innovations are also given in recent development plan of the EU (e.g. in the EU's Reviewed Social Agenda). The importance of social innovation as a response to new social realities and challenges in the EU was underscored by the Bureau of European Policy Advisers (BEPA) in a workshop in 2009 (BEPA, 2009).

3 METHODOLOGY

This research is qualitative because the data and information collection technique used less structured instruments and the analysis of data was descriptive. Likewise, the research is qualitative because it attempts to explore a phenomenon and answer some questions (from a specific issue) rather than to test a hypothesis (Joppe, 2004; Patton 1990; Coutin, *sine anno*). For this exploration, the phenomenon is the creation and implementation of RIS in different regions of the EU. This kind of research is qualitative in nature since the information and data are qualified based on the given account of facts about the current status of the issue (RIS implementation in selected regions in the EU). By that, this study is considered to be a descriptive qualitative research and in accordance with Key's (1997) classification of qualitative research methods, which states that *"a descriptive research is used to obtain information concerning the current status of phenomena to describe what exists with respect to variables or condition in a situation"*.

Accordingly, the study utilised two types of data: primary and secondary. Primary data were obtained by using a questionnaire. A semi-structured questionnaire (Annex 1) was prepared and sent by e-mail to the regional authorities in pre-selected regions in Finland, Italy, United Kingdom, Ireland, Poland and Romania (Fig. 3, Table 1). The regions in the selected EU countries were chosen for two reasons. The first reason is opportunistic in nature because there is an on-going project at LUT's Department of Environmental Technology and Management and Lahti School of Innovation. Such on-going project deals with the regions in selected countries and has available contact personals at the local regional authorities. The second reason is based on the report (European Commission, 2002; Bleischwitz, *et al.*, 2009) that among the selected countries there are some noted examples of good practices in relation to regional development, sustainable innovation and sustainability in general. The contact respondents (Annex 2) from the regional authorities from the selected countries provided information through returned filled questionnaires about the RIS and relevant actions.



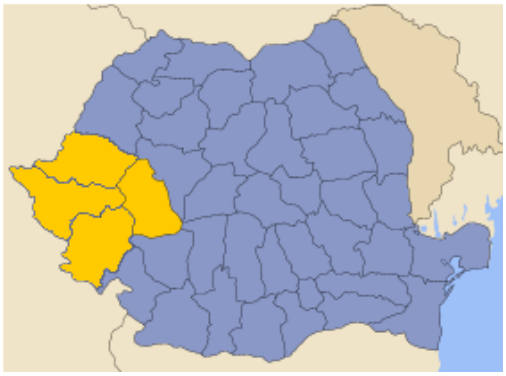
(a) Päijät-Häme Region, Finland

(b) London Region, UK

(c) Mid-West Region, Ireland

(d) Veneto Region, Italy

(e) Eastern Region, Poland



(f) West Region, Romania

Figure 3. Location maps of the selected regions (Sources: (a) Päijät-Häme, 2011; (b) London region. UK, 2011; (c) Regions of Ireland: the Mid-West, 2011; (d) Veneto, 2011; (e) Lublin, 2011; (f) West Region, 2011).

Table 1. Selected regions for the study

Region	Country	Brief features
Päijät-Häme Region	Finland	Area: 5,126 km^2 Population: 200,000
London Region	United Kingdom	Area: 1,572 km^2 Population: 7,753,600
Mid-West Region	Ireland	Area: 8,248 km^2 Population: 339,591
Veneto Region	Italy	Area: 18,399 km^2 Population: 4,936,197
Eastern Region	Poland	Area: 25,155km^2 Population: 2,175,251
West Region	Romania	Area: 31,825 km^2 Population: 1,930,000

Secondary data were taken from various sources such as: articles, publications, sustainability reports, programmes and regional innovation strategy' papers, internet and library resources. Most of the secondary information was taken from the European Commission's website, since the study comprises countries of European Union and EU website has vast and abundant information.

The collected primary information from the returned questionnaires from the regional authorities were processed and analysed accordingly. Generally, processing and analysing were done by coding and thematic grouping, summarising of descriptions, and tabulating descriptions. In this process, convergence and divergence of important ideas and issues were thoroughly noted for comparative purposes. On the other hand, secondary information such as RIS documents and RIS activities obtained from regional authorities websites were also analysed accordingly and utilised directly in different manners (e.g. as direct reference, quotations or excerpts). On-line information from the internet were also analysed in similar fashion.

4 RESULT AND DISCUSSION

4.1 Regional innovation strategy and environmental sustainability

In this study, the following regions of the EU countries were considered: Päijät-Häme Region, Finland; London Region, United Kingdom; Mid-West Region, Ireland; Veneto Region, Italy; Eastern Region, Poland; and West Region, Romania. In the following sections, the RIS in relation to environmental sustainability of these selected regions are presented and discussed accordingly.

4.1.1 Regional innovation strategy and its objectives

The RIS of each region under consideration serves as a guide in policy and decision-making of the regional authorities towards regional sustainable development. This is based on the premise that innovation is seen as an important factor of sustainability as promoted by the EU and as identified by various actors in the region. Table 2 presents the existence of RIS in its current form in each region and objectives set in carrying out those innovation strategies. From Table 2, it is shown that each region has some similarities and variations in terms of focus in objectives and priority areas/sectors.

Table 2. RIS and objectives of the selected regions

Region/ Country	RIS	Main objective(s)
Päijät-Häme Region/ Finland	Existent RIS adopted in 2005 and revised every 4 years	- raise innovative environment of the Lahti Region to a higher level - help to strengthen the spearheads of the region's know how - increase the innovative actions to improve productivity
London Region/ United Kingdom	No formal document of RIS, but claimed as embedded in London Plan	set out the strategic spatial framework for the future development of London up to 2025/26
Mid-West Region/ Ireland	RIS is called 'Mid-West Regional Planning Guidelines'. currently for 2010-2022	- networking the national Gateways - development of transport corridors - identification of the role of medium-sized towns and rural areas as drivers of sustainable development
Veneto Region/ Italy	Existent RIS adopted in 2007 and revised every 5 years	- person and family's centrality in the Veneto society - environmental and territorial resources - propelling factors in the Veneto economy - institutional and organisational innovation
Eastern Region/ Poland	Existent RIS adopted in 2004. First revision is under preparation	- increasing entrepreneurship in the region - enhancing effectiveness of agriculture - developing eco-products sector - increasing competitiveness of scientific and didactic offer
West Region/ Romania	Existent RIS adopted in 2009. Updated yearly.	Speeding up the economic development of the West by integrating innovation and knowledge into the public policies and current activity of the enterprises, in order to increase the competitiveness of innovative products and services on the global market

The RIS in *Päijät-Häme Region* in *Finland* aims to raise innovative environment and improve productivity of the region. The RIS emphasises on strengthening the spearheads of the region's know-how. These three spearheads are: eco-design, sustainable innovation and practice-based innovation activities. These three spearheads are the current focus of innovative activities in the region due to the presence of traditional industries in the region, increased knowledge-transfer activities, growth of research centres and innovation clusters as well as the popularity of developing innovation by practice in every day life.

London Region in *UK* does not have its officially called RIS but it has the equivalent blueprint called London Plan. London Plan is the development strategy for London and its regional coverage. This Plan sets out the strategic spatial framework for the future development of London up to 2025/26. Accordingly, the six specific objectives of the London Plan are to:

- accommodate London's growth within its boundaries without encroaching on open spaces;
- make London a healthier and better city for people to live in;
- make London a more prosperous city with strong, and diverse long-term economic growth;
- promote social inclusion and tackle deprivation and discrimination;
- improve London's accessibility; and
- make London an exemplary world city in mitigating and adapting to climate change and a more attractive, well-designed and green city.

Looking at these specific objectives, London Region's RIS focuses on three important aspects of sustainability: health, ecology and economy. In this sense, it can be constructed that health refers to human or people's health. Good health defines more productive people who are the force behind economic growth and sustainable development. In Sustainability Appraisal Report (2006), such "*good health*" includes not only absence of illness but embraces life-long physical and mental wellbeing. Having this kind of health people can lead meaningful, enjoyable and productive lives, thereby improving society and economies.

Ireland has National Spatial Strategy (NSS) that has the main aim of achieving more balanced regional development in the country. Central to the implementation of this policy is the preparation of effective planning strategies at the regional level. The purpose of this spatial planning framework is to strengthen local authority development plans and other planning strategies at county, city and local level. Since 2002, implementing the NSS requires that "Regional Planning Guidelines" (RPG) be put in place across the country and to encompass a socio-economic vision and context for more detailed planning guidance for the regions. That is why the RPG is the main strategy document for Mid-West Region. As reflected in its objectives, RPG pays a lot of attention to the networking and development of transport corridors. Transport and access are the key issues for the Mid-West Region. There are two corridors that have strategic importance. The first one is Dublin-Limerick corridor which links the principal city of Ireland's Mid-West Region Limerick and the capital of the country Dublin. The second one is the western corridor, linking Cork-Limerick-Galway which are the

second, third and fourth largest urban centres of Ireland. The development of the Western Rail Corridor with a link to Shannon airport is also a priority. Since Ireland is an island, it is important to have a good access to the airport to have connection with Europe and the world.

In *Veneto Region* in *Italy,* the goals of RIS are to increase the usage of innovations and to improve the economy of the region. In doing so, the region draws from its agricultural sectors and environmental territorial resources. The agricultural sector continues to play a significant role in the regional economy and is among the most productive in Italy. Similarly, one of Veneto Region's main territorial resources are the coastal areas where fishing is also quite an important activity. The other territorial resources are its waterways and canals that remain the centre of tourism activities. Having these characters, the objectives of RIS do point to the importance of people and family in the society. This is probably because of the intensive use of labour rather than capital in the mentioned sectors and resource-utilisation activities.

The next two countries belong to the Eastern Europe. The first one is *Poland*. The RIS of West Region of Poland focuses on increasing entrepreneurship in the region and developing eco-products sector. Good entrepreneurship and reasonable agriculture management provides a steady position in EU since the economy of the region is based on agriculture. Lubelszczyzna[5] is a large and important farmland in Poland. Lubelskie is the country's leader in crop-raising and fruit-growing due to good soil and soft climate. Enhancing effectiveness of agriculture helps region to have a stable economy.

Romania is interested in economic development through the integration of innovation. The West Region of Romania focuses on improving its economic situation through the usage of innovative products and services. The main objective of RIS is to involve all the Research Development and Innovation (RDI) resources available in order to increase the competitiveness of the West Region. The regions aim is translated into a series of specific aims:

[5] *Lubelszczyzna is a part of Lublin Voivodeship. Its main city is Lublin.*

- developing new regional projects in support of innovation in the public and private field, as well as capitalisation of the existing projects;
- stimulating the absorption of innovation and of innovative product and service development within the business environment; and
- correlating and interconnecting RDI activities at regional level.

Moreover, to achieve these specific aims, the West Region pays special attention to the following three strategic axes in the new RIS:

- supporting the innovation infrastructure which generates added value in terms of RDI products/solutions/technologies;
- supporting innovation in enterprises, also relying on their internationalisation; and
- promoting the innovation culture at regional level.

Based on above presentation of RIS in the selected regions, it can be observed that there are some similarities and differences in RIS focus and priorities in their objectives. London Region (UK) and Mid-West Region (Ireland) are more concerned on spatial development particularly emphasising on infrastructure related issues as transportation, mobility, accessibility, etc. Both are aimed to healthy and better quality of life. For London is for city dwelling while for Mid-West Region of Ireland is for rural areas. The Päijät-Häme Region of Finland is different in the sense that it is strongly focusing on its vast innovation capabilities. The RIS is geared towards even more of strengthening such capabilities that would make the region a truly an excellent region known for innovation in many fronts. Interestingly, The RIS of Eastern Region of Poland and West Region of Romania emphasises on greater economic development and entrepreneurship. This may not be surprising since these regions are in some ways have probably lower economic activity compared to their regional counterparts. Despite this, the Eastern Region of Poland has a very strong agricultural sector which is the backbone of its economy. It can be seen out of these RISs that the balance of regional sustainability imperatives (economic, environmental and social) are dependent on the priority and the state of development in each aspect. Nevertheless, it is safe to say that each region aims to promote innovation in areas that are practically the specific needs, strength and resources inherent to the region itself.

4.1.2 Environmental sustainability aspects currently supported by RIS

In the current state, each region has its own sustainability aspects which are supported by its RIS. In this study, more attention was given to the environment sustainability aspects but it does not mean that a region does not have economic and social aspects supported by RIS. These sustainability areas specifically focused on environmental sustainability are presented in Table 3.

Table 3. Current focus of environmental sustainability supported by RIS

Region/Country	Current focus on environmental sustainability
Päijät-Häme Region/ Finland	eco-design, sustainable products and designs, renewable energy and climate change
London Region/ United Kingdom	design and constructions, infrastructure, sustainable waste behaviour, conserving biodiversity
Mid-West Region/ Ireland	climate change mitigation, waste management, city development and infrastructures
Veneto Region/ Italy	eco-innovation and design in every sector development, stewardship of resources particularly on agriculture water and tourism
Eastern Region/ Poland	eco-product, eco-innovation
West Region/ Romania	eco-innovation, eco-park, eco-business, eco-goods and services, specific instruments: e-business, e-citizens

As mentioned earlier, one of the main objectives of *Päijät-Häme Region, Finland* is to strengthen the three spearheads of the region's know-how. Environment is one of the three spearheads of the know-how of the region. In the RIS, the environmental sustainability is not exactly defined, however, the emphasis is to understand and improve the value and possibilities of the environment. The main aspects in this area are focused on eco-design and sustainable products and design as an approach to environmental sustainability. Since modernisation of the traditional industries (e.g. furniture industry) in Päijät-Häme Region is one of the priority sectors of development, eco-design is the heart of environmental sustainability. In the furniture industry alone, for example, much attention is paid to sustainable forestry solutions, contents of furniture, emission values for furniture production, reduction of packaging, etc. Eco-design priority in priority sectors is backed by strong promotion of environmental technology, environmental business and environmental expertise in the region. On the other hand, sustainable products and design emphasises on resources efficiency, functionality, effectiveness and consumers attitude (e.g. in packaging industry). The focus on eco-design and sustainable products is driven mainly by the presence of many

manufacturing industries in the region supported by strong centres and institutions in the main city called Lahti. The basic pillar is to develop the quality of the environment of the region.

In the *UK*, the London Plan is kept up by various supporting policies to promote and develop all the priority areas. For example, the sustainable design and construction supplementary planning guidance includes the following measures to:

- re-use land and buildings;
- conserve energy, materials, water and other resources;
- ensure designs make the most of natural systems both within, in and around the building;
- reduce the impacts of noise, pollution, flooding and micro-climatic effects;
- ensure developments are comfortable and secure for users;
- conserve and enhance the natural environment particularly in relation to biodiversity; and
- promote sustainable waste behaviour in new and existing developments, including support for local integrated recycling schemes, CHP schemes and other treatment options.

In *Mid-West Region* of *Ireland,* the RPGs reflect other national social, economic and environmental policies for Mid-West Region. As shown in the Table 4, climate change, waste management, county and city development and infrastructures are the primary focus of environmental sustainability in Mid-West Region.

For *Veneto Region, Italy*, environmental sustainability is described as a principle that leads the development of every sector supporting the economy. Moreover, environmental sustainability is achieved through specific objectives, which encourage the improvement and the stewardship of the resource and cultural heritage. The current focus eco-innovation and design is on built environments (e.g. housing, construction, renovations) and infrastructures.

In *Eastern Region* of *Poland,* environmental sustainability is framed in the RIS of Lubelskie Voivodeship wherein one of the main objectives is towards the development

of eco-production and support eco-innovation activities in the region. To achieve eco-production, the Region develops organic cultivation, production from renewable energy sources, promotes use of alternative energy sources and increases production of eco-food.

In *Romania's West Region*, sustainability is supported through two instruments: (a) the use of instruments that are specific to the information society; (b) eco-innovation. The first instrument is specific to the information society at the level of individuals, public institutions, and companies that allows a better participation in the innovation activities and highly productive activities (for example, e-commerce; e-banking; e-marketing, etc). Usage of these instruments translates to eco-efficiency which is then related to the second instrument – eco-innovation. The next theme to support sustainability is eco-innovation. For example, the stimulation of research and development in the field of waste management helps the West Region become more competitive on a technological market that has great potential. Waste recycling is also recognised as a priority in most West Region programmatic and public strategy documents. An eco-park is being considered in the region cater to the needs of companies in the recycling business.

To achieve the support of innovation in enterprises, attention is paid to those innovative products that reduce the environmental impact and/or support a rational use of the natural resources. For this aim, West region uses the eco-business concept. The eco-business concept is a complex notion covering a large sphere of actions. It involves all the ecological and eco-efficient goods and services in the context of promoting some implementation mechanisms and instruments, such as: industrial ecology, environment management systems, economic incentives, funding actions, bi- and multi-lateral agreements regarding environment protection, etc.

In summary, it is observable that the current focus to achieve environmental sustainability is on the eco-design, eco-product and eco-innovation. In general, it is interesting to note that three of examined regions (London Region, UK; Mid-West Region, Ireland; and West Region, Romania) are strongly concerned about waste utilisation schemes. This is probably due to the increasing and rapid development of infrastructure. Effective treatment of waste is a constituent of good environment. Päijät-

Häme Region, Eastern Region of Poland and West Region of Romania emphasise on eco-design and eco-products to maintain the sustainable level of environment. Among these three regions, West Region of Romania appears to be the most ambitious because of its eco-business concept for environmental aspects and special notion such as e-business for facilitating different operations, concerning society. Veneto Region (Italy) gives primary importance to eco-innovation in all sectors and to the stewardship of its resources. It can be observed that there are many activities regarding to sustainable aspects because good environment satisfies regional development and prosperity.

4.2 Regional policy on environmental sustainability

Regional policy is the means by which governments and international organisations seek to reduce spatial disparities in economic well being. It sets the framework for regional planning. In terms of sustainability and sustainable development, the framework for regional environmental sustainability policy of the selected regions is presented in Table 4. Again, the sustainability in this case can be defined as either all-embracing or strictly environmental. Since the original concept of sustainability pertains only to environment, it is understandable here that the terms sustainability and environmental sustainability are interchangeably applied and still use in the regions.

Table 4. Framework for regional policy on environmental sustainability

Region/Country	Framework for regional policy on environmental sustainability
Päijät-Häme Region/ Finland	Regional Development Plan (low energy consumption, less pollution, less traffic, clean environment, public transport)
London Region/ United Kingdom	- London Plan - Air Quality Strategy - Water Strategy - Climate Change Adaptation and Climate Change Mitigation and Strategy - Energy Strategy - Waste and Municipal Waste Strategy.
Mid-West Region/ Ireland	Pursuing sustainable development (environmental protection, conservation of nature and biodiversity, water resources improving, good quality of housing, prediction of weather, supporting of local government)
Veneto Region/ Italy	In accordance and compliance with National Sustainable Strategy
Eastern Region/ Poland	Regional Operational Programme of Lubelskie Voivodeship (usage of renewable energy, reducing pollution from public transport, support for innovative enterprises, environmental protection)
West Region/ Romania	- development of new services and other research and technological transfer institutions; - encouraging sectoral enterprise association and cluster formation

In *Päijät-Häme*, the regional policy on sustainable development is framed in the Regional Development Plan which aims to create:

- working and living methods of low energy consumption;
- more local energy and less pollution;
- more wireless solutions and less traffic;
- more public transport and less private car driving; and
- more clean environment and less polluted nature.

Regional policy specific for environment is geared towards providing more clean environment and less polluted nature. This is reflected very much in the regions active promotion and implementation of clean environmental technologies. The presence and ever-growing formation of clusters and business parks are also reflective progress of this regional policy on clean environment and intact nature.

In *London*, sustainability policy is framed in the London Plan (the spatial development plan for London) which covers the comprehensive sustainability and integrated impact assessment for London Region. As for region's policy on environment, the Mayor's Office is responsible for the coordination of strategic policy in London through specific prioritised areas. Current examples of these mayoral policy areas are: air quality, water, climate change adaptation, climate change mitigation and energy, waste and municipal waste. Policy measures and instruments in all these areas are generally aimed at achieving healthy London both for the people and the surrounding environment.

In *Mid-West Region of Ireland,* RPGs are set within the overall policy framework established by the National Spatial Strategy which was first adopted in 2002 and the National Development Plan 2007-2013. The RPGs set out clear objectives and targets which guide the preparation and reviews of City and County Development Plans in the Mid-West Region.

In accordance with the Irish Government Department for the Environment, Heritage and Local Government, the Mid-West region's policy on environment is to achieve a high quality environment with effective environmental protection; to address climate change; to achieve effective conservation of natural and built heritage and biodiversity; to

protect and improve water resources and the quality of drinking water; to ensure that the regions and communities are planned and built to respect sustainable and balanced regional development; to ensure good quality housing in sustainable communities; to monitor, analyse and predict Ireland's weather and climate; and to support and enable democratic and responsive local government.

Veneto Region acts correspondingly to Legislative Decree nr. 152/2006 which says that every region must enact National Sustainable Strategy with its own strategy. As such, Veneto Region keeps its policy in the line with the National Sustainable Strategy. The region's policy on environment consists in regional framework strategies which establish protection and development purposes. Given this, it is rather difficult to know exactly the focus areas that Veneto Region is currently addressing in the current policy since the statement "in accordance and compliance with National Sustainable Strategy" is totally general and obscure. By this, there is no clear indicator to reflect on which policy direction the Region is striving on. However, this does not mean that Veneto Region is doing bad in this respect, but it is the lack of explanation and provision of information on this issue of regional policy.

In *Eastern Region* of *Poland* regional policy on sustainable development is based on following potentials:

- Tourist and geothermal potential – Valley of Vistula;
- Tourist – cultural and natural potential – Valley of Bug;
- Cross – border location;
- Lublin Metropolitan Centre;
- Research and knowledge potential;
- Roztocze – tourist potential;
- Energetic potential;
- Host potential; and
- Nord Strand of Economic Activity.

The regional policy on environmental sustainability is reflected in the implementation of the Regional Operational Programme of Lubelskie Voivodeship (ROP LV).

Lubelskie Voivodeshipis is the main regional authority in the eastern region of Poland. The focuses of the policy are on the following:

- increasing the use of renewable energy through comprehensive improvement of energetic effectiveness of renewable energy (including promotion);
- support for companies that adjust their functioning to the environment protection norms (control and reduction of dangerous and toxic substances in sewage and litter management and eliminating ecological threats);
- reducing pollution from public communication in cities by purchasing new, environment friendly means of public transportation;
- reducing troublesomeness of public transport and norm-breaching by obliging the beneficiaries to present the decision of environment determinants;
- support for innovative enterprises in environment protection;
- environment protection, forming pro-ecological attitudes, biodiversity regeneration; and
- promoting Nature 2000 areas.

For implementing policy on environment, Eastern Region of Poland has created the specific programmes to address each focal issue (e.g. waste management and asbestos-removal programmes).

In the *West Region* of *Romania,* there are two important policies supportive of the RIS. These policies refer to the development of a technological transfer association and a cluster in the automotive sector. This are translated into:

- the development of new services by Tehimpuls (the Regional Centre for Innovation and Technological Transfer) and other research and technology transfer institutions; and
- encouragement of sectoral enterprise association and cluster formation.

Tehimpuls is a non-governmental organisation which aims to increase the regional economy by promoting innovation and technological development. It provides:

- assistance for the development of innovative projects and marketing of the results;
- support in the carrying out of cooperative projects between enterprises and research-development-innovation institutions; and

- increasing awareness of innovation and technological development in the West Region.

As a whole, Tehimplus identifies RDI solutions/products/technologies that have commercial value, promotes them and sells research results to the enterprises, thus ensuring a positive impact on the research activities in the West Region of Romania.

The second policy measure is encouraging sectoral enterprise association and cluster formation. The main purpose of this priority is to provide the strategic and methodological framework for the development of clusters in the sectors that display potential at regional level. The cluster as a distinct entity contributes to the increase of business competitiveness and the development of innovation. The activities included in this priority are the following:

- bringing the advantages of the clustering process to the awareness of the enterprises in the region;
- supporting the creation of regional or transregional clusters (with cross-border regions from Hungary and Serbia and/or neighbouring Romanian development regions);
- promoting the clusters and cluster initiatives in an integrated regional manner;
- creating chains of domestic suppliers for the large foreign investors (satellite clusters); and
- bringing added value with the purpose of maintaining foreign investments and attracting new investors to the region.

There are two examples of this policy measure. The first one is the AutomotiVEST Association. It helps the members of the cluster-type network in the West Region to increase their market competitiveness for the automotive industry. The second one is the innovation pole in the ITC sector. The aim of this project is to create a regional pole of excellence in the field of information and communication technology in the West Region by gearing up the substantial resources that exist in this field at regional level and using a shared development strategy to coordinate the innovative activities carried out.

All the frameworks for regional policy on environmental sustainability are observably in accordance with the national sustainable development strategy. This is not surprising as all of these countries have their respective national Sustainable Development Commission. The interesting aspect of these policy frameworks is the way each region translates them into programmes and activities. Typically, each region tries to address all possible environmental aspects in setting the policy framework. But in the programmes, it is typically focused or prioritised in areas that are significantly affecting the region. The prioritisation process maybe very cumbersome but regional offices/authorities are normally more efficient in policy-setting compare to the national level.

4.3 Current programmes for regional sustainability

In order to achieve a certain level of sustainability, there is a need to operate in a way of creating sustainable present and future. It is difficult to take into consideration all of the aspects simultaneously. That is why there are special programmes for achieving focused and prioritised targets. Each region has its own potentials and problems and creates its programmes correspondingly with it. Typically, programmes aimed at regional environmental sustainability are embedded in regional strategy and broken down into various focus or priority areas as shown in Table 5. The list in the table is not exhaustive but rather representative only of the main programmes that are currently in place and being managed in the regions.

Table 5. Current programmes for regional environment sustainability

Region/ Country	Current programmes for regional environmental sustainability
Päijät-Häme Region/ Finland	- Environmental Strategy of the Päijät-Häme Region - Hollola-Lahti-Nastola environmental programme
London Region/ United Kingdom	Sectoral sustainability programmes specific for each sector (e.g. construction, transportation, food, municipal waste, biodiversity, energy, air quality, noise, etc.). All these programmes are in accordance with Sustainable Development Framework for London
Mid-West Region/ Ireland	Sectoral programmes on transportation, land-use, housing recreation, city and county development, retail, river basin, climate change and energy
Veneto Region/ Italy	Sectoral sustainability programmes. Every sector, in its activity, carries out actions to obtain and promote environmental sustainability (e.g. eco-tourism, rural development)
Eastern Region/ Poland	- Lubelskie Voivodeship Water Management Plan - Waste Management Plan for Lubelskie Voivodeship - Alternative Energy Sources Development Programme for Lubelskie Voivodeship - Regional Operational Programme for Lubelskie Voivodeship - Operational Programme Infrastructure and Environment - Rural Development Programme
West Region/ Romania	- FRESH – sustainable homes construction - MITKE (Managing of the Industrial Territory in the Knowledge Era) – sustainable territorial development and marketing - PROSESC sustainable transport system - CO2 Free promoting Renewable energy, Green ICT, ICT for energy efficiency and Sustainable transports

In *Päijät-Häme Region, Finland,* the two programmes connected to the environmental issues are: Environmental Strategy of the Päijät-Häme Region and Hollola-Lahti-Nastola environmental programme. The Environmental Strategy for the region is aimed to address problems in ecological sphere. The programmes falling under this Environmental Strategy can be of any general issues concerning environmental quality and ecological protection. The Hollola-Lahti-Nastola environmental programme aims to find locally feasible means to implement strategy objectives. It focuses on measures that can be implemented with decisions made by the city and municipalities, their activities and their management. It also studies the activities that cause the major emissions in the city and the municipalities as well as focusing on reducing the energy consumption level.

In *London Region, UK* there are a set of sustainability programmes specific for each sector (e.g. construction sector, waste and waste utilisation, transport sector and climate change mitigation). As reflected in Table 5, London Region has rather a well-focused strategy for each area affecting its environmental sustainability (e.g. energy, air quality).

All these are likewise reflective upward to the main Sustainable Development Framework for London.

To achieve sustainability, *Mid-West Region* of *Ireland* has a lot of programmes. To improve economy of the region it has the Regional Economic Strategy (RES). The vision of RES is to develop a strong forward view for the Mid-West region by creating a longer-term perspective. The ultimate economic development goal for the region is that it would contain a broad range and distribution of sustainable enterprises incorporating a wide range of activities and utilising the region's particular strengths. The achievement of this goal will require that indigenous investment is encouraged and facilitated and that external investment is attracted to the region. There are two programmes, connecting to the transport issues. The first one is Smarter Travel – a special programme for a sustainable transport future. The second one is a programme embedded in the Mid-West Area Strategic Plan which concentrates on examining land use and transportation issues in the region. Housing, recreation, city development, retail, river basins, climate change and energy programmes are also in the current priority. The main principle regarding the conservation and enhancement of environmental qualities from a regional perspective include:

- development of well-based collaborative processes for managing natural resources that cross county and regional boundaries;
- development common approaches to managing key environmental assets including ground water, surface water, Natura 2000 sites and other habitats as well as air quality;
- protection and enhancement of water quality in line with the Water Framework Directive;
- improvement in the quality of drinking water at certain locations;
- maintenance of the quality of drinking water where it is satisfactory at present; and
- maintaining the architectural heritage and improving the design quality of new development.

In *Veneto Region* of *Italy*, every sector carries out actions to obtain and promote sustainability. For example, Veneto is the pilot region concerning sustainable tourism

and is ranking first in Italy for tourism. Despite this, high-volume of tourists does not mean the environmental havoc for this region because of policies protecting the territory and its vulnerability. This sustainable tourism involves different aspects, such as; responsible management of natural resources, considering the environmental impact of activities, the usage of clean energies, the protection of cultural heritage in tourist destinations, the quality employment and effects on local economies and the quality of accommodation facilities.

In *Eastern Region* of *Poland,* there are many programmes as listed in Table 5. The most important one is Regional Operational Programme for Lubelskie Voivodeship. It includes actions for increasing the production and use of renewable energy, improving energy efficiency and supporting replacement of traditional heat sources by alternative (renewable) ones in public utility buildings. It also aims to improve the quality and accessibility of health and social care. The Regional Operational Programme also finances local and regional services such as; system-facilitating administration, environment protection, education, culture and sports and helps in establishing guarantees and loans which will help entrepreneurs use external, bank-unrelated sources of investment financing. The Rural Development Programme modernises agricultural holdings, increases the added value to basic agricultural and forestry production and improves infrastructure related to the development and adjustment of agriculture and forestry. This programme also includes water supply and wastewater management.

For *West Region* of *Romania,* sustainability is a broad goal which is being achieved through specific activities. The most strategic way to achieve it is the inclusion of sustainability aspects within the current Regional Development Plan that West Region is working on. Practically, sustainability is supported through the Interreg-projects where West Region is a partner. The first project is FRESH (forwarding regional environmental sustainable hierarchies) which addresses regional sustainable value creation and eco-design and it is intended to promote the sustainable homes construction. The next project in which West Region is a partner is MITKE. MITKE stands for Managing of the Industrial Territory in the Knowledge Era. The aim of this project is to provide a platform and mechanisms for collection, exchange and transfer of experiences and views among regions in Europe. This project is turned to sustainable

territorial development and marketing. For sustainable transport system, there is a PROSESC project. PROSESC stands for "Producer Services for European Sustainability and Competitiveness". PROSESC aims to contribute by raising the awareness as to the significance of producer services for Europe and by assisting regional authorities to identify, develop and share proactive strategies to improve the public support for such services and the enterprises that provide them. Additionally, CO_2 Free project aims to promote and take action towards reducing CO_2. It promotes renewable energy, green information and communications technologies (ICT), ICT for energy efficiency and sustainable transports.

The term "sustainability" includes three aspects: ecological, economical and social. For sure, the current programmes of the selected regions to promote sustainability cover all these three aspects. However, the current programmes for environmental sustainability are very much highlighted in this paper. This goes again with the original conceptualisation that sustainability is much about environment. Nevertheless, looking at the arrays of programmes in Table 5, most regions are taking more or less similar approach in making programmes, i.e. sectoral programme. Such sectoral programming approach however does not mean isolation of issues but it is just the way to emphasise the main concern. Since environmental issues/aspects are related to each other (e.g. in land-use, housing and transport), the sectoral programme approach is for easier management.

4.4 Enhancing factors supporting RIS and sustainability

The development of a region according to RIS and the achievement of sustainability level is affected or enhanced by various factors. The enhancing factors are those factors that serve as the drivers to realise the successful implementation of RIS in a region and to achieve the desirable level of sustainability. Table 6 provides some of the main enhancing factors supporting RIS and sustainability in the selected regions.

Table 6. Enhancing factors supporting RIS and sustainability

Region/ Country	Main enhancing factors
Päijät-Häme Region/ Finland	- presence of innovation research centres, business parks and innovation clusters - strong R&D support (government, research agencies and universities)
London Region/ United Kingdom	- strong support of the Mayor's Office - cooperation with other organisations and actors
Mid-West Region/ Ireland	- hierarchal support - enterprise development - investments - access infrastructure - geographical location advantage
Veneto Region/ Italy	- professional associations - support agencies - financial project support from the EU
Eastern Region/ Poland	- industrial development - project financial support from the EU
West Region/ Romania	- research infrastructure - financial resources from the EU - organisation/association support and networks - industrial investments from Western Europe

Päijät-Häme Region of *Finland* has innovation research centres, business parks and innovation clusters as its main enhancing factors. Lahti School of Innovation is the research centre in this region and it has a strong research focus on sustainable innovation. Lahti Business Park and Cluster is an important incubation centre tied strongly with the business sector. For promoting environmental technologies and eco-innovations, there is the National Clean Tech Cluster which is run by the Lahti Science and Business Park. Having that advantage, Päijät-Häme has a very strong position in running and directing the national environmental policy. The aim of Clean Tech Cluster is to promote Finnish environmental businesses and create new jobs. The allocation of financial resources from the national government of Finland and from the EU to Päijät-Häme Region also facilitates and supports RIS implementation.

In the *UK*, the main factors supporting sustainability innovation in the *London Region* are Mayor's Office, agencies and cooperation with other organisations and civil actors. The Mayor of London has large policy teams supporting environmental and sustainability matters, as well as project managers who support the delivery of sustainability initiatives across London. There are many projects in each prioritised sector under the Mayoral initiatives. Example of such initiatives include RE:FIT programme to support the delivery of energy efficiency measures across households in London, and RE:NEW programme to make public buildings more energy efficient. The

Mayor has also set up a Green Enterprise District in East London which is envisaged to be the focus of green and low carbon enterprise in London. There are also other organisations collaborating to support sustainability across London (and even the whole UK) including the Institute for Sustainability, the Green Building Council, Energy Savings Trust and many more.

In *Mid-West region, Ireland*, the main enhancing factors supporting RIS and pursuit of regional sustainability are: (a) hierarchical support at different range and levels of services; (b) enterprise development; (c) local and foreign investments; (d) access infrastructures; and (e) geographical location advantage. In terms of hierarchical support, an example is in the sustainable retail strategy wherein five different tiers of support centres were created at the regional level. Good access infrastructures and advantageous location do enhance the programme implementation (e.g. in transport sector and land-use planning) of RIS. The Mid-West Region borders a number of other regions. However, it has particular affinities with the West, Midlands, South-West and South-East Regions. The Region has strong road links and existing and developing rail links with the other regions. The role of the Gateway linkage between Limerick/Shannon, in particular, is of pivotal importance to the region, as does, the intersection of Cork-Galway and Waterford-Galway Corridors (The Atlantic Gateways Corridor). The location of Shannon Airport is also an integral piece of strategic infrastructure with the development of a cargo hub at the Airport having important economic relevance. The Region also shares a number of major environmental resources such as Lough Derg, the Shannon Estuary, the Burren and the Galtees, which all need proper development and management of these natural assets.

Among the enhancing factors for *Veneto Region* of *Italy* are professional associations and agencies that provide organisational support. The Region has Veneto Innovazione Agency which is the regional agency for innovation and technology transfer with the aim of promoting research and innovation. Its mission is to coordinate and support technology parks, companies, private and public research centres. Veneto Innovazione's main activities include the promotion of a regional network research and innovation, assistance to companies to submit European and regional research and innovation projects, provision of information on technological innovation and applied research, and

participation in European projects on research and innovation. Likewise, the Veneto Region Administration is member of European Regions Research and Innovation Network (ERRIN) which is a research and innovation network concerning environment and the energy. By participating in this network, Veneto uses experience of other regions and shares good practices especially in water management aspect, because the region is situated near the sea and has huge knowledge in this sphere. In addition, the Veneto Region has financial support from the EU for some of its projects on eco-tourism, agriculture and rural development.

The Operational Programme "Development of Eastern Poland" of *Eastern Region* of *Poland* is characterised by stimulated or accelerated socio-economic growth. The RIS implementation in this region is therefore being enhanced by the rapid modernisation of the economy, growth of regional centres, new infrastructure development (e.g. better public transport), nature-based tourism, industrial development, technical assistance and financial support from the EU.

In West Region, Romania, resources and capabilities are important to achieve regional sustainability. The major enhancing factors in West Region are the creation of research infrastructures, organisational support and investments from other countries (particularly from Western Europe). For example, research infrastructures (buildings and laboratories) for sustainable energies and environmental studies were developed by universities with EU research grants. Such research infrastructure serves as a source of learning and know-how that are needed to support the environmental capabilities of the region. Organisational support, i.e. support given by the EU to the regional offices/authorities of the West Region in Romania does play a big role in RIS. This support includes not only financial but also capacity-building and technical support. Additionally, the increasing investment from Western Europe (e.g. in manufacturing and ICT sectors) is prominently enhancing the region's ability to further the mandates of its sustainability agenda.

The factors enhancing innovation have some similarities and differences. There maybe other factors not stated or given that enhance the successful implementation of RIS in all the regions, nevertheless, it is clear that RIS being an EU strategy is well-supported

by the EU both financially and technically. Variations among these factors are reflective of the current structure and economic circumstances of each region. That is to say that in more advance regions the enhancing factors are generally local (or internal) while in Poland and Romania the enhancing factors are also coming from outside (external) as EU support and Western countries' investments.

4.5 Associated problems in pursuing sustainability

Sustainable development programmes bring many benefits to a region's economy, environment and society. But in achieving a certain level of sustainability, some difficulties are inevitable. By this, each region has its own problems related to pursuit of sustainability. Table 7 streamlines the major problems identified in each region. Most of the listed problems are self-explanatory, however, explaining the real cause and details of each problem is impossible and not aimed for this study.

Table 7. Major problems affecting regional sustainability

Region/ Country	Main problems affecting regional sustainability
Päijät-Häme Region/ Finland	- decreasing investment to R&D - lack of university system - need to improve international skills - coal based energy production in district heating
London Region/ United Kingdom	- coordination and collaboration across the various sustainability policies and initiatives - overwhelming focus on environmental sustainability - developing robust, quantifiable and verifiable models of the (social, economic and environmental) benefits of sustainability - ensuring a well skilled supply chain of SMEs to retrofit existing communities and deliver eco-innovation products - need for more professionals
Mid-West Region/ Ireland	- following through on the existing and proposed regional strategies - proportion of Governmental funds - land and water quality issues
Veneto Region/ Italy	- reduction of public expenditure - rising costs due to technological innovation - immigrants influx - inadequacy of professionals
Eastern Region/ Poland	- limitation investment possibilities and development of power industry from renewable energy sources - lack of tools - lack of good transfer between research and economic sectors - low awareness of possibilities of funds gaining and market rights
West Region/ Romania	- creating a regional budget for innovation - existence of the abandoned industrial sites - inappropriate implementation of the policies - obsolescence of sewerage systems and water cleaning stations - reduced level of investments for the control of the industrial pollution - insufficient equipment of companies for the environmental protection

In *Päijät-Häme Region, Finland* the main problems refer to investment and human factors. The region has decreasing trend in investment on R&D due to the realisation that the region is well-served with research centres, innovation centres, business parks and clusters already. The lack of university system in the Region aggravates the problem. Most research and knowledge are produced outside the Region and the know-how transfer is facilitated by the presence of consortium of universities from other regions of Finland (e.g. from Helsinki). Due to the global appeal of the eco-innovation clusters in the Region, international expertise and skills present a challenge to the local experts. Energy production for district heating in the region is still seen as unsustainable due to its dependent on coal. This is considered harmful to the environment and more so contributing to climate change problem.

One of the key challenges for *London Region* relates to coordination and collaboration across the various sustainability policies and initiatives. Whilst the Mayor's Office takes

the lead, there are no formal partnerships or networks where private, public and voluntary organisations with an interest in sustainability can come together to share and coordinate ideas and projects. The other challenge relates to the overwhelming focus on environmental sustainability and less so on social and economic sustainability. In particular in London there is a sharp focus on the Low Carbon agenda which can detract wider aspects of sustainability. Region has technologies but there is a need to develop intelligent rules and policies that promote sustainable behaviours to attract people.

The main challenge for *Mid-West Region, Ireland*, is to follow through on the existing and proposed regional strategies, as well as the plans and programs stated in the Mid-West Regional Planning Guidelines 2010-2022. Although projects/programmes are achieved and got results, there are many other sectors in the region that are lagging behind. Taking into consideration the current economic situation in Ireland, the proportion of Governmental funds in supporting all the regional programmes is the key element in implementing the RPG. In addition, over 40% of the regions land area is under pressure with problems connected to water quality.

In *Eastern Region* of *Poland,* the main problems are connected with the big amount of protected areas in the region which limit investment possibilities and development of power industry from renewable energy sources. There is also shortage of tools to implement the regional strategic plans and little influence of local government on ministerial funds – Environmental Protection Fund. Insufficient cooperation and transfer of information between scientists and enterprises complicates the process.

For *West Region* of *Romania,* the main challenge is financing. The Regional Authority is fully aware of the importance of creating regional budget for innovation but in the present this budget does not exist. There are problems with environment as well. Existence of the abandoned industrial sites in the urban environment and inappropriate implementation of the policies for minimising or recycling the waste resulted from the economical activities. Due to lack of financing the region has problems with renovation of the facilities, for example, the sewerage systems and water cleaning stations are both in obsolete condition. The level of investments for the control of the industrial pollution

is reduced and the large companies are not equipped for the environmental protection, especially the old factories which are still operating.

It is natural that problems in pursuing sustainability exist in each region. The problems of each region are varying strongly from each other, however lack or decreasing in investment is observed as a common problem to all regions. This can be explained by the recent economic downturn and probably increasing cost of labour and technology in the EU. Despite all these challenges, however it is a positive note that all these regions have made good progress in implementing their RIS and that good practices, learning and knowledge-transfer activities in the EU's has been intensified and contributed to the attainment of the goals set by EU in its various sustainable development agenda (EU Commission, 2002).

5 SUMMARY AND CONCLUSION

This study is conducted with the objective to explore the existence and adoption of RIS in different regions of selected EU countries, and to highlight the characteristic features of a region's RIS and to compare the similarities and differences between them in achieving sustainable development of the region. Additionally, the study is aimed at identifying the factors that characterise the formulation and implementation of RIS as well as the problems associated thereof.

The results shows that RIS or equivalent document serves as a blueprint for forwarding innovative programmes towards sustainability, particularly environmental sustainability. The framing of regional sustainability objectives is typically reflective of the priority sectors and the state of region's economic development. The environmental sustainability aspects that are currently supported by RIS are generally focused on on eco-design, eco-products, and eco-innovation. London Region of UK, Mid-West Region of Ireland and West Region of Romania are strongly concerned about innovations leading towards waste utilisation. The West Region of Romania appears to be the most ambitious having issued eco-business concept and special notion such as e-business. Veneto Region puts primary importance of innovative sustainable approaches to stewardship of its resources.

Regional policy framework plays an important role in environmental sustainability of the regions under study. Regional policy framework is typically stemmed out either from the national or regional strategies which in turn are translated into priority areas of environmental concerns. By that, it also typically follows that programmes aimed at regional environmental sustainability are embedded in regional strategy and broken down into various sectoral focus or priority areas.

The main enhancing factors supporting RIS and sustainability among the regions have some interesting similarities and variations. Support from regional agencies or organisations as well as professional associations and networks are common factors that enhance regional innovation and sustainability. Notably, the regions from Eastern Europe (Eastern Region Poland and West Region Romania) as well as Veneto Region

Italy share similar dependence from EU financial resources to support the implementation of the stipulated sustainability programmes in the RIS. It is also significant to point out that in Paiäjät-Häme Region in Finland, the main enhancing factors are research centres, business parks, innovation clusters and strong R&D support. On the other hand, associated problems in RIS are inevitable and despite the differences in the current challenges, the lack or insufficiency of financial resources is single-out as common to all the regions.

Based on the gathered information from the regional authorities in the regions, it is therefore clear to see that RIS and regional sustainability are mutually reinforcing each other. From this study, it is also shown that there is no direct one-size-fits-all strategy and therefore a confirmation that a case-to-case approaches and flexible RIS guidelines are favoured and forwarded by the EU accompanied by financial support.

Finally, the strong focus towards environmental sustainability in the regions are overrated in this study despite the knowledge that regional sustainability is also about a balance of the three imperatives of regional development (i.e. economic, social and environmental). The results of this study are therefore reflective only of the current environment focus and priorities of the regions and should not be taken as a whole point in the RIS and regional sustainability.

Each region has its own way of development, enhancing its strong sides and improving weak by well-focused and prioritised RIS and regional sustainability agenda, and this is the essence of the regional development.

REFERENCES

2nd European Forum on Eco-Innovation. 2007. Markets for Sustainable Construction. EU Commission. Brussels.

Amin, A (ed). 1994. Post-Fordism: A Reader. Blackwell, Oxford, UK.

Antonelli, C.H., Momigliano, A. 1981. Problems and experiences of regional policy in Italy. Micros, vol. 2.

Asheim, B., Isaksen, A., Nauwelaers, C. and F. Tötdling. 2003. Regional innovation policy for small-medium enterprises, Cheltenham, UK and Lyme, US : Edward Elgar.

Aydalot, P. 1985. High technology industry and innovative environments. London. Routledge.

Bergman, E., Maier, G., Tödtling, F. 1991. Regions reconsidered. London. Mansell

Bleischwitz, R., Giljum, S., Kuhndt, M., Schmidt-Bleek, F. 2009. Eco-Innovation-putting the EU on the path to a resource and energy efficient economy. Wuppertal Institute for Climate and Environmental Energy. Germany.

Boissiere, B. 2009. The EU Sustainable Development Discourse – An Analysis. L'Europe en formation No.352.

Braczyk, H.J. Cooke, P. and M. Heidenreich. 1998. Regional Innovation Systems: The Role of Governance in a Globalised World, UCL Press, London, UK.

Bradburn, N.M. 1982. Question-wording effects in surveys effects, In Hogarth (Ed.), New directions for methodology of social behavioral science: Question framing and response consistenly, No.11, Jossey-Bass, San-Francisco, 65-76.

Bureau of European Policy Advisers (BEPA). 2009. Conclusion of the BEPA workshop in social innovation. European Commission, Brussel.

Camagni, R. 1991. (toim.) Innovation networks: spatial perspectives. London. Pinter

Castell, M., and P. Hall. 1994. Technopoles of the World, Routledge. London.

Chen, Y. 2010. What Is Sustainable Innovation? [www document]. Available at http://blog.technologyevaluation.com/blog/2010/04/09/what-is-sustainable-innovation/

Competitiveness and Innovation Framework Programme. 2011. EU Commission [www document]. Available at http://ec.europa.eu/cip/index_en.htm

Cooke, P. 1985. Regional innovation policy: problems and strategies in Britain and France. Environment and Planning, C3.

Cooke, P. 1998. Introduction: Origins of the Concept. In: Regional Innovation Systems: The Role of Governance in a Globalised World, Braczyck, Cooke and Heindreich (Eds), UCL Press London, UK.

Cooke, P. 2001 Regional innovation systems, clusters, and the knowledge economy. Industrial and Corporate Change, 10 (4): 945-974.

Cooke, P., Morgan, K. 1998. The associational economy – firms, regions, and innovation. Oxford. Oxford University Press.

Courvisanos, J. 2009. Regional Innovation For Sustainable Development: an Australian Perspective. Journal of Innovation Economics – 2009/1 – No.3.

Coutin, *sine anno*. Qualitative research in law and social science. Department of Criminology, Law and Society, University of California, Irvine.

Crauser, G. 2002. Good Practice Lessons from PIS+ projects (2000-2002). In: Regional Innovation Strategy under the EU Regional Development Fund. Innovative Actions 2000-2002. EU Comission.

Doloreux, D. and Parto, S., 2011. Regional Innovation Systems: A Critical Review.

Dormann, J., Holliday C., 2002. Innovation, Technology, Sustainability and Society. World Business Council for Sustainable Development.

Enright, M.J. 2001. Regional clusters: what we know and what we should know. Paper presented for the Kiel Institute International Workshop.

ETAP. 2011. Environmental Technologies Action Plan. EU Commission [www document]. Available at http://ec.europa.eu/environment/etap/policy/actionplan_en.html

EU Commission. 2002. Regional Innovation Strategy under the EU Regional Development Fund. Innovative Actions 2000-2002.

Eurostat, 2009. Sustainable development in the European Union. Monitoring report of the EU sustainable development strategy. Eurostat Statistical Book.

Hilchevskaya, R.I., Safonov, P.I. 1994. The Problems of Sustainable Development and Ecological Economy and its Solution in Russia [www document]. Available at http://www.ulb.ac.be/ceese/STAFF/safonov/HIL-SAF.htm

Hockerts, K. and M. Morsing. *sine anno.* A Literature Review on Corporate Social Responsibility in the Innovation Process, Center for Corporate Social Responsibility, Copenhagen Business School, Denmark.

Hubner, D. 2006a. Press release. Promoting innovation in the next generation of cohesion policy programmes. EU Commission [www document]. Available at http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/685&format=HTML&aged=0&language=EN&guiLanguage=en

Hubner, D. 2006b. Press release. Innovation and competitiveness crucial tools of Cohesion policy 2007-2013. EU Commission [www document]. Available at http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1575&format=HTML&aged=0&language=EN&guiLanguage=en

Hubner, D. 2007. Press release. The region knows how to play the innovation card. EU Commission [www document]. Available at http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1279&format=HTML&aged=0&language=EN&guiLanguage=en

Innovating regions in Europe. 2009. [www document]. Available at http://ec.europa.eu/enterprise/ire/Innovating-regions/www.innovating-regions.org/network/whoswho/projects_extended5a7e.html?sub_id=43&projec

Innovation must do more for the environment. 2007. Press release. EU Commission [www document]. Available at http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/602

Innovation. 2010. EU Commission [www document]. Available at http://ec.europa.eu/enterprise/policies/innovation/index_en.htm

Isaksen, A. 2003 Knowledge-intensive industries, clustering, and regional development. The software industry in Norway. Urban Studies (Forthcoming).

Joppe, M. 2004. The research process. Ryerson University, Toronto, Canada.

Kates, R.W., Parris, T.M., Leiserowitz, A.A. 2005. What is Sustainable Development

Key, J.R. 1997 Descriptive research module R12: Research Design in Occupational Educational. Oklahoma State University, Oklahoma.

Lesáková, L. 2011. The Process of Forming the Regional Innovation Strategy. Acta Polytechnica Hungarica Vol.8, No.1, 2011.

Lisbon Agenda. 2007. [www document]. Available at http://www.euractiv.com/en/future-eu/lisbon-agenda/article-117510

London region UK. 2011. [www document]. Available at http://mapsof.net/london/static-maps/png/london-region-uk/medium-size

Lublin. 2011. [www document]. Available at http://www.skyscrapercity.com/showthread.php?t=859180&page=14

Lundvall, B.-A. 1992. National Systems of Innovation – Towards a theory of innovations and interactive learning. Pinter, London.

Mahdjobi, D. 1997. Regional Innovation Strategies in the European Community.

Maillat, D., Vasserot, J-Y. 1998. Economic and Territotial Conditions Revival in Europe's Industrial Regions. in (ed.) Aydalot, P., Keeple, D. High technology industry and innovative environments: The European Experience. London. Routledge.

Malecki, E. 1991. Technology and Economic Development: The Dynamics of Local, Regional, and National Change, Longman Scientific and Technical, Essex, UK. 495p.

Maskell, P. and Malmberg, A. 1999. Localized Learning and Industrial Competitiveness. Cambridge Journal of Economics, 23: 167-185.

Meyer-Krahmer, F. 1985. Innovation behaviour and regional indigenous potential. Regional Studies, vol. 19.

Mytelka, L. and Smith, K. 2001. Innovation Theory and Innovation: Bridging the Gap. The Netherlands.

Nelson, R. R. and S.G. Winter. 1977. In Search of Useful Theory of Innovation. Research Policy, 6: 36-76p.

Nelson, R., (ed.) 1993. National Innovation systems. A comparative analysis. Oxford Uneversity Press, New York.

O'Sullivan, M.A. 2000. The Innovative Enterprise and Corporate Governance. Cambridge Journal of Economics, 24:393-416.

Ohmae, K. 1995. The End of the Nation-State: the Rise of Regional Economies. Simon and Schuster Inc., New York, 214 pp.

Our Common Future. 1987. World Commission on Environment and Development (WCED), New York: Oxford University Press.

Päijät-Häme. 2011. [www document]. Available at http://www.intopractise.eu/eng/paijat-hame-finland/

Patton, M.Q. 1990. Qualitative evaluation and research methods (2nd edition), Sage, Newbory Park, California.

Porter, M. 1990. The Competitive Advantage of Nations. Free Press, New York, 855pp.

Regional Innovation Strategies under the European Regional Development Fund. 2002. Innovative Actions 2000-2002. European Commission DG Regional Policy.

Regional Innovation Strategies. 2011. Polish Innovation Portal [www document]. Available at http://www.pi.gov.pl/eng/chapter_86528.asp
Regions of Ireland: the Mid-West. 2011. [www document]. Available at http://www.iro.ie/midwest_region.html

Reid, A., Miedzinski, M. 2008. Eco-Innovation. Final Report for Sectoral Innovation Watch.

Rennings, K. 1998. Towards a Theory and Policy of Eco-Innovation - Neoclassical and (Co-) Evolutionary Perspectives. Center for European Economic Research. Germany

Riche, M. 2010. Regional Focus. EU Commission

Rothwell, R., Dodgson, M. 1991. Regional technology policies. In: (ed.) Brotchie, J., Batty, M., Hall, P., Newton, P. Cities of the 21st century. Harlow. Longman.

Saxenian, A. 1994. Regional Advantage – Culture and Competition in Silicon Walley and Route 128. Hardard University Press, Cambridge.

Scott, A.J. 1994. Technopolis. High-Technology Industry and Regional Development in Southern California. University of California Press. Berkley, CA.

Support actions to RIS-NAC processes. 2009. EU Commission [www document]. Available at http://ec.europa.eu/enterprise/ire/Innovating-regions/www.innovating-regions.org/network/presentation/projectsa63e.html?project_id=11

Support for innovation. 2010. EU Commission [www document]. Available at http://ec.europa.eu/enterprise/policies/innovation/support/index_en.htm

Sustainability Appraisal Report. 2006. Greater London Authority.

Sustainable Development. 2010. EU Commission [www document]. Available at http://ec.europa.eu/environment/eussd/

Sustainable Development. 2011a. [www document]. Available at http://louiskennedy.files.wordpress.com/2011/01/sheme_dev_durable.jpg

Sustainable Development. 2011b. [www document]. Available at http://www.hrea.org/index.php?doc_id=444

Veneto. 2011. [www document]. Available at http://www.bugeurope.com/destinations/it-veneto.html

West Region. 2011. Regions of Romania. [www document]. Available at http://www.romania-central.com/economy-of-romania/the-economy-of-romania/33-development-regions-of-romania/335-west-region-regiunea-vest/

What is Sustainable Development. 2011. [www document]. Available at http://www.worldbank.org/depweb/english/sd.html

Wolfe, D. 2003. Clusters Old and New: The Transition to a Knowledge Economy in Canada's Regions. Kingston: Queen's School of Policy Studies.

ANNEX 1: Questionnaire

"Strengthening sustainability imperatives in regional innovation strategies (RIS) of selected European Union countries"

Name of respondent	Organisation	Region

1. Please state your RIS briefly and its objective(s). If your region has no RIS, please go to Questions 5 – 7.

_____

_____

2. What are the current policy measures supportive (or as bases) of your RIS?

_____

_____

3. Please, describe how sustainability imperatives are framed and supported in your RIS.

_____

_____

4. List current programs/activities aimed at regional sustainability.

_____

_____

5. What factors of innovation (e.g. resources, capabilities) are enhancing the achievement of sustainability objectives in your region?

_____

_____

6. How are these factors of innovation supported (e.g. by institutions, services, networks, platforms, clusters)?

_____

_____

7. What are the challenges/problems related to the above issues?

_____

_____

Note: Please, feel free to expand to extra pages as the space provided for answers here are limited.

Thank you very much for your assistance!

Please, return this questionnaire to Anna.Koroban@lut.fi on or before 15 April 2011.

ANNEX 2: Contact respondents in the regional authority offices

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