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Background document

1 GLOBAL TRENDS IMPACTING THE REGIONS AND COMPANIES IN THE BSR

In the last few years, global challenges as well as the global socio-economical processes have had more and more direct or in-direct influence on regional economy. As a consequence, global challenges become one of the most important topics to be discussed on both regional and national level.

1.1 Demographic change

Two related demographic challenges are confronting regions in Europe. The most dominant challenge is population ageing, while the second challenge, the population decline, is especially typical outside the metropolitan areas[i].

Ageing has a great significance for society, economics, corporations, and individuals[ii]. Scientists predict that over 2 billion older persons will be alive by 2050. This rapid change requires economic and social adjustment in most of the world countries. As a result, the ageing population is one of the key policy priorities in most of the EU and OECD countries. Issues such as health care, pension systems and care for the elderly have become increasingly important but at the same time pose challenges for the economies in many countries as health and social security costs rise at the same time when more and more elderly move outside the labour market.

The changes in the labour market may result in bottle-necks and even shortage of manpower in some sectors. The greater demand for scarce labour may also put pressure on salaries, international competition and as a result affect the competitiveness of EU countries. In this way, ageing may indirectly amplify the effects of economic globalisation with increasing off-shoring and outsourcing of production. In the immaterial and creative economy of the future, more of the especially well-educated elderly may remain active in business life longer, but that requires companies and organisations to start considering new forms of employment to create optimal conditions for this group.

Ageing provides both a need but also an opportunity for innovation. The rising cost of services for the elderly means that there is a need to increase productivity in the social and health care service sectors. At the same time most of the elderly are financially better off than in the past and live longer. This means there is an increasing opportunity to not only private health services but in many other services such as recreation, tourism etc.

Another important phenomenon is the population decline in many of the non-metropolitan regions around the Baltic Sea. Ageing of the population partly explains the population decline but despite the cohesion policy there is still a widening gap between booming (typically metropolitan) regions and structurally weaker areas. Outmigration, and even more importantly, brain drain of young educated people hamper the development in many regions.

Ageing and population change are a particularly big challenge for many countries and regions in the BSR. Although there are great interregional differences in the age structure, generally the regions outside the metropolitan areas have a more serious problem with ageing population. Within the BSR, especially German and Finnish regions suffer from the ageing population, with the old age dependency ratio over the EU27 average. At the same time, many of the regions suffer from outmigration[1] or even population decline.

The demographic challenges, although different between regions, pose a challenge for future policies, and innovation promotion has to take these effects into account in the future, too.

1.2 Globalisation

Globalisation tendencies are one of the most important sources of overall changes in the world, and thus one of the key contextual factors for regional policies. Previously, transport of goods between countries, for instance, lasted much longer and traditional communication tools like mail were mostly used. The newest products and technology enable further optimising of processes and lead to shortening of goods deliverance all over the world.

As a result, regions are engaged in a fiercer global rivalry than before in creating or attracting activities generating wealth for their citizens. Particularly fierce is the competition over talented people that are the core resource in the knowledge economy. In view of globalisation, people have the opportunity to find work worldwide. This leads to increase in people mobility, which has led to a situation where regions have different opportunities to prosper.

Another problem are labour costs as a main factor for placing production. Several companies move from Europe to countries where labour costs are much lower. On the other hand, increasing demand of high qualified labour force in EU countries can be observed.

One of the most visible effects of globalisation is the rapid increase of markets. On one hand, companies have access to the opened global market, but on the other hand, the competitiveness

[1] From the partner regions only Tampere region, Tartu region and Havelland-Fleming have had a consistently positive net-migration during recent years. Panevezys and Podlaskie have had a declining population (Source: Eurostat)

pressure (based on price or specialisation) has increased. Thus, competitiveness has become the crucial growth factor for business.

Economic globalisation will make value chains more dispersed globally. Globalisation of the value chains does not only affect production but also research and innovation activity. This is also visible in the BSR as more and more R&D activities have moved to other places, especially Asia. Many leading firms adopt new modes of R&D, such as open innovation and R&D offshoring, and look for specific competences across the globe. This development poses a challenge for the Baltic Sea macro region and especially for many non-metropolitan regions which have already lost production as well as R&D activities to third countries. There is a need to respond to this development in many ways: specialisation of production and R&D, production based on local specific assets, as well as increasing co-operation.

At the same time, new intelligent production systems may help to bring production back to more developed countries. This is especially true in sectors where environmental impact is significant. The competitive advantage of many developing countries relies on inexpensive labour as well as low environmental standards. Tightening environmental regulations together with increasing price of energy and raw material decrease these competitive advantages in some sectors. Moreover, the value added in many products is increasingly connected to brand ownership and product development[iii].

Globalisation is not only about production, financial flows and trade. What is important for the future is the increasing globalisation of lifestyle and consumption habits. On one hand we can witness the increase in truly global trends but at the same time an increasing differentiation between various groups across the globe. These specialised needs provide new niche markets in the future both locally and globally.

It is also important to notice that globalisation highlights local differences in many ways. The trend in the market is towards regionalisation in production, R&D and markets. Regions have relative strengths and unique assets that can be attractive nationally and also globally. Citizens and consumers also seem to be cross-culturally different in their behaviour and their preferences and therefore, a growing number of companies have begun to adapt their products and marketing to the individual markets.

1.3 Natural resources and energy

The competition between the regions of the world leads typically to higher demand of natural resources. China and India are the main boosters for the price of resources and more or less responsible for growth and development of some regions.

The prices of food and raw material continue to grow. The economic growth, especially in large countries such as China, India, Brazil and Russia (BRIC-countries), has also increased the demand for raw materials and changed the food consumption habits. At the same, time more agricultural material is used for energy production. All this has raised the demand for raw materials and agricultural production and it is likely that this trend will continue in the future. This will provide both challenges and opportunities for regions around the Baltic Sea. The regions within the BSR, face different challenges and possess various opportunities in relation to the use of natural resources and energy. It is clear that the trends highlighted above will have a significant impact for the regional economies in the future. The increasing price of energy, for example, may lead to increasing need to save energy. The rising energy prices will slow down economic growth but may also provide new opportunities for BSR region especially through new innovations and production of renewable energy. Many regions around the Baltic have abundance of materials for renewable energy production as well industrial activity in the energy sector.

The critical role of energy and natural resources is also recognised in Europe. Europe's citizens and companies need a secure supply of energy at affordable prices in order to maintain our standards of living. At the same time, the negative effects of energy use, particularly fossil fuels, on the environment must be reduced. That is why EU policy focuses on creating a competitive internal energy market, offering quality services at low prices on developing renewable energy sources, on reducing dependence on imported fuels, and on doing more with a lower consumption of energy.

1.4 Environmental issues

Environmentalism as a trend is not new. Environmental concerns have been discussed actively already in the 1970s and 1980s. However, only during the recent years environmental issues have become part of the mainstream policy debate and economic activity related to environmental protection has started to grow rapidly. The new sense of environmental urgency has also changed the consumer behaviour and in this way put pressure for the businesses as well government sector to respond accordingly.

Of all the environmental issues, climate change is probably the most important. The relevance of climate change with its huge negative impact on economic development in the long run is likely to increase rapidly. The relation of greenhouse effect to growth is obvious: higher CO_2 emissions follow economic growth due to higher demand and consumption of fossil fuels. Thus a sustainable use of energy resources is required[iv] and the consumption of fossil fuels needs to be reduced.

The mixed blessing of the climate change is a result of the emissions, greenhouse effect, disforestation and the natural climate cycles. The results of a short term are the temperature increase (0.74 Celsius during the last century), the vegetation cycles are confused, and also the migrating birds. The consequences of the middle term are increasing temperature of the oceans, melting poles and spreading of the desert. In the long run the consequences will be a rising sea level, lack of drinkable water and global dimming[v].

The scientific findings and the increasing awareness of the related problems in the public at large have prompted governments around the world to respond. The European Commission, for example, has set a goal for the European governments to cut carbon dioxide emissions (CO2) by 20 percent, to increase the share of renewable energies to 20 percent and to improve energy efficiency by 20 percent by the year 2020.

The national and supranational decisions to fight climate change will also affect regional innovation policy. There is a need to respond to common targets with not only new regulations and new solutions for energy production but also through innovation. The industry will continue to be affected by legislation adding various restrictions on raw materials and substance and requiring various activities for energy reduction and recycling. New solutions based on innovation are welcome and in this way the climate change may also offer new possibilities for economic activity.

1.5 Technological development

Especially from the regional innovation policy perspective one important megatrend is the technological development and the sometimes even revolutionary changes that various new innovations bring about. Since the start of the industrial age, technological development has accelerated, so changes come faster and in more areas. Technology developments in the past few decades have significantly transformed the way people live and communicate.

New technologies have also been connected to the globalisation process. Innovations in the information technologies and logistics, for example, have created a global collaboration platform that in many ways overcomes the barriers of geography, distance and time. Businesses are becoming globally distributed as the location of R&D, production and service activities are less tied to specific locations. For the regions, this means that they are increasingly vulnerable to international competition.

The most important technological development areas in the next decades are information technology (ICT), agro-technology, biotechnology, nanotechnology, robotics, energy and environment[vi]. The new technologies are not only related to increasing productivity or to new life

style and consumption habits, but they are also increasingly connected to new societal and environmental challenges such as ageing, health, pollution, climate change and energy consumption.

Besides technological development, the whole innovation paradigm is changing. This does not mean that new ways of fostering innovation will substitute the old ones. Instead the new paradigm mainly argues that the traditional (linear) R&D approach is only applicable to some industry sectors. For many or most of the industry sectors, the new ways to foster innovation, such as open and collaborative innovation models as well as user and customer driven approaches, become more important in the future. Moreover, innovation is no more restricted to business and government sectors alone but also to society as a whole.

The high speed of technological change will continue in the future and it is therefore important for the regional innovation policy in the BSR to make sure that there is an adequate knowledge creation and knowledge absorption capacity, so that the local businesses as well as governments and society are able to benefit from the technological development.

2 EUROPEAN POLICY FRAMEWORK FOR TRANSANTIONAL INNOVATION COLLABORATION

In the last few years, it became increasingly important to take global challenges into consideration as the global socio-economical processes have had more and more direct or indirect influence on regional economy. As a consequence, global challenges are one of the most important topics to be discussed on regional and national level. Global challenges include, for example, globalisation, demographic change (ageing society) and knowledge economy.

In 2000, the Lisbon Strategy was developed to face these challenges with the aim to make the EU “the most dynamic and competitive knowledge-based economy in the world” by 2010. (European Union Parliament)

It was necessary to develop a suitable strategy, as the global competition is a fact that Europe is facing at the moment. Currently, the USA and the upcoming Asia are the main competitors for the European Union, and Europe has got the lowest level of development due to skill gaps, high unemployment rate, social exclusion and lack of economical dynamism.

The Lisbon Strategy was renewed in 2005 by emphasising Innovation, Education, Energy and Environment as additional issues with highest importance.

To go forward the following issues were defined as main action fields:

- Making Europe a more attractive place to invest and work,
- Knowledge and innovation as a basis for European growth,
- Giving priority to shaping the policies allowing businesses to create more and better jobs.

Moreover, 2006 Spring European Council set out four priority areas for action:

- Knowledge,
- Innovation,
- Business environment, and
- Energy policy.

Another crucial part of the reform agenda of the European Union are the sustainable development issues built on the Gothenburg Strategy of 2001, focusing mostly on climate change, poverty and emerging health threats. In this document it was agreed that all policies must have sustainable development as their core concern, as well as that the next Community Framework Programme for Research should be used as platform for research activities in this field.[vii]

The Strategy was revised in the process that started in 2004. This led to the adoption of renewed Sustainable Development Strategy (SDS) by the European Council. It was based on the following key objectives:

- Environmental protection,
- Social equity and cohesion,
- Economic prosperity,
- Meeting international responsibilities.

Additionally, making use of synergies between SDS and renewed Lisbon Strategy became a crucial part of the process. [viii]

This approach was clearly reflected in the decision of the European Parliament and the Council concerning the Seventh Framework Programme (FP7) of the European Community for research, technological development and demonstration activities (2007–2013), which recognised the Programme as an instrument for achieving major EU objectives deriving from the Strategies. It was decided that FP7 will consists of four sub-programmes: cooperation, ideas, people and capacities.

The most important supra level policy framework for the next decade is the Europe 2020 strategy emphasising what is called “Smart growth – an economy based on knowledge and innovation”. This target area highlights not only the strengthening of research performance, but also improving the quality of education and promoting innovation and knowledge transfer throughout the Union.

This is an important message also to regional innovation policy in the non-metropolitan regions, since it means that innovation policy needs to be connected with research and education. Moreover, the traditional R&D-oriented approach obviously favoured core regions since they typically have a higher concentration of both public and private R&D activity. However, a more broad based approach and stronger focus on education and innovation policy in non-metropolitan regions can and should find their own mix of activities that support “knowledge triangle policies”. Moreover, as it is stated in the strategy, in order to turn these innovations into new products and services, research and innovation policies need to be “combined with entrepreneurship, finance, and a focus on user needs and market opportunities”.

The most recent EU level initiative related to the Europe 2020 strategy that needs to be considered in the regional innovation activities in the BSR is the Innovation Union initiative (2010). The main objective of the initiative is to make Europe into a world-class science performer. Moreover, it is important to remove various obstacles to innovation in Europe, such as expensive patenting, market fragmentation, slow standard-setting and skills shortages and revolutionise the way public and private sectors work together, notably through Innovation Partnerships between the European institutions, national and regional authorities and business. Although some of the topics (e.g. patenting and standards) are mainly issues that need to be considered at the national and EU level, many of them also have implications to regional innovation policy. Especially skills, public-private collaboration and Innovation Partnerships are areas that regions may need to address in their own activities as well as in interregional cooperation.

According to the initiative, for Europe to achieve Innovation Union at least the following measures are needed:

- Investment in education, research and ICT
- Reforms in research & innovation systems to improve performance and reduce fragmentation
- Education systems at all levels need to be modernised
- Truly free movement of knowledge across EU - completion of ERA

- Access to EU programmes and enhancing their leverage effect on private sector investment
- Cooperation between the worlds of science and the world of business to get more research based innovation
- Removing barriers for to bring "ideas to market": e.g. better access to finance, affordable IPR, better regulation and targets, better interoperable standards e.g. patenting, strategic use of public procurement
- European Innovation Partnerships to tackle major societal challenges, pool expertise and resources and boost the competitiveness of EU industry
- Better utilisation of design and creativity
- Increasing collaboration with international partners e.g. by opening up research programmes

In the Innovation Union initiative, the European Commission aims to address various global (and European) challenges through a strategic research agenda. These include climate change, energy and resource efficiency, health and demographic change. As research areas at least the following will be emphasised in the near future: energy security, transport, climate change and resource efficiency, health and ageing, environmentally-friendly production methods and land management. Together with region-specific assets this strategic agenda may also be considered as the backbone of the sectoral approach to regional innovation policies in near future. The further development of ERA is also important in a sense that its realisation requires further transnational and interregional cooperation alongside the European level developments.

The EU also aims at strengthening and further developing the role of EU instruments to support innovation (e.g. structural funds, rural development funds, R&D framework programme, CIP, SET plan). This is another EU-level guideline that needs to be carefully followed at regional level since these instruments (along with national and regional initiatives) are important tools and resources for future development.

Another important EU initiative (especially considering the demographic challenges) is the “Youth on the move” initiative that aims at enhancing the performance of education systems and at facilitating the entry of young people to the labour market. Although the initiative does not directly target innovation policy measures, it is nevertheless tightly connected to innovation issues by targeting young people who as “future talent” should be nurtured especially in the non-metropolitan regions.

In the BSR macro region, an important policy initiative framing the future development in regional innovation policy is the EU Strategy for the Baltic Sea Region (EUSBSR) that was adopted in 2009. The strategy seeks to provide both a coordinated, inclusive framework in response to the key challenges facing the BSR and concrete solutions to these challenges. The EUSBSR aims to support balanced economic development in the region, and to enhance the EU cohesion and regional policy in the macro-regional framework. From the EU perspective, the EUSBSR relates both to macro-regional cooperation and policies, and to the future of cohesion policy and structural funds, and even further to the European Research Area and the Framework Programmes[1]. The EUSBSR can thus be seen as an integrated EU policy framework facilitating more effective coordination and more strategic use of the EU programmes in the BSR.

The success of the EUBSR depends on the level of importance BSR national and regional authorities attach to it in their own European and innovation policies and cooperation. For the BSR non-metropolitan regions, the territorial cohesion focus of the EUSBSR provides new opportunities to enhance regional competitiveness and innovation and *regional smart specialisation* through European regional cooperation and its policy instruments – independent of national policies.

The above mentioned initiatives and strategies frame policymaking at regional level but also offer possibilities to make the BSR more competitive as an entity. Many of the action points addressed in the policy framework favour or require even more intensive collaboration and joint activity. Implementing new initiatives may also be more effective on smaller scale than in Europe as a whole, and BSR provides an attractive platform for new initiatives and activities.

3 OPPORTUNITIES AND CHALLENGES FOR NON-METROPOLITAN REGIONS IN THE BSR

3.1 Innovation performance in the BSR InnoReg regions

Baltic Sea region as a whole has many structural strengths, such as the physical infrastructure, developed communication networks, international logistics and distribution systems. There are also potential strengths such as high qualification level of human capital, good system of research and development and worldwide competitive innovation cluster. These provide a good opportunity for future development. At the same time, a great number of development challenges can be identified as potential fields for collaborative innovation policy activities. Some of the

challenges are shared by all regions but other challenges only address certain areas. The key challenges for the BSR region are presented in the following chapters.

Finland and Germany have proved highly resilient and adaptable to fast changing global environment, and represent some of the most successful nations both in terms of economic and social development. They have complex innovation systems in place that are high-technology oriented and have co-operative spirit embedded. At the same time, Estonia, Latvia, Lithuania and Poland have previously concentrated mostly on economic activities that are not R&D and innovation intensive, but rather the opposite: low technology and relatively cheap labour based activities, and their innovation systems are still less developed, although developments have been made during the recent decade.[2]

Still, some of the regions involved in the BSR InnoReg project might outperform national averages. The Tampere region in Finland is quite strong even in international terms and has a rather strong industrial sector. South-Ostrobothnia (Finland) is behind the national average but has developed its R&D capacity recently despite still having a strong agricultural sector. Kaunas (Lithuania), Riga (Latvia) and Tartu (Estonia) all have a relatively strong industrial sector, are national centres of higher education and R&D, and do have several innovation support structures in place. Panevezys (Lithuania) also has a quite strong industry base, although the R&D activity is relatively low. Mecklenburg Vorpommern (Germany) fares relatively weakly by national standards. The Brandenburg region (Germany) has relatively strong public R&D capacity but at the same time is behind the national average in several other factors. Both German areas still have a relative high unemployment. Podlaskie voivodeship (Poland) is in a more challenging position as it has a relative high rate of employment in agriculture and a relatively high unemployment rate.

The regional differences are quite extensive among partner regions. Although the statistics used by Eurostat are quite general and do not give detailed information[3] about each BSR InnoReg partner region, they provide a comparative picture of the innovation performance of each region.

[2] Such differences between the innovation leaders and catching-up regions can be observed on the EU level as well.
[3] The data is based on greater region level (NUTS-2)

Table 1. Some key indicators and performance of BSR InnoReg partner regions[4]

Relative to EU	OLD	EDU	LLL	MHTMAN	KIS	GERD	BERD	HRST	PAT
Brandenburg	127,3	132,2	85,8	85,3	99,8	52,6	23,0	112,9	93,8
Mecklenburg-Vorpommern	125,7	119,7	83,9	64,0	97,4	55,8	26,8	99,5	48,9
Estonia	98,4	151,2	79,2	58,3	84,5	23,8	32,1	113,6	13,2
Latvia	97,9	84,4	82,0	28,1	75,0	9,5	10,6	97,9	6,3
Lithuania	90,7	122,5	64,4	36,5	78,8	18,3	12,7	106,8	2,5
Podlaskie	82,4	82,7	55,9	52,0	66,7	4,1	1,1	81,4	0,4
Länsi-Suomi	108,2	177,3	160,0	138,8	112,4	208,2	288,6	106,0	214,1

As can be seen from the indicators, the regional (or national in the case of the Baltic states) indicators differ greatly across the fields. The differences are most profound in business R&D and patenting activity. Also the share of medium to high technology manufacturing varies greatly.

Based on the reports developed by project partners and other available background material, the following could be said of regions:

Innovation Leaders

Tampere (Finland): Tampere is a traditional industrial centre in Finland with industrial history dating back to the 18th century. During the past 40 years, the region has also developed as a substantial centre in education and R&D activity. The region has performed above average in Finland despite suffering from structural change in different industries several times. The dominant industry sectors in the region are machinery, automation and ICT but also several rising sectors like media services and health care technology.

Innovation followers

South Ostrobothnia (Finland): South Ostrobothnia is dominantly a non-urban region with strong history in agriculture with the relative share of agriculture being twice the amount than in whole Finland. Entrepreneurship is also strong in the region, which means that SMEs hold a strong position in the regional economy. The region has not had its own university but has nevertheless been able to establish a working innovation system around a few strong local industries, a local

[4] The most recent data used (2006-2009), EU27 = 100. OLD = Old age dependency. Tertiary Education; LLL = Participation in life-long learning per 100 population aged 25-64; MHTMAN = Employment in medium-high and high-tech manufacturing (% of total workforce); KIS = Employment in high-tech services (% of total workforce); GERD = Total R&D expenditures (% of GDP); BERD = Business R&D expenditures (% of GDP); HRSTC = Human Resources in Science and Technology; PAT = EPO patents per million population. The data is based on NUTS-2 level.

polytechnic and several branch research and training units of various universities. Strong industry sectors include food, metal and wood processing. As a whole, the regional performance is below average in Finland but the urban region around the town of Seinäjoki has fared much better.

Brandenburg[5] (Germany): Education and research are strong areas with several universities, research institutes and other research and education institutions. However, the regional economy in Brandenburg region enjoys a mixed development path. The area around the capital Berlin enjoys relatively high growth but other parts of the region grow more slowly. These areas have suffered heavily from structural change and economic decline in agriculture and traditional industries. The region has several traditional industries such as mechanical and electronical engineering, vehicle manufacturing and petrochemicals but also new emerging industries such as medical and biotechnology, aerospace, logistics, environmental technology, ICT and media.

Catching-up regions

Mecklenburg-Vorpommern (Germany): The region is relatively rural in character with Rostock and Schwerin the only cities of considerable size. Like other parts of Eastern Germany the region passed through a period of strong structural change after the German Reunification. The economic base is focused on marine industries, food and construction industries with biotechnology activity emerging. The unemployment rate is high. The region enjoys a high number of academics per capita and relatively high investments high public R&D. Two traditional universities with several other educational institutions are located in the greater Mecklenburg-Vorpommern area.

Kaunas (Lithuania): Kaunas Region includes high concentration of R&D-performing universities, strong industrial sector and local public administration institutions (including innovation support organisations) making in the strongest technology-based regional innovation system in Lithuania. Although the dominant industrial sectors in Kaunas are currently textile and light industry, there is a considerable potential for innovation-based development.

Panevezys (Lithuania): Panevezys is well situated in terms of traffic connections. The region has a relatively strong position especially in the food and textile industries, but agriculture is also still quite strong in the region. The GDP is well below the national average. Public research and development capacity is low compared to the biggest centres Kaunas and Vilnius.

[5] This covers Havelland-Fläming region, too.

Riga (Latvia): The region is a centre of higher education and R&D, relatively strong industrial sector and various innovation support structures. In innovation drivers, knowledge-creation and intellectual property we can assume the region doing much better compared to Latvian average.

Tartu (Estonia): Tartu Regional Innovation System is very much university-based; the main industrial branches are forest-wood, metal works-machinery, food and textiles. In innovation drivers, knowledge-creation and intellectual property we can assume the region doing much better compared to Estonia in general. There is high concentration of (especially) biotechnology-related research teams and companies in the region.

Podlaskie (Poland): Compared with other regions under focus, Podlaskie voivodeship has a high rate of employment in agriculture and related industries – food production and processing (dairy, meat, fruit and vegetable, brewing and spirit industry) – dominate. Unemployment rate is relatively high from a European perspective but below the average in Poland. Strong sectors in the region are food, wood and various light industries.

Joint activities for transnational and interregional cooperation in innovation promotion are often easier to implement between regions whose innovation performance is on the same level and whose innovation systems and policies share similar characteristics. Within the BSR zone such options are relatively limited as regions are of very different development levels. On the other hand, particularly catching-up regions can learn a great deal of the innovation systems and governance systems of the more developed regions. Also the developed regions like Tampere might benefit from learning from specific activities and policies, which are more developed in some other regions.

3.2 Some key challenges and development needs

3.2.1 The availability of human resources

Human resources are a widely shared development challenge. Innovation-based development relies heavily on human resources not only in research and development but also in manufacturing and provision of services. Despite good education systems and quite extensive level of higher education in several regions, various challenges are still identified. These are, amongst others:

- Brain drain (particularly young and/or highly educated people) to other regions and abroad
- The provision of skilled workforce for today's and tomorrow's needs
- Ageing of population

- Employment of older people
- Development of lifelong learning
- Lack of professional workforce with high level vocational education (e.g. in Finland)
- Lack of professional workforce with engineering education (e.g. in Germany, Lithuania, Latvia)
- Low workforce mobility
- Lack of motivation to graduate in some regions

3.2.2 Developing bridges between education, science and economy

Basic education and science infrastructure is relatively developed in most of the regions in the Baltic Sea area with a good variety of educational and R&D institutions present. However, there are many challenges in getting the most out of these institutions. Universities tend to be rather distant from the problems of the private sector and the regional economy and sometimes not very well networked and/or internationalised. In this field, various challenges can be identified:

- How to increase the match between education and the needs of the regional economy
- How to improve entrepreneurship education
- How to encourage University-Business interaction
- How to influence university regulation and working culture in order to facilitate interaction with businesses
- How to facilitate interdisciplinary cooperation and collaboration between local universities
- Ageing of scientists and researchers (particularly in the Baltic states)
- Internationalisation skills and international networks

3.2.3 How to support business development in regions

In business and private sector innovation, there are also various issues that concern all or several regions in the Baltic Sea area. Even though some regions enjoy a relatively high level of private R&D, there are still many factors that hamper innovation processes. Lack of proper early stage funding instruments and appropriate innovation services are some of the

most important. Innovation in SMEs is especially important for several regions. Among the important challenges that have been discussed are:

- How to encourage SMEs to invest
- How to attract foreign direct investments (FDI)
- How to encourage companies to grow
- How to develop entrepreneurial culture and atmosphere
- How to develop financing innovation activities, particularly in SMEs (venture capital, seed funding)
- How to facilitate creation and development of new start-ups
- Poor innovation culture in enterprises, particularly SMEs
- Networking and cooperation between enterprises (e.g. innovation networks, clustering, open innovation)
- How to attract new and retain existing businesses in the region
- Insufficient experience and skills for international business
- Business and innovation services that meet the needs of the local economy

3.2.4 How to improve capabilities and resources for regional innovation support

The BSR also faces broader development challenges. In several regions, the regional innovation system is not fully developed and many issues have to be tackled to make the region more attractive for business activity. Various innovation support instruments need to be improved and made permanent and interaction between various actors in the innovation system needs improvement. In some regions, the governance system lacks knowledge on innovation related issues or is not efficient for supporting innovation oriented regional development. As a result, the partner regions have several challenges ahead in order to foster the competitiveness of their regions and the BSR as a whole. Some of the key issues are:

- How to develop the capacities and resources of intermediaries and service providers in the field of regional development and innovation support
- How to develop regional governance system in order to better understand and support innovation
- How to build a sustainable and efficient innovation system

- How to better use national and international networks to support regional innovation policy
- How to mediate balanced regional development with innovation promotion

The areas within the BSR are different and possess various strengths and weaknesses. Moreover, European developments and the changes in global economy also affect all regions. Increased interaction and competition represent an impact of the global economy and are also necessities in it. Competition is especially targeted to investments and human capital. Simultaneously, the roles of innovation and knowledge as a source of productivity and competitiveness have increased while competing with low costs has become less feasible. This has led to the need to concentrate on regional strengths and has added emphasis on regional characteristics.

Instead of only trying to differentiate from other regions, several areas have also created clusters of excellence, which gather competences and resources from various regions and add value to companies, public sector actors, third sector organisations and the users. This development has been speeded up by the changing nature of innovation. New technologies and ways to organise economic activities allow more interactive and networked nature of innovation. Especially the introduction of open innovation concept suggests that companies rely heavily upon the availability of external knowledge and other innovative resources such as finance and human capital in their innovation activities.

Hence, there is a need to have unique characteristic on one hand and also a need to be able to build clusters or consortia of regions on the other. In the innovation ecosystems of today's world, no region can excel alone. The recommendations below take this into account as they encourage catering for the region-specific assets and opportunities and interregional innovation policy cooperation in the Baltic Sea region.

4 RECOMMENDATIONS

Based on the analysis of key global trends as well as specific threats and opportunities in the BSR non-metropolitan areas, a set of recommendations is presented for future directions of innovation promotion and support practices that should be created to deal with these trends, challenges and opportunities. These include activities for directing scarce financial and human resources and proposed actions for innovation support, practices, policies and cooperation in the BSR non-metropolitan areas in the future.

4.1 Developing an innovation policy framework that takes into account the needs of the non-metropolitan regions

In national policies on regional development the roles of the metropoles on one hand and sparsely populated regions on the other hand have been emphasised. Traditional policies and instruments supporting R&D have been derived from high tech and well performing regions and often applied in a similar way across different types of regions and this approach has not always worked very well. The peripheral regions, on the other hand, have been the main target of regional policy – often targeting more physical and human infrastructure than specific innovation-related issues.

The non-metropolitan areas need their own approach and their own tools to make themselves competitive. They should find their own development policies and not depend too much on metropolitan areas or on central government guidance. If the non-metropolitan regions have their own "product portfolio" they are also more capable (mentally and materially) to make their own decisions and to create prerequisites for spontaneous development. Functional and qualitative capability makes progress and success possible. A clear regional profile can only be created by the region itself. The prowess of the regions could be utilised more in the EU structural policy.

The metropolitan regions have also had a strong role in the BSR cooperation. However, as their needs and challenges often differ from other regions, it is recommended that differentiation between various types of regions will be further emphasised in the BSR development activities in the future. There is also a need for differentiated innovation networks within the BSR so that the needs of the non-metropolitan areas can be targeted more specifically.

4.2 A long term commitment to secure a consistent and efficient innovation policy implementation

One of the key challenges for the non-metropolitan regions is that despite having many different innovation strategies to guide innovation policy (ranging from regional to national, BSR and EU), the innovation policy implementation is often described by short-term focus and impermanence. This is mainly a result of the funding structure of innovation activities. Most of the public innovation support instruments are funded by project and programme funding from various sources such as EU Structural Funds, national funding instruments and local funding sources. The often short-term funding and its implication to develop activities frequently bring good initiatives to halt just when they are starting to bear fruit. Various development services are also dependent on highly qualified staff, which is difficult to find and retain due to unstable funding. As

a result, a need to develop a more consistent long term development focus in order to secure an efficient innovation policy in the world of short-term project funding and changing politics is needed in many regions.

There is a need to further raise awareness on the existing innovation support tools and existing best practices across BSR. Various non-metropolitan regions around the BSR have developed their own approaches to combine long-term strategies with shorter-term funding sources. This provides an opportunity to learn from the solutions that other regions have used to secure financing to innovation support services. It is therefore *recommended that non-metropolitan regions around the BSR start a new initiative that concentrates on knowledge transfer and policy learning* on how to build sustainable regional innovation environments in the future.

In the next period for structural funds, the European Commission is planning to channel more resources to measures that support innovation. Already starting in 2010, in the Innovation Union Communication, the Commission proposes that Member States considerably increase and improve their use of existing structural funds for research & innovation.

There is also a need to develop jointly funded activities in the BSR cooperation. Despite great differences in structure and resources, the regions outside the metropolitan areas share many common development challenges and opportunities. BSR InnoReg project and its predecessors have shown that it is possible to transfer good practices and develop joint activities that will be used in concrete innovation policy measures in the regions. With these good experiences in mind it is recommended that a more coherent and long-term strategy for developing collaborative activities within the BSR that exceeds individual projects – i.e. a *long-term collaborative innovation policy agenda for BSR* non-metropolitan areas is established.

4.3 Strengthening the regional dimension of innovation policy to cater for the region-specific assets and opportunities

There are many differences between regions in their industrial structure, R&D and technology provision, policy initiatives, business service provision, governance structures and the institutional framework, particularly in the nature and extent of inter-relationships between key players. The structure of industry, government and higher education systems are different and relations between these spheres of activities also vary between regions.

The non-metropolitan regions within the BSR are in different stages of development towards knowledge economy. Some of the regions can be considered as innovation leaders whereas innovation performance in other regions is still rather modest. These differences in innovation performance should not hide the fact that all of these regions have specific assets that should be

developed with specific care and even prioritised. However, when looking at regional innovation strategies, the objectives and priorities look surprisingly similar, especially in terms of key R&D sectors.

There is evidence that region-specific advantages, which are embedded in specialised firms, skilled labour and innovation capacity, remain a significant source of productivity gain for firms, even for the largest multinational enterprises[ix]. Combined with specific geographical and cultural specificities these may provide unique assets or at least relative competitive advantages that need to be utilised.

The regional dimension of innovation policy is also important, because many of the factors that are known to influence innovative capability at national level are often based on strengths and unique assets of individual regions. Attention should also be paid to the opportunities that these region-specific assets provide for innovation policy. The strength of interregional cooperation is in the fact that it may uncover relative assets that are not easily recognised by the regional actors themselves. Moreover, there are also shared assets between regions that could be developed in cooperation. In the BSR, innovation-related to tourism is a good example of further possibilities.

It is therefore recommended that within the BSR non-metropolitan areas, further collaboration and knowledge exchange will target specifically continuous development of the Regional Innovation Strategies, so that they truly address 'smart specialisation' based on unique region-specific assets.

4.4 Securing the future human capital – young people as professionals and entrepreneurs

Many non-metropolitan regions are facing the challenge of demographic change and lack of entrepreneurial culture in general. Large metropolitan areas typically attract younger people with their more diverse study and work opportunities. Therefore, it is crucial to support the young generation in entrepreneurial matters and innovation. Future innovation policy should support tools and practices that are capable of raising the innovation awareness and training of the entrepreneurial minds of young people as well as providing opportunities that allow them to stay in the region.

In this respect, very encouraging experiences have been gathered from so called “innovation days” and initiatives from individual regions such as the Demola concept from Tampere region. The former have been organised in the BSR InnoReg project, and they aim to bring together the young generation (students) and companies in an innovation dialogue on concrete cases. The latter brings together university students and companies in an open innovation environment.

Several measures are needed to maintain young talent in the regions, provide them with attractive career opportunities and to increase entrepreneurship. These may include:

- Seminars or courses where entrepreneurs can discuss together with students
- More project-based courses in schools and universities where students actually work longer periods to solve company problems
- Innovation workshops, fairs, competitions and other events that bring science and technology closer to everyday life of young people
- Tools to attract and maintain young specialists by providing them job opportunities in the region

There is a need to develop cooperation of different stakeholders to promote innovation among the young generation both regionally but also with external partners. Due to shared problems and existing networks, the BSR provides a very good platform for spreading awareness on the existing innovation support tools and best practices. As the nurturing of future professional workforce is crucial for non-metropolitan regions, it is therefore recommended that a specific joint strategy connected with concrete measures should be developed for BSR non-metropolitan areas to address these issues.

4.5 Better support for new modes of innovation in the non-metropolitan regions

Traditionally, innovation has been mainly associated with R&D carried out by the private sector, research institutes and universities. As a result, science and formal R&D have even become comparable to innovation in many cases. However, in the 21st century, the traditional science pull model for innovation does not work anymore by itself. Remaining competitive model requires the ability to integrate innovation in new technologies, products and processes (traditional innovation) with innovation in business models, organisational forms and market positioning (hidden innovation)[x]. There is also a need to utilise design and creativity as sources of innovation more broadly since the sources of innovation do not only come out of R&D laboratories but from various sources.

The nature of innovation has changed and will change further. Especially open innovation and user-driven innovation have been considered increasingly important for business success in public, private and research sectors. In today's global knowledge economy, various bodies promote the user- and demand-oriented approach to increase the efficiency and effectiveness of

innovation processes. These modes of innovation are particularly important in the service sector although all sectors benefit from this.

In practice, **user-driven innovation** means integration of users and other stakeholders to the development of new services and products. **Open innovation** does not only rely on the research paradigm (linear innovation) in the field of innovation but also allows innovation input from other directions or sources, such as art, creative class, and the customers. From a non-metropolitan region perspective, open innovation can also be seen as a tool for exporting ideas outside core areas.

One specific tool for more open and user-driven innovation is the creation of **innovative markets** and **public procurement**. Although these tools are often better suited for national level measures, in some cases the regional markets (especially through collaboration) are attractive enough, so that there is a possibility to use innovative public procurement as a tool to foster innovation particularly in public services.

There is a need for developing existing innovation policy instruments as well as new schemes that support the full scale of innovation such as user- and demand-driven innovation, social innovation, organisational innovation, etc. There are already various innovation support measures and tools developed around the BSR. Therefore, it is recommended that non-metropolitan regions around the BSR concentrate on exchanging best practices and starting joint pilot projects to further develop these instruments.

An example of future joint efforts could be to further develop and spread the concept of Innovation Vouchers. Innovation voucher programmes have been established by many European Regions, also during the BSR InnoReg project, and the experiences are very encouraging especially among SMEs. The EU should support this process by defining minimum requirements and setting up a framework that allows/helps regional and national organisations to open their regional voucher schemes and support the implementation of an exchange system. This would help the SMEs to find the best possible knowledge provider. The BSR could be a pilot area in this process.

4.6 Developing a more diverse funding model for innovation policy in the non-metropolitan regions

The funding for innovation policy comes from different sources. However, the role of structural funds (SF) has been very important in many non-metropolitan regions. The Commission will propose a framework for post 2013 SF with more focus on innovation. This should at least mean that even though the total amount of SF expenditure in the BSR may decrease, the remaining

amount will be increasingly targeted towards innovation. Despite these strategic guidelines, it is possible that the SFs will have a smaller role in the future in many regions, implying that other forms of financing are required.

There is a need to better utilise other EU and international funding for developing tools and services that may take advantage of shared experiences and challenges. The availability of international funding may be better for larger consortia of regional actors especially when there is a genuine possibility for joint action.

The countries around the BSR also need to have a clear division of labour between national funding instruments and region-specific *complementary* instruments. National instruments do not always take into account the region-specific needs and opportunities, and therefore, in the future it is important to discuss with the national decision makers about the development of innovation policy towards more flexible and bottom-up direction, where regions have the possibility to develop their own approaches.

It is also foreseen that increased use of private funding sources for innovation support is needed. Europe and most of its regions are clearly lagging behind in private investments for R&D and this is also the case in many regions within the BSR. Private funding for innovation is scarce in many regions and there is a lack of both industry investments and venture capital. Some regions have been able to develop activities to attract and mobilise private resources but national activities may also be needed to boost private sector R&D (e.g. subsidies or tax incentives). Exchange of best practices and joint initiatives are needed to find new ways to facilitate public-private partnerships as well as instruments that facilitate private R&D investments especially among SMEs. Although many of the barriers are best addressed by EU and national level activities, transnational cooperation and regional instruments (including e.g. better support for technology-transfer, public procurement and the creation of larger pilot markets) may also boost private sector R&D investments and successful commercialisation of innovations.

4.7 Targeting innovation in the traditionally strong sectors

High-tech industries are responsible for most of the innovations. It has also been stated that the difference between the innovative performance between the EU and the USA is mostly explained by the high-tech sector.

Not all non-metropolitan regions have strong capability and industry activity in the fast growing high-tech sector. It is a fact that these industries tend to concentrate more, although not exclusively, in metropolitan regions. However, not all innovation and growth takes place in the

new high-tech industries and even existing strong industries can survive and grow through innovation. A good example is Tampere region that has been part of the BSR InnoReg project. The region is home to strong machinery industry, which has survived and grown through upgrading its basic capabilities such as materials, machining, design, and testing, and infusing new technologies from high tech sectors, such as electronics, control, and information technology into the machines.

As a result, innovation policy in the non-metropolitan regions should not only target growing high-tech industries but also upgrade and develop the traditionally strong industries. New and improved innovation policy instruments need to be created to support the upgrading of existing industries and fostering innovation by absorption. The ability to adapt, develop and apply existing knowledge – often created elsewhere or in other sectors – and implement that to improve existing products and services is important. This is often achieved through building better links to centres of knowledge in other regions and to other related high tech sectors.

It is therefore recommended that in the future a specific joint framework is developed to exchange best practices in improving the absorptive capacity of the traditional industries in the regions. The framework should also include a set of joint initiatives to build new approaches and instruments to further facilitate the upgrading of existing industries through innovation. Transnational co-operation between non-metropolitan regions provides an excellent platform for this kind of approach as the metropolitan regions typically prioritise knowledge creation capacity in their strategies and cooperation.

Another important sector that has been often neglected in the innovation policy strategies is services. Services are the biggest productive sector in most of the countries and sub-regions around the BSR. Many of the service sector activities, such as tourism and the so-called creative industries, are also growing quite rapidly. Since the service sector typically innovates by providing solutions to the customers' problems or needs, innovation in services is not primarily based on formal R&D. Partly due to this different nature of innovation, the traditional support instruments targeted for manufacturing sectors do not always support services very well. Innovation in services has been increasingly targeted in the EU and national innovation policy initiatives. However, since many services are by nature more embedded in the local and regional environment, it is important to develop locally tailored measures to support innovation in the service sector. BSR cooperation has opportunities to further enhance these activities especially in some specific sectors, such as tourism.

4.8 Focus on innovation in the public and non-governmental sectors

Public services represent a huge area of economic activity as well as potential area for innovation. Yet innovation activity in this area is relatively underdeveloped compared to many other sectors. The share of public services account for between 40% and 56% of GDP and employment related to public services between one quarter and one third of the total working-age population in the EU. Public sector employment alone represents more than 15% of the total employment in the EU. Additionally, various global and European challenges such as demographic change, pollution, and security concerns create new demands for public services. Statistics indicate that the demand for public services in many advanced countries is growing faster than the rest of the economy – even before the onset of the recent economic crisis. At the same time, the tightening economic situation together with the demographic change poses challenges to public sector finances.

Innovation is seen as one key solution to these challenges. Typical sources for innovation in the public sector are regulation, organisational innovation, service innovation, technology procurement and co-operation with other public organisations, universities, NGOs etc. Almost all of these areas of innovation (excluding regulation) take place in the regional and local settings as many services are provided in close proximity to the citizens. These local settings provide a platform especially for service innovation. As a result, focus should be on the public and the third sector in the innovation policy as target groups and also as lead users.

Recent debate and associated initiatives dealing with public sector innovation have mainly aimed at improving the effectiveness and efficiency of the delivery of public services and improved transparency and user interface.

One has to remember that public services are not always provided by the public sector. Instead, many private sector actors and NGOs may actually provide the service although the public sector ultimately has the responsibility to organise and finance these services. In this way, fostering innovation in the public services covers a wide range of actors and activities. Citizens can also initiate such processes and should be included in the innovation activity. This is an important topic and connects public sector innovation with user-driven and open innovation approaches.

A specific area of activity that needs to be targeted is the use of ICT in the service sector. BSR cooperation provides a good platform for joint development of initiatives in e-

government and e-services, where new innovations can be developed and tested in various national and regional contexts.

The huge opportunities and fiscal challenges related to public sector innovation provide both a need and an opportunity for regions in the BSR to actively develop instruments to support innovation in the public sector. Since many of the challenges in the public sector are shared by several European countries or even globally, this provides an opportunity to create exportable public sector innovations.

The recommendation to emphasise public sector innovation in the regional innovation policy within the BSR also complements wider EU initiatives. The Commission is expected to launch a major research programme on public sector and social innovation and pilot a European Public Sector Innovation Scoreboard in 2011. The Commission has also proposed that governments set aside dedicated budgets for public procurement of innovative products and services.

4.9 Increased long-term commitment for interregional innovation policy cooperation in the BSR

The recent economic crisis, together with challenges posed by globalisation, have further emphasised the need to strengthen macro-regional innovation and economic cooperation as tools for innovation policy. At the moment, there is many kind of transnational and interregional networking within the BSR aimed at supporting innovation. Regional aims include the pooling of top-expertise and resources in order to become more competitive in the global market, making the BSR more attractive for skilled workforce and innovative companies, and serving as a springboard for internationalisation for the region's SMEs.

Regions outside the metropolises in the Baltic Sea area are committed to enhancing innovation development and governance jointly, and this cooperation has developed to be quite successful in some areas, yet many opportunities provided by cooperation remain untapped or even ill-observed. At the same time, the regions are facing major challenges in securing availability of skilled work force, developing bridges between education, science and the economy and supporting the creation and reform of small and medium-sized enterprises. Potential areas of synergy and co-operation include:

- Connecting local special competences with the needs of the foreign and global firms
- Helping to connect local SMEs to the global value chains
- Helping SMEs with niche products to enter global markets
- Communicating needs of the local firms to the government

- Synergies with developing similar key industries, clusters and BDOs supporting them
- Accumulation of critical mass by linking centres of knowledge in various regions
- Exchange of expertise, tools and joint activities
- Possibilities for piloting diverse markets

An important development in this field has been the EUSBSR Priority Area 7 flagship project on research and innovation, clusters and SME networks (BSR Stars). BSR Stars facilitates and creates a strong policy framework for the next level of transnational knowledge-based collaboration in the region. Experiences and good practices from earlier and existing transnational collaboration projects and networks, such as BSR InnoReg, can now be utilised and further developed under a common umbrella with stronger policy support.

BSR Stars emphasises a coherent territorial/macro-regional approach with strong involvement of the BSR sub-regions and regional clusters, also beyond metropolitan regions. It thus provides a suitable macro-regional framework and EU policy support also for the BSR non-metropolitan regions for the development of their innovation and European cooperation strategies and instruments. With its focus on grand challenges and the new innovation paradigm (user-driven and open innovation), BSR Stars also facilitates the further elaboration of new project ideas emerged in connection with BSR InnoReg.

It is recommended that the joint policy framework introduced in these projects will be further elaborated in the future as well as spreading collaboration to new non-metropolitan regions around the BSR. The good results of existing collaboration clearly demonstrate that synergies and additional value added can be achieved to regional innovation policy activities through transnational and interregional cooperation. This added value is also important for the BSR to achieve targets set out in the Europe 2020 strategy and the Innovation Union initiative.

[i] Van Nimwegen, Nico & van der Erf, Rob. 2010. Journal of Ethnic and Migration Studies, Volume 36, Issue 9 November 2010 , pages 1359 – 1379

[ii] Larsen, Gitte. 2006. Why megatrends matter. Futureorientation 5/2006

[iii] A good example is Apple iPhone, where only a small portion of the retail price of the phone goes to China, where the phone is manufactured (Wall Street Journal, December 2010: Not really 'Made in China').

[iv] European Sector Innovation Scoreboard, Hollander H., Arundel A., Luxemburg 2005, S.3

[v] Fossil fuel use, as well as producing greenhouse gases, creates other by-products. These by-products are also pollutants, such as sulphur dioxide, soot, and ash. These pollutants however, also change the properties of clouds.
Clouds are formed when water droplets are seeded by air-borne particles, such as pollen. Polluted air results in clouds with larger number of droplets than unpolluted clouds. This then makes those clouds more reflective. More of the sun's heat and energy is therefore reflected back into space.
This reduction of heat reaching the earth is known as Global Dimming.
http://www.globalissues.org/article/529/global-dimming#Whatisglobaldimming

[vi] Larsen, Gitte. 2006. Why megatrends matter. Futureorientation 5/2006. Megatrendit ja me. Tekesin katsaus 255/2009.

[vii] A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development COM(2001)264 final.

[viii] Review of the EU Sustainable Development Strategy (EU SDS) − Renewed Strategy 10917/06.

[ix] OECD, 2007. Globalisation and Regional Economies: Can OECD Regions Compete in Global Industries?

[x] Total Innovation: Why harnessing the hidden innovation in high-technology sectors is crucial to retaining the UK's innovation edge. Nesta Research report: May 2008.