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Strategic Development Concept of Transnational Cooperation in the Field of Innovation Promotion in the Via Baltica Nordica Macro-Region – Final Report

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Strategic Development Concept of Transnational Cooperation in the Field of Innovation Promotion in the Via Baltica Nordica Macro-Region

FINAL REPORT

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List of Abbreviations

BSR	Baltic Sea region
CIS	Community Innovation Survey
EIS	European Innovation Scoreboard
EU	European Union
FDI	Foreign Direct Investments
IMF	International Monetary Fund
IRE	Innovating Regions in Europe
R&D	Research and Development
RIS	Regional Innovation System
SME	Small and Medium sized enterprises
MNC	Multinational Corporation
FP6	Sixth Framework Programme
FP7	Seventh Framework Programme
CIP	Community Innovation Programme

1 Introduction

1.1 VBN InnoReg project

1.1.1 Background and objectives

VBN InnoReg - Strengthening Via Baltica Nordica Macro-Region through Transnational Cooperation for Regional Innovation Promotion – is an Interreg III B project, which involves 10 partner regions in the Via Baltica Nordica (VBN) zone.

VBN InnoReg has promoted international networking and collaboration between regional authorities, universities, technology centres and enterprises to foster competitiveness and economic performance of the Via Baltica Nordica corridor but also in the Baltic Sea region (BSR) as a whole, and provided a platform and tools for extensive and focused communication and cooperation in innovation development issues.

The main objectives of the VBN InnoReg project have been:

1. To promote sustainable economic development, competitiveness and coherence in the VBN macro-region in the framework of regional innovation system development
2. To enhance efficiency, innovation performance and operating environment of the regional innovation system through transnational cooperation, exchange of information and experiences between project partners with joint interests in knowledge-based innovation promotion.
3. To enhance capacities of regional authorities and other key innovation system actors with collaboration between transnational partners in their regional innovation promotion efforts.

1.1.2 Activities

The project activities are implemented in parallel regional and transnational operations:

1. A joint VBN approach to innovation promotion will be developed through analysing Regional Innovation Systems (RIS) in VBN partner regions to identify strengths and development needs of innovation systems and opportunities for transnational cooperation in innovation promotion.
2. Regional training events and seminars for regional innovation system actors are organized to ensure their involvement and capacity building as well as sustainability of the RIS analyses results. Study tours are organized for the partner regions.

3. New innovative tools and concepts are developed and piloted by project partners and shared with interested actors in the Baltic Sea Region and in the European Union.

1.1.3 Project partners and funding

In addition to the Lead Partner, the Baltic Institute of Finland, VBN InnoReg involves 17 partner organisations from seven BSR countries: Sweden, Finland, Estonia, Latvia, Lithuania, Poland and Germany. Total budget of the project is almost EUR 1.1 million, out of which about EUR 675,000 will be co-financed by the EU. The project duration is from the beginning of 2006 to the end of 2007.

1.2 Starting point for a joint approach in innovation promotion

Innovation is nowadays seen as a major force behind competitive economic growth. It has even been increasingly argued that innovation has become the most important source of competitiveness, especially for the high-tech industries working in the global markets. Innovations can be seen as the way to utilize the opening market and technological opportunities that define the success of firms, industries and also regions and countries.

However, the innovation capability and the success of innovation activities of firms are not just endogenous factors, but are also defined by the regional, national and global environment where the firms operate. This broader environment where the firms innovate can be approached through the concepts of national and regional innovation systems. The performance of the national or regional innovation system influences the capabilities of companies to adapt to new market and technological opportunities.

The creation and promotion of high performing regional innovation systems is a shared challenge among the regions around the Baltic Sea. The ways different regions have responded to tackle this challenge varies greatly. The different approaches and solutions act as an important source for policy learning between countries and regions. However, at the same time there are various shared development needs among the regions and various good practises and joint interests in the regions. By developing a shared strategic development concept – *a joint approach* - to the development of regional innovation promotion it is easier to share information, join forces for collaborative action and benchmark development activities related to innovation issues.

This strategic development concept is intended to be a basis for collaborative action for *all regions* around the Baltic Sea. However, because of highly developed existing network relationship and experience of transnational col-

laboration, the strategy has a specific focus on Via Baltica Nordica macro-region (VBN) and a network of regions inside that macro-region.

The objective of preparing a joint approach for innovation promotion activities is to combine the analyses of regional innovation systems (RIS) produced by the partner regions during the VBN InnoReg project and provide a synthesis based on common understanding of development challenges, conditions and transnational cooperation that will foster the competitiveness of the VBN zone.

As a result of this process a strategic development plan has been prepared with common definitions for innovation issues, comparable innovation performance indicators and possibilities for regional and transnational collaboration in the field of promoting innovations. The objective of this strategic development plan is to lead to improved knowledge on VBN innovation system dynamics and its strengths and development needs.

1.3 Towards a joint approach to innovation promotion in the VBN macro-region

The joint development activity between the Via Baltica Nordica co-operation zone has originated from joint interests to develop especially tourism, accessibility along the zone that extends form eastern Germany and northern Poland through Baltic states and Finland to northern Sweden and Norway. These activities were promoted through projects Via Baltica Spatial Development Zone (VBSDZ, 1998-2000, Interreg 2C) and Via Baltica Nordica Development Zone (VBNDZ, 2002-2005, Interreg 3B). Main outcome of VBSDZ was development strategy and vision for the VBN macro-region. VBNDZ brought visions into practice in three sectors: development of railway traffic, tourism and Geographical Information Systems (GIS). From the original topics the collaboration has expanded to cover other development issues, like innovation, which are less connected to physical development zone but rather based on joint interests and an active transnational network of regions.

VBN InnoReg utilizes and strengthens the cooperation and network between regions in the Via Baltica Nordica zone, which was created during these earlier projects. VBN InnoReg offers a new perspective to innovation policy issues and aims at increasing competitiveness of the VBN macro-region by providing support to on-going regional innovation system development actions in the VBN zone by means of regional and transnational cooperation

The regions in the VBN macro-region have different knowledge creation and utilisation profiles and they are at different levels in developing and implementing the regional innovation policies and strategies. However, they share similar challenges in promoting innovations to ensure sustainable eco-

nomic performance, industrial competitiveness and employment in the future. While networks and interdependencies between regions and their actors are increasing, transnational cooperation requires shared concepts, measures and activities.

One key element of the VBN InnoReg project has been to analyse good practises, joint interests and development needs in innovation promotion in the partner regions to develop *"a joint approach to innovation promotion"* for the VBN macro-region.

The strategic development plan has been prepared as following: in the first stage a general analysis of the operational context of the regions and the VBN macro-region as a whole was carried out. Based on this analysis (literature, reports, development workshop and interviews) a set of preliminary scenarios was constructed for the joint approach to innovation promotion. These scenarios together with the analysis were then sent to regions for feedback (discussion, survey and workshop). Based on this feedback strategic objectives together with an operational concept were formulated. As a result, a proposal for Joint Approach to Innovation promotion in the VBN macro-region has been prepared. This joint approach is presented in Chapter 5 of this report.

The process for preparing the joint approach for VBN macro-region in innovation promotion activities is described in following figure.

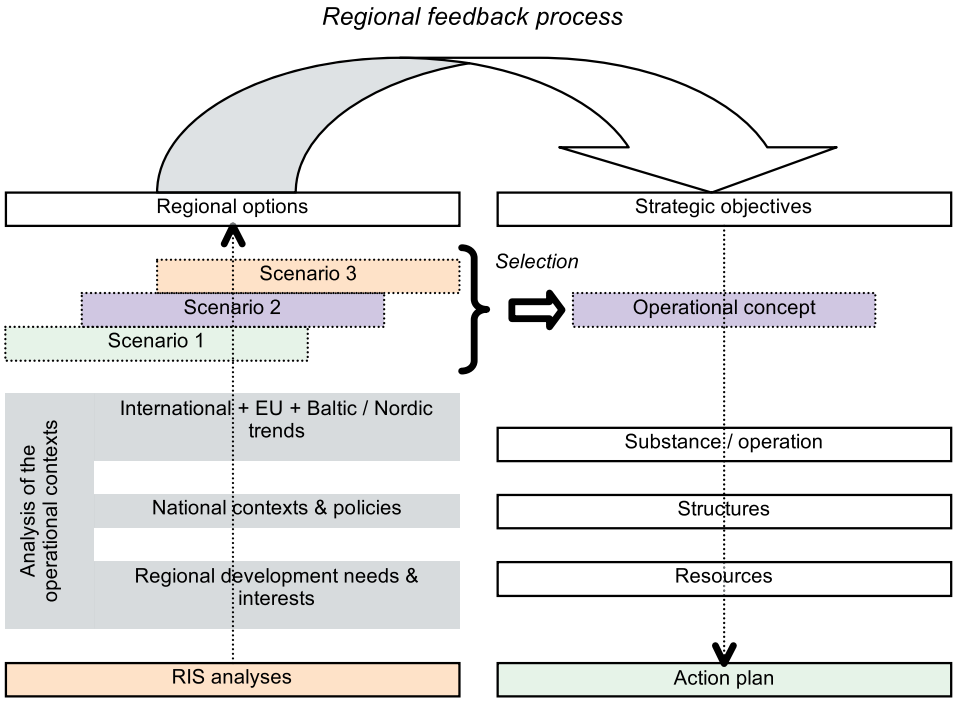

Figure 1. The strategy development concept and the scope of the mid term report (in gray).

The input for the strategy process has consisted of Regional Innovation System analysis reports from VBN InnoReg Partner regions, workshop material from two development workshops, interviews with VBN InnoReg project partners and a feedback survey data from the project partners. The interviewees included 9 people that are listed in Annex 1. The web-based feedback survey resulted with 10 responses, including responses from Estonia (1), Finland (2), Germany (3), Latvia (2), Lithuania (1) and Poland (1).

The report has been prepared by Kimmo Viljamaa from Advansis Ltd, Finland and Tarmo Kalvet from PRAXIS Center for Policy Studies, Estonia. Kimmo Halme (Advansis) and Prof. Rainer Kattel (Tallinn University of Technology and PRAXIS) have also contributed to the process through planning, material collection and expert advice.

2 Innovation in the VBN macro-region

2.1 Global and European development trends

There are various global and European developments that affect the regional economies in the VBN InnoReg partner regions. The impact of the global economy is often about increased interaction and competition of various regions in the global arena. The regions are forced to compete on investments and human capital. The competition is also changing in nature. As the level of production costs is on the rise particularly in the new EU member countries and at the same time more and more low-cost locations appear in the world map, it becomes less feasible to compete with low costs only. As a result, the role of innovations as a source of productivity and competitiveness has increased. However, the rising research and development (R&D) capacity in new locations such as China and India[1] means that even a move from price competition to innovation based competition is not enough in the future for some industries but specific activities are needed for the regions to be competitive business locations.

At the same time, the nature of innovation activity itself is changing. Through new technologies and ways of organising economic activities innovation is becoming more and more interactive and networked by nature. The concept of open innovation[2] applies that companies rely heavily upon the availability of external knowledge and other innovative resources such as finance and human capital in their innovation activities. These factors are linked to the increasing mobility of knowledge workers, the increasing importance of venture capital, greater dissemination of knowledge throughout the world, increased quality of university research and increased rivalry between companies in their product markets.[3] One related trend is that the economic importance of immaterial goods and services is increasing. All these changes require also new approaches and mechanisms for innovation support activities as traditional industrial policy instruments are not well suited for changing

[1] European competitiveness report 2006. Communication from the Commission COM(2006) 697 final. Commission staff working document SEC(2006) 1467/2

[2] See Thrift, N. 2006. Re-inventing invention: new tendencies in capitalist commodification. Economy and Society Volume 35 Number 2 May 2006: 279/306; Cooke, P. 2005. Regionally asymmetric knowledge capabilities and open innovation Exploring 'Globalisation 2'—A new model of industry organisation. Research Policy 34 (2005) 1128–1149

conditions. The concept of open innovation urges for interlinking public policies towards science, technology, intellectual property, competition, entrepreneurship and education in any society.

Another recent trend in innovation policy is the creation of lead markets for innovation in order to increase the demand for innovative products and this way strengthen local business activity. This can be done, amongst others, via public procurement policies, standardisation, the creation of "technology platforms" but also by promoting a cultural shift which celebrates innovation and a desire to possess innovative goods[4]. However, to reap the benefits of these changes requires experience on innovative services.

Research, business and government sectors all need regions to be attractive and competitive in order to promote knowledge based entrepreneurship and capitalising of new technologies. Knowledge is born more and more in specialised concentrations of top expertise, which are built around innovative education and research organisations and businesses. Top research and dynamic innovation environments are a way to improve the competitiveness of local businesses and increase the attractiveness of the regions among foreign companies and labour force.

Next to globalisation trends there is a creation of "glocal" states going on: when countries increase their bids to support the competitiveness of cities and regions, supranational organisations like the European Commission, IMF and the World Bank have an increasing role in the development of respective countries as well. This development trend has the effect that government efforts to improve the economic development of regions is becoming more direct through dedicated regional and national activities in science and technology policy, public-private partnership and capital investment.

This tendency is also visible in innovation policy. The EU has promoted innovation and the creation of innovation environments as part of its regional and innovation policies. Through regional policy instruments and especially with structural funds, the EU has supported the development of regional innovation environments, mostly with activities related to infrastructure and education. Moreover, innovation activity in regions has been promoted indi-

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[3] See Chesbrough, H. (2006), Open Business Models: How to Thrive in the New Innovation Landscape, Boston: Harvard Business School Press; Chesbrough, H., W. Vanhaverbeke & J. West (2006), Open Innovation: Researching a New Paradigm. Oxford: Oxford University Press; Chesbrough, H. (2003), Open Innovation: The new imperative for creating and profiting from technology, (HarvardBusiness School Publishing: Boston, MA.

[4] See Creating an Innovative Europe, Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit and chaired by Mr. Esko Aho. European Commission. January 2006; European competitiveness report 2006. Communication from the Commission COM(2006) 697 final. Commission working document SEC(2006) 1467/2

rectly by the EU Sixth Framework Programme for research through various instruments such as support for Regional Innovation Strategies (RIS)[5], IRE-network[6], Regions of Knowledge[7] and INNO Net projects. Similar instruments can be also found in the earlier Framework Programmes.

In the coming years, the European framework will be further strengthened as part of the development of innovation activity in the regions. Europe has fallen behind especially compared with USA and South-East Asia. This has caused some readjustments in the European competitiveness strategies. European research and innovation policy instruments have been renewed recently to correspond to the objectives of the Lisbon strategy agreed in 2000. This has meant both the introduction of new instruments and redesign of existing instruments to support the aim of making Europe the most competitive macro- region in the world. For VBN network these changes mean that in the future there are more and more EU instruments and initiatives available for innovation support activities, which means new opportunities for joint development activities. This is particularly important in the regions where the role of structural funds as a financing instrument has decreased in the new programming period.

In practice the European Union innovation policy affects regions through three main instruments. These are the Seventh Research Framework Programme (FP7), the Competitiveness and Innovation Programme (CIP) and structural funds. Of all these instruments, the utilisation of the former two should especially be increased as resources both in the regions and in the various interregional networks. Also in the Structural Funds the emphasis is moving more and more to "soft infrastructure" related to research, innovation, entrepreneurship and competitive business environments. Structural Fund operational programmes will co-finance innovation strategies through research infrastructures, seed capital funds, venture capital and training activities. There have been also specific instruments for the development of the Baltic Sea Region. INTERREG III B Neighbourhood Programme (2000-2006) has been one of the EC initiatives that support transnational projects working together for balanced and sustainable development of the Baltic Sea Region. This is followed up by the Baltic Sea Region Programme 2007-2013, one of the mainstream Structural Funds programmes under the EC territorial co-operation with the objective to supports transnational projects working

[5] RIS strategies. http://ec.europa.eu/regional_policy/innovation/innovating/inno-pro.htm

[6] IRE http://www.innovating-regions.org/

[7] The international dimension of the European Research Area. http://cordis.europa.eu/era/regions.htm

together for balanced and sustainable development of the European territory. One of the program's objectives is related directly to fostering innovations[8].

Other important European trends in innovation policy are service innovations, demand led innovation, and large project related to innovation infrastructure and development platforms (e.g. European technology platforms, ERANET and INNO Net type of projects) related to governance and various broad based transnational cluster projects. These new trends and focus areas are important to take into account in planning joint development activities.

Key European dimension for joint activities can be seen in several directions. These are, for example, joint operation models (e.g. regional cluster projects, regional risk funds and joint models for analysis and evaluation) and in industry sectors that are important for several regions (e.g. information and communication technology services). European financing instruments are also a very important source of funding for joint activities. All in all it is important that the regional innovation systems and regional governance mechanisms are able to respond to the internationalisation needs of innovation activity and a joint development networks are a good instrument for improving these.

2.2 Economy and innovation activity in the VBN macro-region

Both the empirical studies as well as all the experts interviewed (See Annex 1) strongly argued that although the Baltic Sea region has in recent years outperformed European peer regions on key performance measures, the region continues to be dominated by the Nordic countries. The Baltic Sea region – more specifically the part of its economy that competes internationally - has strong positions in forest products, telecom products, oil & gas, and health care. However, these sectors are not dominant in all of the VBN regions.

Higher education and particularly tertiary education is strength for the region as a whole and the prevalence of science and engineering graduates and researchers is generally high. However, there are substantial regional differences in the science and engineering education. Nordic countries and Germany invest more in R&D than their eastern rim counterparts, especially when we take a look at the private sector. The government effectiveness is stronger in the regions in Nordic countries due to longer traditions of market economies. Patent applications and employment in high tech sectors are lower in the Baltic countries and Poland than in the Nordic countries and Germany. The availability of venture capital and especially seed financing is a problem for several countries in the region[9].

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[8] See http://eu.baltic.net/ for details.

[9] Wise Hansson, E. 2007. Regional Co-operation on Innovation and Cluster Development. In Giguère, S. (Ed.) Baltic Partnerships. Integration, Growth and Local Governance in the Baltic Sea Region. OECD.

While key strengths are said to be a strong physical infrastructure, a skilled labour force, low levels of corruption, strong clusters, demanding regulations, a strong science system, and companies competing on innovation and uniqueness[10], these are truer for the developed Nordic states and for German regions, but not for the Baltic states (Estonia, Latvia and Lithuania) and Poland. According to the *Baltic Development Forum* the performance of innovation systems in various countries[11] reflect that differences in various measurement indicators vary from 2 to 70 times when comparing leading regions to catching-up regions.

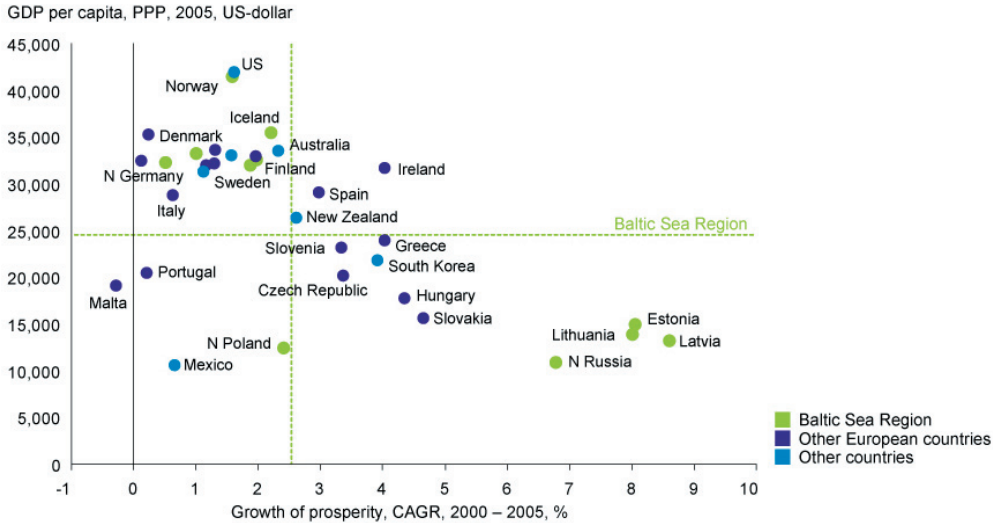


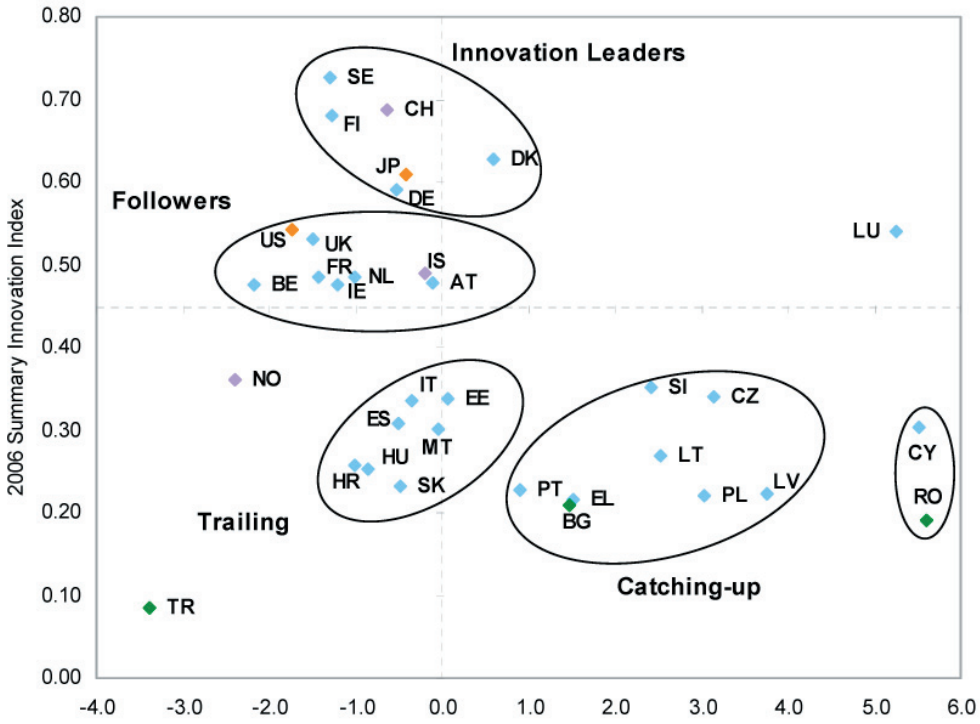
Figure 2. Productivity level and growth[12]

Indeed, according to the most complex and policy-relevant innovation measurement tool available some countries in the VBN macro-region are today clearly *Innovation Leaders* that outperform EU averages in many respects (see Figure 3).

[10] Ketels, C and Sölvell, Ö. 2005. The Baltic Sea Region – Top of Europe in Global Competition, Baltic Development Forum, 2006. Ketels, C., Sölvell,Ö., Schwaag-Serger, S. and Hansson, E.W. State of the Region Report 2005. Competitiveness and Cooperation in the Baltic Sea Region.

[11] The data is based on the European Innovation Scoreboard (EIS) 2006, http://www.proinno-europe.eu/doc/EIS2006_final.pdf

[12] Ketels, C- ja Sölvell, Ö. 2006. The Baltic Sea Region – Top of Europe in Global Competition. Baltic Development Forum State of the Region Report 2006



Dotted lines show EU25 performance.

Figure 3. Various "innovation index" development clusters in Europe[13].

The report from the *Baltic Development Forum* also argues:

- A high capacity for innovation remains one of the key competitive advantages of the Baltic Sea Region that will need to be further developed to keep pace with demands.
- Innovation and innovation policy is still one of the areas in which the different parts of the Baltic Sea Region differ the most.[14]

Differences in various measurement indicators when comparing leading countries with laggards vary from 2-3 times of difference of 60-70 times (Table 1). This indeed shows that countries are very different as far as the performance of national innovation systems is concerned: while Finland, Germany and

[13] European Innovation Scoreboard 2006, http://www.proinno-europe.eu/doc/EIS2006_final.pdf

[14] Ketels, C. and Sölvell, Ö. 2005.The Baltic Sea Region – Top of Europe in Global Competition, Baltic Development Forum, 2006. Ketels, C., Sölvell,Ö., Schwaag-Serger, S. and Hansson, E.W. State of the Region Report 2005. Competitiveness and Cooperation in the Baltic Sea Region.

Sweden have complex innovation systems in place that are high-technology oriented and have co-operative spirit embedded, then innovation systems in Estonia, Latvia, Lithuania and Poland are operating much more poorly, especially in knowledge creation and intellectual property.

Table 1. Countries' performance in European Innovation Scoreboard 2006

	SII	Innovation drivers	Know ledge creation	Innovation & Entrepreneurship	Applications	Intellectual property
EU25	0,45	0,46	0,53	0,41	0,52	0,36
EU15	0,50	0,49	0,60	0,45	0,60	0,42
DE	0,59	0,40	0,62	0,54	**0,69**	**0,72**
EE	0,34	0,51	**0,11**	0,61	0,38	0,03
FI	0,68	**0,81**	**0,75**	**0,62**	**0,62**	**0,62**
LT	0,27	0,49	0,22	**0,42**	**0,19**	**0,01**
LV	0,22	**0,35**	**0,17**	0,46	**0,10**	**0,02**
PL	0,22	**0,32**	0,24	**0,22**	0,31	0,03
SE	0,73	**0,80**	**0,81**	**0,81**	0,60	0,61

There are also various shared challenges rising in most of the regions in the VBN macro-region. These include the ageing of population, a shift of economic power from Europe to other macro regions, increasing competition over talent not only with European core regions but other parts of the globe as well. Another factor that affects especially some of the partner regions is the increasing concentration of economic activities within countries to capital regions and other strong growth poles.

2.3 Innovation systems in the VBN InnoReg regions

Finland, Germany and Sweden 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 are concentrated 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 less developed.[15]

[15] Such differences between the innovation leaders and catching-up regions can be observed on the EU level as well. See, for example, Erik S. Reinert and Rainer Kattel, The Qualitative Shift in European Integration: Towards Permanent Wage Pressures and a 'Latin Americanisation' of Europe?, PRAXIS Working Paper 17, October 2004, 18, http://www.praxis.ee/data/WP_17_20043.pdf.

Still, some of the regions involved in the VBN project might outperform national averages. The Tampere region in Finland is rather 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 stronger industrial sector, are national centres of higher education and R&D, and do have several innovation support structures in place. Also Middle Mecklenburg Rostock (Germany) fares relatively weakly by national standards. The Brandenburg region in Germany has relatively strong public R&D capacity but at the same time is behind the national average in several other factors. Podlaskie voivodeship (Poland) is in a weaker position as it has a very high rate of employment in agriculture and a relatively high unemployment rate.[16]

The regional differences are quite extensive among partner regions. Although the statistics used by Eurostat are quite general and do not give detailed information about each VBN partner region, they provide a general idea of the innovation performance of each region.

Table 2. EIS 2006 key indicators and performance of VBN InnoReg partner regions[17]

Relative to EU	HRSTC	LLL	MHTMAN	HTSER	PUBRD	BERD	PATENT*
Brandenburg	145	74	65	75	155	46	58
Estonia	113	86	61	93	70	9	4
Latvia	79	97	9	74	48	8	4
Lithuania	145	37	45	72	81	1	0
Länsi-Suomi**	149	221	126	112	123	213	249
Mecklenburg-Vorpommern***	109	53	54	88	136	9	24
Podlaskie	69	62	45	24	--	--	2
Övre Norrland****	147	298	72	132	--	78	153

(HRSTC = Human Resources in Science and Technology; LLL = Life Long Learning; MHTMAN = Medium and High Tech Manufacturing; HTSER = Human Resources in Science and Technology; PUBRD = Public R&D Expenditure; BERD = PUBRD = Private R&D Expenditure, PATENT = Patents. See detailed definition of indicators in Appendix 3.
* Numbers vary greatly each year in some countries like Lithuania
** Länsi-Suomi (West Finland) Includes Tampere and South Ostrobothnia regions
*** Mecklenburg-Vorpommern includes Middle Mecklenburg and Rostock
**** Övre Norrland includes Umeå region

[16] See WP1 RIS analysis reports for respective regions in www.baltic.org/vbn.

[17] The most recent data used in EIS 2006. HRSTC = Human Resources in Science and Technology – Core (% of population); LLL = Participation in life-long learning per 100 population aged 25-64); MHTMAN = Employment in medium-high and high-tech manufacturing (% of total workforce); HTSER = Employment in high-tech services (% of total workforce); PUBRD = Public R&D expenditures (% of GDP); BERD = Business R&D expenditures (% of GDP); PATENT = EPO patents per million population.

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

Brandenburg (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 predominantly 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 on a high level with around 23% people unemployed in Middle Mecklenburg Rostock region. The region enjoys a high number of academics per capita and relatively high investments and 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 it the strongest technology-based regional innovation system in Lithuania. Although currently the dominant industrial sectors in Kaunas are textile and light industry, there is a considerable potential for innovation-based development.

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.

Trailing regions

Podlaskie (Poland): Compared with other regions under focus, Podlaskie voivodeship has a high rate of employment in agriculture (37.4%) and related industries – food production and processing (dairy, meat, fruit and vegetable, brewing and spirit industry) – dominate. Unemployment rate is 13.3% (2006), which is a slightly below the average in Poland. Strong sectors in the region are food, wood and various light industries.

The authors admit that joint activities for transnational cooperation in the field of innovation promotion are often easier to propose for regions whose innovation systems and policies share similar characteristics and are thus more probable to result with win-win relationship. Within the VBN zone such options are relatively limited as regions are of very different development levels.

On the other hand, particularly catching-up regions like Podlaskie 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 Key challenges and development needs

Based on regional analysis and information gathering during the strategy process, a great number of development challenges have identified as potential fields for collaborative effort. Some of the challenges are shared by all regions but other challenges only by some of the regions.

3.1 The availability of human resources

Human resources are 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 and quite extensive higher education in several regions, several 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 tomorrows needs
- Ageing of population
- Employment of older people
- Development of life long 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 finish schools in some regions

3.2 Developing bridges between education, science and economy

Basic education and science infrastructure is relatively developed in most of the VBN regions with a good variety of educational and R&D institutions present. However, there are many challenges in getting most out of these institutions. Universities tend to be rather distant from the problems of the private sector and the regional economy and sometimes and 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 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

3.3 How to support business development in regions

In business and private sector innovation there are also various issues that concern all or several of the VBN partner regions. 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. Some of the most 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

3.4 How to improve capabilities and resources for regional innovation support

VBN zone faces also 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, VBN partner regions have several challenges ahead in order to foster the competitiveness of their regions and the VBN zone 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

4 Expectations on transnational networking in innovation promotion

4.1 General scope of collaboration

VBN InnoReg partner regions have different industrial and knowledge creation profiles and they are at different levels in developing the RIS. However, they share similar challenges in promoting innovations to ensure sustainable economic performance, industrial competitiveness and employment in the future. While networks and interdependencies between regions and their actors are increasing, transnational cooperation requires shared concepts, measures and activities.

Experts interviewed indicated that as regions are on very different developmental levels, the strategies for achieving common goals (e.g. FDI attraction, policy lobbying, brand building) and joint governance of innovation systems do not seem to be realistic in the short-run or medium-run perspective. As one of the experts argued: "…the interests are so different and so are our capacities to develop and implement innovation policies". Instead, more modest targets and short term milestones should be pursued.

Also, many of the challenges the regions are facing are of national nature and addressable (mainly) with national policies and by the central government (e.g. the need to modify the existing education system, issues related to the ageing of population). As a result, regions lack the mandate and resources for the implementation of several innovation policy instruments. Also, all experts interviewed indicated that both human and financial resources for transnational co-operation are limited or very limited. This means that a joint development approach needs to have realistic targets for activities.

At the same time, the weak resources emphasize the need to join forces to make more out of the limited resources and to gather these resources from European resources. VBN network can act as a tool for launching joint projects with EU funding, for example. Some partners saw the VBN network itself as a good instrument for getting much needed extra resources to internationalisation efforts.

It was also argued that the selection of the VBN partner regions is somehow artificial and in many cases does not reflect the geographic, economic, cultural and social patterns in the regions.[18] In some circumstances and fields

[18] There are some regions, though, that do have long-term relationships with each other, and e.g. Tartu and Tampere share a friendship agreement already since 1993.

some experts suggested co-operating rather with Asian countries and/or USA. While this is definitely true for some specific industries and scientific fields, in many other areas, collaboration within VBN zone was seen feasible and even preferable. Some experts stressed the fact that building up networks takes a lot of time and resources so that intermediary organisations can only handle a limited set of interactions at the time.

It is therefore more efficient to exchange information and initiate joint projects with *an established network* of partners first and only lean on new co-operation partnerships if that is necessary. A few experts also argued that despite differing economic patterns and development stages of the innovation systems in the partner regions the shared cultural background makes it easier to collaborate with regions in the VBN zone rather than with regions in Southern Europe for example. However, as many internationalisation-oriented activities of innovation system support structures covered are project-based and funding-driven, there seemed to be an interest to "leave all doors open" (including for other possible partnering regions).

Several project partners seemed to prefer less ambitious and loose project-based bilateral co-operation that might have some larger goals in mind (e.g. cluster development, university collaboration). This is also confirmed by the fact that even regions with long-term positive relationships with each other have not moved towards the implementation of more proactive and systematic innovation promotion measures.

However, this situation can also be seen as a result of limited resources or lack of shared frameworks and determination. This can be seen in the arguments of some partners, who see that in addition to bilateral project based collaboration and information exchange *a more focused strategic collaboration* is preferable in the future to make collaboration and development efforts more consistent. It was discussed that specific themes and more regular and organised knowledge exchange is possible in addition to more strategic partnerships with some specific initiatives.

It was also discussed that more organisations should be included in the network so that all *different sectors* in the innovation system (governance, research and education, business) could be represented in the collaboration. Quite a few partners see that one of the key challenges in the current network is that partner organisations have different mandates and needs and this makes deeper and more focused collaboration difficult. It would therefore be advisable to have organisations presenting different spheres included in the network so that various theme specific development issues could be better addressed. Partners could also more easily exchange good practices with organisations that have similar tasks and responsibilities.

4.2 Suggestions on potential activities to be promoted in collaboration

Competence building (provision of education and training, creation of human capital, production and reproduction of skills, individual learning) is one of the knowledge inputs to innovation and an area that is highly relevant to regional economies. All experts interviewed indicated that increasing of absorptive capacities of the companies is perhaps the most important challenge and a potential area for co-operation.

It was mentioned several times both in interviews as well as strategic documents that to improve the situation *curricula of universities as well as vocation education establishments should be developed* in strong cooperation with private sector employers.[19] There are various good examples from some of the more developed regions in how this issue has been tackled.

Another shortcoming of the education provided today consists in the weakness of the *practical training system.* Companies generally lack interest and an immediate need to hire a person for a couple of weeks/months and to train him or her – that would mean generally finding simple work for apprentices and wasting time on supervision. In principle, practical training currently constitutes an additional risk for companies, while it also fails to add much to students.[20] While creating a system where that risk would be hedged from the point of view of both students and companies, all experts interviewed indicated interest in a possibility of students doing their *practical trainings in companies abroad*. Incentives must be created for foreign companies to participate in such systems, though. *Short-term apprenticeship* in Nordic companies could also be used for adult education as well as life-long learning is rather modest in the Baltic countries and Poland.[21]

It was also argued that *courses related to innovation management (on company level) and technology governance (policy-level)* are not generally available in the region, but a clear need for such programs exists. There were also other measures proposed (e.g. students exchange), which already have instruments on national and European levels existing.

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[19] For the related discussion in the case of Estonian ICT education, see Rainer Kattel and Tarmo Kalvet, Knowledge-based Economy and ICT-Related Education: Overview of the Current Situation and Challenges for the Education System. Tallinn: PRAXIS Center for Policy Studies, 2006.

[20] Ibid.

[21] There is, for example, NordProLink - Nordic Professional Links program of the Nordic Council of Ministers. Short-term apprenticeship in Nordic SMEs is supported for employees of SMEs. In designing related instrument brief impact assessment might be relevant.

Considering that research and development (R&D) are today truly cross-border activities, the *provision of R&D* – creating new knowledge, primarily in natural sciences and engineering – can be one of the areas for joint activities.

Although it was also argued by one expert that "the key development need is the improvement of relations between scientists and business companies via the improvement of skills of scientists and increasing the number of scientists" other experts interviewed were more emphasizing companies' absorptive capacities issues.

The *mobility of researchers* was also considered as important by a few experts, but there are various support instruments already available. Centres of excellence might be situated out of the partner regions and therefore this topic should be tightly connected with specific technologies and concentrate in *strengthening existing scientific collaboration* rather than trying to build interaction between research groups and R&D institutes from scratch.

One of the typical cross-border partnership initiatives is related to the elaboration of *joint R&D programmes* that target priority areas for investment that have implications for the participating regions. This includes also opening up of existing R&D funding schemes for foreign partners. There are certainly many areas where already today challenges are rather common (e.g. energy and environment issues) or will be so tomorrow (e.g. nanotechnology research) and stronger R&D co-operation can contribute to the development of the participating regions, including realisation of commercial opportunities and bringing societal benefits for communities. This process should bring together leaders from government, academia, industry and not-for-profit organisations, but it has to be driven by the central government.

Within innovation systems there have to be *support organisations* (e.g. public agencies for enhancing entrepreneurship) as well as *supportive institutions*[22] (e.g. IPR laws, tax laws). Today Finnish innovation support organisations serve as an example for several countries and have brought up discussions about the transferability of the Finnish model for them. However, it is well know in the innovation research that institutions like norms, habits, and rules matter and thus immediate policy transfer is impossible – "Borrowing a program that is effective elsewhere is no guarantee of success"[23] – and one should instead use benchmarking, best practice, and lesson-drawing. The history of economic policy teaches us indeed that industrial and innovation policies emerge often

[22] Institutions mean sets of common habits, norms, routines, established practices, rules, or laws that regulate the relations and interactions between individuals, groups, and organizations.

[23] Richard Rose, Lesson-Drawing in Public Policy. A Guide to Learning across Time and Space. Chatham, NJ: Chatham House, 1993, ix.

through processes of emulation and lesson-drawing.[24] While the legislative environment, for example, is nation-specific (or sometimes provided centrally for the whole EU), there is a space for lesson-drawing.

As the partner regions are on very different development level as far as organisations and institutions are concerned, all experts interviewed indicated very great interest towards *lesson-drawing from the Nordic countries*. Activities proposed were carrying out of studies and analyses as well as seminars and study visits to look at legislation and effective and efficient policy instruments used in Nordic countries, and discussion of their transferability. Although basic innovation awareness currently exists in all regions, it is sometimes too linear and simplistic; thus wider dissemination of complex approaches used by Nordic countries might be relevant as well to increase awareness among politicians and top civil servants.

The lesson drawing is, however, not just a process from more developed regional innovation systems to less developed ones. This is particularly a case with specific areas of innovation support activity. In almost every region, some specific innovation support approaches, projects or instruments have been developed that can act as an example for some other regions.

One practical tool brought out in the discussions was *expert visits* from other regions to support the development of specific organisations or innovation support services. This could give hands on support for the partners in developing their innovation support mechanisms. Another practical proposal for more focused knowledge exchange was to construct each joint network event on the activities of a single region (the host region) and by this way get a more complete and in-depth understanding of the innovation support activities and good practices in each partner region. Yet another proposal was to introduce specific and more focused topics and bring in experts in these fields together (e.g. university technology transfer, seed funding experts, incubator managers)

Although *networking* takes place to a large extent through markets, quite a few partners proposed that co-operation networks between companies and industry clusters could be facilitated that could lead to learning between different organizations and alliance building. Activities proposed were *company missions*, *brokerage events, dissemination of partnership searches*, etc.[25]

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[24] Erik S. Reinert. How Rich Countries Got Rich and Why Poor Countries Stay Poor, London: Constable & Robinson, 2007.

[25] One concrete example provided was: "The improvement of awareness about companies' need in the context of product development: groups of 2-3 persons from different countries are placed in one hosting organisation in order to acknowledge with practical processes of product and innovation development, to know real need of company. There could be up to 10 such groups. After that, groups gives presentations about the impressions, the conclusions about companies' needs are produced, proposals also."

It was also emphasized by several partners that the development activities in promoting innovation networks and industry clusters should have an emphasis on *SMEs* and *low-tech* industries. Most of the innovation policy measures in Europe have concentrated on high technology sectors and on commercializing of university research[26]. At the same time the number R&D-intensive companies is very small while innovation barriers to other companies are very high. While the facilitation of innovation in high-technology sectors is important, a key focus could be placed on the one hand to the so-called high-growth companies that might not be in high-technology sectors and on the other hand on SMEs, who need innovation support activities more than large multinational corporations (MNCs).

Some experts interviewed were confident that companies have already co-operation networks existing and/or additional partners needed might not be available from the VBN partner regions; thus such brokerage events are not prioritized. At the same time, others argued that especially SMEs often have difficulties (or lack of interest) in establishing international co-operation networks and it is worthwhile to support brokerage for SMEs in the regions, where the partners have existing contacts.

Joint activities related to *financing* were not prioritized very highly, although the availability of (venture) capital is more limited in regions under consideration and there might be projects in need of additional capital and know-how.

Other activities related to commercialization of knowledge and its adoption (including provision of *consultancy services* of relevance for innovation, technology transfer, commercial information, and legal advice) were also mentioned due to the lack or weakness of, for example, IPR-related consultancy organisations in the regions. *Incubating activities* (e.g. providing access to facilities and needed services) are also local activities by nature and therefore they are best developed locally; however, transnational co-operation was mentioned again in the context of learning from the experience of more advanced incubators in the service provision.

Another important aspect is related to the *formation of new product markets* and could in the current context be related to support to exporting companies. However, all regions are already part of the EU and there are no very specific new services needed in this field. However, the exchange of information and good practices in developing existing instruments and services for supporting market access and internationalisation were seen as important.

[26] Slavo Radosevic and Alasdair Reid, Innovation Policy for a Knowledge-based Economy in Central and Eastern Europe: Driver of Growth or New Layer of Bureaucracy? In: Krzysztof Piech and Slavo Radosevic (eds), The Knowledge-Based Economy in Central and East European Countries; Countries and Industries in a Process of Change, pp. 295-313, 2006.

In summary, based on joint or individual development challenges, the partners have identified several themes and activities that could be promoted jointly by the VBN network in the future. The main themes and activities raised out in discussions and interviews are listed shortly as follows:

Information exchange and lesson-drawing

- Organised and periodic study tours
- Training projects related to innovation support activities
- Studies, regular benchmarking, analyses
- Partner meetings
- Theme specific meetings
- Expert visits

Good practices and joint projects in developing existing services and topics

- Venture capital
- Knowledge transfer between universities, research institutes and companies
- Consultancy services related to commercialisation of knowledge
- Mobility of researchers
- Joint R&D programmes
- Education system development
- Curricula development
- Internship system
- Courses related to innovation management and technology governance
- Tools for supporting innovation in low technology industries
- Tools for supporting innovations in SMEs

Good practices and joint projects to establish innovation support tools and services

- Euro-offices in science parks
- Investors café
- Development of innovation support tools to promote start-ups
- Joint investment schemes - funding for business companies

Continuous innovation support activities

- Awareness raising projects and activities (e.g. innovation issues, innovation policy, open source ideology)
- Development of collaboration and networking in selected key areas (industry clusters, science and technology)
- Analysis of best practices and transfer of them to other regions

In a feedback survey the partners were asked to assess the relevance of the suggested activities that might be promoted via the VBN network, and which of them would be most important to their regions or the organisations they present. The most popular tools were:

- Analysis of best practices and transfer of them to other regions (average grade 4.7 out of 5);
- Tools for supporting innovations in SMEs (4.0);
- Partner meetings (4.0);
- Theme specific meetings (3.9);
- Transferring knowledge between universities and research institutes and companies (3.9);
- Development of collaboration and networking in selected key areas (industry clusters, science and technology) (3.8);
- Organised and periodic study tours (3.7);
- Joint R&D programmes (3.7);
- Tools for supporting innovation in low technology industries (3.7);
- Development of innovation support tools to promote start-ups (3.7);
- Training projects related to innovation support activities (3.6);
- Expert visits (3.6);
- Mobility of researchers (3.6)
- Awareness raising projects and activities (e.g. innovation issues, innovation policy, open source ideology) (3.5);

The measures that received the weakest support were:

- Euro-offices in science parks (2.0);
- Investors café (2.1);
- Education system development (2.3).

It is notable, however, that only the measure 'Analysis of best practices and transfer of them to other regions' received strong support from all regions reflecting the belief of all regions having probably something to learn from each other. All the other measures proposed did receive different support from different regions. Some answers were dependent on the development level of regions. For example, 'Consultancy services related to commercialisation of knowledge' received relatively lower support from the developed regions (median value 3), while the interest of the new member states was very high (median value 5). This also applies to 'Transferring knowledge between universities and research institutes and companies' (respective median values 3 and 5). For the 'Mobility of researchers' the same trend can be observed (although median values differ less; 4 and 5 respectively). This probably reflects that relevant support structures are well functioning in the developed regions, while lacking in the regions from the new member states. 'Curricula development'

is also considered more important for regions from the new member states, although improvement of 'Internship system' received more support from the developed regions, interestingly enough. For other measures the responses did not depend on the level of region's development.

4.3 Suggestions for key economic sectors for collaboration

As part of the process for defining most potential fields of activity for innovation promotion the partners in the current VBN InnoReg network were asked about which economic sectors would be most important for collaborative activities. The classification of various sectors can be found from Annex 4.

When looking at the list of industries the VBN network project should focus according to the experts, only two economic activities – 'Manufacture of machinery and equipment' and 'Manufacture of electrical and optical equipment' were considered as important or very important by all regions. 'Manufacture of wood and wood products' and 'Manufacture of pulp, paper and paper products; publishing and printing' were followed closely. There were several industries that received relatively more emphasis from the regions in the new EU member states. Those were 'Manufacture of transport equipment', 'Construction', 'Manufacture of textiles and textile products', 'Manufacture of leather and leather products' and 'Manufacture of coke, refined petroleum products and nuclear fuel' reflecting to differences in industrial structures. 'Transport, storage and communication' was at the same time prioritized by the developed regions.

As a result the key sectors relevant to all actors are:

- Manufacture of machinery and equipment
- Manufacture of electrical and optical equipment

Secondary sectors for collaboration are:

- Manufacture of basic metals and fabricated metal products
- Manufacture of chemicals, chemical products and man-made fibres

Key sectors where smaller sub-networks of some partner regions could be established were:

- Manufacture of wood and wood products
- Transport, storage and communication

4.4 Organising the network to support joint approach in innovation promotion

4.4.1 Key questions in organising network activities for innovation

Several alternatives and possibilities can be found in building a joint approach to innovation support activities in the VBN network. The basic questions for the joint approach are about which **themes** and topics are preferred in the VBN network activities, what the level of **intensity** (loose – strategic) of the collaboration around these themes is going to be and to how far the partners are ready to go to consolidate and **institutionalise** VBN network activities. Some of the key choices to be made when the partners define future strategy for collaboration in innovation support activities are:

- Is the network aiming to build up larger **thematic entities** or is there a broader based approach to also support smaller projects and work packages in all relevant topics that emerge during collaboration,
- Related to the previous issue is a more general question of how **strategic** is the **collaboration** between partners going to be – does VBN co-operation have strategic long term objectives that guide the planning and development activities in each region or is collaboration more based on specific and individual issues,
- How much the regions prefer to concentrate on the **large scale (focused) joint projects** with selected key themes or do the partners prefer to also support small scale projects and initiatives and new promising initiatives,
- In terms of collaboration to support business environment, do the partners prefer to concentrate on **top expertise and high technology** fields or to what extent there is a need to concentrate also on low technology and emerging industries,
- How much are the VBN co-operative activities concentrating on large scale **system level** topics such as education, innovation strategies, absorptive capacity in SMEs or how much is the collaboration concentrating in operational and organisation level topics such as innovation services, technology transfer and financing of R&D,
- How much is the network going to operate as a general actor that develops all innovation related topics as a whole and how much is it going to encourage sector or theme specific **sub-networks** to emerge,
- How far are the partners willing to invest and commit to make VBN **core network activities** or selected functions (e.g. exchange of good practices, information databases) **established** and/or **long-lasting** or

is a loose and informal interaction preferred in the future,
- What is the role of more extensive VBN **network wide** operations in relation to **bilateral** collaboration between partners
- How much is the network going work with **current line-up** or how much is it planning to actively attract new regions or new sector specific actors from existing regions to join the network or individual instruments

4.4.2 Alternative scenarios for transnational networks for innovation

One of the key tasks of developing a strategic development concept has been to construct alternative development scenarios for the future VBN joint approach in the field of innovation promotion. The current situation, with a core network project that promotes collaboration and works to define shared key concepts and indicators for measurement and comparison, was not presented as an option although continuing current networking activity with a similar kind of follow-up would be an option.

Scenario 1: Loose project based collaboration

VBN network acts as an informal set of contacts where information is exchanged on the irregular basis. No central co-ordination or network project such as VBN InnoReg is started in the future. Instead, collaboration is based on bilateral/regional contacts with partners in the current VBN network in the field of information exchange, study visits and specific joint projects wit two or more partners.

In the long term the VBN network in its current form will gradually disappear but bilateral collaboration between some partners and around specific topics will continue.

Scenario 2: Core network activity with ad-hoc project collaboration

Core network activities such as information exchange, analysis, benchmarking and education of innovation related development topics are maintained by launching follow-up network projects similar to VBN InnoReg. More focused topics related to innovation services and development schemes are also discussed and good practices are exchanged.

In addition to core network activities, casual joint projects are launched by two or several network partners to tackle specific issues of mutual interest. These may include, amongst others, pilot actions to transfer good practices in innovation services, training or cluster development. However, these joint activities are based more on current interests and needs of each partner rather than a long term vision or strategic development objectives.

In the long term collaboration with some partner organisations will get more strategic elements. However, most of the interaction stays at more informal and ad-hoc level and the main value-added of the VBN network will be an established pool of potential partners for new activities.

Scenario 3: Core network project with strategic collaboration

Core network activities such as information exchange, analysis, benchmarking and education of innovation related development topics are maintained by launching network projects similar to VBN InnoReg. More focused topics related to innovation services and development schemes are also discussed and good practices are exchanged in a systematic way. Topics in information exchange are focused on specific development themes that correspond to the key challenges agreed by the network partners.

In addition to support core network activities, a set of joint development projects and actions is launched by all partners or sub-group of partners, depending on the topic. Instead of ad-hoc creation of new a joint development project a shared vision or development strategy has been prepared to steer the activities to meet the long-term objectives. Partners are committed to long-term participation by reserving resources for innovation promotion activities through the VBN network.

In long terms specific development activities and instruments may also take a more permanent form. A more strategic form of collaboration form around specific topics between some partner regions but at the same time some other regions with less interest and commitment will continue with more casual interaction or drop out of the network altogether.

Scenario 4: Permanent network office with strategic collaboration

The core network activities not only continue as a follow-up project but may also get concrete more permanent organisation forms. Some or all VBN network regions invest resources in running joint services, think tanks, cluster organisations or instruments such as researcher mobility schemes or training schemes. In the long term, the network may also have a more permanent secretariat to prepare and manage information exchange activities, study visits and various development projects. Under the core activity, various sub networks appear to develop more sector specific issues.

To carry out various activities agreed in the network various development projects are organised. Some of these projects are bilateral development or knowledge exchange projects between two or more partners. However, quite a few of the projects cover most or all of the members and are aimed at developing long term strategic objectives agreed in the network.

In the long term, the interaction will receive more permanent and formal forms and the set of partners will become more stable. Some current members may drop out but some new member regions may join the network. A joint image will be developed around the network.

The scenarios vary in their depth and ambition and are simplifications of two key dimensions. The first key dimension is relates to how intense and established the network organisation is. The second dimension describes how strongly the various joint projects and schemes are tied to the general strategic objectives of the network.

Table 3. The intensity of network activity and depth of operational collaboration in each scenario. (+ = loose, ++ = strategic, +++ = institutionalised)

Scenario	Intensity of VBN network activity	Strategic approach to operational collabortion
S1: Loose project based collaboration	+	+
S2: Core network activity with ad-hoc project collaboration	++	+
S3: Core network project with strategic collaboration	++	++
S4: Network office with strategic collaboration	+++	++

The main idea of the scenarios is to provide a lens for various development options and highlight choices that have to be made before the decisions of the objectives and organisation of the joint approach can be made.

4.4.3 Partner views on organising the joint activities

When the representatives of the VBN InnoReg partner regions were asked to evaluate the most preferred forms of collaboration in the future it came up that today's "soft" collaboration (benchmarking, exchange of information and good practices etc.) is not considered enough and should be extended with some additional selected joint focus areas (8 respondents out of 10 were convinced of that). The majority were also convinced that the network should keep a broad based approach to support projects in all innovation topics that are relevant to the partners, but also should concentrate resources and activities on a few larger thematic entities.

As partners' interests seem to be different, 9 experts see that all partners should be involved in basic activities, but some activities should be carried out in smaller sub-networks. Also, future activities were seen as both network wide operations as well as bilateral collaboration between some individual

partners. That could indicate that there are already smaller sub-networks operational within the current VBN network.

As the number of stakeholders that influence innovation processes on regional levels is rather wide (although the influence of each individual organisation might not be that big), it was also strongly suggested (9 out of 10) that the current network should be enlarged, e.g. with ministries and governmental agencies, universities, professional associations and companies (especially SMEs with higher barriers in access to innovations), although it was mentioned that enlargement should be discussed in parallel with the network content. This is inevitable as innovation processes and stakeholders are different in case of different sectors (in case of science-intensive industries, for example, the role of universities is very big). At the same time the network has to be of manageable size.

The same attitude towards the enlargement applies when looking at the ideas regarding regional coverage: according to 8 experts the VBN network should actively attract new regions to join the network, although partners from the new member states are more reluctant to this (2 opposing votes came from them). Additional regions proposed included regions from the Baltic countries, Denmark, Norway, Poland, Sweden, or new or future EU-countries, although several experts mentioned that the extensions of the network depends on the focus of future network activities.

The strategic importance of VBN network in the development of innovation activities in one's region was mainly acknowledged. Although there were some experts that were not so convinced, the median value was relatively high '4' reflecting that both developed as well as less developed regions see the benefits. At the same time, however, developed regions are generally ready to contribute more resources to the network development, while less developed regions can generally stay only on today's level.

Regarding the management of the VBN network, five experts preferred 'Core network project with strategic collaboration (Scenario 3), two experts preferred 'Permanent network secretariat with strategic collaboration' and another two 'Core network activity with ad-hoc project based collaboration'. Those who preferred the core network project with strategic collaboration also commented that there is a good cooperation of several years with stable partners and an operating network that can be utilized to build up the further cooperation on this basis. Such cooperation would be better than a spontaneous cooperation to carry out long-term projects for the purposeful development of the strengths (one must know the strengths), but not so cost-intensively and inflexibly as an administrative line with a permanent office. It was mentioned, still, that scenarios 3 or 4 are the most optimistic if there is well developed strategy and clear vision of cooperation; but, it is much better to put higher aims and then more might me achieved.

5 Strategic development plan for innovation promotion

5.1 General framework for joint approach in developing innovation activities

The proposed vision and strategic development plan for the joint approach in innovation promotion has been prepared based on the analysis of regional development challenges in innovation promotion in the VBN macro-region.

Vision for 2017

The regions around the Baltic Sea have attractive, competitive and complementary regional innovation environments. There is an active collaboration between the regions, which is based on a shared view of development challenges and a joint focus to improve competitiveness, innovation and employment and thus the quality of life of people living in the region.

Based on the vision, the emphasis in the joint approach is to develop the competitiveness of both individual regions and the Baltic Sea region as a whole by promoting the creation of joint development view and joint activities. The question is not so much about the strengthening of regional innovation systems *per se* but to develop competitive innovation environments with a shared development view and by transnational collaboration.

A shared development view is an important factor in making a joint approach workable. A shared development view may have a major influence on practical work, as it guides, among other things, the direction of resources and various networks. It may also cause tensions and even conflicts, as all actors do not necessarily share the same view. This may cause not only the perceptions of the regional development network itself and the roles of its members but also the objectives and strategies to be very different from each other[27].

[27] Sotarauta, M. & Viljamaa, K. 2003. Leadership and Management in the Development of Regional Innovation Environments. Teoksessa Riukulehto, S. (Ed.) New Technologies and Regional Development. University of Helsinki, Seinäjoki Institute for Rural Research and Training, Series A 6. pp. 57-80. Seinäjoki.

The strategic objectives for the joint approach by 2017 are:

- To enlarge transnational collaboration in innovation issues between regions in the Baltic Sea region
- To offer regions an established and active development network that regions can utilise in innovation development issues
- To support development of innovation systems in the region by mutual information exchange, benchmarking and joint activities

These strategic objectives are based on the identified challenges and development needs that are shared by the regions in the VBN InnoReg network and the Baltic Sea region as a whole.

5.2 A shared framework for joint development activities

In order to achieve the strategic objectives for the joint approach in innovation promotion, we propose five key operational themes for the future collaboration. The proposed themes are as following:

1. Strengthening innovation governance in the regions
2. New innovation support services and service models
3. Capacity and willingness for SMEs to innovate, export and grow

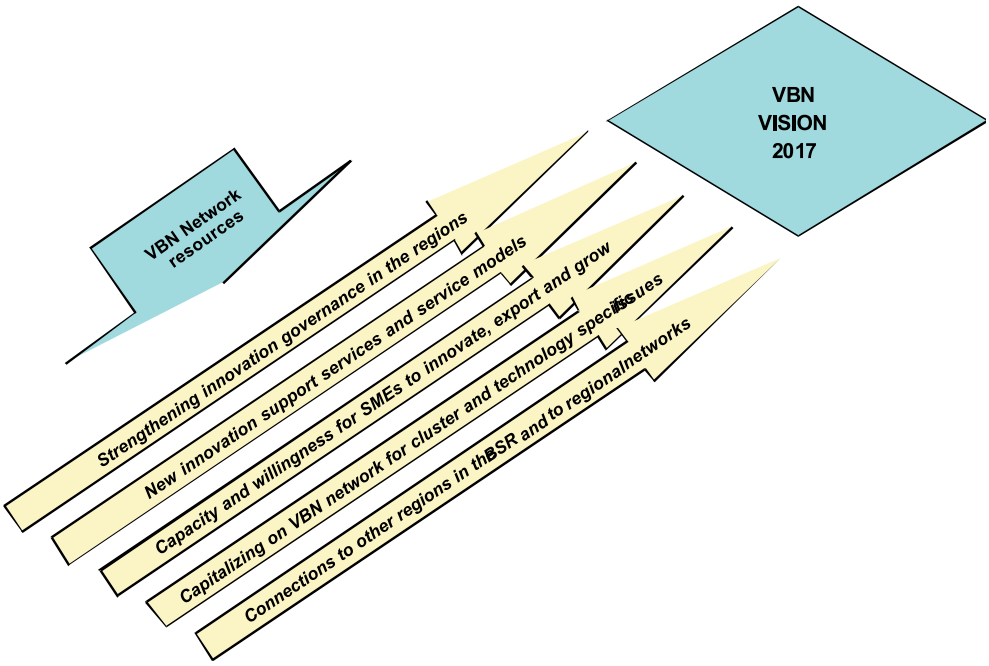

Figure 4. The key operational themes for the joint approach in innovation promotion

4. Capitalizing the VBN network for cluster and technology specific issues
5. The development of connections to other regions in the Baltic Sea area and other regional networks

These objectives support the local, regional and national measures to support innovation by introducing a new layer for collaboration but at the same time try to avoid unnecessary overlapping with already existing activities.

5.3 Proposal for joint activities in innovation promotion

The development themes and examples of activities under these themes are described in more detail below.

1. Strengthening innovation governance in the regions

The first key development objective is related to the development of innovation systems in the regions of the VBN macro-region. In practice this objective means that innovation approach will be adopted as one key horizontal theme in regional development in all regions. The joint approach in this field of development means that an organised collaboration to support exchange of information, the transfer of best practices and benchmarking tools will continue in the future. New specific tools such as organised study tours, dissemination of best practice models through specific projects, and various training projects to support the capacity and expertise of innovation development professionals in the regions, should be organised as part of the transnational networking.

Some of the broader objectives in making innovation development more systematic are:

- Development of shared models to make the development of innovation systems a persistent effort and an integral part of regional development in the VBN macro-region
- Development of models that support transnational collaboration in specific sub-fields of regional innovation systems that connects actors and resources in various regions in a meaningful way

2. New innovation support services and service models

One of the key issues in developing successful regional innovation systems is to create various intermediary organisations, innovation support instruments and services, and specialised development projects that support innovation activities in enterprises, support the accumulation of knowledge and exper-

tise, facilitate knowledge transfer between regional organisations, and increase regional collaboration between various actors. An organised method for sharing the experience of successful and established innovation services and tools can bring crucial value added in developing successful regional innovation systems. The key objectives for a joint approach to successfully introduce new and improved innovation support services in the regions are:

- Organised dissemination and utilisation of good innovation service models
- New services and practices are based on thorough pilot processes and benchmarking
- There is an established way to share specialised innovation services among regions
- The innovation systems in the regions cover all needed services and the innovation support system as a whole is organised efficiently in all regions

Examples and measures to develop new innovation and service models include:

- Transfer of good practices with specific services through study tours and pilot projects
- Identification of potential extra-regional providers of innovation support services
- Collaboration between regions to set up joint services for specific fields of know-how where it is not feasible to set up services in one region only

3. Capacity and willingness for SMEs to innovate, export and grow

The capability of the regional innovation systems to support the creation and growth of SMEs has been widely regarded as one of the most important challenges in the VBN macro-region. The development of support mechanisms is also a widely shared issue among regions and is therefore a reasonable target for joint activities.

SMEs often lack capabilities and resources for consistent innovation activity, which hinders their ability to compete and grow. Developing new and improved tools for analysing and mobilising innovation in SMEs is therefore of great importance.

SMEs are also increasingly looking for new markets and resources across national borders. However, they are confronted with numerous difficulties in the process, even when cross-border clustering occurs between countries belonging to the EU single market. Larger firms and especially MNCs have typically resources and competence to build their own international networks. However, for SMEs building networks to partner organisations in other re-

gions and other countries can prove to be problematic. An active transnational network can support this networking by building connections between business development organisations in each region and facilitate networking between enterprises through these connections.

Based on this emphasis on building innovation support for SMEs the operational objectives for joint approach are:

- Developing new and improved tools for analysing and mobilising innovation in SMEs with joint development projects, pilot activities and exchange of good practices.
- Setting up mechanisms and tools for partnering SMEs with partners in other regions

4. Capitalizing on VBN network for cluster and technology specific issues

One of the key possibilities for future collaboration in innovation promotion lies in the cluster and technology specific activities. Especially for SMEs, clustering is believed to offer unique opportunities to engage in the wide array of regional, national and transnational linkages between users and producers and between the knowledge producing sector (universities and R&D institutes) and the goods and services producing sectors of an economy.

To make this facilitation of networking and partnering it is feasible, at least in the early stages, to concentrate in building selected cluster and network specific networks between regions in the BSR area. This is a practical approach since the needs and specialisations among businesses are so varied that managing all industries and technologies is very difficult. The limited resources for networking also become fragmented unless certain key areas are selected.

Based on this approach of selective cluster and technology based collaboration the key operational objectives for joint approach in this development theme are:

- Creating a networking platform and specialised business infrastructure allowing the exchange of information and the management of joint research and projects between clusters
- Setting up cluster specific collaborative arrangements between two or more partner regions based on their regional industry cluster and strategic development objectives
- Facilitating network connections of established regional clusters and cluster organisations and this way support their internationalisation

5. The development of connections to other regions in the Baltic Sea area and to regional networks

One of the key questions in putting a joint approach for innovation promotion in use is the ability of the current core network to maintain the dynamic

of the network and to expand the collaboration to cover more organisations and regions in the Baltic Sea region.

The current network that has participated in VBN InnoReg project consists of partner organisations from several different spheres of activity. This has been both strength and a weakness for joint development activities. The strength in this kind of network is the multitude of approaches and competences the various organisations bring into the network. However, at the same time, the network partners have difficulties in deepening the collaboration in their own fields of interest as a relevant partner organisation is missing from other regions. It is therefore important to attract new partners from existing regions so that each region has specialised partner organisations e.g. from regional government, technology centres, universities and economic development offices participating in joint activities. There are basically two approaches to expand the organisational base of the network

- New partner organisations from existing partner regions are persuaded to join the network as formal partners for the future activities
- The existing partners strengthen intra-regional networks in innovation promotion and act as a hub and intermediary to these regional partner organisations in transnational collaboration

Both strategies can be used. The strength of the first approach is that it is easier to build direct connections to similar organisations in other regions when the new organisations are active members in the network. The second option is more viable in a way that it does not require more than one organisation to act as a formal member of the network, which is easier to accomplish when new networking projects are established. However, this approach requires that the main partners from each region have good connections to their intra-regional partners and are able to link these organisations to their specialised partners in other regions.

5.4 Proposal for organising collaboration in the future

It is proposed that core network activities such as information exchange, analysis, benchmarking and education of innovation related development topics is maintained by innovation promotion related network projects similar to VBN InnoReg.

The main resources for the network activity would be financed by project funding with an umbrella co-ordination project and separate development projects under that umbrella. For the core network, funding instruments such as INTERREG will be very useful also in the future. However, more specific instruments could be used for key operational themes. European Commis-

sion has several instruments to develop and implement joint research and innovation programmes between Member States such as ERA-NET Plus scheme, new initiatives under FP7, and the CIP Business Innovation Support Scheme, which will draw on the PRO INNO initiative[28].

The current partner organisations should tie a regional network of key actors from their respective regions to transnational collaboration. To tie partners from various organisations using existing partners as "hubs" for the VBN network.

New regions are actively attracted to the network to enlarge the member base. The attraction of new regions is based both a) on the ability of the region to complete the existing network b) a motivated partner organisation with good contacts in the region c) the ability of network to provide value added for the region. The attraction of partner regions is best achieved through individual projects. The regional focus should be broadened to cover the whole Baltic sea region. Innovation issues are not directly connected to geographical limits of the VBN zone and therefore the existing network can also easily cover other neighbouring regions. However, limiting the network to Baltic Sea area makes sure that the network does not become too fragmented and that shared cultural and institutional background of the Baltic Sea region can be utilised.

It is also advisable to focus collaboration more on non-capital and less developed regions. Firstly, the capital cities and capital regions have already collaboration of their own. Secondly, the capital regions are typically the most developed regions in each country and therefore their challenges and development needs differ from most of the other regions around the Baltic Sea.

5.5 Monitoring and benchmarking innovation systems in the VBN macro-region

5.5.1 A framework for monitoring and benchmarking RIS development

Monitoring and evaluation is part of the policy cycle and information gained from measuring regional innovation system development should be fed back into the policy process to inform future policy development. It is important

[28] Particularly FP7 is a good instrument for the transnational collaborative projects, which associate public research and industry. Some other examples of specific instruments that can be used for transnational collaboration in innovation promotion are the Lifelong Learning Programme, LIFE+, EU Culture Programme (especially for cultural industries) and MEDIA 2007.

to receive information where regional innovation systems might be strong or weak and where subsequent intervention might be appropriate. Monitoring and benchmarking of regional innovation systems in the Baltic Sea region is important for:

- monitoring changes in the regional economies,
- monitoring change in the innovation system, and
- for making cross-regional comparisons with a set of jointly used indicators.

The basic dimensions for monitoring innovation in the regions are:

- The performance of the region
- The performance of institutions in the regional system of innovation
- The impact of innovation policies

The challenge in monitoring and benchmarking the development of regional innovation systems is that often there are not enough good indicators that could be used reliably in several countries and regions. The regions would like to monitor longer term trends against a group of key competitors, the outputs of innovation activity and their impact on growth and jobs and the interactions in the regional innovation system. However, the indicators often only measure short-term changes against regions with similar statistical datasets, the intensity of investment in R&D and survey data on innovation activity and sometimes some stocks and flows of resources. In practice this means that the performance of the region can often easily be measured but performance of institutions and policies remains less clear.

Based on the preliminary studies in the VBN InnoReg project there are numerous indicators and sources available for measuring economic development and the regional innovation system. The number of suggested indicators varies from less than dozen to more than 80 indicators[29]. However, there are several limitations and challenges for the use of these indicators. Firstly, several of the indicators are only available in some countries only in the national level. In most of the cases these indicators contain detailed information on the development at the regional level. Secondly, some of the indicators are not fully comparable across countries or regions. This means that several indicators that can be useful for monitoring the development of the regional innovation system and the regional economy are not usable for benchmarking. Thirdly, an indicator is practical only if data can be obtained timely and at reasonable cost. As a result, even though there are several good indicators available, not all of them are practical or feasible for monitoring the innovation development activities in the regions.

[29] The regions have been preparing their own set of indicators as a part of VBN InnoReg

For easily available and generally agreed indicators, the European Innovation Scoreboard (EIS) is a good starting point for finding comparable regional indicators. The indicators used in this survey are available in NUTS2 level and are mostly based on Eurostat data. This availability at one regional level typically means that the national statistical offices have collected this data in sub-national level and there is a great chance that the data is available also in a smaller regional level like NUTS3, which corresponds to the typical regional level used e.g. in Finland. The main problem for using EIS is that some indicators are updated infrequently and are therefore difficult to use for monitoring changes.

A more thorough approach has been presented in the report "Strategic Evaluation on Innovation & Knowledge in the Structural Funds 2007-13[30]". In the study a statistical analysis of 215 European regions was made and as a result four key factors were highlighted:

- Public knowledge
- Urban services
- Private technology
- Learning families

These key factors are based on a set of 15 indicators, which have proved to be workable in regional context (See Annex 5 for more in-depth definitions).

- Higher education (HRSTE)
- Knowledge workers (HRSTC, core)
- High-tech services employment
- Public R&D expenditures (HERD+GOVERD)
- Value-added share services
- Value-added share industry
- Employment government administration
- Population density
- High and Medium/high-tech manufacturing employment
- Value-added share agriculture
- Business R&D expenditures
- S&T workers (HRSTO, occupation)
- Participation in life-long learning
- Activity rate females

(See Annex 3 for further definitions of indicators)

[30] A report to the European Commission, prepared by Technopolis Belgium, in association with Ismeri Europa, Lacave, Allemand & Associés Consultants, Logotech and MERIT

These indicators do not measure the regional innovation system itself very accurately as they do not cover organisations and instruments nor interactions between these. However, they give an estimate of the input and output factors and their development. These indicators are also relatively easily available.

5.5.2 Proposal for monitoring and benchmarking RIS development

The proposal for monitoring the development of regional innovation systems in the VBN zone based on two tier approach. Firstly, a shared set of basic key indicators is used for benchmarking and comparison purposes. Secondly, an expanded specialised set of indicators is used in each region to support their own specific monitoring needs.

The specific steps for advancing monitoring and benchmarking system for regional innovation systems in the VBN macro-region are as following:[31]

- Selection of indicators, which characterise and explain the performance of a region in the field of innovation.
- Creation of a benchmarking database, which concerns the gathering of information on regional performance and the calculation of selected indicators for different regions.
- Production of the benchmarking data, which highlights the main statistics and graphs for the selected indicators (min, max, mean, mode, quartiles) and the position of the region in focus within the range of these statistics.
- Analysis and interpretation of statistics, which tries to find out the causes of the observed performance and the practices that are responsible for this performance.
- Suggestions for improvement - the benchmarking process concludes with the suggestion of measures, which should be taken to improve the innovation performance of a region.

The proposed approach is to define the performance of regional innovation systems from the framework of regional innovation capacity. In this approach the innovation capacity of the regional innovation system is based on several dimensions, which can all be measured individually. The figure below explains the basic dimensions of regional innovation capacity.

[31] Modified from Alasdair Reid. Innovating Regions in Europe. A presentation at the MLP Final Conference. Brussels, 13 October 2006

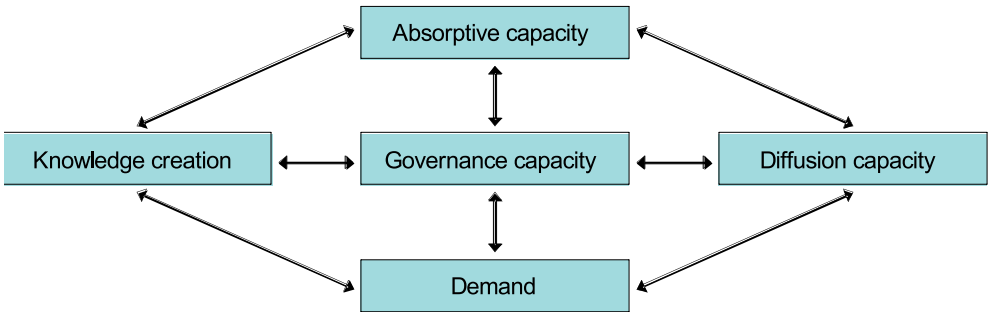

Figure 5. The key operational themes for the joint approach in innovation promotion[32]

Based on the above-mentioned approach the proposed set of indicators to measure the performance of regional innovation systems in the VBN macro-region are[33]:

Knowledge Creation

- R&D expenditures (% of GDP)
- R&D employees (Full time employed per 1000 employed)
- Concentration of patent inventors
- Concentration of publications in Life Sciences
- Concentration of publications in Nanosciences
- Concentration of publications in ICT

Absorptive Capacity

- R&D expenditures by firms (BERD; % of GDP)
- R&D expenditures for higher education (HERD; % of GDP)
- Population with tertiary education (% of 25-64 age class)
- Population with secondary education (% of 25-64 age class)
- Population with secondary or tertiary education (sum; % of 25-64 age class)
- Population with lifelong learning (% of 25-64 age class)
- Population participating in information society (% of households using World Wide Web)

[32] Adapted by Alasdair Reid from: Radosevic, Slavo (2004): 'A Two-Tier or Multi-Tier Europe?: Assessing the Innovation Capacities of Central and East European Countries in the Enlarged EU', Journal of Common Market Studies, Vol. 42, No. 3, pp. 641-66, September 2004.

[33] The list is adapted from on a study for identifying priorities for regional RTDI in the New Member States, which was carried out for DG Research by ISI Fraunhofer and MERIT with support of Technopolis (2004-5).

Diffusion Capacity

- Technology diffusion infrastructure
- Employment in high-tech services (%)
- Employment in manufacturing industries (%)
- Employment in agriculture (%)
- Enterprises participating in information society (% of firms using e-banking)

Demand

- GDP in Euro per capita
- Cumulated growth of GDP
- Unemployment rate (%)
- Population density (persons/km2)
- Change in population density

Governance capacity

- Participation to EU initiatives
- E-Government (% of firms using e-administration)
- Web-presence of regions (availability of website)

Annex 1. List of interviews

Kaili Ojamets, Tartu City Government, 25.5.2007

Sven Illing, Tartu Science Park, 29.5.2007

Juris Balodis, Latvian Technological Center (LTC), 29.5.2007

Marja-Riitta Mattila-Nurmi, Council of Tampere Region, 1.6.2007

Algimantas Venckus, Kaunas University of Technology, 1.6.2007

Tommi Ranta, Seinäjoki Technology Centre Ltd, 4.6.2007

Jens Unruh, ZAB – Brandenburg Economic Development Board, 7.6.2007

Pawel Piatkowski, University of Bialystok, 12.6.2007

Harald Knauer, Regional Planning Council Havelland-Fläming, 13.6.2007 (e-mail communication)

Annex 2. Glossary

Regional Innovation System

A concept to cover the set of institutions at the regional level that interact with each other and contribute to the innovation process. These may be formal organisations such as firms, universities, government departments and various intermediary organisations but also informal institutions such rules, norms, habits and legal conditions that affect the way innovation processes are carried out in regions.

VBN macro-region or VBN zone

An area covering all regions along the Via Baltica Nordica co-operation zone, originally defined in the Via Baltica Nordica development project. In broader perspective, VBN macro-region can also be seen to cover a broader development around the Baltic Sea and specifically the corridor ranging from northern Sweden through Finland and Baltic states to Poland and eastern Germany.

Via Baltica Nordica

Via Baltica Nordica is a co-operation zone project financed by the Baltic Sea Region Interreg III B programme 2002-2005. Idea is to develop the regions located at the corridor by means of transnational co-operation.

VBN InnoReg

Baltic Se Region Interreg III B project, that aims at Strengthening Via Baltica Nordica Macro-Region through Transnational Cooperation for Regional Innovation Promotion

European technology platforms (ETPs)

A framework for stakeholders, led by industry, to define research and development priorities, timeframes and action plans on a number of strategically important issues where achieving Europe's future growth, competitiveness and sustainability

ERA–NET

A scheme under EU 6th Framework programme to facilitate cooperation and coordination of research activities carried out at national or regional level in the Member States and Associated States

INNO nets

Coordination actions aiming at the establishment of innovation specific ERA-Nets under the EU initiative PROINNO

Annex 3. Definition of key EIS regional indicators

Human Resources in Science and Technology – Core (% of population)

Number of persons who have successfully completed education at the third level in a S&T field of study and who are employed in a S&T occupation

Participation in life-long learning per 100 population aged 25-64)

Number of persons involved in lifelong learning

Public R&D expenditures (% of GDP)

Difference between GERD (Gross domestic expenditure on R&D) and BERD (Business enterprise expenditure on R&D)

Business R&D expenditures (% of GDP)

All R&D expenditures in the business sector (BERD)

Employment in medium-high and high-tech manufacturing (% of total workforce)

Number of employed persons in the medium-high and high-tech manufacturing sectors. These include chemicals (NACE24), machinery (NACE29), office equipment (NACE30), electrical equipment (NACE31), telecommunications and related equipment (NACE32), precision instruments (NACE33), automobiles (NACE34) and aerospace and other transport (NACE35)

Employment in high-tech services (% of total workforce)

Number of employed persons in the high-tech services sectors. These include post and telecommunications (NACE64), information technology including software development (NACE72) and R&D services (NACE73)

EPO patents per million population

Number of patents applied for at the European Patent Office (EPO), by year of filing. The national distribution of the patent applications is assigned according to the address of the inventor

Annex 4. Classification of industry sectors

- Agriculture, hunting and forestry
- Fishing
- Mining and quarrying
- Manufacture of food products, beverages and tobacco
- Manufacture of textiles and textile products
- Manufacture of leather and leather products
- Manufacture of wood and wood products
- Manufacture of pulp, paper and paper products; publishing and printing
- Manufacture of coke, refined petroleum products and nuclear fuel
- Manufacture of chemicals, chemical products and man-made fibres
- Manufacture of rubber and plastic products
- Manufacture of other non-metallic mineral products
- Manufacture of basic metals and fabricated metal products
- Manufacture of machinery and equipment
- Manufacture of electrical and optical equipment
- Manufacture of transport equipment
- Electricity, gas and water supply
- Construction
- Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
- Hotels and restaurants
- Transport, storage and communication
- Financial intermediation
- Real estate, renting and business activities

Annex 5. Four key factors of innovation activity

Reduction of the dataset (215 EU-25 regions) into four factors by means of factor analysis in the report Strategic Evaluation on Innovation & Knowledge in the Structural Funds 2007-13

	The 4 factors			
	F1 'Public Knowlege'	F2 'Urban Services'	F3 'Private Technolgy'	F4 'Learning Families'
Higher education (HRSTE), 2003	.839	.151	.190	.184
Knowledge workers (HRSTC, core), 2003	.831	.164	.267	.327
High-tech services employment, 2003	.575	.367	.428	.323
Public R&D expenditures (HERD+GOVERD), 2002	.543	.431	.275	-.195
Value-added share services, 2002	.323	.869	.002	.121
Value-added share industry, 2002	-.265	-.814	.386	-.061
Employment government administration, 2003	-.217	.745	.124	-.175
Population density, 2002	.380	.402	.043	.038
High and Medium/high-tech manufacturing employment, 2003	-.073	-.331	.873	-.089
Value-added share agriculture, 2002	-.222	-.350	-.672	-.198
Business R&D expenditures, 2002	.335	-.050	.664	.267

Principal Component Analysis. Rotation Method: Equamax with Kaiser Normalization, a Rotation converged in 9 iterations. Main factor loadings are highlighted in bold. Source: MERIT, based on Eurostat data, mostly referring to 2002 or 2003

Based on the variable with the highest factor loadings we can characterise and interpret the four factors and give them a short symbolic name:

Public Knowledge (F1)

Human resources in Science and Technology (education as well as core) combined with public R&D expenditures and employment in knowledge intensive services is the most important or common factor hidden in the dataset. The most important variables in Public Knowledge are the education and human resource variables (HR S&T education and core).

Urban Services (F2)

This factor contains information on the structure of the economy. It is well known that industrial economies are quite different from services based economies. It is not a matter of development per se, because in the European regions the variety of economic structure is very large and for a large part based on endowments and path dependent developments like the extent to which government administration is located in a region or not. The factor takes into account the differences between an industrial area and a service based area including the public administration services of the government. Another observation is that there are two different 'urban' factors, indicating that academic centres not necessary co-locate with administration centres. What may not be surprising is that the Urban Services factor is not associated with R&D, since R&D is more relevant for innovation in manufacturing than for service industries.

Private Technology (F3)

This factor contains business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries. A countervailing power is the existence of agriculture in the region. One interpretation could be that agricultural land-use goes at the cost of possibilities of production sites. Another interpretation is that agriculture is not an R&D intensive sector.

Learning Families (F4)

Locations with relatively larges shares of children are places that are attractive to start a family. Possibilities for Life Long Learning in a region seem associated with the lively labour participation of the mothers of these youngsters. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

"Strategic Development Concept of Transnational Cooperation in the Field of Innovation Promotion in the Via Baltica Nordica Macro-Region" was created as a part of a project "VBN InnoReg – Strengthening Via Baltica Nordica Macro-Region through Transnational Cooperation for Regional Innovation Promotion". VBN InnoReg is implemented within the Baltic Sea Region Interreg III B programme and part-financed by the European Union. The project involves 10 partner regions in the Via Baltica Nordica (VBN) macro-region with a common aim to foster competitiveness and economic performance of the Baltic Sea region.

The objective of preparing a shared strategic development concept – *a joint approach to innovation promotion* – is to combine the analyses of Regional Innovation Systems produced by the partner regions during VBN InnoReg project. Furthermore, the target is to provide a synthesis based on common understanding of development challenges, conditions and transnational cooperation that will foster the competitiveness of the VBN zone. By creating a joint approach to the development of regional innovation promotion it is easier to share information, join forces for collaborative action and benchmark development activities related to innovation issues. This strategic development concept is intended to be a basis for collaborative action for all regions around the Baltic Sea.

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