Facilitating Innovation and transfer of knowledge and technology
Facilitating Innovation and the Transfer of Knowledge and Technology

Towards a New Spatial Agenda for the North Sea Region
TOWARDS A NEW SPATIAL AGENDA FOR THE NORTH SEA REGION

Between 1998 and 2001, a spatial vision for the North Sea Region was developed, based on the principles of the European Spatial Development Perspective (ESDP). NorVision, as it was called, is a key advisory document, which has strongly influenced territorial cooperation in the North Sea Region. It describes the existing state of spatial development and suggests directions for the future. Projects that have been developed under INTERREG IIIB NSR put many of them into practice.

In mid 2004 the Programme Monitoring Committee for the Interreg IIIB North Sea Programme decided that there should be a selective update to NorVision to have valuable strategic input for the future cooperation in North Sea Region. They agreed that the original NorVision document continues to be relevant and should not be evaluated or reworked. The new spatial agenda, as it has become known, should focus on issues, which have become more urgent or important in recent years or which have not been thoroughly addressed in the original document.

A Working Group consisting of one national and one regional representative per country was set up and discussed the procedure and topics to be addressed. The idea was not to have a complete analysis of the subject concerned, but to develop a more focused approach, which could be used to inform the future programme and which might form the basis for future co-operation projects until 2010. The working group agreed upon the following topics for which studies were carried out:

- Coastal Water Management
- Transport and Accessibility
- Facilitating Innovation and transfer of knowledge and technology
- Energy*
- Demographic Change*

* Energy and Demographic Change were smaller studies than the other three

This is the final report for the study on Facilitating Innovation and the Transfer of Knowledge and Technology.

The findings of these five studies have been summarised and make up part of the synthesis report, which will be adopted by the Programming Monitoring Committee and will be published together with each of the final reports. The synthesis document sits alongside and complements the original NorVision document.

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Disclaimer: The following text summarises the results of research on the update of the spatial perspective for the North Sea Region, NorVision. Please note that experts have prepared the content and that as such it does not necessarily reflect the opinion of the North Sea Programme or the Working Group.
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Summary of conclusions and recommendations

1. What are the main spatial challenges for facilitating innovation and the transfer of knowledge and technology for the North Sea Region for the next six years?
   - What are the current strengths and weaknesses in the transfer of knowledge and technology?
   - What are the new areas of opportunity for stimulating innovation and new economies? What new areas of knowledge and technology should we tap into? For example, petrochemicals, logistics, media, electronics, science.
   - How can equal opportunities and access to new and existing opportunities be secured?
   - Is it possible to identify areas of spatial concentration of innovation capacity in the North-Sea Region; if yes, how to identify and characterise such areas, and how could such innovation capacity be supported by spatial policies; and what transnational challenges does spatial policy face in this respect?

Conclusions:

The main challenges for facilitating innovation and the transfer of knowledge and technology have been identified as:

- **Challenge 1 – Increase motivation to innovate**
  Companies don or innovate – people do. This basic understanding is a key to facilitate innovation. Without personal motivation and commitment there will be no development - in any business area. Further, it is necessary that a sufficient number of people are motivated – regardless of background, educational level and experience.

- **Challenge 2 – Increasing the competence and capacity to innovate**
  For individuals and companies the success of innovation is depending on two fundamental abilities. 1) Internal innovation ability and 2) Ability to integrate external resources and competencies.

  In particular the National or Regional Innovation Systems approach stresses the importance of interaction and knowledge flows between users and producers of intermediary goods and between business and the wider research community at the national or regional level for the success of innovations:

- **Challenge 3 – Shaping optimal framework conditions**
  Policy makers strive to foster economic growth and wealth of their respective region (on a regional, national or multi-national level). It is no longer the key responsibility of policy to ensure fair play within well-defined system borders. Instead, policy’s main responsibility is to ensure competitiveness of the whole system compared to other systems. The role of policy has changed from serving a referee function to becoming the coach respectively manager of their team (system).

The strength in the transfer of knowledge and technology in the North Sea Region is a strong knowledge and research base, strong business sectors, well developed infrastructures, well-known brands (regional as well as corporations), and relatively organized links between the actors of the triple-helix. The weakness can be identified as a lack of:

- **Need orientation (addressing companies’ demands and latent needs)** - It is crucial to designing innovation support infrastructures that are need oriented.

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Sustainability (strategic adequacy of a time period of ca twenty years). In order to heavily invest in innovation and the transfer of knowledge and technology, some framework conditions should remain stable. Amongst those factors are the regulations on intellectual property rights and the strategies and services of the support providers (in respect to financial support, technology support etc). Whereas the legal framework is rather stable in the North Sea Region, there is an unproductive activism in reshuffling the support infrastructure in some regions. New organizations are created, mergers are conducted, actors change their strategies, and new support schemes are launched at a pace, which makes target group companies become frustrated.

Transparency (knowledge of system participants and system-external players about the strategy, the resources, the competences, the needs of the system).

The RITTS and RIS studies performed in more than 100 European regions between 1994 and 2000 indicate that virtually all regional innovations systems suffer from a lack of transparency. Typically, not even complementary service providers and intermediaries know where the most adequate service offer matching a specific demand can be found. Profound knowledge on which procurement and partnership decisions can be based requires among others are:

- Knowledge about the availability of the offer (e.g. is the provider motivated to deliver? Does the provider have the quantitative resources to deliver?, is the potential provider fully booked already or bound by exclusive agreements?).
- Knowledge about the conditions of delivery (e.g. is an exclusive agreement possible or does the partner insist on publishing rights?, price?).
- Transfer professionalism (e.g. can the provider integrate the client into the innovation process making him understand and own the innovation? Does the provider speak the client’s language?).

Critical mass (dedication of sufficient resources to strategic issues). A high number of public and semi-public organizations facilitating and supporting the transfer of knowledge and technology is indeed an indication of potential efficiency problems but does not necessarily have to be a problem of its own if these organizations are well-co-coordinated and if each of them have sufficient resources to achieve set objectives. The problem facing many European regions might not be the sheer number of organizations involved in innovation but the fact that so few players have what we call a critical mass of their own.

What are the new areas to tap in to? Following our message that the problem is not to find new areas, but rather how to find markets for what is already happening we turn our focus towards the regions of the North Sea Basin. In the North Sea Programme Area there are seven nations consisting of 44 regions. Strong competence areas have been identified in all of these administrative entities (in national and/or regional strategy documents and cluster mapping studies). All of the national and regional sector foci have been combined and mapped in order to find common industrial strongholds in the North Sea Region. The result of this meta analysis is a grouping into five sectoral areas that have been identified as the areas that are particularly strong in the North Sea Region:

- Competence areas thriving the technological forefront such as ICT, Life Sciences and new materials
- Competence areas related to natural resources such as wood and food
- Competence areas deriving from excellence in engineering such as automotive and aviation
- Competence areas within areas such as advanced services, creative industries and tourism
- Competence areas related to energy - including the petrochemical industry as well as renewable energy

Each of the groups that have been identified in the study has a strong industrial presence and a merited research base in terms of public research organizations. Some of the Competence areas also have important key markets within the North Sea Region. These three components

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2 RITTS=Regional Innovation Technology Transfer Strategies and Infrastructure. RIS=Regional Innovation Strategies
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- a strong business sector,
- a strong research base and
- key markets,

together with the fact that the areas are
- pointed out in regional and/or national strategy documents,

support that these are in deed areas with particular spatial concentration in the North Sea Region. This doesn’t mean that the value chains stops at the administrative boarders, but rather that the citizens in the North Sea Region are highly dependent on these sectors.

The question raised about securing equal opportunities for rural areas can be answered by putting forward four suggestions on concrete actions:

1. Strengthen national-regional-local partnerships - Building strong rural communities is a matter of partnerships. It is important that stakeholders are encouraged to participate in various partnerships at the community level.

2. Encourage local research on innovative responses to rural circumstances - Research is required to identify innovative responses to the circumstances, including both problems and opportunities, facing rural communities and minority groups.

3. Rural areas need to learn about the abilities and skills of their own residents - In order to take full advantage of the skills of their residents, rural communities need to know what those skills are and who possesses them. A suggestion is that human resource surveys should be undertaken on a community and regional basis in order to identify the existing skills available for designing, developing and delivering innovative programmes and activities.

4. Secure and develop the infrastructure (physical, social, financial, economic and telecommunications)

Two examples pinpoint the challenge in implementing approaches fostering a climate and structure where equal opportunities can be secured.

- Using information and education as a tool – It is suggested that the partnerships as well as the handling officers are educated in the horizontal goals. This means that there is a frame of reference in place when questions arise. In all this fosters a constructive dialogue that adds content to the concrete objectives.

- Clustering projects according to the horizontal challenges – It is suggested that a classification of challenges can support grouping of projects that face similar challenges regarding environment, equality and integration. A classification of projects in different categories can ease the follow up and evaluation of projects over time and form the basis for learning activities between projects and stakeholders.

Where does innovation take place? In general one sees that innovation takes place in conceptual interception points, i.e. where the market meets new ideas, where a particular need meets the supply, where ideas meet capital, where research meets business, where supplementary sectors meet etc. In a spatial sense this implies that innovations take place in the densely populated areas in the North Sea Region. The study underlines this as many of the approximately 500 identified potential stakeholders are situated in the cities or close to universities, decision centres or logistic nodes.

3 The information for the Objective 1 programme in Wales and the objective 2 programme in Nordrhein-Westfalen is derived from the evaluation “tre strategier för hållbar utveckling” available at www.nutek.se
2. What is the degree of knowledge in facilitating innovation and the transfer of knowledge and technology by key players in the field (relevant sector authorities and policy makers on national and regional level, EU, private sector including SMEs, universities, non-governmental organisations on EU and national level)?

- What role should each of these players have in the process of stimulating and maintaining innovation?

Conclusions:
The key issue of Europe regarding innovation is the (comparative) inability to turn knowledge into commercial success. The reasons for this state of inability has been analysed an uncountable number of times along with benchmarking exercises with the US and Japan. The European weaknesses are well know and well documented although they may be more or less present in different parts of Europe. This is a known and accepted fact by all national and regional policy makers. The challenge is consequently not to find out what to do but to do what is already known.

The implementers of innovation policy are e.g. national and regional development agencies, universities and other education and research institutions, technology and competence intermediaries, local organisations, etc. Among these implementers the level of knowledge of how to implement policy varies significantly. It is impossible to give a straight answer to what level of knowledge there is. A general weakness of Europe, in particular compared to Japan, is the low mobility of people from one societal sector to another, i.e. from industry to public organisations and to academia. This hampers the development of competence necessary to provide adequate support to companies and reduces companies’ willingness to interact with public and academic organisations.

A big step towards facilitating innovation in Europe would definitely be to tear down the barriers between companies, academic research and public sector organisations.

Addressing the question of what role each of the players should have in the process of stimulating and maintaining innovation it should be referred to chapter 4 and the section about the systemic innovation process. The systemic process implies that one particular player might have different roles and tasks at different stages of the innovation process. E.g. a regional development agency might have both a supportive and a monitoring role. On one hand it might support a cluster by helping it to access public funds and on the other it might be responsible for monitoring and assessing how this money is spent. The following table suggest some different roles for different stakeholders but it should be taken only as a source of ideas not as a rule.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Examples of organisations</th>
<th>Possible tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>National and regional policy makers</td>
<td>National ministries, national agencies</td>
<td>Policy development, Policy monitoring, Systemic learning, Overall co-ordination</td>
</tr>
<tr>
<td>Public knowledge generators</td>
<td>Universities, research institutes</td>
<td>Create knowledge, Transferring knowledge to society (education, training, technology transfer), Produce spin-off companies, Cluster promoters</td>
</tr>
<tr>
<td>Private organisations</td>
<td>Companies</td>
<td>Innovate to the market, Create jobs and growth</td>
</tr>
<tr>
<td></td>
<td>Investors</td>
<td>Supply capital at the right time, to the cases with the highest potential and to</td>
</tr>
</tbody>
</table>
3. What is the degree of coverage of facilitating innovation and the transfer of knowledge and technology by existing policies, strategies and investment plans?

Conclusion:

The degree of coverage of facilitating innovation and the transfer of knowledge and technology by existing policies, strategies and investment plans is very good in the North Sea Region, although significant regional differences can be observed. It can also be debated to what extent policies and strategies can be turned into action and eventually achieve success. Lack of funding, critical mass, focus and sustainability often prevents the most brilliant plans to exhaust their full potentials.

Motivation:

The responsibilities of the regions with regards to facilitating innovation are very different within the North Sea Region. In smaller countries policies and strategies are developed on the national level and policy delivery systems are also, at least partially, national. The most extensive and holistic policies and strategies can therefore be found in the bigger countries with strong regions such as Germany or the UK. Generally, however, the regions within the North Sea Region are addressing the topic of innovation, either directly through regional strategies and plans or indirectly via the national initiatives, Many regions have developed more or less formal regional development strategies or regional innovation strategies.

Regional policies and strategies are often the output of the work of broad regional partnerships comprising representatives of the private sector, the public sector and academia. The partnership approach\(^4\) has both advantages and disadvantages. Drawbacks often mentioned are the slow and often conflict-filled process of finding common vision and goals. Positive characteristics are that once finalised the document can not be neglected. A further positive aspect is that all relevant players have a chance of contributing to the process giving the document a bottom-up perspective for everyone involved.

Typically a regional development/innovation strategy takes a quite broad approach to facilitating innovation. A regional SWOT\(^5\)-analysis often helps in identifying the key challenges to be address. Cluster approaches are common in all region of NSR as well as the increased utilisation of IT in companies.

4. How could transnational co-operation facilitate innovation and the transfer of knowledge and technology?

- How can actively facilitating innovation add value to what is already happening?
  - How can this added value be measured/gauged?
- What is the particular benefit for using INTERREG instead of other cooperation instruments and funds (mainly national, but also European: Marco Polo, TEN, EIB, ERDF mainstream...)

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\(^4\) Sometimes referred to as “Triple Helix”. In an innovation system the interaction takes place between three kinds of actors - from science, business and politics.

\(^5\) Strengths Weaknesses Opportunities Threats
Conclusion:
Trans-national co-operation is already today a well accepted and integrated way of working for most European regions. The different programmes of the EU are crucial in providing both a framework and co-funding for international co-operation. This holds true for innovation-related activities as well as for other topics.

It is recognised by stakeholders that the participation in international projects has many positive effects on the organisation that would not have been achieved without the co-operation.

Interreg is one of many programmes that provide co-funding for international projects. Interreg is appreciated by its target groups for some of its characteristics and less appreciated for others.

For organisations that look for possibilities to involve in international co-operations the challenges today is to assess and chose the most suitable programmes and platforms for this co-operation. Reaping all the potentials out of an international project is a task that is not so easy to master.

Motivation:
The key asset of a trans-national programme aiming at facilitating innovation is that it brings people together under a structured framework of activities and deliverables.

“We talked about doing something together for years but not until we designed a project proposal and won did we have the tool and driver to really do something – It was not so much a question of money as of commitment”

(Manger of an Interreg 3b project in the Baltic Sea Region)

Depending on the project there are numerous possible ways that the project can be of value and add value to on-going activities, e.g. by:

- Providing a good contact network for the participants
- Offering benchmarking possibilities
- Providing a platform for experience sharing
- Helping in concrete problem solving
- Providing a tool for policy influence
- Giving image and marketing
- Helping to create critical mass

As most public sector programmes are supporting pre-competitive activities, i.e. support activities not directly related to development of individual companies measuring the casual links between input and output is very challenging. There is no standardised methodology to measure the added value. This methodology should be based on what the individual project seeks to achieve. E.g. a project aiming at sharing experience (internationally) on how to support the uptake of innovations in small companies should be measured on it success in raising the level of knowledge among the projects participants.

Interreg is more, as well as less, popular compared to national and FP 5&6 programmes. In short, Interreg is popular because:

- There are very stable funding conditions for a long time period. This implies a.o. that there is (in theory) normally no rush in setting up project proposals. FP 5&6 programmes, however, are notorious for the “one shot” character.
- The relatively often reoccurring calls for proposals is also much appreciated.
- The level of support provided is fair and based on real terms. In particular the difficulty of covering overhead costs is considered to be a problem in FP 6.

There are also less positive voices raised about characteristics of Interreg. In particular these aim at the stale and bureaucratic management of the programme that causes very high costs for project management. In particular the rigid and inflexible systems for handling budgets are a topic of criticism. Interviews with stakeholders further gave that an advantage of Interreg 3b for facilitating
innovation and the transfer of knowledge and technology is the possibility to promote trans-national/regional activities in meta-regions.

5. Who would benefit/participate from facilitating innovation and the transfer of knowledge and technology?

Conclusions:
The ultimate beneficiary of innovation should be the individual. Innovations should lead to higher standards of living within the framework of sustainable development.

Innovation is driven by people but people usually are active within organisations. Such organisations can be private or public.

When it comes to facilitating innovation, based on the approach taken in this study, the main stakeholders are:

- Companies that are committed to growth
- “Knowledge producers” such as public or private research institutions, consultancy companies etc.
- Intermediary organisations, e.g. regional development agencies responsible for supporting the development of companies in the region.
- Investors, this include institutional investors such as banks but also private such as venture capital funds, business angels, foundations etc.
- Policy makers, either on regional or national level dealing with the framework conditions for innovation

Motivation:
The systemic view on innovation implies that in order to achieve innovation success a significant number of players from different societal sectors need to interplay in an efficient way. In the Interreg programme of today there is a domination of national, regional and local public sector organisations whereas the key organisations of the innovation systems (with the possible exception of universities) are quite rare. In the project with innovation focus (see chapter 3) roughly 30 % of the involved stakeholders are research organisations, a few are innovation intermediaries such as the Danish TIC and the rest (approx. 65%) are regional or local public organisations. Companies are not active at all, which is because of the fact that with present regulations private organisations can not be funded by the programme.

A future programme-strand supporting activities related to facilitating innovation must address different stakeholders than today’s programme does. The possibilities to involve companies in an active way should be considered.

6. Other stakeholders that should/will profit from “facilitating innovation” are research and development-institutions, intermediary organisations, investors and innovation policy makers.

6 Evaluations show that the possibility to use costs of private organisations to generate co-funding from the structural funds is considered to be one of the main success actors of the projects within the Innovative Actions programme of 2000-2006.
Motivation:

The challenges of European states and regions are quite well analysed and defined. During the past 15 years a very large number of initiatives have been launched to address these challenges. Unfortunately Europe’s position against the US and Japan does not seem to change much and there is a new player in the game – China.

Europe’s problem is not defining what to do but how to implement all these plans and strategies and how to get results out of it. For the Interreg programme this implies that the possibilities to duplicate what has already been done are great and maybe even unavoidable. The unique asset of Interreg in this context is the focus on a limited geographical area. The opinion about the strength of this asset when it comes to facilitating innovation is diverging significantly depending on the stakeholders interviewed. Some are of the opinion that such geographical areas have little significance in today’s global world.

“For our organisation and the companies we work with is China the highest priority. Companies source their knowledge world-wide and do not care much about the North Sea Region”

(Managing Director of a technology transfer organisation)

On the other hand, there are a large number of “pre-market” innovation-related challenges that can be addressed within a limited geographical area. For example; geographical proximity does matter when more concrete activities that requires intense co-operation shall be carried out and there are mutual competence areas, which probably could be developed more successfully within the framework of international co-operation. Consequently, if the programme supports activities related to facilitating innovation these should:

1. Be carefully selected to build upon and enable the maximum utilisation of the resources of the NSR.
2. Be concrete and result-oriented

The future programme should consider two different types of activities:

3. Non-sector-based facilitation of innovation
4. Sector-based facilitation of innovation

Non-sector-based activities are activities targeting challenges that are common to most sectors or even not sector-related. A few examples of such challenges and activities are:

<table>
<thead>
<tr>
<th>Non-sector challenges</th>
<th>Example of activities</th>
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<tbody>
<tr>
<td>Facilitating the access of SMEs to research resources and facilities</td>
<td>Develop interfaces (physical and virtual) for smaller contacts with e.g. universities of research institutes.</td>
</tr>
<tr>
<td>Facilitating the access of SMEs to investors</td>
<td>Develop a quality system for the assessment and presentation of business ideas to investors. Create network of business angels in the NSR</td>
</tr>
<tr>
<td>Facilitate networking between companies</td>
<td>Set-up networks of companies and connect them with collaboration partners and/or customers in other countries.</td>
</tr>
<tr>
<td>Raising the competence of policy implementers (regional and local intermediary organisations, public sector organisations)</td>
<td>Design and run (trans-national) training programmes for public</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Improving the work of technology transfer institutions</th>
<th>Run exchange programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisations</td>
<td>Develop patent and licensing databases</td>
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</table>

<table>
<thead>
<tr>
<th>Improve the operations of science and technology parks</th>
<th>Exchange programmes</th>
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<td></td>
<td>Joint customer research</td>
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Sector-based facilitation of innovation aims at specific sectors or competence areas such as biotech, ICT, creative industries, etc. Economic research shows that competence areas or clusters provide a good environment for innovation and growth. This has been the argument for cluster-based approaches to economic development in many of the NSR. This study shows that there are a number of such clusters or competence areas of mutual interest of the NSR. In chapter 6 an overview of these competence areas is given.

A future Interreg programme should consider supporting the development of clusters/competence areas in the NSR. This can be done by tapping into the needs of individual competence areas with the aim of creating NSR-areas. In particular, however, it should be considered to provide holistic support to emerging competence areas of NSR-importance – so called competence- or technology platforms.

7. **What partners outside the North Sea Region would be crucial to consult or to co-operate with?**

**Conclusions:**
This question can only be answered in the light of the kind of activities that should be supported. Co-operation partners could be sourced worldwide depending on the topic. An exhaustive list of partners cannot be given. However, it is likely that Europe still has a lot to learn from the US when it comes to strengthening the relations between companies and research institutions.

More generally, for many of the stakeholders interviewed it is natural to work both in the North Sea Region and in the Baltic Sea Region. As a matter of fact the Interreg programmes are geographically partially overlapping. A stronger future co-operation and maybe even integration of the NSR and the BSR programme would be natural and appreciated by the stakeholders. In this context it is worth mentioning that the BSR programme of today co-funds more innovation-related projects than the NSR programme. There is probably scope to extend some of the successful BSR-projects to the NSR.

*“It would make sense to try to establish something like an innovation system for Northern Europe. If we succeed with developing mechanisms for speeding up the commercialisation of innovations this would attract foreign investments!*

(Representative of a technology transfer organisation)

8. **In what way should this theme be formulated in order to get the most out of transnational spatial development co-operation in a new programming period?**

Conclusions:

- Innovation should also in the future be an integrated, cross-cutting theme in the Interreg projects.

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7 There are many publications in this area. The most famous is maybe “The competitive advantage of nations”: Michael Porter 1998. Palgrave MacMillan.
In addition to the cross-cutting innovation theme there should also be a separate innovation strand supporting very concrete undertakings with a clear focus on facilitating innovation with a market perspective.

There should also be space in the programme to support trans-national competence or cluster-based projects. These projects should build on competences common to several regions of the NSR.

The theme should not pre-define competence areas to be supported but rather have applicants proving the relevance and potential of a particular area.

There are different views on how the theme “Facilitating innovation and the transfer of knowledge and technology” should be formulated in the next programming period. One view is that of a “Cross-cutting” theme where innovation is an integrated part of all projects run regardless of their topic and aims. This opinion is recognised as very important and urgent and cross-cutting innovation should be promoted in a future programme. However, there is a risk that if there is not more focus on innovation than so in the programme this may lead to very weak innovation outputs in terms of the Lisbon agenda. There is more to innovation than doing something in a new way.

Another view on facilitating innovation is to set up a separate strand or action line focussing on innovation projects in the next programme. Such a strand has been labelled “Innovation policy” in the course of this study. This is probably a misleading name for the activities foreseen here and should therefore be changed. Why not into “Facilitating innovation”?

A separate strand on innovation activities can host many different types of projects. As mentioned under point 6 of this chapter activities can be divided into a) non-sector and b) sector activities. The non-sector activities can be broadly defined in order to address the wishes of the present and future stakeholders of the programme. However, it should once again be said that the Interreg programme should focus on very concrete activities engaging the participants in joint development activities.

When it comes to the sector-oriented activities the following cornerstones of the strand are suggested:

- A sector-oriented project should have its starting point in the intersection of emerging competence areas in the NSR
- Only a few number or highly ambitious processes should be supported
- A process should aim at developing a world-class competence platform
- A platform should build on a thorough foresight exercise
- Begin support in early stages
- Provide funding for >5 yrs. Make continuous funding dependent on milestones
- Make sure that there are complementing funding from the regions and/or the EU
- A process must include all relevant players and build on unique assets of the NSR

In an initial step, however, we propose that the INTERREG North Sea Programme supports trans-national/regional foresight processes and make them a basis for future projects.

Foresight, from being a method on national level for finding long-term research priorities has now become a definite tool for commonly define a regional dream scenario and for identifying necessary development tracks on regional level in line with the scenario. Moreover the foresight method

- identifies and mobilizes a trans-national core team of individuals who contributes with their competences and ideas without defending personal interests towards each other or raising demands on other participants.
- is based on an open-minded approach with the target to reach a consensus on possible and desirable future scenarios and action lines.
Updating Norvision – Facilitating Innovation

How could this be implemented in the North Sea Programme? The starting point, the input and the output of the process are the three main issues in this.

- The starting point for each foresight process initialized should be a competence area common to the North Sea Area. The common competence areas identified in this report serves as good examples as these areas have been derived from national and regional strategy documents and identified clusters.

- The input is represented by the collected knowledge of the North Sea Region as a whole. The programme should aim to involve different parts of the society linked to the competence area in a joint process. Market, research, consumers, industry, policy makers and special planners from regions across the North Sea Region should be involved.

- The output should be actions in terms of actual trans-national projects in line with the foresight process.

The foresight process linking the input and output can be described as follows:

Starting point: Common competence area in the NSR

Pre-foresight: STOP, think and engage
- Informal exploration meetings,
- Background research,
- Competence maps,
- Agenda setting
- Engage stakeholders

Foresight: Get set
A series of open deliberative meetings with stakeholder participation designed to:
- Achieve trans-national ownership of the future
- Understand the trans-national process driving change
- Define the challenges that this presents
- Understand how this may be achieved
- Explore the trans-national implications

Post foresight: Go!
- Action lines for interreg-projects
- Meetings with key policy makers to draw their attention to what was achieved
- Calls for project applications in line with the results

Trans-national foresight

What would this mean in terms of programme organisation? We suggest:

- 5-7 initialized trans-national foresight processes involving approximately 20 experts and 200-300 participants each.
  - Timeframe: 1-2 years
  - Budget: 100-200k Euro each

- 2-5 initialized trans-national projects deriving from each foresight process.
  - Timeframe: 2-6 years
  - Budget: 1-2m Euro each
Abbreviations

**BERD:** Business Expenditure on R&D

**BIC:** Business Incubation Centres

**BSR:** Baltic Sea Region

**ERP:** Enterprise Resource Planning

**EU:** European Union

**FP:** Framework Programme

**FY:** Fiscal Year

**GDP:** Gross Domestic Product

**GOVERD:** Government intramural expenditure on R&D

**HEI:** Higher Education Institutions e.g. Universities

**HERD:** Higher Education Expenditure on R&D

**ICES:** International Council for the Exploration of the Sea

**ICT:** Information and Communication Technology

**IP:** Intellectual Property

**IPR:** Intellectual Property Rights

**IRCs:** Innovation Relay Centres

**ISR:** Industry-Science Relations

**ITTE:** Improving institutions for the Transfer of Technology from Science to Enterprise

**NSR:** North Sea Region

**OECD:** Organization for Economic Cooperation and Development

**OTLs:** Offices for Technology Licensing

**PROs:** Public Research Organisations

**PSREs:** Public Sector Research Establishments

**PTO:** Patent and Trademark Office

**R&D:** Research and Development

**RIS:** Regional Innovation Strategy

**RITTS:** Regional Innovations and Technology Transfer Strategies

**RTD:** Research and Technology Development

**S&E:** Science and Engineering
**SMEs:** Small- and Medium sized Enterprises

**Spin-offs:** Firms established by staff from a Public Research Organisation to develop or commercialise an invention. In this study start-ups are also regarded as spin-offs.

**Start-ups:** New firms established especially to develop or commercialise an invention licensed from a public research organisation but without staff participation.

**TIC:** Trade information Centre

**VC:** Venture Capital
1 Background

The Lisbon strategy launched by the European Council in March 2000, completed and reinforced by subsequent European Spring Councils demands that innovation must constitute the cornerstone of European policy. Innovation is regarded as crucial for not only closing the economic gap to the U.S. and Japan but to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.

Among the most foresighted stakeholders in the North Sea Region the Barcelona and Lisbon declarations raise a question on the agenda. How can we turn the increased investments in knowledge (as well as the existing regional resources) into growth and competitiveness? Both national and regional stakeholders play an important role in this phase as the commercialisation tools need to be linked to national as well as regional goals and strategies in order to further develop the knowledge-based economy and thereby gain growth, better jobs and greater social cohesion. This will indeed affect the short and long term spatial development and the design of future trans-national projects in the next structural funds period.

The urgency of updating existing strategy documents, integrating the concept of innovation and the creation of growth based on knowledge, has been recognised by the Interreg IIIB North Sea Programme. The programme has commissioned a study – “Facilitation innovation”, which will look at the present strengths and weaknesses regarding facilitation innovation in the North Sea Region today, it should identify new areas of interaction for a future Interreg programme and it should suggest a strategy for how the programme should interact to facilitate innovation.

The inno-group has been contacted to carry out the study. The overall objective of this study is that the generated knowledge shall

“update the NorVision document and have valuable strategic input for the new programming period in case a new North Sea Programme will be established in the next structural funds period.”

To achieve the objective the study will deliver answers to the questions highlighted in the terms of reference. In particular the study shall provide:

- A clear and correct picture of the main spatial challenges for facilitating innovation and the transfer of technology and knowledge in the North Sea are during the next six years.
- A description of the role of trans-national co-operation initiatives (such as Interreg) in facilitating innovation and the transfer of technology and knowledge including methods to evaluate added value.
- An outline of a trans-national agenda for maximising the output of spatial development with regards to facilitating innovation and the transfer of technology and knowledge.

The aim of this report is to outline the work undertaken so far and to provide a material, which should stimulate discussions between key stakeholders of the North Sea Region.

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9 Whereas ca 2% of the European Union’s GDP is invested in R&D, the respective figures for the U.S. and Japan are 2.8% and more than 3%. The financial resources dedicated to innovation by the US are exceeding those committed in Europe by 40 billion US $ per year. Not too surprisingly, European companies apply for only 170 patents each year per million inhabitants, compared to 400 for American companies.

10 www.inno-group.com
2 Methodology - Progress to date

Below a summary of the work that has been carried out is presented.

2.1 Identification and analysis of existing reports/knowledge

The project team has gathered information from analyses, research and ongoing projects/initiatives within the relevant fields.

Most relevant sources have been:

- Deliverables deriving from the ITTE project including a catalogue of 1493 Technology Transfer organisations in Europe, an overall analysis of the Technology Transfer organisations and the framework conditions in each country, 5 good practice studies of Technology Transfer Institutions within the North sea region, Country reports for each EU-15 country covering the characteristics of the transfer of technology, the national framework conditions and policies.

- Regional strategy documents, the innovation scoreboard, trendchart on innovation, NorVision, The European Spatial Planning Perspective, National and regional foresight-studies, RIS/RITTS and RIS++ studies

2.2 Identification of stakeholders and respondents

Contact details of the stakeholders of today's Interreg-programme have been sent to the project team as lists divided by countries. These lists and other potential respondents suggested by the secretariat have been evaluated. The project team has also identified new potential stakeholders and respondents representing new and interesting perspectives on facilitating innovation and the transfer of knowledge and technology. A so called snow-ball methodology has been used in order to identify these (all respondents have been asked to name additional potential respondents/stakeholders). This means that the list of potential stakeholders and respondents have and will continuously be expanded as the project proceeds and as the new potential areas within the field “facilitating innovation and transfer of knowledge and technology are known” are identified.

Respondents that the project team has involved include representatives at international and EU organizations, national authorities, regional authorities, universities, cluster organisations and ITTE experts, investment agencies, project participants (North Sea projects as well as within other programmes/initiatives).

2.3 Workshop in Brussels

The objective of the workshop that was held on the 9th of May in Brussels was to raise and discuss the complex issues related to the study in a dynamic context and thereby...

- gather crucial input to the next INTERREG IIIB North Sea Programme
- highlight important questions to be addressed
- provide a stimulating networking-climate

Nine participants representing international, trans-national, regional and academic organizations as well as trans-national and regional financing bodies and cluster organisations attended.

The participants will, together with additional motivated stakeholders identified during the interviews, be involved as a reference group giving further input to the ongoing process.

2.4 Conference in Middleburg

At the Annual Conference 15th/17th June 2005 in Vlissingen, the Netherlands, the draft findings in the interim report were presented to the stakeholders in today’s programme. The input from the approximately 40 participants at the seminar on facilitating innovation has been used as an
important information source reflecting the views of the current stakeholders on the topic innovation and facilitating innovation. In order to catalyze a discussion among and with the participants at the seminar a 2 page discussion paper on the topic was presented.

The aim of the 2-page paper, presented in annex II, was to focus on the most relevant themes and to build consensus among the stakeholders (old as well as potential). However, presenting the discussion paper underlined that there are huge differences among the stakeholders when it comes to this topic.

2.5 Interviews with stakeholders/respondents

The project team has performed 68 (workshop participants included). The respondents involved are listed in annex I. The project team has kept an open communication channel towards the stakeholders and respondents.

Interviews – Questions and topics during the interviews have been open in order for the respondents to fill in with experiences and new views. An important aspect of this 2-way communication has been to raise awareness of the theme facilitating innovation and transfer of knowledge and technology.
3 Innovation in today’s Interreg 3b programme and tomorrow’s

3.1 Innovation in current projects

The NorVision document and the Interreg NSR programme manual address the topic of innovation but in a somewhat generic way. In the NorVision document, knowledge and innovation are mentioned as upcoming key factors for determining regions’ competitiveness. Strengthening knowledge and innovation is also directly linked to strengthening Research and Technological Development (RTD) with a somewhat new approach.

Instead of supporting large-scale research centers, normally placed in major cities, the new focus is on promoting the innovation culture. This is achieved through the creation of networks, stimulating innovation in SMEs, and widely disseminating research results. One also emphasizes the advances in information and communication technology as a mean for creating a “knowledge society”.

The regional differences in the North Sea Region are illustrated through two statistical indicators: Number of patent applications per head of population, and Expenditure on R&D in relation to GDP per head. It becomes clear that the North Sea Region comprises both progressive and lagging-behind areas in terms of innovation performance.

In the Programme manual it is particularly in Measure 1.5: Co-operation on research and development matters and access to innovation support that opens the door to innovation-related projects. Here an extract from the programme text;

It is … important to provide sufficient access to innovation support and R&D. This requires the formation of partnerships between universities, research institutes, other higher and adult education establishments, sectorial and/or professional organizations and SMEs across the North Sea region ....

Expected results of this measure are:

- establishing R&D centers
- co-operation between universities, research institutes and SMEs
- R&D infrastructure
- more innovative companies
- new products

Further, Measure 2.1: Effective and sustainable transport in rural and urban areas, including maritime areas, and in new rural-urban connections also links to innovation. Here, innovation and development of ICT is linked to the future need of transport systems, since ICT infrastructure affects both our private and business lives. ICT can reduce the need to relocate, but can also increase the need for transports related to Internet trade. One concludes there is an obvious need to further study this matter.

A few projects under the current programme address more or less directly innovation-related topics, these are:

- VISP - The aim of VISP is to develop a new trans-national planning strategy, new methods and new ways of working for the creation of attractive and competitive physical, social, economic and environmental areas in the periphery of large cities in the North Sea Region.
- LoG-IN - Focus on how to use ICT to:
  o Improve local government processes (e-administration)
  o Improve service development and distribution (e-services)
  o Improve public-private interaction (e-society)
- ICTs for SMEs - Supports SMEs in 8 participating regions to increase and improve their use of ICT. By thorough evaluation of local SMEs, the experiences gained in the project will be developed into a best practice guide.
E-VOICE - E-Voice aims to increase public influence and participation in political decision-making by providing new ways of communication and interaction between citizens and politicians or public officials.

Green North Sea Docks - Green North Sea Docks is looking into the most practical and environmentally sound option for wastewater treatment processes to eliminate Tributyltin (TBT) and reduce heavy metals in dockyards.

GeoShare - The long-term aim of GeoShare is to support, promote and enable a balanced improvement in the use of modern information and communication technologies across the North Sea Region, starting with a new system for sharing geological data.

Interviews with the managers of these projects show that the views on what innovation is differ quite substantially. For some, facilitating innovation is tearing down barriers such as bureaucracy and funding to achieve new things. For others it is the creation of environments so attractive that the right people are drawn there in order to improve processes and products. For others, further, innovation is networking, i.e. bringing various actors such as research institutes, public and private sector together.

As diverse as the view on facilitating innovation is the view on the key challenges to innovation. A more or less common opinion is, however, that small and medium sized companies face bigger challenges than larger companies. Related to this is the view that in today’s debate the focus on high-tech topics is too strong, marginalizing low-tech applications, although so-called incremental innovation is much more common and of higher importance to most companies. The problem of in-transparent regional systems for support to innovation is also observed

“there is a patchwork of organisations and services that no company has a chance to understand”

Here the problem of using a common vocabulary to describe problems and goals is highlighted as well as the diverging interests and agendas of various actors (private/public) and within sectors (national, regional and local governments). The challenge of activating the local level is mentioned by the project managers. Today there is a lack of influence on the local level and possibly also a lack of motivation. The omnipresent issue of under-funding of projects and initiatives is also considered to be a big problem and challenge.

At the same time as there are problems and challenges to innovation there are opportunities. The project managers of current projects believe that the NSR does hold plenty of co-operation potential based on that many of the NSR regions share interests on certain topics that the population in general is well educated and the know-how is good. Further, the well developed infrastructure in all countries around the North Sea is considered a great advantage as well as the existing co-operation and exchange (i.e. geographical information systems and water management). Last but not least the regions of the North Sea share similar historical, cultural and political approaches, something that considerably facilitate all types of exchange activities, not least innovation.

When it comes to preferred initiatives the project managers would like to see increased development of policies at the trans-national level and application at the regional and the local levels. Systematic planning to improve structures is the key word. Further, training programmes for civil servants (with regards to innovation), fostering the ability of SMEs to capitalise more of regional advantages and increasing the sensibility of SMEs to innovation and technology transfer is also considered important. A way to achieve this would be the establishment of regular arenas for pooling actors on all levels.

External partners (outside of the NSR) to involve in co-operation activities are the, as according to the project managers, the Baltic countries and Poland.

3.2 Innovation for growth - The systemic view on innovation

Innovation is doubtlessly considered as the most important driving force for economic wealth; however, it is not just related to high technology industries. It can pertain to any industry or economy sector. Likewise, innovation is more than simply the initial ‘big idea’ or the end product or services that result from it. Innovation is more accurately defined as a process through which knowledge can be translated into new products, new services or an increase in productivity through new production methods. “Production method” is a broad term, which also can include the process of public sector organisations.
Innovation is a systemic rather than linear process, i.e. its processes are multidimensional, and they involve many different players, and often take place over extended periods of time. Successful innovation may entail the transfer of technology – for instance, from a university or research centre to a company – but this is rarely an isolated event. The speed and the success of the transfer almost certainly depend on other interactions, before and after the transfer itself, and are heavily influenced by the conditions given in the local and national innovation environment. Innovation therefore requires the development, over time, of highly interconnected systems. Well-functioning innovation systems in particular serve to ensure the free flow of information across the interfaces between large firms, researchers, entrepreneurs, investors of all kinds, consultants, patent agents and other intermediaries, regional authorities, and other actors. Such systems may have technical components but are, above all, networks of individuals. Proximity is an important feature of most innovation systems – policy-makers for example rightly devote resources to attempts to create self-sustaining local and regional innovative competence areas. Vertical interconnections are also vital – for example, linking business angels, banks, venture capital funds, and stock markets to create a seamless equity market for innovation. Finally, inter-regional and trans-national links are essential for the efficient exchange of knowledge, people, and good practice as well as for the frictionless diffusion of new technologies between individual local and regional innovation systems. [cf. EC DG Enterprise 2001].

Therefore, the success of any new product, new service, or new production method is dependent upon the availability of a complete system of interactions between the innovator and those individuals and organisations that facilitate the innovation process from the idea stage over research and development to commercialisation.
All involved partners have to have a common understanding of the mechanisms of their actions to be able to foster the economic success of the regional firms and thus to increase the quantity and quality of work in their region. Knowledge structure (including the R&D capacity, design and prototyping) and human resource infrastructure (including both education and training) are key parameters as well as strong linkages to primary and global markets.

The Interreg 3b NSR programme of today does relate to innovation in the above described commercial perspective. The focus of actually supported projects, though, tends to be distanced from the commercial markets focusing on basic prerequisites such as ICT infrastructure etc. If the programme aims at complementing the present view on innovation with a stronger focus on facilitating innovation for economic growth there is not only a need to define the prioritised areas, which is the task of this study. Even more important is to:

- clearly define facilitating innovation in the sense of going for growth, competitiveness and jobs. When talking about innovation in Europe today one can not overemphasise the importance of the Barcelona objective and the Lisbon strategy.
- open up the mind-set of the present stakeholders of the programme. These could be more aligned to address commercialisation issues in project proposals
- open up the mind-set of the programme organisation and to develop the necessary tools and know-how. The programme organisation must be equipped both with the necessary understanding and acceptance and the right tactical instruments (programme, measures, etc) to effectively address innovation matters.
- to activate new stakeholders. Facilitating innovation aiming at commercial success demands the mobilisation of organisations, which so far have not been involved in Interreg IIIB to any noticeable extent. Examples of such stakeholders are private companies and technology transfer organisations.

### 3.3 Spatial development and Facilitating Innovation

As classical Fordism is no longer the dominant paradigm of socio-economic development, corporate structures are grappling to adjust to a new system. One of the relatively few certainties is that companies have to be competitive to survive and that competitiveness requires innovation. In terms of spatial development regional clusters, science parks and the like have been one answer to increase competitive advantage (Porter, 1990). This has been widely adopted by countries and regions that seek to identify and enhance their competitive potential through supporting industry clusters. Although the question “do I want to sell?” is easier than the question “do I want to share?”, network relations based on trust and reciprocity are gaining in predominance. The debate that stresses incompatibilities between collaboration and competition seems to be redundant. Enright (1996) suggests that regional clusters have to find the right mix of collaborating and competing. Collaboration implies a trade-off between access to greater resources against the potential for loss of valuable proprietary information. The case of foreign direct investment shows convincingly that it is increasingly attracted to specific regional locations. Not at least because of the support activities and incentives provided by regional governance institutions. Regions are thus composed of networks of firms linked by both cooperative and competitive imperatives. Their relationships are not hierarchical but heterarchical, which means based on an inclusive and empowering approach. Modern regional development theory stresses the embeddedness of companies in a socio-cultural environment. Public action towards innovative regional clusters has shifted from state regulation of economic affairs to associative governance, which implies a degree of self-regulation.

Regions are often defined in terms of shared normative interests (culture areas), administrative homogeneity (governance areas) and economic specificity. Recent tendencies indicate that firms rely more and more on their capacity to forge links to non-local firms for gaining strategic competitive advantages. Economic specificities are not sustained by all regions, in fact successful innovation sometimes implies a change of trajectory. Particularly in terms of regions that cross national boundaries governance (i.e. legal systems) can be difficult to adjust. However, government administration can become the institutional framework in which a learning society is embedded. Environmental regulation is a case in point as it creates opportunities for innovation. In other words, incremental innovation is made possible in periods of relative stability where close networks facilitate rapid information diffusion, while the more dynamic innovations are sustained within transnational networks. The conceptualisation of regions is more and more driven by the ways in
which policies pursued by regional governments give distinctive identity to the regions in question. Some of the problems with conceptualising the region are their non-specific size – there can be regions within regions - and that larger regions such as the North Sea region lack a distinct identity in terms of challenges, opportunities and public awareness. Not all would agree to that and propose instead that the North Sea is a common ground with similar cultural, historical and political roots and perspectives in the countries surrounding it. Internal cohesion is supported by common challenges with regard to ecology. The trust developed between firms and public institutions on a regional level can be applied to transregional entities as they realise the benefits of cooperation. Sabel (1993) demonstrated that heterarchies and networks develop rules and routines of interaction by which members regulate themselves and each other. Nevertheless, long-term strategies – both on a transnational level (Lisbon strategy) and on a regional level (“learning regions”) – backed up by adequate funding for enterprise support programmes and especially for R&D in the education sector are crucial in facilitating innovation. Some 60% of the innovation resources accessed by firms come from interactive learning and exchange relationships with other firms (Step Group, 1994). Relatively few innovations are conducted within the public sector, but public policy and administration is invaluable in providing the institutional infrastructure as promoters, providers of incentives and coordinators of specific programmes.

Regional economies can be understood as places of collective learning and the North Sea region is moving in this direction, creating interdependencies in cooperation. There are however barriers to this process. These barriers centre on the lack of awareness of transregional opportunities, the lack of adequate funding and adaptation of transregional processes to the local level and smaller firms (SMEs). There is thus a need for more information and communication to create awareness and motivation, and an increased impetus for networking among local communities and SMEs. The structure of funding should be altered to ameliorate these concerns. In this effort the public sector has a particular responsibility.
4 Facilitating innovation – key challenges

The observation that innovations and in particular research based knowledge is more successfully exploited in other countries, such as the US and Japan, has prompted a number of policy reactions in Europe. In 1995, the European Commission presented the Green Paper on “Innovation in Europe” documenting several factors influencing the competitiveness of the European Economy. One of these was the development of closer links between the producers of research (i.e. Universities and research centres) and the final users (i.e. enterprises). The need for a more outward looking policy by European research institutions was highlighted, and several routes of action were proposed, for example; changes to the patent system, redirection of public and private funds towards innovation and the use of economic intelligence tools for data gathering and comparison between European countries and the US and Japan.

During the last five years innovation and transfer of knowledge and technology has moved into the centre of the European agenda. The research investments throughout Europe are about to take a giant leap in accordance with the Barcelonas objective (The goal agreed upon is that R&D investments in Europe should increase from 1.9% to 3% of GDP until 2010). In addition to this the public research investments have been put in a context underlining the importance of commercialisation: The increased research investments are intended to accelerate the transformation of the European economy to the most competitive knowledge-based economy in the world according to the Lisbon agenda. The structures supporting innovation and transfer of knowledge and technology of today are going to be streamlined and reshaped according to this. This underlines the connection between research, innovativeness, growth and spatial development.

It is recognised by a number of studies and empirical evidence that co-operation between Public Research Organisations and private enterprises improve the quality and economic success of innovation processes. Therefore, promotion and facilitation of co-operation and technology transfer contributes, on the one hand to the Lisbon objective by improving innovations and on the other, to the achievement of the Barcelonas objective of increasing R&D expenditure to 3% of EU-GDP as it drives greater private investment in R&D. Furthermore, the role of technology transfer is widely recognised especially for Europe as, according to studies, “European research produces results comparable to those in the US, but these results are not commercialised as frequently and quickly.”

4.1 Fundamental challenges of facilitating innovation

The determinants of innovation processes are manifold. Most empirical studies have identified market-related factors, technology-related factors, organisation-related factors (partly incl. financial issues) and strategy-related factors as key success determinants of innovation processes. In the
following chapter we elaborate on some generic challenges for successful commercialization of innovations.

4.1.1 Challenge 1 – Increase motivation to innovate

Companies don or innovate – people do. This basic understanding is a key to facilitate innovation. Without personal motivation and commitment there will be no development - in any business area. Further, it is necessary that a sufficient number of people are motivated – regardless of background, educational level and experience. Otherwise the chances of success are limited. This is to a certain extent complementary to prevailing growth policies in Europe today, which strongly focus on research-based innovations. In our view this is important but not sufficient if Europe is to maintain a competitive position in the global economy innovation must be the normal way of living. Not an abnormity only possible to achieve through 15 years of basic research and billions of Euros of investments.

The motivation to be entrepreneurial and innovative is strongly related to society’s acceptance of such behaviour. It must be accepted and even envied to be a successful entrepreneur and it must be accepted to fail. Here the NSR-states are very different. Norway may be the society with the highest social barriers to innovation whereas Denmark and Flanders are much better in this respect.

**Solution to challenge:**

Motivate more people to be entrepreneurial and innovative, influence society’s view on entrepreneurs

4.1.2 Challenge 2 – Increasing the competence and capacity to innovate

For individuals and companies the success of innovation is depending on two fundamental abilities.

1. Internal innovation ability and
2. Ability to integrate external resources and competencies.

Within businesses, an increased level of competence and internal development will contribute to the innovation ability of the companies. At the same time possible lacks in the internal innovation ability can be complemented by the ability to integrate external resources/competences. However the success of innovation is also dependant on appropriate supporting structures – of formal or informal nature.

Lacks within the companies regarding these two types of competences will result in an internal corporate need of a corresponding/matching service demand. Existence and availability of public and private competence bearers hereby becomes very important. Parallel with the industry’s development towards more complex production systems where concepts such as education and competence become more and more important, the concept of innovation has also developed into being regarded in a higher extent as a system of players who integrate each other.

The need of individuals and companies for external support in their innovation processes implies that such external support must be of good quality in order to be beneficiary for the innovation process. Again we can extract two fundamental demands on external partners:

1. The ability to offer high quality services

   Depending on the organisation this will include everything from research competence to market research and intellectual property know-how. In the Communication from the commission – Science and technology, the key to Europe’s future; COM(2004) 353 Final.

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*themselves and the EU (Enterprise DG respectively Regional Policy DG). Within the framework of these projects, thorough analyses have been conducted of the regional firms’ innovation activities and their need of complementary external resources as well as the range and quality of the service portfolio of the innovation support infrastructure. These analyses have been used in order to define regional innovation strategies and design pilot actions.*

*Communication from the commission – Science and technology, the key to Europe’s future; COM(2004) 353 Final.*
European Commission it is stressed that scientific research, technological development and innovation are at the heart of the knowledge based economy

2. The ability to transfer knowledge

In particular the National or Regional Innovation Systems approach stresses the importance of interaction and knowledge flows between users and producers of intermediary goods and between business and the wider research community at the national or regional level for the success of innovations. The most important of these interactions relates to those between firms and knowledge institutions. Innovation performance relies on sharing and exchanging knowledge between partners which are capable of interaction and willing to participate.

When it comes to industry-science linkages many barriers seem to be present though. Some of the more important ones is the academic merit system, which often provides disincentives for researchers to work with companies. Another is the fundamental difference in the view on development projects; Researchers want to understand why things happen as they do, companies want to understand how these thing can be turned into money.

The NSR does not seem to be better off when it come to handling this particular challenge than any other European area. In particular, the relatively scarsely populated area could provide additional drawbacks (e.g. long distances) when trying to foster interaction between players of the innovation process. On the other hand, there could be a large potential in connecting people and organisations in the NSR and also easier to make things happen due to cultural and regulatory similarities.

Solution to challenge:

Make entrepreneurs aware of the potential in collaboration. Supply platforms and arenas for connecting different organisations with each other.

4.1.3 Challenge 3 – Shaping optimal framework conditions

Policy makers strive to foster economic growth and wealth of their respective region (on a regional, national or multi-national level). It is no longer the key responsibility of policy to ensure fair play within well-defined system borders. Instead, policy's main responsibility is to ensure competitiveness of the whole system compared to other systems. The role of policy has changed from serving a referee function to becoming the coach respectively manager of their team (system).

The prime objective of policy has become to generate innovation support infrastructures, which are characterized by:

- Need orientation (addressing companies’ demands and latent needs).
  It is crucial to designing support innovation support infrastructures; what they want is a solution out of one hand. Consequently, those organizations which go and map a company’s need (preferably) on site and have the competence to offer a problem solution integrating all necessary competence into one service bouquet will be the most successful. It does not matter whether the organization draws upon in-house competence or partners’ competence.

- Sustainability (strategic adequacy of a time period of ca twenty years).
  In order to heavily invest in innovation, some framework conditions should remain stable. Amongst those factors are the regulations on intellectual property rights and the strategies and services of the support providers (in respect to financial support, technology support

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etc). Whereas the legal framework is rather stable in the North Sea Region, there is an unproductive activism in reshuffling the support infrastructure in some regions. New organizations are created, mergers are conducted, actors change their strategies, and new support schemes are launched at a pace, which makes target group companies become frustrated.

➢ Transparency (knowledge of system participants and system-external players about the strategy, the resources, the competences, the needs of the system).

The RITTS and RIS studies performed in more than 100 European regions between 1994 and 2000 indicate that virtually all regional innovations systems suffer from a lack of transparency. Typically, not even complementary service providers and intermediaries know where the most adequate service offer matching a specific demand can be found. Profound knowledge on which procurement and partnership decisions can be based requires among others are:

- Knowledge about the availability of the offer (e.g. is the provider motivated to deliver? Does the provider have the quantitative resources to deliver?, is the potential provider fully booked already or bound by exclusive agreements?).
- Knowledge about the conditions of delivery (e.g. is an exclusive agreement possible or does the partner insist on publishing rights?, price?).
- Transfer professionalism (e.g. can the provider integrate the client into the innovation process making him understand and own the innovation? Does the provider speak the client’s language?).

Knowledge about the available offer is crucial in keeping transactions costs down and speed up innovation processes. An infrastructure’s appearance can be more or less easy to grasp and overview. We use the term transparency in order to describe its actual success in communicating its entries and communication channels, its ethics, its competencies etc to its target groups. A high transparency is mirrored by a thorough knowledge of companies about the infrastructure. In order to highlight that knowledge about each other to a very high degree is the responsibility of the publicly (co-) financed supply side, we prefer the term of transparency to the term of companies’ knowledge about the infrastructure.

➢ System approach (connectivity of players, exploitation of synergy potentials, achieving high integral quality, cross-disciplinary and cross-sector work).

In order to effectively and efficiently pursue strategic innovation targets, it is crucial that the respective innovation-supporting organizations is well co-coordinating its different measures, thus achieving synergy potentials and avoiding redundancies and conflicts. This does not mean that ideas should not be allowed to compete against each other, but it means that the organization runs a communication system, which secures effective interaction between relevant departments and entities. More difficult to achieve, but as important to reach integral quality of the innovation support system is the inter-organizational embeddedness of an organization respectively an approach.

➢ Critical mass (dedication of sufficient resources to strategic issues).

A high number of public and semi-public organizations populating the innovation system is indeed an indication of potential efficiency problems but does not necessarily have to be a problem of its own if these organizations are well-coordinated and if each of them have sufficient resources to achieve set objectives. The problem facing many European regions might not be the sheer number of organizations involved in innovation but the fact that so few players have what we call a critical mass of their own.

\[\text{Solution to challenge:}\]

Better integration of politicians in innovation strategy development, network public and private innovating supporting organisations, increase transparency of the innovation-supporting

\[\text{RITTS=Regional Innovation Technology Transfer Strategies and Infrastructure. RIS=Regional Innovation Strategies}\]
4.2 Some more concrete challenges for facilitating innovation in the NSR

4.2.1 Promoting the NSR as one region

Today the NSR is not considered to be a natural region for facilitating innovation. In this respect the Baltic Sea Region is much further even though much work remains before concrete effects can be seen. However, considering some key facts such as:

- Similarities in culture and societal scripts
- Common competence strongholds
- Geographical proximity

There seem to be a good common ground also for boosting and promoting innovation-related activities in the NSR. This work must consider the necessity to establish networks, trust and a track record of joint activities. It might therefore be wise to continue to build on some of the innovation-project with NSR-participation that have been funded through other EU-sources. A list of such projects can be found in:

4.2.2 The need for speed and change of mind-set

Innovation processes are accelerating. A better time-to-market ratio with innovative niche products is an important factor in competitiveness. At the same time, the required technology and the know-how needed is harder to get. Trends such as outsourcing, work in big supplier-networks and globalization have distributed the knowledge needed among various actors in different places. Furthermore, entrepreneurs and scientists have become “two sides of the same medal”. Successful innovation relies on sound research and professional entrepreneurship. In addition, technology has to be seen in its social and ecological context: Demand-led innovations are even more crucial than supply-led technological innovations. All innovations must meet a market demand to be successful. Technologies can create their own market but it takes much longer and costs much more. Therefore, knowing about the needs of people is the key to developing an innovation. Information about the demand delivers strategic intelligence, which is essential for innovations and competitiveness in the future.

It is important not to be restricted to instruments and tools. One should also be aware of the importance of a process in itself, making actors think about the future and the implications of future developments. The actual process of using an instrument or tool is often more important than the qualities of the tool itself. One should focus on encouraging potential actors to take part and to try the process (be it Foresight or Technology Transfer (TT)). This is the best way of getting them to realise the importance of Foresight and TT and encourages them to try. It is the doing which creates confidence and commitment. The technology is rarely the problem when it comes to implementation. This seems to be especially important for public bodies. Traditionally, they were in a dominant position of power, but the picture has changed. Today, in order to govern successfully, an administration must be aware of future developments and their consequences for local politics. It is not only globalisation that has undermined the power of national or regional politics.

4.2.3 Networks and social capital

The future will bring interlinked centres of trans-regional technological, scientific, social and entrepreneurial excellence. Trans-regional knowledge transfer between enterprises, universities and technology organisations will become usual practice. Clusters will be trans-regional, since small regions cannot survive on their own. Regions will essentially be defined by competence. Thus is needed is active interfaces and promotion of supra-regional cooperation to foster regional competitiveness and a world class connectivity for local partners. Improved direct communication between disciplines will facilitate interdisciplinary work. The increasing multidisciplinary nature of...
new technologies may be tackled by combining specialised competences of some regions. Co-operation will be needed in order to have more and competitive patents.

To build up social capital and trust is highly important for functioning co-operations. The future is cooperation and integration, sharing of information, resources and knowledge. Networks are used also to build the critical mass of resources (mainly professional and financial) needed to pursue the scientific development of some emerging technologies (such as nanotechnologies). A region embarking upon these R&D themes by itself may waste resources due to its inadequacy with respect to the S&T goals and the lack of critical mass within the region itself.

4.2.4 Institutional landscapes, funding and education

The roles of the regional actors will change, there will be much more trans-regional cooperation. Hence new instruments are needed. This is especially true when seen against the background of the European Research Area (ERA). The role of the regions will alter in respect to the challenges arising from the ERA. Innovation research has shown that innovations occur at the interfaces between disciplines and sectors. This leads to a significant change in the way we manage innovations: The focus of attention shifts from isolated research in one institution to a network of competencies all crucial for an innovation. In other words, one has to open up the boundaries between institutions and build direct links between the competencies within each of the institutions. These links will make the interfaces productive. In consequence, all institutions involved in innovation processes will face a tremendous change in their organisations’ self-understanding and development. An age of networking has started and it will dissolve the big institutions we know today. Public bodies will often see themselves in the role of a facilitator, initiating and steering innovation processes between partners.

The availability of joint funding for collaborative strategic processes such as TTT is important. In addition, more funds for training and new business development should be made available. However, funding must be flexible enough for new demands in technology. What is needed is a simple non-bureaucratic innovation funding system. Where co-operation is seen as important, then there also should be funding for the management of co-operation.

Training and education is the key to strengthening collective learning capacity by developing competence in political institutions. Indeed, this is done already in a growing number of universities. However, it is pertinent to provide training in TTT and multidisciplinary work, especially for those responsible for innovation processes (entrepreneurs, senior administrators etc). This of course means that those people with responsibility should have a chance to learn without having negative consequences for their careers when mistakes are made. This could be done for example using software-based “innovation games” that are based on indicators of success of trans-regional innovations. Businesses do not want people with only technical skills that may but trans-functionality.

4.2.5 Some key questions related to the challenges

- Is there a win-win solution for co-operating between regions that also are competitors? This question is especially difficult and pressing in an environment of market-competition. Successful co-operations are win-win solutions. They rely on trust. But, how is trust built trans-regionally? What are instrument which could help?

- Successful innovation needs the best know-how available world-wide. Yet, knowledge is distributed more and more broadly among diverse actors. How can a new model of knowledge and technology transfer help to bring this knowledge together and make it productive?

- It is agreed that regions are important for the making of innovations. This study emphasises trans-regional knowledge and technology dissemination. However, what is a “region”? It is possible to define a region from very different points of view (politics, economics, cultural, etc.). A region might be understood as a functional rather than geographic entity, which means that it is defined by the way actors in a given space interact. Silicon Valley is understood and known as a region not because of its geography but due to its IT-clusters.
Knowledge and technology transfer is to a considerable degree dependent on the co-operation between public and private bodies, due to the fact that innovations are very often developed by alliances of very different partners. Thus, is Knowledge and technology transfer always a public-private partnership (PPP) or should it be that way?

Is it possible to bring together all relevant partners across national and cultural borders? Can this be done efficiently and be a basis for a high output in knowledge and technology transfer? Could one develop platforms which continuously gather strategically relevant issues for cross-boarder knowledge and technology transfer?

Is it possible to motivate companies to do engage in knowledge and technology transfer and to get them to use new technologies? Many companies do not see the need, or do not have the capacity, to innovate.

4.3 Horizontal challenges

Depending on location and involved people the conditions for innovation are different. The question to ask is how equal opportunities and access to new and existing opportunities can be secured. In order to address this some examples of good practise are presented. These include:

- Development in rural areas - The outcome from a rural innovation summit in Canada (with huge areas and relatively small population and an ambitious plan for innovation in rural areas) is presented.
- Equal opportunities - Good practice from programmes in Wales and Nordrein-Westfalen are presented.

These outlooks show how these challenges could be tackled. The examples give valuable input to the future North Sea Programme.

4.3.1 Development in rural areas

The passage is based on the outcome of a rural innovation summit held in Portage la Prairie 2002 that brought together about 100 participants from rural communities and regions throughout Canada. Four facilitated workshop sessions were held during the Summit. These workshop sessions were developed around the main themes of Innovation and Skills and Knowledge. The four most relevant themes include:

Need to strengthen partnerships

Building strong rural communities is a matter of partnerships. The rural representatives in Canada, stress that all levels of government need to coordinate their programs better and work together more effectively and efficiently. An important thing is that stakeholders are encouraged to participate in various partnerships at the community level. To achieve this, the governments could offer some incentives for those stakeholders (through appropriate policies, grants, subsidies, and assistance or taxation incentives).

The partnerships must be inclusive with the opportunity for marginalized groups such as youth and other economically disadvantaged residents to participate fully in them. At the same time, more economically powerful, including large corporations and successful businesses, must also be involved in these partnerships.

Lack of local research on innovative responses to rural circumstances

Research is required to identify innovative responses to the circumstances, including both problems and opportunities, facing rural communities and minority groups. A suggestion from the rural representatives is that the federal government should take part in supporting research through direct support to, and encouragement for, academics, corporations, community organizations and government researchers to carry out their research in full partnership with all stakeholders at the community level in the rural areas.

18 www.innovation.gc.ca
Inadequate information on the abilities and skills of their own residents

In order to take full advantage of the skills of their residents, rural communities need to know what those skills are and who possesses them. A suggestion is that human resource surveys should be undertaken on a community and regional basis in order to identify the existing skills available for designing, developing and delivering innovative programmes and activities. The rural representatives stressed that these surveys should be community-driven; however, implementation would require government funding.

Lack of infrastructure (physical, social, financial, economic and telecommunications)

The lack of physical and social infrastructure is a major barrier to economic development in rural communities. Different levels of infrastructure can severely disadvantage rural communities. Many emerging technologies require significant infrastructure, such as high-speed, broadband access to the Internet through affordable satellite connections or landline fibre optics. The federal government has a typically important role to play in this area. Unless the federal government works with the communities to ensure they have equal access to telecommunications infrastructure, those communities would fall further behind in their efforts to utilize new technologies to strengthen rural areas. Technology offers both opportunities and challenges to rural communities. Those opportunities include the:

- ability to break down barriers of distance and isolation;
- effective provision of services such as education, training and tele-medicine;
- ability to establish e-businesses; and
- improved communication between stakeholders.

In order to utilize new technologies, rural residents require:

- information on the technologies;
- ongoing training in the use those technologies;
- new equipment for those technologies; and
- high-speed, broadband access.

The challenge - and the fear - is that without these requirements in place, much of the emerging technologies will be unavailable to many rural residents and businesses and they will fall farther and farther behind.

4.3.2 Equal opportunities

Two examples pinpoint the challenge in implementing approaches fostering a climate and structure where equal opportunities can be secured.\(^{19}\)

### Wales - Information and education as a tool

**Background - Objective 1 programme in Wales**

- **Total program turnover:** 3,9 billion Euro (1,9 from EU-funds)
- **Inhabitants in the region:** 1,9 million
- **Horizontal goals:**
  - Equal opportunities
  - Stable environmental development
  - ICT, information and communication technology

Horizontal goals are highly valued in the program. About one fourth of the questions dealt with

\(^{19}\) The information for the Objective 1 programme in Wales and the objective 2 programme in Nordrhein-Westfalen is derived from the evaluation “tre strategier för hållbar utveckling” available at www.nutek.se
Updating Norvision – Facilitating Innovation

when judging projects consider these goals. A concrete example of the horizontal goals is that the gender quotation among working groups planning-, carrying out- and supervising projects shall preferably be 50/50 and at least 40/60. The importance of joining minority groups and disabled is also mentioned. Further, an environmental goal is a 20% reduction of the discharge of carbon dioxide. This shows a traditional approach with fixed objectives. The news presented in this programme is the focus on information to the applicants and education/support to the officers handling the applications.

**Information and education**

The secretariat argues that, to receive project applications that consider the horizontal goals it’s important to inform the project owner about these goals. Information is the key. In Wales, such information is available on the internet. Furthermore, to ensure that the goals are taken into consideration, the project applications are written in a dialog with local partnership, covering the whole geographic area of Wales. In this way, most of the work is done when the handling officer receives the application. The partnerships as well as the handling officers are educated in the horizontal goals. This means that there is a frame of reference in place when questions arise. In need of expertise, the applicants can contact experts within the different areas of the horizontal goals. There are two experts for each horizontal goal and these experts are the ones educating the handling officers and the partnerships. In all this fosters a constructive dialogue that adds content to the concrete objectives. This way of informative- and educative work has many advantages such as:

- It’s a good way to improve the understanding of the horizontal goals among, not only the project owners but also the decision makers. A common understanding is essential for the development of the projects.
- It increases the quality of the applications, especially in such regions where the competitions is low and other methods must be used in order to improve the quality of the applications.
- To have experts working with the different goals shows that the horizontal goals are important for the program. These experts deliver necessary knowledge to the program and act as a driving force improving the motivation among involved people.
- To demand high quality of the applications is essential not only for the further progress of the projects but also for the democratic right to be equal treated. By having local partnerships helping the applicants, this right is better maintained.
- When access to information and knowledge becomes easier, more projects ought to start which would increase the funding competition. In the long term, this would result in improved implementation of horizontal goals in the projects and also secure future funding.

Nordrhein-Westfalen – Clustering projects according to horizontal challenges

**Background - Objective 2 programme in Nordrhein-Westfalen**

- Total program turnover: 3,5 billion Euro (970 millions from EU-funds)
- Inhabitants in the region: 2,8 millions (1997)
- Horizontal goals: Long-term- and environmental development
  - Equal opportunities for men and women at work
  - The integration of vulnerable groups in the renewal process of the industry
  - Orientation towards innovation and preparedness for the information society

It is stated that the horizontal goals are part of the Governmental states politic and shall be taken into consideration in all program activities. The horizontal goals are also part of the development.
strategy of the program. Due to the heavy industry in the area, all projects are revised from an environmental and ecological point of view. A concrete goal is that at least 50% of the projects shall contribute to a better environmental situation or understanding of and knowledge about the environment. The approach in Nordrein Westfalen is based on concrete indicators that can be used to group projects that face similar horizontal challenges. This fosters an internal learning process in between project owners and stakeholders.

**Clustering projects according to the horizontal challenges**

When applying, projects with expenses larger than 100 000 Euro have to answer a questioner where the horizontal goals are taken under particular consideration. The questioner is an expansion of the application and also a checklist for project owner and handling officers. It's used for programme/project controlling and to strengthen the quality of the projects. Examples of questions are

- The estimated number of women in the total number of work- and student opportunities resulting from the project.
- Whether the project contributes to better equality, for instance by women in important project positions, possibilities to part-time work and parental leave
- Whether or not vulnerable groups are integrated in the project and what the support for these groups look like
- If the project contributes to a long-term environmental development looked at in different aspects such as ground, water, air etc.

What indicators to use, must be evaluated in each project separately. These depend on the conditions of the region and prior experiences of program implementation. The indicators can be used to categorize those projects fulfilling the horizontal goals and those who don’t. Furthermore, those projects fulfilling the goals could be ranked with a low-, mid- and high value depending on how well the horizontal goals are fulfilled. By using this kind of classification in the program document, the program could formulate concrete goals in which, for instance, the number of projects that ought to be supported in the different classes are defined. The classification can support grouping of projects that face similar challenges regarding environment, equality and integration. A classification of projects in different categories can ease the follow up and evaluation of projects over time and form the basis for learning activities between projects and stakeholders. This could be done in a trans-national scope in the future North Sea Programme.
5 Stakeholders and innovation capacity in the North Sea Region

Approximately 500 stakeholders for innovation in the North Sea Region\textsuperscript{20} have been identified and mapped. Their geographical distribution is visualised by the map below.

The number of potential stakeholder shows that there is a huge potential for possible cooperation in the North Sea Region. Another interesting observation is that many of the stakeholders are situated close to cities or universities.

\textsuperscript{20} Contact details can be provided as a separate document
5.1 **Innovation capacity of the North Sea Region**

The North Sea Region is a European stronghold when it comes to innovation capacity and also innovation performance. The North Sea Regions belong to innovation superpowers of Europe such as the UK, Germany and Sweden. Having a glance at the 2004 European Innovation Scoreboard it becomes obvious that in its ambition to implement measures aiming at supporting innovation the Interreg IIIA programme could easily act in a less receptive area.

The Scoreboard consists of several indicators reflecting the relative position in areas such as knowledge, patenting, information and telecommunication technology etc. Each of these indicators measures some characteristics of the economies and innovation systems. This gives us the opportunity to characterize the countries involved in the North Sea Programme. In addition to this a comparison with the US and Japan is presented. In all this gives an indication of the global competitive scope in which the North Sea Region and its nations and regions compete.

The indicators and their variables are presented as indexes related to EU average below:

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21 The scoreboard and underlying documents can be accessed via [http://trendchart.cordis.lu/tc_innovation_scoreboard.cfm](http://trendchart.cordis.lu/tc_innovation_scoreboard.cfm)
5.1.1 Knowledge – Human capital

Knowledge

This indicator is based on the indexed variables:
- S&E graduates (% of 20 – 29 years age class),
- Population with tertiary education (% of 25 – 64 years age class),
- Participation in life-long learning (% of 25 – 64 years age class).

These set of indicators mirror a region with a strong knowledge base, especially when it comes to lifelong learning. The exceptions in these categories are Belgium and Germany which have a weaker position than the EU average.

5.1.2 Employment in the high tech sector

Employment High-Tech

This indicator is based on the indexed variables:
- Employment in medium- high and high-tech manufacturing (% of total workforce),
- Employment in high-tech services (% of total workforce).

The focus of companies in the high tech sector is on services rather than manufacturing in all of the North Sea Countries. This is consistent with the strong knowledge base in the region.

5.1.3 Patents

Patents

This indicator is based on the indexed variables:
- EPO (European Patent Office) high-tech patent applications (per million population),
- USPTO (US Patent Office) high-tech patents granted (per million population),
- EPO patent applications (per million population),
- USPTO patents granted (per million population).
The North Sea Region is a stronghold when it comes to patents. The core countries are Sweden, The Netherlands, Denmark and Germany which show an index 1.5-4 times higher than the EU average. Norway and Belgium (as a whole) lags behind in this category.

5.1.4 Innovation among SMEs

This indicator is based on the indexed variables:
- SMEs innovating in-house (% of all SMEs),
- SMEs involved in innovation co-operation (% of all SMEs),
- Innovation expenditures (% of total turnover),
- SMEs using non-technological change (% of all SMEs).

The indicators reflecting the innovativeness in SMEs varies a lot between the North Sea Countries. This could be explained by the different industry structures. Sweden and the Netherlands are small countries with a lot of large companies. On the other hand we have Denmark with a strong SME base. Germany and Great Britain have a mixed base. The different structures have most probably influenced policy makers and the support structures/initiatives in the North Sea Region. Experiences of different approaches towards SMEs could be a valuable source of knowledge for national exchange of good practices etc.

5.1.5 Venture Capital

This indicator is based on the indexed variables:
- Share of high-tech venture capital investment,
- Share of early stage venture capital in GDP.

The venture capital markets in the North Sea Region differ from country to country. Denmark and Germany have the strongest Venture Capital markets in the High Tech Sector. Sweden, Denmark, the UK and Norway have the most developed Venture Capital markets in the early stage. Once more one sees that an exchange of good practice and experience could be beneficial to the North Sea Region as a whole.
5.1.6 Sales – New products

Sales - New products/services

This indicator is based on the indexed variables:

- Sales of ‘new to market’ products (% of total turnover),
- Sales of ‘new to the firm but not new to the market’ products (% of total turnover).

Most countries in the North Sea Region seem to have lessons to be learned when it comes to selling products on new markets (new markets and markets that are new to the company selling). This shows that identifying and working up new markets should be areas of common interest to the whole North Sea Region.

5.1.7 R&D Spending

R&D Spendings

This indicator is based on the indexed variables:

- Public R&D expenditures (% of GDP),
- Business expenditures on R&D (% of GDP).

In terms of public R&D spending one can recognise that the UK and Belgium are lagging behind. The other countries invest more than the EU average. Business spending on R&D varies quite a lot. The outstanding example is Sweden with 2.5 times higher index than the EU average. Other big spenders are Denmark, Belgium and Germany. Businesses in Norway, The Netherlands and the UK are spending less than the EU average. All countries in the North Sea Region besides Sweden spend less than the US and Japan (This holds true for public and business spending).

5.1.8 Information and communication technology

This indicator is based on the indexed variables:

- Internet access (composite indicator),
  - Level of internet access - % of enterprises who have Internet access,
  - Level of Internet access - % of
households who have Internet access at home,

- ICT expenditures (% of GDP).

The IT and telecommunications infrastructure is strong in the North Sea Region. With a few exceptions all countries shows a stronger position than the EU average.

### 5.2 Involvement in innovation-related EU-funded projects

Since the early 90’s the European Commission has been launching programmes within the framework of the Research and Technology-framework programmes. During the late 90.s there was a significant push towards international co-operations within these programmes. Funds have been available not only within the Research programmes but also from the Structural funds, in particular through the so-called “Innovative Actions”.

In the following an overview of the participation of the North Sea-regions in a selection of EU-funded programmes is provided. The description does not have the ambition to be complete. There are other programmes not considered here and new ones are launched continuously.

#### 5.2.1 Thematic networks

14 so-called Thematic Networks have dealt with subjects of interest for groups of regions during the period 2001-2004. Their aim was to help regions that were designing or implementing regional innovation strategies to gain knowledge of successful schemes in other European regions.

<table>
<thead>
<tr>
<th>Network</th>
<th>NSR-participation</th>
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<tbody>
<tr>
<td>ACENET brought together regional organisations interested in the development of processes and methodologies to set up and manage clusters and company networks.</td>
<td>Oslo, NO; Western Sweden, SE</td>
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<tr>
<td>The 11 regional organisations that were members of BASAN exchanged good practice in the promotion of commercial activities based on agriculture raw materials in the rural areas of the Baltic Sea region.</td>
<td>Bornholm, DK</td>
</tr>
<tr>
<td>BIGEAR aimed to understand and disseminate best practice in the effective exploitation of academic research to stimulate business growth.</td>
<td>Groningen, NL</td>
</tr>
<tr>
<td>CAFÉ brought together 16 regions whose regional authorities wished to improve the economic performance and competitiveness of their food industry.</td>
<td>East of England, UK and Yorkshire and Humber, UK; Trøndelag, NO</td>
</tr>
<tr>
<td>CRESCENDO brought together regional stakeholders with an interest in developing programmes and strategies that improve the conditions for SMEs to access growth finance.</td>
<td>Weser Ems, DE</td>
</tr>
<tr>
<td>The aim of CRO-BO-BU-CO was to boost regional authorities’ capacity to support cross-border business co-operation between EU and NAC regions.</td>
<td>None</td>
</tr>
<tr>
<td>INNOBA investigated ways of helping SMEs to overcome innovation barriers. The network mapped and analysed processes that encourage and discourage the acceptance and implementation of innovation in small and medium-sized companies.</td>
<td>Ringkoebing, DK; West Lothian, UK</td>
</tr>
<tr>
<td>METROPOLIS brought together 13 regional organisations dealing with innovation strategies in Large Metropolitan Areas in order to support the formulation and design of innovation schemes.</td>
<td>Oslo, NO; Rotterdam Zuid-Holland, NL</td>
</tr>
<tr>
<td>PARTNER provided support and opportunities of exchange of experience to regions that carried out Regional Innovation Strategy (RIS) projects in Associated States during the period 2001 – 2003.</td>
<td>East of England, UK</td>
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<tr>
<td>ProWomEn aimed to promote women’s entrepreneurship and encourage regions to support women in exploiting their entrepreneurship potential and starting their own companies.</td>
<td>Yorkshire and Humber, UK;</td>
</tr>
<tr>
<td>The objective of SAIL was to facilitate the trans-national exchange of knowledge</td>
<td>Western Sweden, SE;</td>
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and experience about academic and industrial co-operation between regions.

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<tr>
<th>SCOME promoted the exploitation of academic knowledge as a way to create new ventures and to bridge the regional scientific-technological supply with the productive system.</th>
<th>Western Sweden, SE; Flanders, BE, Western Sweden, SE; Ringkøbing and Fyn, DK; Bremen and Schleswig-Holstein, DE</th>
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<tbody>
<tr>
<td>The members of STRINNOP collaborated to define their regional innovation profiles and create a model that would allow them to increase the attractiveness of their regions and the competitiveness of regional SMEs.</td>
<td>Flanders, BE, Western Sweden, SE; Ringkøbing and Fyn, DK; Bremen and Schleswig-Holstein, DE</td>
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</table>

5.2.2 Regional Innovation and Technology Transfer Strategies and Infrastructure (RITTS)

The RITTS (Regional Innovation and Technology Transfer Strategies and Infrastructure) projects aimed to support regions to develop regional innovation strategies that would enhance regional innovation and competitiveness through optimising innovation policies and infrastructure. The RITTS projects were funded by Enterprise DG under the Innovation Programme. 70 regions have been supported to formulate regional innovation strategies with RITTS projects. The projects used a common methodology based on three main elements: consensus-building among key actors within the regional innovation system, analysis of the regional innovation system, and the development of widely endorsed policies and strategic frameworks on innovation support. They enabled regions to implement new initiatives and services that meet regional needs, in particular those of SMEs. The following North Sea regions carried out a RITTS-project:

- Flanders, BE
- Aarhus and Greater Copenhagen, DK
- Bremen, Hamburg and Lüneburg, DE
- Noord-Holland, Overijssel and Rotterdam, NL
- Oslo and Western Norway, NO
- South Sweden and Western Sweden, SE
- East Midlands, East of England, North East England and Highlands and Islands UK

5.2.3 RIS/RIS+

The RIS (Regional Innovation Strategy) projects aimed to support regions to develop regional innovation strategies that would enhance regional innovation and competitiveness through optimising innovation policies and infrastructure. The RIS projects were funded by Regional Policy DG. 32 regions have been supported to formulate regional innovation strategies with RIS projects. The projects used a common methodology based on three main elements: consensus-building among key actors within the regional innovation system, analysis of the regional innovation system, and the development of widely endorsed policies and strategic frameworks on innovation support. They enabled regions to implement new initiatives and services that meet regional needs, in particular those of SMEs.

25 RIS+ projects, financed by Regional Policy DG, were carried out to support regions to implement specific measures and projects stemming from their RITTS/RIS strategies. North Sea Region participation were

- RIS: Weser Ems, DE; Yorkshire and Humber, UK; Overijssel, NL
- RIS+: Weser Ems, DE; Yorkshire and Humber, UK

5.2.4 TRIPS

The Trans-Regional Innovation Projects (TRIP) focused on the implementation of measures based on the outcomes of RITTS and RIS projects in participating regions. The ultimate goal was to support innovation in firms, by joining forces and comparing exercises in several regions. The projects involved key regional players, and their results were expected to benefit local or regional
small and medium-sized companies (SMEs). Eleven projects, gathering altogether about forty regions, were carried out.

<table>
<thead>
<tr>
<th>Project</th>
<th>NSR participation</th>
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<tr>
<td>APPLICOM started in 1998 and its mission was to promote the sustainable growth of innovative SMEs. It was developed around three strategic lines: 1. enhancement of the provision of information to companies, 2. financing the creation of innovative companies and 3. Good practice exchange in technology transfer and the financing of innovation</td>
<td>Hamburg, DE</td>
</tr>
<tr>
<td>The aim of DELCOSI (Development of a System of Transregional Mutual Support in Creating New Innovative Companies on the Grounds of Advanced Scientific Infrastructure) was to highlight the need to support innovation processes in the fields of commercial exploitation of R&amp;D results, technology transfer by staff placements, and corporate development.</td>
<td>Bremen, DE</td>
</tr>
<tr>
<td>The Trans-Regional Innovation Project ‘INFOACT – Diffusion of Economic Intelligence for SMEs’, was carried out by five regions that shared a common problem, namely that SMEs had difficulty accessing the necessary key information (markets, technologies, finance, regulations) to make strategic decisions. The INFOACT project had the following objectives: to promote the use of Economic Intelligence (EI) amongst SMEs; to investigate existing tools to implement EI; to develop, test and validate the relevant methodological tools; and to create a regional and trans-regional network of actors involved in EI processes.</td>
<td>Yorkshire and Humber, UK</td>
</tr>
<tr>
<td>The regions of Northern Finland and Northern Sweden are sparsely populated areas, which face very similar problems. Building on the experience of the RITTS project carried out in North Sweden (1994-96) and the RIS Northern EU (1997-98), NORTHERN EU set out to address the regional problems involved in networking and exchanging research results from a trans-regional perspective.</td>
<td>None</td>
</tr>
<tr>
<td>The Trans-Regional Innovation Project “PEP - Partners Ensuring Progress” had the following principal objectives: to implement regional measures defined in the RIS/RITTS projects to support innovation in SMEs; to transfer successful schemes among the partner regions; and to create a good practice network for European transregional co-operation in the field of innovation.</td>
<td>Schleswig-Holstein, DE; South Sweden, SE</td>
</tr>
<tr>
<td>The objective of SESAMES – Serving Subcontractors in the Automotive Sector – was to support subcontracting companies in the automotive sector through innovation and technology transfer services. The partners intended to identify barriers and key success factors for successful subcontracting relationships, and to collect and disseminate relevant information about technologies, markets, competition and framework conditions.</td>
<td>Weser-Ems, DE</td>
</tr>
<tr>
<td>The Transregional Innovation Project “AUTOCHAIN – Automotive Supply Chain” was carried out by three regions which all have one factor in common, namely the automotive industry. The Autochain project was to improve the performance of the supply chain in these regional automotive sectors.</td>
<td>None</td>
</tr>
<tr>
<td>The aim of the project TEURPIN was to improve trans-regional technology transfer using previously identified best practice methodology and the RIS/RITTS strategies developed within the participating regions. The objective of TEURPIN was to provide a working ‘network’ of trans-regional support between the partners, building on existing skills and experience.</td>
<td>None</td>
</tr>
<tr>
<td>The objective of TRESP – Trans Regional Services Support Programme – was to support the growth and development of high added value service enterprises. It aimed to develop and test new approaches and methods to support growth in European service companies.</td>
<td>None</td>
</tr>
</tbody>
</table>
5.2.5 Innovative Actions

The European Regional Development Fund (ERDF) ‘Innovative Actions’ for the period 2000-2006 aim to enhance innovation and research and development (R&D) activities, as well as use of new information and communication technologies, in less-favoured regions. The Innovative Actions focus on three strategic themes:

- Development of the regional economy based on knowledge and technological innovation
- E-Europe Region: information society serving regional development
- Regional identity and sustainable development

All regions at least partly covered by Objective 1 or 2 programmes can submit programme proposals, focusing on one single strategic theme or on a combination of them. In addition to the regional programmes, three networks have been launched to foster co-operation between regions, and to share experiences and good practices from their Innovative Actions programmes, in the fields of: Knowledge and technological innovation, Information society and Sustainable regional development.

A number of regions have taken advantage of the first strand (knowledge and technological innovation) to fund the implementation of actions stemming from their Regional Innovation Strategy projects. Others have used the Innovative Actions as an opportunity to develop innovation strategies and schemes. North Sea Regions participation in the Innovative Actions are:

- Vlaanderen, BE
- Denmark
- Schleswig, Bremen, Hamburg and Niedersachen, DE
- Overijssel, Groningen, Friesland, Noord-Holland, Zuid-Holland, Zeeland and Flevoland, NL
- Västsverige and Sydsverige, SE
- East Midland, Yorkshire, North East and Eastern, UK

5.2.6 Regions of Knowledge

Launched by the Research Directorate-General of the European Commission in August 2003 at the request of the European Parliament, the Regions of Knowledge Pilot Action promotes the active involvement of local players in designing and shaping regional knowledge development models. The Regions of Knowledge Pilot Action aims:

- to enhance regional research strategies, and promote clustering and public-private partnerships between regional authorities, universities and industry;
- to demonstrate the crucial role of knowledge in regional development;
- to support the goal of the European Research Area (ERA) to make Europe the most fertile ground for technology-based regional economic development in the world.

14 pilot projects have been selected to take part in the Regions of Knowledge initiative. These projects help build or sharpen regional research and innovation strategies; strengthen regional public-private partnerships; lay down links between researchers, companies and financial institutions; and promote networking between technological innovators in various European regions. They fall into four specific areas:

- **Technology Audits and Regional Foresight**: Analyse the regional economy and its technology fabric, and identify future development scenarios (BRIDGE, IN.TRACK, MAREDFlow, MetaForesight, and REKNOMA projects)
- **University-driven actions for regional development**: Demonstrate how universities can act as important technology relay points by providing expertise to local companies and public institutions, by stimulating technology creation and uptake, and by creating spin-off companies (Baltic Sea-KR, BlueBioNet, COHERA, and SPIDER projects)
Updating Norvision – Facilitating Innovation

- Mentoring initiatives: Help set up networks between technologically advanced and less favoured regions (Demand Knowledge, MentorChem, and SMERNA projects)
- Supporting activities: Promote the organisation of workshops or conferences to raise awareness on the importance of technology-based regional development (ERRIN and NEKS projects)

<table>
<thead>
<tr>
<th>Project</th>
<th>NSR participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRIGES:</td>
<td>None</td>
</tr>
<tr>
<td>MAREDflow:</td>
<td>Institute of Shipping Economics and logistics, Bremen, DE and Administratie Waterwegen en Zeewezen; Flandern, BE</td>
</tr>
<tr>
<td>IN-TRACK:</td>
<td>None</td>
</tr>
<tr>
<td>REKNOMA:</td>
<td>Veje amt, DK</td>
</tr>
<tr>
<td>META Foresight:</td>
<td>None</td>
</tr>
<tr>
<td>COHERA:</td>
<td>None</td>
</tr>
<tr>
<td>SPIDER:</td>
<td>Z_punkt GmbH, Weser Ems, DE</td>
</tr>
<tr>
<td>Baltic Sea-KR:</td>
<td>Lund University, Region Skåne, SE, University of Copenhagen, Kobenhavns amt DK, Hamburg Innovation, Hamburg, DE</td>
</tr>
<tr>
<td>BlueBioNet:</td>
<td>None</td>
</tr>
<tr>
<td>MentorChem:</td>
<td>None</td>
</tr>
<tr>
<td>SMERNA:</td>
<td>Lund University, Region Skåne, SE</td>
</tr>
<tr>
<td>Demand Knowledge:</td>
<td>Marketing Interactive UK Ltd, Suffolk UK</td>
</tr>
<tr>
<td>ERRIN:</td>
<td>Free Hanseatic Bremen, DE and Scotland, UK</td>
</tr>
<tr>
<td>NEKS:</td>
<td>University of Durham, Tees valley and Durham, UK</td>
</tr>
</tbody>
</table>

5.2.7 Geographical presentation of NSR participation in EU-programmes

Thematic Networks

RITTS
5.3 Competence areas in the North Sea Regions

In the North Sea Programme Area there are participating seven states consisting of 44 regions. Strong competence areas (clusters is a common term used in regional strategy plans) have been identified in all of these administrative entities (in national and/or regional strategy documents and mapping studies). All the national and regional sector foci have been combined and mapped in order to find common industrial strongholds in the North Sea Region. The result of this meta analysis is a grouping into five sectoral areas that have been identified as the areas that are particularly strong in the whole North Sea Region:

- Competence areas thriving the technological forefront
- Competence areas related to natural resources such as wood and food
- Competence areas deriving from excellence in engineering
- Competence areas within areas such as advanced services, creative industries and tourism
Updating Norvision – Facilitating Innovation

- Competence areas related to energy - including the petrochemical industry as well as renewable energy

Each of these competence areas shows a strong industrial presence and a merited research base in terms of public research organizations within the area. Some of the competence areas also have important key markets within the North Sea Region. These three components

1. strong business sector,
2. strong research base and
3. key markets,

combined with the fact that the areas are pointed out in regional and/or national strategy documents, supports the assumptions that this is in deed areas with particular spatial concentration in the North Sea Region. This doesn’t mean that the value chains stops at the administrative boarders, but rather that the citizens in the North Sea Region are highly dependent on these sectors.

One must also mention that there are additional competence areas that have been mentioned in the regional strategies and competence mapping studies in the North Sea Region. Included among these additional areas are various sectors such as Textiles, Knitwear, Woollens, Aluminium and stainless steel, Metalworking, Steel and Manufacturing, Metal products. The importance of these areas to certain regions are not to be ignored, however the importance to the North Sea Region as a whole is less obvious.

The five strong areas are visualised and further categorized below.

5.3.1 Competence areas thriving the technological forefront

In the North Sea Region there is a high concentration of a set of competence areas thriving the technological forefront in today’s society – Information and communication technology, life sciences and new materials (nano and micro technologies). The focus areas identified in the regional strategies and/or competence areas mapping studies show that there is an almost complete coverage in the North Sea Region within these sectors. The different focus areas have been grouped according to the following structure:

- Information and communication technology - Information and Communication Technology, Electronics, Digital Signal Processing, Web design/internet services, e-Business and Telecom, Simulation Technology and Software development
- Life Sciences - Life sciences, Health, Biotechnology, Natural medicine, Bio science
- Medical Technology - Medical Technology, Medical equipment, Hearing aids, Handicap aids
- Materials - Nanotechnology, Micro technologies

The results are presented in the pictures below.
Although the coverage in the North Sea Region is almost complete the innovation oriented activities within these future oriented sectors tend to be concentrated to universities and densely populated areas. This stresses the differences between densely populated and rural areas in the region and might generate certain spatial challenges (However, this is a political question to be addressed). The innovation capacity is often linked to large universities, end markets, research institutions and technology/science parks. This derives spatial challenges as sufficient meeting spots, where research, ideas, markets and capital can meet have to be facilitated. Links to other more traditional sectors such as engineering, food etc are also often said to be important in the regional strategy documents. There is a belief that this will induce new innovations and improve the productivity in the traditional sectors. This underlines a challenge in bridging the areas thriving the technological forefront with other more traditional regions.

Another message from the regional documents is that these are sectors that are valued as positioning instruments. A strong base in these sectors seems to be used as an indicator for the advancements towards a knowledge society. It is also an important argument when attracting inward investments within these or other related fields.
5.3.2 Competences related to natural resources such as wood and food

Another set of competences identified in the regional strategies and/or cluster mapping studies are linked to natural resources such as agriculture and forestry. The focus areas identified show that the North Sea Region covers the whole value chain from agriculture (over food industries) to functional food as well as from forestry to paper and packaging industries. This is a strength in these innovation environments. Another strength is the cross-sectoral possibilities with life science, ICT and logistic competencies in areas where these two sectors meet. The different focus areas identified in these documents have been grouped according to the following structure:

- Food and agriculture - Food Technologies, Agriculture, Food, Whisky, Dairy products, Pork, Seeds, Water, Seafood, Food and Meal cluster
- Forestry and Paper - Wood, Paper, Forestry

The results are presented in the pictures below.

The pictures illustrate that the food and agriculture covers the whole North Sea Region, whereas the clusters in forestry and paper are concentrated to the UK and the Scandinavian countries. The innovation capacity in the food industry is particularly strong in regions where the whole value chain is covered. Universities and research centres play an important role, but not to the same extent as in sectors such as IT and life sciences. Many regions stress that there is a lack of linkages between research and business within these sectors. The linkages, in terms of value chains, between rural and densely populated areas are particularly articulated in these sectors. However, the nature of innovation within these sectors varies. In the rural areas, where production in the early stages of the value chain has a strong presence, the innovation activities aim for higher quality and production. In some regions the focus is on health/functional foods and in others areas the innovativeness thrives new concepts linking food to life style concepts (consumer marketing). In some areas, such as Scotland, the food industry (whisky production to be specific) can be linked to tourism and a regional image. The spatial challenge in this lies in connecting rural areas with the knowledge centres and supporting regional branding that could strengthen the competitiveness within this sector.
5.3.3 Competence areas deriving from excellence in engineering

Engineering is a strong stronghold in the North Sea Region when analyzing the regional strategies and/or cluster mapping studies. The different focus areas identified in these documents have been grouped according to the following structure:

- Engineering, Technology, Manufacturing - Manufacturing, Robotics, Mechanical engineering, High-tech engineering, Industrial parts, Power electronics, Instrumentation
- Automotive and machinery - Automotive, Vehicle construction, technology industry, Heavy vehicles, Machinery and industrial equipment, Vehicle safety, Maritime Technologies, Shipbuilding
- Aviation – Aviation

The results are presented in the pictures below.

These industries – such as automotive and aviation - are mature and highly internationalized. The sites with a strong capacity – especially Lower Saxony, Västra Götaland, Hamburg, East Midlands and East Flanders - lean on the production and innovation capacity from many other different regions, worldwide. The value chains are global which means that the regional infrastructure and logistics are very important components to these sectors. As production is very important in these sector it is important to support linkages between research/innovation and production. The automotive industry is highly advanced and sets the standards for other production intensive industries. The location of the production sites are of high importance as these have close cooperation with innovation and research centres. The spatial challenge in this is to allow production to develop and grow more efficient/automized in an environment that seems to abandon hope for these sectors. The invitation shows that there are very competitive production sites in the North Sea Region even though the general understanding is that China is the one production site on the globe. The spatial challenge is to allow the production sites within these cluster to innovate in order to develop in parallel with a growing knowledge economy (The modern production sites are very much based upon and supported by knowledge intensive industries).
5.3.4 Competences within areas such as advanced services, creative industries and tourism

The North Sea Region is a prosperous region with many regional and/or national decision making centres such as Hamburg, Amsterdam, Copenhagen etc and a number of important logistic nodes such as Rotterdam, Antwerp, Gothenburg, Copenhagen. These preconditions reflect the many competences within advanced services, creative industries and logistics. The different regional and national focus areas identified in the regional strategies and/or cluster mapping studies have been grouped according to the following structure:

- Creative industries - Tourism Industry, Culture and Media, Multimedia, Design, Gardening, Graphics, Glass, Diamond industry, Fur, Film, Furniture, Leisure software, Footwear, Education and recreation, Perfume/toiletries
- Logistics - Transport Logistics, Distribution, Water transport-related activities, Packing industry, Logistics
- Advanced services - Back office and customer support functions, Customer support centres, Head Offices, Financial services, PR/Communication, Research and development, Shared service centres, Real estate, Contact centre

The advanced services sectors are very much dependent on the decision centres in the capital and densely populated areas as the business needs to be close to the markets. To some extent these hot spots correlate with transport and logistics nodes in the North Sea Region. The advanced services sector is situated close to the market as this business often depend on face-to-face interactions, good communications and a strong research base. When talking about innovation one sees that these sectors often focus on process and market innovations. One can also argue that these sectors facilitate innovation as they transfer knowledge within and in-between different sectors. When talking about innovation this sector tend to focus on process and market innovations.

The creative industries do have a strong position in many of the regions in the North Sea Region. In the creative industries there are a strong presence lot of small life-style businesses depending on human capital to a large extent. Tourism is another strong sector in the area. Both of these sectors
differ from the traditional industry in many ways when it comes to innovation. The innovations are process and market oriented rather than product oriented. But, still one can see that new technology have a tremendous influence in industries such as film, music and advanced services. To a certain degree one can see that new technologies means that the geographical dimension (i.e. distance) diminish in importance. This could be presented as a spatial opportunity for rural areas.

The logistics, transport and distribution sectors show a steady development. New functions are adapted to these industries as production and manufacturing becomes global activities. New technologies make it possible to produce just in time and use the roads, seas and railways as storages. This requires a solid infrastructure deriving huge spatial challenges.

5.3.5 Competences related to energy - including the petrochemical industry as well as renewable energy

The fifth strong competence are in the North Sea Region includes the energy and the petrochemical industry. This competence area is twofold:

- On the one hand there are regional and national clusters related to the fossil energy resources in the North Sea Basin. These industries represent the backbone of today’s energy system.
- At the same time, on the other hand, there are many regions that have tapped in to renewable energy sources such as wind energy, bioenergy etc.

Clustering these industries together might seem like a contradiction following the energy debate. However, one sees that giants in the off-shore sector such as British Petroleum invest huge amounts in future energy resources and systems such as hydrogen etc. This innovative approach towards the energy systems of tomorrow somehow unites the two energy related competence areas in the North Sea Region. The different regional and national focus areas identified in the regional strategies and/or cluster mapping studies have been grouped according to the following structure:

- Renewable energy - Wind Energy, Energy saving technologies, Cooling/Heating Technology
- Chemicals - Petrochemical industry, Chemical Industry, Plastics, Specialty chemicals
- Off-shore - Oil and gas refineries, Gas and oil exploration
The question to be answered in the years to come reveals a tremendous challenge directly linked to innovation as well as spatial development: What will replace the fossil fuel resources in the future? This question will find its way throughout the whole society: It is a question about how we

- produce energy, store energy, transport energy, use energy and
- about the effects of our usage?

The infrastructures (refineries, petrol stations, harbours) and the interlinked technological systems (the combustion engine, power plants and petrochemical industry) represent enormous investments in resources and knowledge. Today's systems will gradually be replaced as soon as the benefits of a challenging system(s) reach an equilibrium due to economic and/or environmental reasons. This ongoing change has already started with a search for potential solutions. Innovation thrives the development of systems running on biofuel, hydrogen, solar energy, wind energy. Innovation sets new standards on how to produce energy via biofuel, solar energy, fusion, wind energy etc. New energy sources will effect the spatial development as new transport routes and power lines has to be established as the production sites changes.

Another question is about changing fossil fuel as an energy carrier. Wolfgang Reitzle, chief executive of a leading international energy company, announced that “the US, Japan, China and the European Union have focused on hydrogen technology as the most likely mainstay of continued economic development.” Industry, he said, is putting its long-term money on the hydrogen fuel cell. Fuel-cell-powered aircraft, trains, boats and trucks are in development. Car and energy companies are pumping billions of dollars into building prototypes of vehicles and filling stations, while governments are pursuing hydrogen as a potential replacement for car fuel. One realizes that introducing hydrogen as an energy carrier who induce huge spatial challenges in the North Sea Region. One interesting international example to follow in this case is Iceland. The Icelandic Government’s priorities on hydrogen are part of a long-standing policy aimed at increasing the utilisation of renewable energy in harmony with the environment. As a result, the establishment of Icelandic New Energy enjoys full governmental support. The opening of the first hydrogen refuelling station in Reykjavik, which is also the world’s first hydrogen station to be built at a conventional petrol station, is a major step in bringing hydrogen closer to the public and in full concordance with Icelandic Government policy of creating a hydrogen society.

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22 Interview in Financial Times
23 Ministry of Industry and Commerce www.idnadarraduneyti.is
6 Trans-national co-operation – a way to facilitate innovation?

The question how trans-national co-operation could facilitate innovation and the transfer of knowledge and technology is of vital interest to this study. Obviously there is no easy answer to this as there probably is as many examples of how trans-national co-operation can facilitate innovation as there are projects and initiatives in that particular area. A further vital question is how actively facilitating innovation can add value to what is already happening and how this added value can be measured and/or gauged. Again, this is a broad inquiry and the answers are bound to depend on the nature of activities carried out. More straightforward is the question what the particular benefit for using INTERREG is instead of other cooperation instruments. The Interreg programmes have a set of characteristics that distinguishes them from e.g. national programmes or the RTD-framework programme of the European Commission.

To address, in particular, the first of the questions a number of cases on trans-national and trans-regional co-operation in the field of innovation and knowledge transfer is provided in Annex IV. Case information stems primarily from interviews with the project managers, from homepages and interim and final project reports. The ambition is not to give an objective and critical view of the projects but to provide the reader with ideas and inspiration about which forms and what content trans-national/regional co-operation on innovation can take. Particular efforts have been made to include cases with a good representation of regions and organisations of the North Sea Region. Here follows a discussion regarding the questions raised.

The overall question to address in this chapter was “How trans-national co-operation could facilitate innovation and the transfer of knowledge and technology.” The case studies are used to highlight a set of examples of how trans-national co-operation can facilitate innovation. The related questions are of more specific character and the following sections are used to provide a more in-depth description of the added value and benefits of facilitating innovation within the Interreg-programme.

6.1 Added value of the projects

Initially it should be stated that all people interview during the course of this study are positive towards international co-operation. As matter of fact, international co-operation on all societal levels (industry, research and education and public sector) is considered to be of outmost importance and top-priority. Today, however, there are a quite significant number of different programmes that support international co-operation on different societal level and with different thematic focus. For organisations that look for possibilities to involve in international co-operations the challenges today is to assess and chose the most suitable programmes and platforms for this co-operation. Reaping all the potentials out of an international project is a task that is not so easy to master.

This is important to note because it implies that the added value of projects is not only determined by the programme itself, its focus and its framework conditions but also by the participants in the programme, their commitment and their competence. In the light of introducing innovation-related activities in the next programme period this must not be forgotten. A programme such as Interreg 3b will only be successful if it succeeds in attracting the best and most motivated peoples and organisations. Assuming that the programme will succeed with this there is a great deal of added value to be created by facilitating innovation. This added value spans a wide range of different aspects and is, of course, depending on the type or organisations that is participating in the project. Here is an overview of benefits of international co-operation extracted from interviews with managers of projects within Interreg, FP 5&6 and from different reports and evaluations:

- A good contact network
  A natural outcome of an international co-operation is, obviously, that contacts between the participants are created and, in best case, that long term relations are established. The possibilities of creating long term relations are dependent, however, on the composition of the project consortium. Key success factors are e.g. common topics of interest of the participants, mutual added value and the personal chemistry of the people involved. If a project is the basis long term relations is consequently depending on factors which are very hard to examine before network activities start.
The thematic network CAFÉ is one example of a project that in particular opened up new networks for the participants.

- **Benchmarking possibilities**
  Benchmarking gives the project participants the opportunity to compare themselves with others. Comparability is therefore the key-word in benchmarking. In order to offer high value benchmarking features to its participants the project consortium needs to be composed in such a way that as many perspectives of a problem or topic as possible can be displayed.

  STRINNOP focus was on benchmarking and comparing regional innovation profiles.

- **Experience sharing**
  In many international projects experience sharing is organised through seminars and workshops. The participants’ chances of benefiting from these exercises are depending on the general disposition of the events and on the relevance of the contents of the individual presentations. Further, the participant’s uptake ability is crucial.

  Most projects contribute to experience sharing. Experience sharing was a key activity e.g. in the thematic networks funded by DG Enterprise.

- **Concrete problem solving assistance**
  The development of innovation systems is normally a long-term task. Often a time-period of several years is necessary before concrete results can be noticed. Through international co-operation it is possible to help organisations or region to make leaps in their development by transferring a particular piece of know how of how to handle a certain situation.

- **Tool for policy influence**
  Innovation-related activities and innovation policy is by no means a method for industrial development that is fully accepted and implemented all over Europe. Particularly in the new member states there is a lack of understanding of why innovation is so important. A valuable outcome of an international project can be a set of arguments and good practice examples for regions seeking for ways to convince decision-makers of the effectiveness of innovation for fostering economic growth.

- **Image and marketing**
  Image creation and marketing for the project participants is an often under-estimated value of international co-operation. Taking part in an international consortium is actually an excellent platform for marketing.

- **Critical mass**
  Some international projects are launched because the vision and objectives require international co-operation to succeed. E.g. the project can be depending on the pooling of resources or competencies only available in a specific consortium or a specific region. The project Scandball campus is an example of such a project.

### 6.2 Measuring/gauging added value

The issue of measuring the effects of public sector support to innovation-related activities is receiving increasing attention by regional and national policy makers as well as the European Commission. The reason for this is the need to show the casual links between investments in innovation-supporting activities and results, preferably in terms of employment, competitive companies, foreign investments, etc.

As most public sector programmes are supporting pre-competitive activities, i.e. support activities not directly related to development of individual companies measuring the casual links between input and output is very challenging. How can the causes of effects at companies be isolated to the indirect measure of a public support programme? Such evaluations must be very detailed and
always include zero-stage measurements and evaluations of the development of a reference group of companies.

The measuring of effects of programmes aiming at facilitating innovation in a trans-national context does not differ much from evaluations of national programmes. There is, however, no standardised methodology to measure the added value. This methodology should be based on what the individual project seeks to achieve. E.g. a project aiming at sharing experience (internationally) on how to support the uptake of innovations in small companies should be measured on its success in raising the level of knowledge among the projects participants.

Generally, the different types of added value stemming from international co-operation projects mentioned in the previous section can be used as a starting point when defining desirable results to measure. It should be noted, however, that monitoring and measuring the outcomes of a project (or programme) is the fundament for improvements and should therefore be taken serious. In many cases, particularly on the project level, there tend to be a bias towards ex-post or in best-case intermediate evaluations. To achieve learning effects, which have a chance to influence the running programme, other evaluation methods must be implemented. The following table suggests a three-stage evaluation approach which can be used in projects co-funded by the Interreg programme.

<table>
<thead>
<tr>
<th>Evaluation hierarchy</th>
<th>Topic of evaluation</th>
<th>Type of evaluation</th>
<th>Assessor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual projects</td>
<td>Quality of proposal</td>
<td>Pre-selection</td>
<td>Steering committee/expert panel</td>
</tr>
<tr>
<td></td>
<td>Project process</td>
<td>Continuous</td>
<td>External evaluator</td>
</tr>
<tr>
<td></td>
<td>Effects</td>
<td>Ex-post</td>
<td>External evaluator</td>
</tr>
</tbody>
</table>

**6.3 Comparative advantages of Interreg**

The odyssey of trans-national/regional co-operation in the field of innovation presented in this chapter covers projects funded within the frame of different programmes. Some projects belong to sub-programmes of the 5th and 6th Framework Programmes for Research and Technological Development and others to the Interreg family.

The key question to address is what the comparative advantages of using Interreg as a source of project funding are. To answer this question it is necessary that the people interviewed has a frame of reference allowing them to compare different programmes. Most of the project managers did possess this experience and were able to provide some interesting views on the comparative benefits of Interreg. In this context it should be noted that the types of programme that were the objects of comparison were in particular national programmes and the 5th and 6th Framework Programmes for Research and Technological Development (FP 5&6). The following are the main conclusions drawn:

1. **Project managers do not care about who is providing the funding - they are pragmatic creatures**
   
   Many of the managers interviewed are very experienced and skilled in the game of finding public support for project ideas. From their point of view it matters very little which programme is providing funding or co-funding for a project, what matters is:
   
   - Timing, i.e. the programmes funds must be available when the window of opportunity is open

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24 The main bulk of funding for FP 5&6 are, of course, dedicated to research activities or targeted towards research networks. There are, however, also a few sub-programmes that supports activities of non-research nature such as the programme “Structuring the European Research Area” and the “Innovation and SMEs” programme. When FP 5&6 is referred to in this chapter it is the non-research programmes that are meant.
The level of support provided, i.e. the level of co-funding and the level of overhead coverage

The administrative and preparatory efforts connected to the programme and the project

With respect to these points Interreg is more, as well as less, popular compared to national and FP 5&6 programmes. In short, Interreg is popular because:

- There are very stable funding conditions for a long time period. This implies a.o. that there is (in theory) normally no rush in setting up project proposals. FP 5&6 programmes, however, are notorious for the “one shot” character.
- The relatively often reoccurring calls for proposals is also much appreciated.
- The level of support provided is fair and based on real terms. In particular the difficulty of covering overhead costs is considered to be a problem in FP 6.

There are also less positive voices raised about characteristics of Interreg. In particular these aim at the stale and bureaucratic management of the programme that causes very high costs for project management. In particular the rigid and inflexible systems for handling budgets are a topic of criticism.

"Interreg offers interesting opportunities for cooperation in the Baltic and North Sea Region but the administrative burden is too big. Too much time during joint meetings has to be spent on discussing administrative issues”

(Representative of a Technology Transfer Organisation in Schleswig-Holstein)

2. The geographical aspect of Interreg is an advantage as well as a disadvantage

The Interreg-family encompasses three strands; A for cross-border co-operation, B for trans-national co-operation and C for inter-regional co-operation. All of the programmes foresee that different thematic issues are addressed by the projects that the programme co-funds. The programmes of FP 5&6 are normally targeting regionally-based organisations and a basic pre-requisite is that inter-regional consortia are created to carry out the projects. In this respect there is a similarity with Interreg 3c. National and regional programmes typically only allow the support of organisations located in the home region or state. However, there are examples of national and regional schemes that support the involvement of domestic organisations in international programmes and projects. Consequently Interreg and FP 5&6 programmes fill an important function by providing funding that enables different types of international co-operation activities.

When trying to elaborate on the particular benefits of Interreg for facilitating innovation and the transfer of knowledge and technology a distinction must be made between the different programmes. Interreg 3b has its own particular place and position among the many complementary programmes; it supports trans-national projects in pre-defined mega-regions such as the North Sea or the Baltic Sea area. The question to answer is consequently - What is the particular benefit of using Interreg 3b for facilitating innovation?

Interviews with stakeholders yields that the primary advantage of Interreg 3b for facilitating innovation and the transfer of knowledge and technology is the possibility to promote trans-national/regional activities in mega-regions. As the advantages of working together in mega-regions are not obvious some of the main pros are mentioned here:

- Mega regions often have some kind of historical or cultural linkage, which makes it easier to develop efficient networks for transfer of knowledge and innovations. In

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25 There are, of course, many exceptions to this. For example aid programmes targeting developing countries can also finance organisations in another state.

26 In this context it should be noted that there are many other organisations than the European Commission that host programmes that funds international co-operation. Two famous ones are the United Nations and the World Bank.
the Baltic Sea Region references are often made to Hanseatic times and the old traditions of trading between the Baltic Sea states.

- Mega regions often already have developed common technological and social infrastructure that allows for smooth co-operation, e.g. university-university co-operations in educational programmes.
- It is believed that mega-regions can be promoted as target areas for foreign direct investments. An investment in one region would then be of benefit for neighbouring regions due to spin-off effects such as business opportunities for sub-suppliers etc.
- Of particular interest for facilitating innovation is that mega-regions can be seen as a way of mastering the European challenge of fragmentation and lack of critical mass. A mega-region could enable the emergence of a holistic innovation system that seamlessly drives innovations from the source to the market. In smaller regions this is usually not possible because some part of the system is missing, e.g. funding in early stages of the innovation, lack of competence to take the innovation to the market etc. A bigger region could encompass all necessary system-components and also offer a sufficient market to allow for innovations to quickly generate income.

“When we speak about innovation I do not know if it makes sense to have one Interreg programme for the Baltic Sea and one for the North Sea Region. If we could establish a system in Northern Europe that allows us to increase the speed with which innovations create market value, this would be a real achievement”

(Comment from a participant in an Interreg 3b project in the Baltic Sea Programme)

Having highlighted the opinion that it makes sense to facilitate innovation in mega-regions such as the North Sea it should also be mentioned that several interviewees mentioned that the geographical limitation of the programme also is a disadvantage when it comes to facilitating innovation. In particular this concern was expressed when it come to activities related to experience- and knowledge-exchange. Here stakeholders believed that carrying out such activities is best done on a European scene. A geographical boundary would only limit the possibilities of finding good practice examples and create lock-in effects.
7 Suggestions for activities in a future trans-national programme

7.1 Interregional foresight as a basis for project generation

Foresight is a “...process involved systematically attempting to look into the longer-term future of science, technology, the economy and society with the aim of identifying the areas of strategic research and the emerging generic technologies likely to yield the greatest economic and social benefits.”

The technological approach represented in this quote is far from exclusive. Since 1995 when Ben Martin formulated this view on foresight the methodology has gained in importance among policy makers and spread from the national to the regional level. Foresight means not just industrial innovation but social renewal in terms of how society is organised, its relationship with government and industry and in terms of its hopes and visions for the future. It can help to strengthen the regional identity. The common characteristic is that the challenges to meet are great, complex and involves different competencies and different parts of the society. The reason for employing foresight in this is that foresight enables

- consensus on long term perspectives
- reduction of uncertainty and ambiguity failures
- agreement on concrete strategic initiatives
- commitment to implement those initiatives subsequently.

Inno-group proposes that the INTERREG North Sea Programme takes the methodology one step further. This by initializing trans-national foresight processes guiding applicants and serving as a basis for future projects.

7.2 What is foresight?

The development of trans-national regions is not predestined but is to a great extent dependent on active choices and on the ability to initiate action with regard to different kinds of future threats and opportunities. Thus, the future of the North Sea Region is the result of many interlinked results, taken during a long period of time within the public and private sector. The conditions for a coordinated planning have changed dramatically due to the fact that the economy has increasingly become more global, innovation led and network-based. For the national and regional policy makers this implies more insecurity, higher degree of complexity and more severe consequences in case wrong decisions are being made. In order to be able to fully exploit the potential offered by resources in the North Sea Region a coordinated working approach is needed where the public sector, higher education institutions and the private sector co-operate taking into account identified profiling competences in the region.

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27 Ben Martin, 1995
Foresight, from being a method on national level for finding long-term research priorities has now become a definite tool for commonly define a regional dream scenario and for identifying necessary development tracks on regional level in line with the scenario. Moreover the foresight method

- identifies and mobilizes a trans-national core team of individuals who contributes with their competences and ideas without defending personal interests towards each other or raising demands on other participants.
- is based on an open-minded approach with the target to reach a consensus on possible and desirable future scenarios and action lines.

This way of working improves the conditions for predicting different possibilities for future action. The benefits of a foresight process are:

- Increased research and innovation performance; focused investments; better transformation of knowledge into new products and services
- Improved policy design and implementation in all policy fields (better governance as source of competitive advantage); design of innovation-friendly regulations
- Improved mutual understanding between science and other parts of society; constructive cooperation between research and industry/social partners for a successful society
- Improved social understanding of innovation; enhance consumer confidence in innovative products and services; stimulate culture of innovation and entrepreneurship
- Development of a strategic intelligence, empowering regional and local actors;
- Policy coherence and flexibility which results on commitment to build the European Research and Innovation Area

A case presented in the “Blueprint for foresight actions in the regions” highlights the possibility to gather industry and potentially other parts of society in joint process.

**UPGRADE Case Study – The North Sea Oil and Gas Sector**

In the “Blueprint for foresight actions in the regions" an example of a foresight exercise in an industry under threat is presented. The challenges were characterized by foreign competitors that were employing new technology and sub-sea extraction more effectively.

A foresight exercise was carried out with 20 managing directors of marine/offshore companies in the North East of England. The methodology was as follows:

**Activity steps:**

- Produce template appropriate to sector
- Compare global and regional issues
- Predict changes over 10 years
- Produce regional and global maps
- Identify potential “hot spots”

**Outputs**

- Map of existing regional conditions in the industry
- SWOT analysis based on current conditions
- Alternative scenarios of global energy production
7.3 Initializing trans-national foresight processes in the North Sea Programme:

How could this be implemented in the North Sea Programme? The starting point, the input and the output of the process are the three main issues in this.

- The starting point for each foresight process initialized should be a competence area common to the North Sea Area. The common competence areas identified in this report serves as good examples as these areas have been derived from national and regional strategy documents and identified clusters.

- The input is represented by the collected knowledge of the North Sea Region as a whole. The programme should aim to involve different parts of the society linked to the competence area in a joint process. Market, research, consumers, industry, policy makers and special planners from regions across the North Sea Region should be involved.

- The output should be actions in terms of actual trans-national projects in line with the foresight process.

The foresight process linking the input and output can be described as follows:

**Starting point: Common competence area in the NSR**

**Pre-foresight:** STOP, think and engage
- Informal exploration meetings,
- Background research,
- Competence maps,
- Agenda setting,
- Engage stakeholders

**Foresight:** Get set
A series of open deliberative meetings with stakeholder participation designed to:
- Achieve trans-national ownership of the future
- Understand the trans-national process driving change
- Define the challenges that this presents
- Understand how this may be achieved
- Explore the trans-national implications

**Trans-national foresight**

**Post foresight:** Go!
- Action lines for interreg-projects
- Meetings with key policy makers to draw their attention to what was achieved
- Calls for project applications in line with the results

In performing this there are some important steps to take.
Identification and selection of participants - The key to a successful foresight discussion is a thorough identification and selection process of foresight participants. We suggest that the starting point is the approximately 700 identified stakeholders in the North Sea Area. Contributions and recommendations from this group can form the basis for the process.

Organising foresight exercises - In organising the foresight sessions a variety of organisational tools may be applied:

- Expert panels, working groups and taskforces,
- Discussion groups, brainstorming and ideation exercises,
- Exercises for scenario writing, road mapping and action plan development

Setting the agenda - The agenda of the discussions should to some extend be decided in advance. Key questions to be addressed in the sessions could follow the scheme presented by “Blueprints for foresight actions in the regions”:

- What are the DRIVERS of change and how do they affect the future of the region?
- What CHANGES can be expected in terms of the intensification, extensification and abandonment of agricultural/industrial activity? What pressures will bear upon the physical and social infrastructure of the region?
- What IMPACT will these changes have in terms of society, the environment and the economy?
- What SCENARIOS exist as possible futures for the region? What KNOWLEDGE INFRASTRUCTURE is required to support these scenarios? How will the region evolve from a SPATIAL point of view? What is our VISION for the kind of region we want to become?
- What ACTIONS can be taken now to realise this vision?

- What does SUSTAINABILITY mean for this region?
- What does MULTIFUNCTIONALITY mean for this region?
- What does the KNOWLEDGE SOCIETY mean for this region?
- What role will SCIENCE, TECHNOLOGY, RTD and INNOVATION play in the development of the region?
- What kind of a DIVERSIFIED KNOWLEDGE DRIVEN ECONOMY could this region become?
- What GOVERNANCE issues must be addressed? What are the relevant LEGISLATIVE issues? What POLICY instruments and sources of FINANCE are available?

Deriving trans-national projects from the foresight process - The result of the foresight process should inspire applicants and serve as a guidance when writing the project ideas. The initial step of the foresight process, involving the vast majority of the important stakeholders in the North Sea Region, secures a transparent communication channel. This means that multiple projects can be docked to the same inter-regional foresight process. The panel could optionally give feedback on some of the most qualified applications.

7.4 Action line for the North Sea Programme

What would this mean in terms of programme organisation? We suggest:

- 5-7 initialized trans-national foresight processes involving approximately 20 experts and 200-300 participants each.
2-5 initialized trans-national projects deriving from each foresight process.

- Timeframe: 2-6 years
- Budget: 1-2m Euro each
# Annex I: Interviews

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<td>Bart Clarysse</td>
<td>Prof. Dr.</td>
<td>Vlerick Leuven Gent Management School</td>
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<td>Rudy Dekeyser</td>
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<td>Royal Flemish Academy of Belgium for Science and the Arts</td>
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<td><strong>DENMARK</strong></td>
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<td>Klaus Müller Pedersen</td>
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<td>Lars Klüver</td>
<td>Head of Secretariate</td>
<td>The Danish Board of Technology</td>
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<td>Torben Nielsen</td>
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<td>Gerlind Schütte</td>
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<td>Prof.</td>
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<td>Johannes Harpenau</td>
<td>Dr.</td>
<td>Technical University of Hamburg</td>
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<td>Stefan Johnik</td>
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<td>Johannes Velling</td>
<td>Dr.</td>
<td>German Federal Office for Economic Cooperation &amp; Development</td>
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<td>Jeffry Matakupan</td>
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<td>Gert Jan Hospers</td>
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<td>University of Twente</td>
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<tr>
<td>Jan Severjins</td>
<td>Project Manager</td>
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<td>Per Anders Havnes</td>
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<td>Lars Lyngdal</td>
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<td>Hordaland County Council</td>
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<td>Sverre Sogge</td>
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<td>Terje Pettersen</td>
<td>Consultant, Regional department</td>
<td>Østfold County Council</td>
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<tr>
<td>Jan Dietz</td>
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<td>Bergljot Landstad</td>
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### SWEDEN

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<td>Åke Lindén</td>
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<td>Västra Götalandsregionen</td>
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<td>Lena Blomberg</td>
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<td>Olle Stenberg</td>
<td>Director</td>
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<td>Anders Källström</td>
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<td>Johan Karlsten</td>
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<td>Thomas Liljemark</td>
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<td>Sven-Thore Holm</td>
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<td>Division Manager, Industry</td>
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<tr>
<td>Andrew Coulthard</td>
<td>Director, Business Incubation</td>
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<td>Mark Wathan</td>
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<td>Mr. Reza Zadeh</td>
<td>Head of Competitiveness</td>
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### INTERNATIONAL

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<td>Michal Meidizinski</td>
<td>ERIK - European Regions Knowledge-based Innovation Network</td>
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### INTERREG IIB PROJECTS

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<td>Filip Meuris</td>
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<td>Ullrich Müller</td>
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<td>W. Calmano</td>
<td>Project Green North Sea Docks</td>
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<td>Walter Leal</td>
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### TRANSREGIONAL PROJECTS

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Annex II: Discussion paper

The international competition among trade blocks, nations and regions for inward investments, human resources and capital is increasing. The industry is internationalized, trade barriers are dismantled and the fall of the western information and knowledge monopoly means that strong centers of excellence are being established throughout the globe. This implies that a strong research and knowledge base alone will not secure the long term competitiveness. The focus of policymakers and business strategists shifts from how to gain knowledge to how to make use of it? This is the very essence of innovation and the foundation for long term competitiveness in the EU as a whole and in the North Sea Region.

- Successful innovation means to invest money into the generation of knowledge and to commercialise the knowledge in a way that the interest on the investment is satisfying.\textsuperscript{28} Innovation is no gambling but investment under high uncertainty.
- Facilitating innovation is all about facilitating system and business processes increasing the probability of successful innovation investments and thereby enhancing long term competitiveness (of the EU as a whole and of the North Sea Region).

The North Sea Region is a European stronghold when it comes to innovation capacity and innovation performance. The region stands out with a strong research base (in generic areas such as ICT, Biotech and materials as well as in application areas such as renewable energy, automotive, food, creative industries and marine technologies), internationalized businesses, established process oriented and diverse public innovation support structures (in relation to other regions), a systems approach towards facilitating innovation and high national, regional and local awareness/experience of innovation issues. Even though this seems like an excellent position, there are challenges ahead.

On a European level these challenges are mirrored in the Barcelona objective and the Lisbon agenda as a macroeconomic diagnosis, but what is the action-oriented medicine? What will fill the gap between the vision – transforming Europe to the most competitive knowledge based economy in the world – and the macroeconomic goals – intensifying the RnD investments to 3% of GDP etc? There is no single answer to this. A systemic view of innovation, in contrast to the obsolete linear model, dramatically increases the complexity of managing innovation systems. However, this view allows us to concretise common challenges of the North Sea Region as a starting point:

- improve innovation capacity and entrepreneurial spirit in industry and among people,
- improve science base motivation and ability to interact with industry,
- increase efficiency of public sector intervention,
- create incentives through legislation and regulations and in

\textsuperscript{28}This understanding of the innovation process is broader than those applied by many contributors. Cf. e.g. Mirow (1998) who differentiates between the research process (R&D) and the innovation process (commercialisation process): „Die Umwandlung von Geld in Wissen ist Forschung, die Umwandlung von Wissen in Geld ist Innovation.“ Mirow, M. (1998): „Innovation als strategische Chance“, in: Franke, N. and Braun, C.-F. von (eds), Innovationsmanagement und Technologiemanagement – Konzepte, Strategien, Fallbeispiele, Berlin et al, pp. 481-492.
finance innovation processes

The scale of these challenges implies that there are numerous stakeholders (including national authorities, regional authorities, universities, cluster organizations, investment agencies, development agencies and business) facing these. All these stakeholders must be engaged in order to meet these challenges. In fact, the possibility to combine and inter-link existing stakeholders and innovation support structures represents a strength of the North Sea Region. Joint efforts of these players can constitute the basis for building unique competitive advantages bridging the gap between investments in research and the long term competitiveness. Balance is the key in this. Too much focus on public or private interests could have several implications where actions fully driven by industry tend to jeopardize sustainability and where actions lacking industrial involvement tend to be “bureaucratized” characterized by inflexibility and low understanding of business needs and drivers for change. Too much focus on the academic stakeholders on the other hand tends to set the course for an endless search for new knowledge. These three eccentricities emphasize that facilitating innovation shouldn’t be a one-man-show, that there is a need for a joint action line and holistic process management.

In facing the challenges the programme must engage all relevant stakeholders including business, public sector and academia!

How do we make things happen? What will make these critical components come together? One must argue that one of the most vibrant components in this sense is the pan-European programmes and initiatives in cooperation with its nations and regions. The 7th Framework programme will thrive on the frontline of knowledge and technology (in particular the ERA-net programme will continue to synchronize national initiatives) and the structural funds will tap into the field of facilitating innovation from other perspectives. At the same time the coordination of different initiatives at EU and national level will be increased and the complementarities between the Union’s research budget and structural funds will be strengthened. In order to fully exploit the potential complementarities and synergies there will be a need for a holistic and transparent implementation with unique positions. As the focus on innovation will be sharp there will most probably be a competition among programmes and initiatives. Only those programmes and initiatives that are attractive enough to engage the most important stakeholders will have a raison d’être. In all this means that a successful programme requires a unique position attractive to the most important stakeholders within the field of facilitating innovation. Attractive is beautiful!

The future programme should have a unique position and be complementary to other EU programmes and national initiatives regarding facilitating innovation!

What actions and concrete projects would materialize this position? In facilitating innovation there will be a growing need for trans-national cooperation as long as there are actions that are too great for stand-alone regions and too complex for nations to handle. Facilitating innovation is an international matter with internationalized businesses and international research in combination with nations and regions captured in old-time administrative borders. The added value capitalized by trans-national cooperation could span from exchange of best practice to mobilization of critical mass, creation of trans-national transparency and implementation of joint actions and initiatives. Taking the future European technology platforms, which will bring together companies, research institutions, the
financial world and the regulatory authorities at European level, as an example shows the scale of the initiatives that are intended to constitute the backbone of European innovation success and competitiveness. This example might be a guiding star for the future North Sea Programme.

- The key challenges of the North Sea Region, with regards to innovation, are best mastered by fostering trans-national, interdisciplinary competence platforms aiming at competitiveness in the global market. Such platforms can rely on the region’s excellence in generic technologies and the integration of such technologies in profile sectors such as food, energy, automotive, marine technology and creative industries.
Annex III: The innovation systems in the North Sea Region

This chapter gives an overview of the innovation systems in the North Sea Region country by country. It starts with giving a picture of the national systems, the key players and the general challenges with regards to innovation. Further, it and picks up on the situation in the regions, presenting the main players, puts forward some specific challenges and gives a picture of the present involvement in innovation-related programmes of the EU.

**Flanders (Belgium)**

**Overview of the innovation system – key players**

Over the past twenty years, a series of constitutional changes have progressively devolved power from the Federal State to the three Regions (Wallonia, Flanders and Brussels-Capital Region) and to the three Communities (the French-, Flemish- and German-speaking communities). As a result, most areas of major importance for innovation policy – are under the control of the regions, which have complete autonomy in these matters. In Flanders, a comprehensive review of the government structures has led to the creation of a Ministry for Science and Technological Innovation. Furthermore, there will be five “independent agencies” under direct authority of the minister.

Belgium has a federal government responsible for federal issues regarding industry-science relations (ISR) which can be divided into the French and Flemish community, each responsible for some parts of ISR (i.e. the higher education sector). Finally, in matrix format, the three Regions also share some responsibilities (e.g. technology policy). Only in Flanders, do the Flemish Region and Flemish Community have a common government and administration.

The public science sector in Belgium consists of universities, polytechnics and several public sector research enterprises (PSRE). There are 17 universities in Belgium employing about 25,000 persons. In addition, there are 59 polytechnic schools in Belgium whose main focus is on education. Almost each university in Belgium has or is developing a “business incubator” which provides offices and a “science or research park”. In addition to office space, university seed capital funds are created and activities initiated to coach these start-ups. Both in Wallonia and Flanders, universities are also developing their technology transfer and research interface offices. Many of the technology transfer offices are limited in terms of size and funding, typically consisting of one or two persons who have overall responsibility for negotiation and management of patents, commercial evaluation of intellectual property from research management and monitoring of spin-offs.

Besides the university system, Belgium has several public and semi-public research institutes with varying objectives, structures and size. In total, their significance in the public science sector is limited but some institutions are highly specialized on ISR activities and therefore play a major role for industry-science links. Particularly in Flanders, these institutions play a prominent role in the regional innovation system. The three most prominent are the Interuniversity Microelectronics Centre (IMEC), the Flanders Interuniversity Institute for Biotechnology (VIB) and the Flemish Institute for Technological Research (VITO).
Updating Norvision – Facilitating Innovation

Belgium has 8 Business Incubation Centers (BIC), of which seven are in Wallonia and one in Flanders. An analysis of 2 BICs shows that cooperation between industry and science is one of their most important achievements.29

The complex institutional framework in Belgium creates a large population of different intermediaries that play a role in ISR. There are three types of intermediaries that can be distinguished:

- financing institutes for R&D;
- bridging institutes at regional and sectoral level; and
- private-public incubator initiatives.30.

The Belgium government and the regions are conducting a number of initiatives aimed at coordination and cooperation of research and technology transfer activities.

Challenges and measures

The approaches to creating a strategic vision on research priorities and orientating the research funding of the regional governments have diverged over recent years, although initially both of the Flemish and Walloon authorities gave priority to the funding of pre-competitive research programmes around a specific technology theme. It should be noted that the institutional setting in PSREs seems to be more favourable to ISR activities, particularly in technology specialized research institutes oriented towards a well-defined research area and group of industrial clients.

Up to 1998, both main regions have launched “impulse” or “mobilizing” programmes, open to research institutions and enterprises. In Flanders, two main impulse programmes were implemented between 1996 and 1998. However, the Government's policy paper for 2000-2004 foresaw a much lower emphasis on such “top-down” programmes, which have now been discontinued in favour of “bottom-up” projects driven by HEIs, PSREs and industry.

The second option in terms of providing a strategic orientation to research is the creation of (networked) research centers and inter-university poles. The Flemish Government has invested heavily in creating two major “thematic” inter-university research centers:

- IMEC (Interuniversity Microelectronics Centre) created in 1984
- VIB (Flanders Interuniversity Institute for Biotechnology) created in 1995

A third institute, created in 1994, VITO (Flemish Institute for Technological Research) conducts customer-oriented contract research and develops innovative products and processes in the fields of energy, environment and materials, for both public and the private sector.

These institutes provide top quality research in their respective fields and are considered “success stories” by the Flemish Government. Moreover, they have a clear mission of commercialization of their results and interaction with industry.

30 Ibid.
Denmark

Overview of the innovation system – key players

Currently Denmark is undergoing a major restructuring of its whole innovation system including its governance in aim to create institutional changes and governance structures better suited for coordination of and cooperation between the various actors of the national innovation system. The overall responsibility for the research and innovation policy has been concentrated in the hands of the Ministry of Science, Technology and Innovation. The Ministry allocates 75 percent of the governmental appropriations to research and innovation.

The Ministry of Science, technology and Innovation is divided into two departments; Research Innovation and Education and Information and Communications technology. The Ministry provides the secretariat supporting the Danish Council for Research Policy. The Ministry for Economic and Business Affairs is concerned with innovation issues in the traditional industrial sector. Coordination between sectoral ministries is done on an informal basis under the initiative for the Ministry of Science, Technology and Innovation.

To advise the Minister of Science, Technology and Innovation there is The Danish Council for Research Policy on matters concerning Danish and international research policy for the benefit of society. With the objective of strengthening technology development and innovation within trade and industry a Council for Technology and Innovation has been set up. The Council also assist in implementing the legislation. The Council for Independent Research will be supporting research projects based on the researchers’ own research initiatives. The Council for Strategic Research is to support research based on politically defined programmes. It will also give advice on research and technical subjects to applicants and others within its scope of activities. The Danish Research Coordination Committee promotes co-ordination and co-operation between the research councils and the rest of the research system. Finally the Danish National Research Foundation, which has an independent fund status, funds larger research activities based on researchers’ own ideas and contribute to the development of Centres of Excellence. The major research units within the public sector are universities, Government Research Institutes and hospitals.

Other actors are the Approved Technology Service institutes or GTS-institutes that offers consulting services and application-oriented knowledge to companies and public institutions on an individual basis. There are 9 institutes operating with the aim of disseminating new technology to a broad
spectrum of trade and industry. The GTS-institutes are encouraged to pay special attention to small and medium-sized enterprises. Technology Incubators constitute another implementing part of the Danish innovation system. They work in close co-operation with universities or science/research parks and target innovative entrepreneurs, researchers and students. The objective is to build bridges between research environments, innovative entrepreneurs and finance companies in order to develop and transfer research and innovative ideas to commercially sustainable innovative projects and enterprises. The new Danish Innovation Council, which was established in October 2003, is to discuss and encourage innovation in the Danish economy. It is to provide specific recommendations as to how Denmark can develop new knowledge environments and new jobs.

In September 2003 the Danish government issued a new plan for improving industry-science relations. The plan has 20 action points grouped in 6 different action areas. One of these areas is directly concerned with technology transfer. The intention is to improve the framework for technology transfer to better suit the way the industry works. Moreover, the government stresses the need to simplify the establishment of spin-off. In a longer perspective the act on technology transfer should promote the development of a transparent and efficient market for knowledge and IPR between academia and industry.

### Challenges and measures

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Measures</th>
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<tbody>
<tr>
<td>Better exploit Denmark’s strengths in innovation</td>
<td>Strengthen co-operation between knowledge institutions and the private sector</td>
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<tr>
<td>Assure a higher economic growth than in the past.</td>
<td>Strengthen the transfer of technology between public knowledge institutions and the private sector.</td>
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<tr>
<td>Lifelong learning</td>
<td>Reform vocational education</td>
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<td>Continuing training system</td>
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<td></td>
<td>Improve opportunities for those holding the lowest levels of education.</td>
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<tr>
<td>Losing momentum in US PTO high-tech patents.</td>
<td>New law in Jan 2000 making it possible for universities, research institutions and public hospitals to take over inventions from employees and negotiate toward companies</td>
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<tr>
<td></td>
<td>Improve companies’ and researchers’ electronic access to patent databases (Internet).</td>
</tr>
<tr>
<td>General Measures</td>
<td>Innovation Consortia Initiative — developing technologies generally available to trade and business via co-operation between various players in the research, trade and business.</td>
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</table>

In order to stimulate the creation of new innovative companies and to increase commercialization of research results, the Government co-finances seven so called innovation incubators. These incubators provide finance, guidance and various facilities for research based companies as well as other types of new innovative business ideas. So far the incubators have collectively contributed to the formation of over 500 companies. The initial public investment in the start-ups has been supplemented with three times as much private capital.

The incubators can also assist if an idea is to be sold or licensed to external parties. The incubators have been approved after a public tender. Seven incubators are approved for the period 2004 – 2008.

There are seven research parks around the country with the intention of strengthening commercialization of research results. The research parks are private institutions. They co-operate with the innovation incubators.

In September 2003 the Danish government issued a new plan for improving industry – science relations. A total of DKK 275 million (€ 37 million) was committed to the plan.
The plan has 20 action points grouped in 6 different action areas. One of these areas is directly concerned with technology transfer.

The intention is to improve the framework for technology transfer to better suit the way the industry works. The government wants to discuss the possibility of introducing new legislation and suggests that creating critical mass may be important. One way to achieve the critical mass and increase the professionalism at the technology transfer institutions could be to have only very few such organizations that are jointly owned by several research institutions.

Moreover, the government stresses the need to simplify the establishment of spin-offs. This could be done by easing the rules of the process when research institutions accept shares in the newly established companies as compensation for IPRs, equipment, facilities and personnel from research organizations.

According to a new legal framework, presented to the Danish parliament in spring 2004, Danish universities and government research institutions shall be entitled to found and invest in commercial companies for the purpose of technology transfer. This organizational model is expected to provide a number of advantages:

- Dynamic management of public research IPR’s and licensing contracts with business partners and spin off enterprises.
- Critical volume technology transfer by access to joint ownership of cross institutional tech trans companies.
- Competitive recruitment of professional tech trans officers.
- A clear distinction between scientific and commercial interests in public research.
- Safeguarding PRO’s from economic hazard and risk of infringement.

In a longer perspective the act on technology transfer should promote the development of a transparent and efficient market for knowledge and IPR between academia and industry.
Germany

Overview of the innovation system – key players

The public German innovation system is heterogeneous and manifold. There exist more than 750 government–financed research organizations. 92 Universities constitute the backbone of the system. Other important organizations and institutions that carry out R&D and systematically transfer their know-how to industry include but are not limited to the Fraunhofer Gesellschaft31 (57 FhG institutes in Germany, one of them being the Patentstelle für die Deutsche Forschung), the 15 members of the Helmholtz Association of German Research Centres32 (HGF, formerly Großforschungseinrichtungen) and the 78 Institutes forming the Gottfried Wilhelm Leibniz Science Association (WGL).33 Also, Fachhochschulen (polytechnics respectively Universities of Applied Science34) do, nowadays, substantial need-oriented applied research and development work.35 Furthermore, the Max Planck Society (MPG, 77 institutes in Germany) is a key player in basic research, but engages only very limitedly in technology transfer.

Despite its heterogeneity, the German system is well-structured. In particular, the system addresses two key issues of professional production and commercialization of research results, namely critical mass and transparency.

- Big entities and groupings of organizations to “families” (like e.g. the Fraunhofer Institutes, the Helmholtz Institutes, the Max Planck Institutes) respectively professional networking of

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31 For further information see: www.fhg.de.
32 For further information see: www.helmholtz.de.
33 These institutions (plus one more institute) are also referred to as “Blaue Liste Institute” (Blue List Institutes). For more information see www.wgl.de.
34 In total, the higher education sector consists of 345 higher educational institutes (HEIs) of which 92 are universities, six are colleges of education, 18 are colleges of theology, 46 are colleges of art, 152 are general “Fachhochschulen” and 31 are administrative “Fachhochschulen”. Most “Fachhochschulen” call themselves University of Applied Science, today.
35 When Fachhochschulen were established during the 1970s, they did not conduct any research, but focused on teaching. Today, this has changed dramatically. Fachhochschulen have high competence in Applied research and development. Particularly SMEs, but not limitedly so, highly value the need orientation and pragmatism they demonstrate in meeting companies’ needs.
smaller units (e.g. Steinbeis network of institutes primarily at Fachhochschulen but increasingly also at universities) ensure that the necessary critical mass is achieved.

- There exists a rather clear cut and transparent distinction in terms of mission of different types of organizations. For instance, Max Planck is mostly dedicated to basic research whereas Fraunhofer engages in applied research and is substantially financed by contract research.

**Challenges and measures**

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<tr>
<th>Challenges</th>
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<tbody>
<tr>
<td>Reverse the economic stagnation.</td>
<td>Provision of better incentives for innovation in enterprises.</td>
</tr>
<tr>
<td>Enhance the educational system and maintain a highly skilled labour force.</td>
<td>Significant investment increase in the last year University reform, i.e. with new forms of education.</td>
</tr>
<tr>
<td>Create a competitive position in new technology trajectories, in particular knowledge intensive services.</td>
<td>Boost ICT adoption Creation of high-tech competence centers</td>
</tr>
<tr>
<td>Making SMEs more innovative.</td>
<td>The Action Programme on Innovation addresses technology-based start-ups, redesign of R&amp;D programmes for SMEs, promotion of co-operation between public research and SMEs ensuring supply of highly qualified labour.</td>
</tr>
<tr>
<td>Appropriate Government Policy</td>
<td>Two main governmental policy lines: 1. Improving framework conditions for innovation through reducing and simplifying taxes 2. Improving education and science systems to tackle shortage in qualified labour force.</td>
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</table>

Although Germany is still very strong regarding many innovation indicators, there are a number of weaknesses in innovation performance. Financing of innovation activities in some german states is getting increasingly difficult, especially for SMEs. The enterprises’ share in turnover with new-to-market products is lower than in most other countries, presumably due to the weak domestic market. In high-tech sectors such as pharmaceuticals, computers or electronics, Germany is losing momentum.

In recent years new measures in particular target the VC-sector. Examples of initiatives include:

- In the High-tech Masterplan, a new public funds-in-funds was announced. This fund should invest in private VC funds that are specialized in investing in technology-based firms in early stages and expansion stages of firm development. Such firms are subject to decreasing VC supply since the New Market collapsed at the end of 2001 and VC investment fell significantly. The new fund is financed jointly by the EIF and the ERP separate estate and will amount to EUR 500 million. Within this volume, private investment in young firms of up to EUR 1.7 billion within the next five years should be mobilized.

- The BTU-Programme on supporting the VC supply for young technology-based firms will be radically reoriented. The programme is currently not running effectively, as the majority of programme costs finance failed investment. In order to provide new technology-based start-ups with public financial support, a new high-tech start-up fund will be established amounting to about EUR 250 million. This new fund will directly invest in young firms by providing seed capital. Through this fund, the lack in private VC supply for seed stage should be overcome.

- In order to tackle the shortage of private equity supply for innovative SMEs that need small amounts of private equity (EUR 1 to EUR 5 million), two pilot projects run by the KfW will test which type of measure is most adequate to reduce this shortage. Later, a nation-wide programme in this area will be introduced. Other major changes in innovation policy
programmes include a redesign of the R&D grants programme for Eastern German enterprises (DE_19), a new sub-programme within the thematic R&D

**The Netherlands**

Overview of the innovation system – key players

In the Netherlands, there has always been a strong division of labour between science on the one hand and technology and innovation on the other. This extends to policy design, funding sources and researchers. Gradually this division between science and innovation has been addressed at different levels in the system and has decreased over the last several years.

The quite decentralized and fragmented science and research community comprises 13 Universities, 18 Royal Netherlands Academy of Arts and Sciences (KNAW) Research Institutes, 6 Netherlands Organization for Scientific Research (NWO) Institutes, 5 Large Technological Institutes (GTIs), 4 Technological Top Institutes (TTIs), 14 Netherlands Organization for Applied Scientific Research (TNO) Institutes, and a number of state owned research and advisory centers. The academic research system functions quite independently and has its own “sub-governance system”. In addition, there is a multitude of applied research centers which receive funding from various Ministries and whose mission is to find research contracts in the market.

A small number of dedicated public intermediaries act as “front desks” for applicants and are formally attached to ministries. In some cases these intermediaries work for more than one ministry. Their level of independence in defining their strategies varies from case to case yet despite the complex set of formal linkages and funding routes, it offers a system through which organizations and people can effectively deal with each other on an informal level.

A new government subsidy scheme known as Infrastructure Technostarters was developed to shift the orientation of the science and research community toward knowledge transfer and exploitation. The objective of the scheme is to create a network of incubators linked to knowledge institutes. During the first phases of the programme between April 19 and July 19, 2002 only 10 proposals for incubators were received.
### Challenges and measures

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<tr>
<td>To its full potential, achieve more growth through innovation.</td>
<td>White Paper on Innovation, “In Action for Innovation, tackling the Lisbon Ambition”:</td>
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<tr>
<td>Increase business investments in R&amp;D.</td>
<td>Improve interaction between innovation stakeholders</td>
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<tr>
<td>Stop losing ground in terms of employment and value-added in high-tech sectors.</td>
<td>Improve exploitation of knowledge and streamline policy instruments</td>
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<td></td>
<td>Facilitate high-tech start-ups</td>
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<tr>
<td>Insufficient supply of knowledge workers.</td>
<td>Governmental action plan which, for example, focuses on integrating technology into primary schools.</td>
</tr>
<tr>
<td>Increase the number of companies and the employment level in high-tech manufacturing while maintaining the relative lead in high-tech services.</td>
<td>On governmental level: intensifying co-operation between R&amp;D players worldwide</td>
</tr>
<tr>
<td>General need to increase the rate and intensity of innovation across the SME sector.</td>
<td>Governmental action plan for entrepreneurship.</td>
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</table>

Innovation policy in the Netherlands is focused on specific technologies that have large social and economic potential such as ICT and Life Sciences. For example, in October 2001, the Ministry of Economic Affairs and the Ministry of Education, Culture and Science announced the set up of the ICT Forum which began to operate in April 2002. As other technologies become important other technology areas are being explored. In June 2002 five quick policy guidance assessments were completed in the following areas: micro-system technology, new materials, partition technology, medical technology and robotics.

In March 2002 a new investment impulse through the ICES/KIS36 programme was announced. Similar to previous impulses (in 1994 and 1998) the third impulse aims to reinforce the position of the Netherlands as an innovative and knowledge-intensive economy. Regional innovation policy in the Netherlands comprises policy for Regional Development Companies (ROMs). There are five ROMs in the Netherlands which perform activities relating to the development, investment promotion and participation, aimed at improving the regional economic climate.

Another aspect of regional policy in The Netherlands is the regional innovation network known as Syntens. The ROMs and Syntens are in fact supposed to co-operate closely and in October 2000 the State Secretary sent a proposition to Parliament regarding a new line of policy for Regional Development Companies to encourage this.

“Dreamstart” is a measure that aims to increase the number of technology-based companies in areas other than ICT and Life Sciences. It is designed to increase the transparency and accessibility of initiatives currently existing for start-up companies. Also, Dreamstart will encourage universities, research institutes and market organizations such as firms and financial organizations to build support networks. Such networks could be used to set up incubators in various technology areas.

Another scheme in the area of start-up of technology-based firms is the Incentive Fund Program for Innovative Drug Research and Entrepreneurship in the Netherlands (STIGON). This scheme was launched in 1998 and aims to stimulate spin-offs from pharmacology. It is administered by the NWO Research Council and the Health Care Research and Development Agency/Council for Medical and Health Research.

Besides instruments that encourage co-operation directly, there are a number of initiatives that induce research institutes and universities to direct research efforts more toward the needs of business. The first of these initiatives are the Innovation-Oriented Research Programmes (IOP)

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The ICES-instrument is a large budget made available by the government aimed at strengthening the Dutch economic structure. A part of this budget is set aside to support the knowledge infrastructure (ICES-KIS).
Updating Norvision – Facilitating Innovation

which is an umbrella-scheme of subsidies to universities and non-profit research institutes for research projects in pre-determined technological areas. The subsidies are designed to meet the long-term needs of business.

The second initiatives are designed to fund and commercialize research from semi-public organizations such as the Applied Scientific Research Institutes and the major universities. The main initiative, known as The Netherlands Technology Foundation, is a Dutch funding agency for university research. The Technology Foundation uses a layered structure consisting of a generic programme, the Open Technology Programme, and specific research area targeted programmes known as Technology Programmes aimed at embedding research results into society. The funding for these programmes comes partly from the Ministry of Economic Affairs and partly from the Ministry of Science and Education via the Netherlands Organization for Scientific Research (NWO).

**Norway**

*Overview of the innovation system – key players*

At Government level, the responsibility for innovation as well as R&D matters is divided between several ministries. The Ministry of Education and Research (Utdannings- og
forskningsdepartementet, UFD), the Ministry of Trade and Industry (Nærings- og handelsdepartementet, NHD) and the Ministry of Local Government and Regional Development (Kommunal- og regionaldepartementet, KRD) are the main actors when it comes to developing national innovation policies. In the area of R&D policies, policy formulation is based on the so-called ‘sector principle’, meaning that each ministry is responsible for promoting and funding research activities within their own areas. The Ministry of Education and Research is responsible for the overall R&D policies, for funding large parts of basic science in the universities and colleges, and for coordinating sectoral R&D policies.

Three high level government committees focus on innovation, science and technology policy related issues: the inter-ministerial Research Forum for Government Officials (Departementenes forskningsutvalg, DFU), the Government’s Research Board (Regjeringens forskningsutvalg, RFU) chaired by the Minister of Education and Research, and the Government’s Innovation Board (Regjeringens innovasjonsutvalg, RIU) chaired by the Minister of Trade and Industry. RIU, which is responsible for the development and coordination of innovation policy on the national level, was recently established as part of the Government’s plan to introduce a comprehensive innovation policy.

The Research Council of Norway (Norges forskningsråd, NFR) was established in 1993, as a merger of five former research councils. The institution bears overall responsibility for national research strategy, and manages nearly one third of public sector research funding. One of the principal tasks of the Research Council is to promote cooperation and coordination among Norwegian research institutions. The Council identifies important fields of research, allocates funds and evaluates R&D. It is also called upon to offer strategic advice to the Government on science and technology issues.

Originally, the Research Council had six relatively autonomous sub-councils corresponding to six divisions.20 On 1 September 2003, the Council was restructured into two administrative divisions and three research divisions, the latter being:

- The Division for Science.
- The Division for Strategic Priorities.
- The Division for Innovation.

The Research Council’s overall annual budget amounts to NOK 4.61 billion (EUR 0.58 billion21) for 2004. The Council draws its funds from several ministries, the most important being the Ministry of Education and Research and the Ministry of Industry and Trade. Business development is specified as a goal for about half of the Council’s annual spending. (http://www.forskningsradet.no/)

The State-owned company Innovation Norway (Innovasjon Norge) is the Government’s main agency for the development and administration of business-orientated policy instruments aimed at increasing innovation. Through its network of offices, covering all Norwegian counties and more than thirty foreign countries, the organization is to function as a gateway to a well coordinated and easily accessible set of policy instruments in the field of innovation and internationalization.

### Challenges and measures

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<th>Challenges</th>
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<tr>
<td>Low attractiveness as a location of FDI</td>
<td>See below</td>
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<tr>
<td>Low, but increasing, R&amp;D investment in industry</td>
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<tr>
<td>Innovation activity in industry is mediocre and could be improved</td>
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<td>Few large high-tech industrial locomotives</td>
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<td>Underdeveloped market for venture capital</td>
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<td>Lack of strong incentive and support structure for radical innovations, especially service</td>
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The Ministry of Local Government and Regional Development is, in close cooperation with SIVA, the Research Council of Norway and Innovation Norway, currently considering the establishment of so-called Centers of Expertise in Norway. The idea comes from Finland, and the objective is for local and regional core competencies to contribute to innovation and start-ups. A pilot project has been running in Ålesund Knowledge Park since the beginning of 2004.

Another recent initiative is the introduction of a scheme for outstanding young researchers, YFF (Yngre Fremragende Forskere). The scheme is to provide young, talented researchers with particularly favourable framework conditions, so that they may establish themselves in the international forefront within their particular research area. The main objective is to strengthen the quality of Norwegian research. The Research Council of Norway is administering the scheme, which was started in 2004.

The industry incubator programme is a new policy measure under the Industrial Development Corporation of Norway, SIVA. An industry incubator is an incubator which is closely linked to an established manufacturing company, called ‘the mother company’ (‘the mother company’ can also be a group of companies). The new programme is to facilitate successful readjustment in existing manufacturing industry, and to contribute to spin-offs and the development of a broader and more robust sub-supplying industry.

In 2003, the Norwegian Industrial and Regional Development Fund, SND received NOK 5 million (EUR 0.6 million) over the Revised National Budget, that were to be spent on promoting culture-based industrial development. The objective was to bring together actors from Norwegian industry and cultural life in joint efforts to increase creativity, innovation and value creation - not only in the participating institutions, but in society at large. For 2004, NOK 18 million (EUR 2.2 million) has been allocated to the scheme which is to support initiatives within the following priority areas:

- Product development with a high degree of ‘novelty’.
- Competence development.

Norway has a total of 12 science parks. The traditional role of these parks was to be service organisations and real estate managers. However, the role as incubators and assistants for innovation has become more important. The term “science parks” is used to describe a property based initiative which:

- Has operational links with universities and/or other institutions of higher education.
- Is designed to encourage the formation of growth of knowledge based industries and other organisations, normally resident on site.
- Has a management team actively engaged in fostering the transfer of technology and business skills to tenant organisations.

In 2001 the state granted 200 mill NOK to increase the R&D investment among private enterprises. This was replaced by another initiative from the Norwegian parliament. From 2003, SkatteFUNN is a scheme for tax deduction of R&D expenses in all enterprises, which are eligible for Norwegian taxation. For enterprises with more than 250 employees, eighteen per cent of the expenses related to an approved R&D project may be deducted in income tax, wealth tax and national insurance tax to the state. For smaller enterprises 20 per cent deduction is possible if certain conditions are met. The eligible R&D projects are defined as: “A limited, focused project aiming at bringing forward new knowledge, information or experience which suppose to be of use for the enterprise in developing new or improved products, services or manufacturing/processing”. The SkatteFUNN system is administered by Innovation Norway and The Research Council of Norway.
Sweden

Overview of the innovation system – key players

The main actors in the Swedish Innovation System are presented in the figure above. The Swedish institutional system is characterised by relatively small ministries and they all support research activities in their own sectoral interest with their own budgets according to the so-called sectoral research principle. The Ministry of Education and Science and the Ministry of Industry, Employment and Communication mainly handle issues affecting innovation. A specific characteristic of Swedish Governance is that decision by a ministry needs to be accepted by all ministers in order to become a Government Decision. The Ministry of Finance is responsible for the overall governmental budget allocation, and hereby wields an important influence on the framework for the innovation system.

The new organisational structure includes the establishment of a Research Forum for dialogue among researchers, research financiers, the general public and others concerned by the research performed.
Mission-oriented Agencies: The Swedish National Space Board (SNSB) is responsible for national and international activities related to space and remote sensing, primarily research and development. The Swedish Council for Working Life And Social Research (FAS) has a mission to promote the accumulation of knowledge in matters relating to working life and the understandings of social condition and processes. FORMAS (the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning) encourages and supports scientifically significant research related to sustainable development. VINNOVA (the Swedish Agency for Innovation Systems) promotes sustainable economic growth by fostering effective innovation and by funding research at universities. The Swedish Energy Agency (STEM) promote new energy techniques and energy production and maintains comprehensive research funding in order to make energy use more effective, not least within industry.

A separate Institute of Growth Policy Studies (ITPS) was set up to improve knowledge for the needs of growth policy development. Important areas for analysis are growth, innovation systems and entrepreneurship.

Research foundations: The Knowledge Foundation (KKS) promotes a broad use of IT in society and supports research at Sweden’s university colleges and new universities. The purpose of The Swedish Foundation for Strategic Research (SSF) is to support strategic research in natural sciences, engineering and medicine. Finally strategic environmental research with a long-term perspective is supported by The Foundation for Strategic Environmental Research (MISTRA).

Compared to many other countries (e.g. Germany, Norway and the Netherlands) Sweden dedicates only a small share of public R&D spending to the research institutes. The Swedish parliament decides upon the volume of public R&D-funding. In addition there are a number of private sources of funding for R&D, mainly private donors. Funds are provided to universities and colleges almost exclusively on a competitive basis.

The Swedish parliament decides upon the volume of public R&D-funding. In addition there are a number of private sources of funding for R&D, mainly private donors. Funds are provided to universities and colleges almost exclusively on a competitive basis. The main bodies for distribution of R&D-funding are the research councils a number of public and private foundations and Vinnova, the Swedish national agency for innovation systems.

Overall responsibility for the coordination of research policy at Government Offices rests with the Minister of Education and Science.

### Challenges and measures

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<td>Close the gap between strong innovation performance and moderate GDP and</td>
<td>National strategy for innovation (Innovative Sweden), aiming at economic</td>
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<td>employment growth.</td>
<td>growth through renewal, with four priority areas:</td>
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<td>Turning this strong performance into higher levels of innovation in</td>
<td>· A sustainable knowledge base for innovation</td>
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<td>enterprises.</td>
<td>· Innovative industries</td>
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<td>· Innovative public investments</td>
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<td>· Innovative population</td>
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<td>Increase the volume and impact of mission-orientated research.</td>
<td>Development of Competence Centers; joint ventures between universities,</td>
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<td>industrial firms and research institutes.</td>
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<td>Improve incentives and support structures that lead to creation of new</td>
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<td>tech-based SMEs</td>
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<td>Recruiting more students to Science and Engineering education.</td>
<td>Creation of new graduate research schools in close co-operation with</td>
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<td>industry.</td>
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Provide high-risk pre-seed financing to create more small innovative firms. | More efficient use of venture capital  
Clear focus on high-tech companies.  
Introduction of an SBIR scheme, i.e. allocating a percentage of the overall public R&D funding exclusively to knowledge-intensive SMEs.

VINNVÄXT provides regional growth through dynamic innovation systems. The aim of the programme is to promote sustainable growth and international competitiveness within the growth area defined by the functional region. This is achieved through problem-oriented research and development of innovation systems to internationally competitive levels. The main features of the programme:

- Selection through competition
- A range of supporting activities (seminars, training/education, experience sharing, research/increased know-how) at the disposition for planning and the resulting projects.
- Long-term perspective: 10 years
- Approximately ten functional regions will receive up to 10 MSEK per year. 3 winners were picked in 2003- Lund (functional food), Västerås/Mälardalen (robot technology) and Uppsala (biotech) and 3-6 more have be chosen in the fall of 2004.

The total budget for the whole programme is 600 MSEK from VINNOVA plus an estimated regional co-funding of at least as much. With the co-funding this means 20 MSEK a year. Funding will be given during ten years.

From March 1st 2005 a new group called Innovationsbron AB will invest 200 million Swedish crowns every year for developing of knowledge based innovations and companies in early phases. Different types of actors are now brought together in an organisation with a clear commission and a long-term financing. This investment is based on Teknikbrostiftelserna and VINNOVAs work with growth capital, incubators and capital from the Industry fond and the government. Innovationsbron will become a group with regional subsidiary in Luleå, Umeå, Uppsala, Stockholm, Linköping, Göteborg and Lund. The purpose is to retain the regional force and to improve the national coordination. One of the keystones in Innovationsbrons activity is the well working network of incubators. Another keystone is the Teknikbrostiftelserna that during several years have developed an extensive activity within innovation development and seed financing. The lack of early seed capital for high-tech companies have previous impended the growth and with that also the Industry fond activity. The work of the present foundations has given strong regional structures for counselling, education and support for early enterprises.
Overview of the innovation system – key players

The main components of the UK national system are: the Government—responsible for policy setting, implementation and funding; the Science and Engineering Base, largely comprising the Higher Education sector but also including the remaining Government laboratories and the research institutes; and the Business Enterprise sector, which funds and undertakes the largest share of UK R&D. There are also independent research and technology organisations which carry a broad range of research activities.

The focus point for the UK system of innovation governance is the Department of Trade and Industry (DTI). The DTI influences UK innovation through a variety of channels. With regard to science and policy, the Office of Science and Technology (OST), located in DTI, is responsible for the funding of basic research both within, but largely via, the six Research Councils. The DTI’s Innovation Group aims to create the right climate for innovation by changing attitudes within the public and private sectors. The DTI is the key Government actor in UK innovation policy but a number of other departments and ministries undertake innovation related activities. Of particular relevance is the Department for Education and Skills (DfES) which has responsibility for all issues relating to education in England. The Department for Work and Pensions (DWP) forms a single contact point for matters relating to jobs, unemployment and other state benefits. Lastly the Office of the Deputy Prime Minister (ODPM) has oversight of sustainable economic development in the English regions.

There are six Research Councils, non-departmental public bodies, whose budgets come from the office of the Director-General Research Councils in the OST. Overall coordination of research council policy is now conducted by Research Councils UK (RCUK).

The Higher Education sector is largely composed of universities and is the main performer of basic research in the UK. The majority of their funding comes via what is known as the dual support system. The Higher Education Funding Councils provide general funding, used mainly for academic salaries and research infrastructure while Research Councils provide funding for projects, research training and centres on a competitive peer-reviewed basis. The other principle funding source for research is the charitable, non-profit sector, notably the Wellcome Trust which is the largest single funder of medical research.
Preliminary results of the second UK technology transfer survey for FY2002 are revealing some significant shifts in the patterns of research commercialization in universities. Relatedly, universities are employing more technology transfer staff and investing more in protecting inventions arising from university research; licensing activity has increased relative to spinout formation as the prevalent route for research commercialization, and there has been an increase in commercialization activity across the board with an overall increase in income generated.

A large number of schemes exist to support the transfer of research results from the science base into new competitive products, processes and services. Examples of ongoing initiatives having an impact in this area include: the Fund for commercialization of research in PSREs, the Higher Education Innovation Fund – HEIF, the Business Fellows Scheme, Faraday Partnerships, LINK, the University Challenge Fund, the Science Research Investment Fund and funds for innovation held by Regional Development Agencies in England and the Devolved Administrations. Also relevant are the Grant for R&D (formerly SMART) and Knowledge Transfer Partnerships (formerly TCS), which act to lower the commercial and technological risks of investment in R&D and innovation, particularly for SMEs.

Under the broad umbrella of the HEIF, over 70 universities have been supported in a range of activities such as the employment of specialist staff, establishing business incubators, improving the IP infrastructure and providing enterprise training for staff. A number of University Innovation Centres have been established, with more planned. The centers are intended to be top class, long-term research partnerships between major business interests and the university sector, and at “the heart of cluster development and support for new start-ups and businesses that are growing in business incubators”.

In addition, New Technology Institutes are to be set up (2 in each English region). These will be based on partnerships between universities, colleges and local businesses and will provide specialist ICT and other high tech learning programmes, working closely with local companies to ensure they have the know-how to apply advanced technology practices.

The DTI has announced that it intends to revise its former LINK programme into a more focused Technological Strategy which will support collaborative research in five main technology “pillars”37. This new funding gives emphasis on “basic technologies that can be exploited” through technology transfer in fields such as advanced composites, photonics, nanotechnology, data storage, energy efficient transport and several power-saving technology areas.

The Ministry of Defence (MoD) has announced the creation of a new range of Defence Technology Centers (DTCs), of which six may eventually be funded, to carry out research into defence science and technology. Those taking a stake in the DTCs will be able to gain access to the IP they generate, giving opportunities for further exploitation of ideas and concepts in both defence and civilian applications.

### Challenges and measures

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<th>Challenges</th>
<th>Measures</th>
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<td>Boost intensity of innovation activity in enterprises.</td>
<td>Technology Strategy Board formed, mainly of senior business representatives. Aims:</td>
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<td>Identify key technology priorities</td>
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<td>Ensure that the governmental Technology Programme (£150M) is market-focused</td>
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<td>Strengthen linkages between the research base and the industry.</td>
<td>Higher Education Innovation Fund</td>
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<td>Identify future skills needed and ensure the supply of specialized scientific, engineering</td>
<td>Knowledge Transfer Networks</td>
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<td>Collaborative Research and Development</td>
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37 For further information see: www.dti.gov.uk/technology programme.
An influential report for HM Treasury by Richard Lambert38 pointed to many areas of the links between business and universities in the UK that need attention such as the need for many more companies to learn how to exploit the innovative ideas that are being developed within British universities, the need for British universities to get better at identifying and communicating their areas of comparative research strength to a wide community, the lack of clarity over IP ownership, the price that universities are setting on their IP, and the variable quality of university technology transfer offices.

The Foresight programme (UK_01) also continues to provide an input into the Government’s strategic policy decision-making process, although it has now become more of a continuous exercise than the previous system. The current round of Foresight – launched in April 2002 – operates a fluid, rolling programme that looks at three or four areas at any one time. The starting point for a project area is either: a key issue where science holds the promise of solutions; or, an area of cutting edge science where the potential applications and technologies have yet to be considered and articulated.

One of the DTI's top-level objectives is: to “encourage business innovation, particularly by facilitating collaboration and exploitation of research, with an emphasis on regional growth”. The promotion and stimulation of innovation at the regional level is a high-level Government priority. To this end, the Government established nine Regional Development Agencies (RDAs) in England which complement the Devolved Administrations in Scotland, Wales and Northern Ireland.

In the English regions, strategic frameworks for innovation are provided by Regional Innovation Strategies (RIS) developed by the Regional Development Agencies in consultation with a broad range of regional and local actors. Typically, a RIS may address issues such as the identification and stimulation of: industrial sectors of particular regional significance; regional networks that foster collaboration, the exchange of good practice, etc.; the level of interaction of universities and research institutions with local/regional businesses, particularly SMEs.

All the English RDAs will establish a “Science and Industry Council” along the lines of those already established in the North-west and North-east. They will draw together key business and academic interests to draft a regional science strategy that is intended to develop the region’s science base over the next twenty years. The strategies will contain action plans in key fields of science and technology for the region.

In general terms, UK innovation policy may be characterized by a move away from intervention to address market failures towards intervention to redress systems failure. Hence, most Government support measures for innovation aim to either provide framework conditions conducive to innovation or to stimulate interaction at the interfaces of innovation.

Annex IV: Examples of trans-national co-operation projects

*Scanbalt Campus*³⁹

**Background**

ScanBalt is a non-profit association – co-financed by the Nordic Innovation Centre - within the meta-region that encompasses Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland, Sweden, northern part of Germany and north-western part of Russia. This meta-region is named ScanBalt BioRegion. ScanBalt will promote the development of ScanBalt BioRegion as a globally competitive meta-bioregion.

Research and education are major prerequisites for regional development and global competitiveness. That is especially true for life sciences/biotechnology. However, European state-owned universities have been criticized for being unresponsive and rigid, unable to cluster for excellence and to be not open enough for collaboration with external actors like companies and hospitals. The European education and research systems are considered to be fragmented and isolated and with a disparity of regulatory systems. In addition, Europe has a non-competitive level of funding of education, research and development when compared with our competitors.

To attack these problems, ScanBalt Campus (SBC) will create a cross-sector network of education and R&D between universities, companies, hospitals/university hospitals and other actors—all sharing life sciences/biotechnology as a common base—in a meta-region encompassing the Nordic countries, the Baltic countries, Poland, North Germany and North-western Russia. The brand name for this meta-region is ScanBalt BioRegion. The SBC will improve regional coordination and mobility, increase cross-disciplinarity, increase collaboration between sectors, and create critical mass.

SBC will deliver a framework, acting as an umbrella and/or as a platform, in the whole field of knowledge formation from idea to market. The initiation of ScanBalt Campus is co-financed by the EU Interreg III B-programme for regional development.

**Implementation**

The SBC project is pursuing the following objectives with corresponding activities:

1. Providing a bottom up trans-sectorial, trans-disciplinary concept for a sustainable SBC with participation of the main public and private actors inside education, research and development

2. Preparing the establishment of ScanBalt Academy as a high level strategic advisor and body to ensure academic excellence in SBC, promote the use of shared curricula, undertake high level guest lecturing, select grants and rewards and review different SBC activities

3. Creating examples of shared curricula between institutions in SBC with requirements of mobility

4. Initiating 4 new transnational knowledge centers with education, research, tech transfer or development activities and integrating existing ones into SBC

5. Establishing a media database in SBC aiming on asserting competences and generating interest among students, lectures, academic institutions, industries, public authorities, decision- and opinion makers

6. Establishing an Internet based one-stop-entry to activities in SBC where courses, lectures, grants, projects, degrees, personal, positions can be posted

7. Hosting three events plus a number of workshops and meetings.

It is a specific aim to ensure activities beyond the project schedule by setting up public-private partnerships and create SBC as a permanent institution with lasting effects. SBC sets out to be a European Model Case for increased knowledge-based competitiveness thereby bringing benefits to society.

Outcomes and benefits of the international co-operation

ScanBalt Campus was initiated at a conference at Lund University, Sweden on June 14 2005. 31 universities, regional networks, technology transfer organisations and companies from 11 countries located in ScanBalt BioRegion make up SCB. Initially a number of transnational centers in specific topics will be set up e.g.

- ScanBalt Faculty of Regenerative Medicine
- ScanBalt IP Knowledge Center
- ScanBalt Faculty of Environmental Biotechnology as well as an initiative in molecular diagnostics.

By establishing ScanBalt Campus ScanBalt BioRegion has taken a significant step towards a more effective and better coordinated use of the resources in education and research and an increased mobility of knowledge and human resources. ScanBalt Campus aims at creating a critical mass for education and research that will enable ScanBalt BioRegion to compete at a global level.

To support ScanBalt Campus, ScanBalt Academy will be established as a body of prominent academic and industrial scientists that shall act as a strategic advisor and guarantee quality in ScanBalt Campus. Members of ScanBalt Academy will also provide high level lectures to partners in ScanBalt Campus. At the ScanBalt Executive Committee meeting 13 June Kaare Norum, Chairman of MedCoast Scandinavia and professor at the Oslo University were elected as Chairman for ScanBalt Academy. In addition, Leena Peltonen, professor at the Helsinki University was elected vice chairman.

The chairman of ScanBalt, Bo Samuelsson expects that ScanBalt Campus will be crucial for Northern Europe to be competitive within life sciences and biotechnology with e.g. the US and Japan by 2010. Only by sharing and better coordinating the use of the scarce resources can this ambitious goal be achieved.

Børge Diderichsen, Vice President of the pharmaceutical company Novo Nordisk, Denmark, says “For industry it is important to have access to world class competencies in ScanBalt BioRegion. Even in a globalized world geographical proximity is important. In addition ScanBalt Campus and ScanBalt itself can play an important role in attracting highly qualified ex-patriates to return to ScanBalt BioRegion.

The chairman of BioCon Valley, Horst Klinkmann, Germany, says, “ScanBalt BioRegion is Europe’s first metaregion. With ScanBalt Campus we are now establishing the necessary infrastructure to face the new challenges of education and research in a globalized and more competitive world, where the regions are playing an increasingly important role. We hope to be a role model for the rest of Europe”
STRINNOP

Background

The Thematic Network STRINNOP as part of "Innovating Regions In Europe IRE" (see www.innovating-regions.org) aims at strengthening the Regional Innovation Profiles of its member regions by developing a proactive, holistic, and comprehensive approach. By integrating regional good practice tools and ideas into a common step-by-step model, the STRINNOP approach takes into account the specific framework and individual culture of every region. Every step of the model reflects the main steering wheels which influence the regional innovation system and thus the Regional Innovation Profile.

Based on their experiences in defining regional innovation indicators and gathering the respective data the STRINNOP partners elaborated a prototype of a pragmatic self-assessment tool - called STRINNOP Facilitator - as an incentive for the STRINNOP member regions as well as for other regions to raise awareness, intensify and structure their effort in strengthening the Regional Innovation Profile and to sharpen the image of a successful, innovative and attractive region.

With its integrated approach of fostering and promoting the regional innovation system STRINNOP also intends to contribute to the regional economic growth and the international competitiveness of its member regions.

Implementation

The core element and driving force of the STRINNOP network has been the exchange of experiences (incl. study visits) among all network members on how the support infrastructure will have to be developed in order to maximise the benefits for the companies. Each region has presented successful initiatives and ‘Good Practice’ cases to the other network members. The personal face-to-face exchange between the STRINNOP members and the visits of good practice cases have increased the understanding for each other and the insight of the STRINNOP partners in the framework of the individual innovation systems.

STRINNOP does not aim to erect a “euphemistic mask” as Regional Innovation Profile but to mirror the regional innovation reality by providing a pragmatic tool set. Only an honest innovation profile of the own region will open up the opportunity to strengthen regional strengths and to overcome regional weaknesses and risks.

Despite of this general understanding of the regional innovation system and its profile today the policy scene is still dominated by linear tools, addressing inputs into the innovation process rather than the functioning of the system, and providing support to firms in isolation rather than to networks of actors [SMEPOL 2000].

STRINNOP pays attention the complex and iterative process of fostering the regional innovation system and strengthening the Regional Innovation Profile. Therefore STRINNOP developed a pragmatic methodology based on a step-by-step-approach and involving the exchange on Good Practice as well as a draft set of regional innovation indicators. With the “STRINNOP Facilitator” STRINNOP offers a tool for the pragmatic self-assessment of the own Regional Innovation Profile as the starting point for its further strengthening.

Outcomes and benefits of the international co-operation

The several STRINNOP meetings within the last two years underlined that every region has its own specific framework and its own culture. Some regions have a higher degree of freedom in innovation politics and more financial resources than others; some have already gathered more...
Updating Norvision – Facilitating Innovation

experience in innovation support than others. Due to the different regional perspectives and due to the intensive controversial discussions the STRINNOP partners have gained a mutual understanding of each other. They realised that it is not possible to develop the “one size fits all” approach to strengthen all Regional Innovation Profiles in the same way. The STRINNOP network is taking the regional specialities into consideration by integrating the individual good practice tools and ideas into its step-by-step model. The discussions within the group and with externals even underline that a continuous process of further amendment of the currently implemented STRINNOP Model will be necessary.

About 100 Good Practice Cases and financial tools are available under www.STRINNOP.net. In order to assure the quality and applicability of the ‘Good Practice’ tools some criteria were formulated which a methodology or tool has to fulfil in order to become a ‘Good Practice’ case for the STRINNOP approach:

- Only methodologies and tools are considered (not institutions or departments in general)
- The tool must be completely developed, respectively those parts of the tool which can be used independently.
- Experience of the application of the tool must be given and results/findings from the application must be available.
- The tool/methodology must be acknowledged within the respective region.

Parallel to the elaboration of the step-by-step approach and the identification of regional good practice tools the STRINNOP network has worked on the definition of a set of applicable indicators describing the Regional Innovation Profile. However, it is expected that within the near future there will be much more reliable data available for a broad number of possible regional innovation indicators. Therefore the STRINNOP partners came to the conclusion during the STRINOP project not to spend more time on the definition of indicators than a first draft of a set of quantitative and qualitative indicators but to focus on the Good Practice Cases.

In order to facilitate the self-assessment of the Regional Innovation Profile the STRINNOP members have developed an EXCEL tool, called the “STRINNOP Facilitator”. This instrument helps the user to fill in the rating and gives him/her an immediate visual feed back of his/her rating of single indicators in form of a “spider diagram”. The “STRINNOP Facilitator” allows the user immediate comparisons of his/her own region to the ratings of the whole STRINNOP sample (min-mean-max). The user can choose between the comparison of each indicator and the comparison of whole steps according the STRINNOP approach.
**Background**

The Trans-Regional Innovation Project “PEP - Partners Ensuring Progress”, was carried out in 1999-2001 by four regions: Lower Austria, Kent, Schleswig-Holstein and South Sweden.

Preceding analyses that were carried out in the four regions showed that only insufficient relations exist between the SMEs and the universities as key sources for innovation and that external innovation supporting services are generally only scarcely used by SMEs. The regional SMEs of all partner regions need external innovation support and react positively to proactive innovation counselling. In all four regions similar approaches exist as to cover this need: Technology and Innovation Consultants (Technologie- und Innovationsberater, short TIB) in Lower Austria, Innovation Counsellors (Innovationsberater) in Kent, Regional Innovation Consultants (Regionale Innovationsberater, short RIB) in Schleswig-Holstein and Technology Knowledge Bridge Managers in South Sweden.

Nevertheless, SMEs of the partner regions complained about a lack of transparency and access to suitable support programmes and to partners for innovation activities. Therefore, the PEP regions decided to establish a close and coordinated network of regional innovation consultants and to start measures on the development of Innovation Supply Chain Management in their regions in order to meet the SMEs' needs in their respective regions.

During a period of 24 months, individual measures derived from the regional strategies were to be implemented as regional pilot actions within a region and these implemented pilot actions were also to be transferred to the partner regions.

**Implementation**

The basis and the starting point of the PEP activities were the respective evaluations of the regional innovation supporting infrastructure and the deducted regional innovation strategies as well as single measures. In the individual regions, the following focal topics and pilot actions were defined:

- Facilitating the SMEs' access to “public support schemes” by developing specific tools for monitoring of the funded projects and for systematic and continuous survey of the SMEs needs in the field of Innovation Support (Innovation Check) (Lower Austria)
- Setting up an innovation supply chain management (Kent)
- Improving the network and the services offered by the Regional Innovation Counsellors by elaborating the “Strategy of the Regional Innovation Counselling in Schleswig-Holstein” and exemplary implementation in the field of environmental technology (Schleswig-Holstein)
- Stimulating innovation and technology transfer projects between regional SMEs and between universities, other service providers and regional SMEs by "Innovation Teams" and by defining the “intermediary” function involving the experience of the “Technology Knowledge Bridges” (Southern Sweden)

After defining the regional pilot actions and the elaboration of the work programme during Phase 0, Phase 1 concentrated on the implementation of these pilot actions regionally, supplemented by the experience exchange between the PEP regions together with study visits. The tools of the regional pilot actions were first implemented and tested before the transfer of suitable pilot actions into other PEP partner regions was carried out.

The final selection of the pilot actions for the transregional transfer took place in the framework of a three-day meeting at the beginning of Phase 2. The Transferability Check, the evaluation tool which
was developed for the PEP project, was used to make the decision. As preparation of the meeting, all PEP partners had made an assessment of their own pilot actions and of those of their partners. After analysis of the first Transferability Check, the pilot actions “Innovation Check”, “Monitoring” and “Supply Chain” had reached an implementation level at the end of Phase 1 that enabled transfer.

Transregional working groups were set up to carry out the transfer of tools during the second phase of the PEP project. These teams facilitated the transfer considerably and were essential for its success since the personal exchange between the regional actors highly improved the mutual trust – more than can be achieved by telephone or video conferencing – and because the use of the existing implementation experiences is a major asset in the necessary adaptation to the regional conditions.

Outcomes and benefits of the international co-operation

Within the framework of PEP, several measures resulting out of the previously defined regional strategies and evaluations could be successfully implemented as pilot actions in PEP; some of them were even transferred. The introduction of novel proactive tools to identify the innovation potentials of regional companies, in particular of SMEs in a structured way and to efficiently support the SMEs (among others by a need-oriented adaptation) is highly beneficial for numerous companies in the PEP regions.

The results of the PEP project are not only beneficial for the regional companies, but also have an impact in the improvement of the transparency of the existing innovation supporting structures and the own regional strategy implementation. It was very helpful for the PEP partners to have a look over the edge of their own environment and the experience of the good practice examples of the PEP partner regions which entered the own innovation supporting system as “new ideas”. Regional communalities and differences in the companies’ needs for innovation support were identified between the PEP regions. The learning process of the different regional policy structures in the framework of PEP has considerably improved the mutual understanding of the PEP partners. The regional characteristics (regional culture) were also part of the transfer of the regional pilot actions; therefore, no pilot action was transferred on a 1:1 basis but always adapted to regional context factors.

The transfer actions did not only benefit the target regions in the form of applicable tools but also the transferring regions in the further development of their own measures. The insights gained on the influence of regional characteristics on the transferred measures helped to foster and make use of the effective mechanisms of the own pilot actions.

The transregional communication and co-operation between the PEP partners as a further objective of the PEP project could be considerably intensified during the last months. All project partners and the members transregional working groups unanimously considered the newly linked personal networks as a further valuable benefit of the PEP project that will form the basis for future co-operation which can among others be seen in the ongoing transfer actions and the further follow-up actions such as the thematic network „STRINNOP – Strengthening the Regional Innovation Profile“.
Background

The food industry has experienced rapid changes over the last 30 years as a result of technological advancements, changes in customer preferences, methods of marketing and retailing food products and the globalisation of both sourcing and manufacturing facilitated by modern transport and preservation techniques. The focus on Health & Safety is increasing in response to growing customer concern following recent health scares such as BSE, FMD, and the negative publicity about genetically modified materials. Sustainability, in particular environmental sustainability, is becoming increasingly important from a natural resource conservation and an economic perspective. These changes place continuing and growing pressure on the European Food Industry to operate profitably, retain existing markets and develop new products, presentation methods and markets. The growing regulatory and stakeholder pressures for greater Health & Safety and Sustainability are placing cost burdens on companies with little apparent commercial return in the short to medium term.

The above situations provided the rationale and key topics for the Thematic Network Café, a two-year project commencing on 1st October 2001. Café is targeted at the Food Industry, Café comprised 16 members from 12 European Nations. Specific objectives of Café were:

- Develop a pan-European business supply chain based innovation network to facilitate the exchange of knowledge, techniques and information between members and their region’s Food Companies.
- Analyse the Food Industry in the member regions against a common analytical model, identifying priority areas for innovation support.
- Highlight industry involvement in the innovation process and monitor the impact of this involvement against common assessment criteria.
- Identify current best practice business support activity from member regions provided by both the public sector and the industry itself.
- Identify opportunities for trans-regional cooperation between firms and for new value added collaborative innovation support activity between public sector and industry in the food sector.
- Identify existing research and technology transfer activity between industry and the research base to support industry priority actions.
- Identify opportunities for new research and development activity between business and the research base in the member regions.
- Further the exchange of information on food developments with the EC and encourage industry participation in EU-programmes.
- Develop an effective network Information System for members and others linked to Café.

Implementation

The Café project plan defined two main phases:

1. An analytical phase developed to review the challenges facing the food industry in the member regions, the innovation support infrastructure and current business support activity.
2. An implementation phase to look in depth at a number of key issues identified by the analysis and develop information resources, examples of good practice and outline programmes for future activity by member regions.

www.cafe-europe.net
Two analytical templates were developed and completed by Café members. The rationale in using templates was to ensure that information received from Café members during the analytical phase had a level of cohesiveness to ensure the analytical process would be as effective as possible in focusing-in on common issues.

The first template provided a generic overview of the region’s Food Industry and was used to provide base line information and assist in the development of the main analytical template. The second template was a detailed review of the strengths and weaknesses of the member region’s Food Industry together with a review of the Innovation and Research & Development infrastructure in each region.

During the period June 2002 to September 2003, Café members have been working in Implementation Groups to address specific activity areas identified as important to their regional food industry. The groups focussed on:

- Product development
- Market development
- Health & Safety
- Sustainability
- Knowledge Management, Research & Development

Outcomes and benefits of the international co-operation

Each Implementation Group has produced a comprehensive report on their activity and outcomes, which are available from the Café web site www.cafe-europe.net.

As a result of the project the network members have increased the knowledge of other regions’ Food Industry and the issues facing them. Café members have worked together to look in detail at a range of issues that they identified as being some of the most important challenges faced by their Food Businesses that could be effectively addressed by Public Sector Intervention.

As importantly, Café has helped develop network links between member regions, offering the opportunity to share information and undertake joint activity. Over the two years of the Café project, members have worked bi-laterally or multi-laterally on a number of related actions, sharing good practice and experiences and helping their food businesses make trans-regional links. As a part of the Innovating Regions in Europe Network, Café members have met and collaborated with other networks and regions in Europe. The Thematic Networks address complementary issues of knowledge sharing, technology transfer and innovation. These are all issues that have been of benefit to Café members when dealing with their food industry.
**Background**

TOWER – Towards Sustainable Excellence by Innovating Regions is a co-operation between the regions of East Central Sweden, SE; South Great Plain, HU; North West England, UK; Gelderland, NL and Rhône-Alpes, FR. TOWER is financed by the EU Interreg IIIC programme, which promotes co-operation between European regions on issues of regional development. TOWER grew out of a desire from the 5 regions to share knowledge and experience on the processes of innovation that drive regional economic growth. The regions have strong similarities in their geography and development needs, and have much to share and to learn.

The rationale behind TOWER is a common need for further development of strategy shaping methods. The TOWER approach implies a unique and innovative combination of improvement of tools at the project level, and at the same time testing on strategic level the implementation of the findings in the development of strategies for sustainable economic growth. The transnational context will give an added value to the performance in the participating regions.

The overall objective of the TOWER programme is to create and improve strategies, methods and tools for sustainable economic growth, through inter-regional cooperation. In particular the following objectives should be achieved:

1. Long term cooperation of at least three years between five regional partners in old and new member states.
2. Improvement of economic growth strategies/programmes
3. Improvement of methodologies and tools for sustainable economic growth

**Implementation**

The TOWER model consists of a three level approach and can be described as follows:

- On the project level tools for stimulating entrepreneurship that have been tested in a national context (during the performance of Innovative Actions programmes or similar) will be further developed and tested in a transnational context aiming at improving the tools.
- On the strategic level findings from the sub-projects will be used as tools for improvement of regional strategies. Target groups are regional partnerships, regional authorities and other actors involved in economic growth issues.
- Adding a third level - the inter-regional level - gives the possibilities of exchanging experiences, and in a mutual learning process co-operate with other regions with similar problems but with different experiences of approaches and methodologies, which increases the possibilities to create even better strategies.

By creating an interplay between the three different levels, the findings from the sub-projects will be implemented in the regional strategies in order to improve the strategically performance. By doing so in a mutual transnational learning process an added value will be given to the approach.

Projects within the TOWER programme must address one or more of the following topical areas and must include partners from at least two of the participating regions.

- Strategies for sustainable economic growth in regions
  Projects in this component will promote the improvement of economic growth strategies and their implementation and monitoring. An important aspect to exchange experience on is

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*http://www.e.lst.se/e/amnen/Regional_utveckling/Program_och_projekt/pagaende/tower.htm*
how to successfully monitor and carry out economic growth strategies. Examples of possible activities are Exchange of experience and best practice on regional growth strategies, for example on innovation, clusters and also how to integrate cross-cutting criteria such as gender equality, youth and integration of minorities.

Target group: regional partnerships, local/regional public authorities.

- Strengthened technology infrastructure in regions and transfer to SME’s
  Projects will exchange experience of creating strengthened technology infrastructure in regions and transfer to SME’s, strengthening the competitiveness of SMEs by increasing their level of innovation and offering them improved support services, and the development of knowledge-based business clusters/networks. Examples of possible activities: Creating tools for the practical application and transfer of research; support services in specific sectors (Bio-tech, life science), development of tools to improve access to finance and support.

Target Group: SMEs, universities, research centres/institutes, company associations, and other public actors.

- Competitive and knowledge-based entrepreneurship
  Projects will exchange experience of how to stimulate entrepreneurship and increase the competitiveness among SMEs, fuelling entrepreneurial mindsets, new ways of supporting start-ups and existing SME’s, and implementing new instruments for increasing spin-offs. Examples of possible activities: Projects to look at new and innovative ways of creating and sustaining businesses; sharing experience of new kinds of business development, or support for new target groups (such as young people, women); finding new models for teaching entrepreneurial skills covering a wide range of clients and settings.

Target Group: SMEs, business associations, universities, local and regional authorities and other public actors.

- Sustainable SMEs
  This component will strengthen the competitiveness and viability of SMEs by adapting sustainable development concepts, creating a joint knowledge basis for SMEs environmental performance, identify and test tools for support of environmental improvement, and develop tools for the marketing of sustainability among SMEs. Examples of possible activities: Developing environmentally responsible products and processes in SMEs; developing SMEs that promote or develop environmental benefits; maximising the economic potential of the environment and sustainable development.

Target Group: SMEs, environmental consulting firms, industrial research institutes, trade organisations, universities, consumer-organisations, other public actors, local/ regional/national authorities.

Outcomes and benefits of the international co-operation

TOWER started in spring 2005 and so far 1 projects in the range of Euro 280.000 has been launched. The second round for proposals was opened in July 2005 and closes in September 2005.

The project manager, Anna Jacobsson, sees the benefits of the project and Interreg as a chance to embark on a multiregional co-operation project that allows not only mere exchange of experiences but also gives the opportunity to launch concrete collaboration projects. This opportunity is rarely or never offered by national programmes. Further, the possibility to offer international collaboration opportunities to the region’s players without having them bearing the full responsibility themselves is considered to be a good way of involving more regional and local organisations in EU-programmes.
**MAREDFlow**

**Background**

The project partners cover diversified economic regions which will benefit from the development of transport logistics linked to the maritime transport.

MAREDFlow will stimulate economic development in a number of maritime regions’ transport logistics sectors, by developing the knowledge-based economies of these maritime regions. The gains obtained from the implementation of the technologies and techniques - in logistical supply chains and port and commercial clusters - will be used to improve the overall regional economic performance.

**Implementation**

Knowledge development maps will be used to identify relevant technologies that will provide economic gains and the paths which may be used for the effective transfer of information, expertise and experience from those able to deliver to those requiring it. The maps will be interactive and will determine the need for actions such as technology transfer, training, benchmarking, mentoring, and consultancy. These actions will subsequently be executed. Indication will also be provided on complementary requirements such as financial support. Private sector companies as well as more conventional academic and public sector organisations will be targeted. The knowledge development maps will link organisations involved in the logistical supply chain within maritime regions: companies, ports, research institutes, higher education establishments and public authorities. Further, the maps will allow those knowledge flows that will stimulate economic and trade development. Linked financial flows will also be identified by the maps, such as when the flow of knowledge involves the transfer of intellectual property or requires capital investment.

**Outcomes and benefits of the international co-operation**

Once a sufficient number of transfers have been made, an assessment of their impact in terms of improved regional economic performance will be undertaken. The results of this investigation will consolidate the project and new, incrementally improved, cycles of the system will be launched - providing a continuous, adaptive process. Measurement of the regional economic impacts will be made and published. The knowledge development mapping technique will remain able for use by the participating regions, and other regions, once the MAREDFlow project has been completed.
Baltic Sea KR

Background

Baltic Sea-KR aims to create a strong Baltic Sea Knowledge Region with scientific excellence, capital and innovation far beyond the potential of each individual region. As an initial pilot project it aims to inter-connect the knowledge clusters in Hamburg, Øresund and Helsinki and prepare for later expansion of the network to include other metropolitan regions in the Baltic Sea Region. The Baltic Sea Region taken as a whole has a population of 103 million covering 11 countries with a geographical area of 2.4 million m², nearly three quarters the area of the EU.

The specific objectives of the project are:

- To improve the outreach of regionally based clusters and their achievements by making these more accessible to individuals in other regions and facilitating personal contacts. To achieve this a Baltic Sea Region Web based Knowledge Portal will be set up to contain an advanced database of organisations, documents, individuals etc. relevant to cluster development and innovation; to provide facilities for the community to interact with one another.
- To improve access to early stage finance by facilitating personal links between financiers and business angels so that they can operate on an inter-regional basis.
- To establish a dialogue between policymakers responsible for innovation in the regions. Regional innovation initiatives have in the past been formed only at the local regional level. Baltic Sea-KR provides a tremendous opportunity to engage with regional institutions and also organisations such as the Baltic Sea Development Forum and the European Investment Bank.
- To expand the membership to other Baltic Sea countries. The ultimate goal is to have a well functioning inter-connected regional innovation support system linking the Baltic Sea region as a whole. Preparations will be made to include new members.

Implementation

The pilot action takes advantage of the fact that the participating regions have well established policies to support the development of the knowledge based economy. However, concerning the regions the success of these policies is critically dependent on strong interregional links.

This pilot action intends to make the first steps towards sustainable crossregional clusters by applying the so called “triple-helix” model approach to integration of the business, public administration and research community drawing on already existing regional and local political initiatives. The universities in each of the regions are the engines for future economic development providing proven ideas which can be spun out as commercial ventures and licensed; they provide an important source of R&D services for large companies and SMEs, and they can act as magnets for intellectual capital. Linking intellectual capital is the key to developing the knowledge-based economy. Øresund University is a prime example providing an umbrella organisation for some 14 universities. Baltic Sea-KR provides an opportunity to extend this partnership to over 35 research institutions.