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RETHINKING REGIONAL PERFORMANCE IN THE KNOWLEDGE SOCIETY

Foresight as a Tool for European Regions

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This report expresses the views of the writers, who are solely responsible for the content of this book. It does not represent the official opinion of the European Union.

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INTRODUCTION AND ACKNOWLEDGMENTS

It was acknowledged in the early 90s, by both researchers and policy makers, that knowledge would become one of the key factors for prosperity in the 21st century. During that time, it was also argued that the evolution towards a knowledge economy would dramatically reduce the importance of space. Globalization and new information and communication technologies, the argument went, will render spatial units of policy-making obsolete: Geography is a thing of the past, distance is dead, place is irrelevant.

However, things turned out differently. While globalization does indeed pose serious challenges for traditional spatial units of policy-making, it has become clear in recent years, that place continues to matter, albeit its role may change drastically. A spatial unit that seems to have gained importance in the knowledge economy is the region. Economic success continues to be deeply rooted in regional performance, witness, e.g. the phenomenon of clusters of tightly connected companies structured around a regional core. Increasing regional competitiveness has, we may conclude, become a central challenge – not only for the regions themselves, but also for the EU member states and the EU institutions.

The SPIDER project (funded by the European Union's Regions of Knowledge Pilot Action Programme), was focused on the potential for using foresight methods to increase regional competitiveness. In this project, the tools of foresight and futures research were utilized in order to explore the features of knowledge within regions and regional innovation systems.

This document aims at presenting the mains results of the SPIDER project based on regional analyses, local action group work, expert workshops, DELPHI answers and the debates held during the closing conference in order to discuss the challenges facing regions today, and the steps regions need to take to overcome those challenges.

The writers wish to thank the European Commission for the funding of the project. The Directorate's general research personnel have been flexible and understanding towards the project and its possible problems. We thank them for their patience.

The project could have not been carried out without input from local action groups, the DELPHI panellists and the participants at the Expert Seminar on January 27 2005 and the Closing Conference on March 13 2006. The writers wish to thank each and every one of you for your remarks, opinions and work done for the SPIDER project.

Last but not least the undersigned wish to thank the whole SPIDER team from the Finland Futures Academy and the Finland Futures Research Centre, the Destree Institute and Z_punkt The Foresight Company for their effort and input. The project has shown how an international project can be productive, cohesive and also fun.

Juha Kaskinen
The coordinator of SPIDER project

1 THE SPIDER PROJECT

The basic aim of SPIDER, *Increasing regional competitiveness through futures research methods,* was to increase the potential contained in intrinsic regional strengths. The project focused on exploring future potentials held within the emerging fields of economic activity in the three regions which participated in the project. The regions to be evaluated and compared were selected from three EU countries:

- Southwest Finland, Finland
- Wallonia, Belgium
- Regierungsbezirk Düsseldorf, Germany

SPIDER was conducted by three project partners:

- Turku School of Economics and Business Administration / Finland Futures Research Centre and Finland Futures Academy (project coordinator, Finland): http://www.tukkk.fi/tutu/
- The Destree Institute (Wallonia, Belgium): http://www.destree.org/
- Z_punkt GmbH The Foresight Company (Germany): http://www.z-punkt.de/

The output of the networked co-operation was the selection of regional visions which focused on exploring future possibilities for promoting European economic progress. Also explored by the project partners was the future potential of emerging fields of economic activity in those regions and their inherent competitive advantages. Furthermore futures studies and foresight exercises were conducted to provide an initial overview of the research questions and discuss policy options and opportunities.

The goals of SPIDER:

- **Connectivity:** to create connections between regional actors and reinforce their roles as actors and creators of regional knowledge-based innovation systems
- **Benchmarking:** the development of foresight methodologies made on the basis of good practices arising from national foresight exercises and e.g. the methodological proceedings of other projects
- **Implementation:** the implementing of futures research and foresight methods as a central part of regional innovation systems

The duration of the SPIDER project was from 1.2.2004–31.3.2006 and it was funded by the European Commission's Regions of Knowledge Pilot Action Program (KnowReg).

1.1 The working process

SPIDER involved five knowledge production and evaluation processes:

1. **Regional "status quo" analyses** *(literature and statistics).* A present state assessment of the regions was conducted using ten aspects taken from an evaluation model of each region's competitiveness.
2. **Regional local action group (LAG) working** *(workshops).* Local action groups were formed by local actors from both the private and public sectors. The aim of the local action group process was to emphasize and bring more regional and locally specific perspectives and approaches into the process. Another aspect was networking, which meant that through the LAGs information was transferred from the project to the field of action.
3. **Expert seminar.** The Expert Seminar of the SPIDER project held on 27th January 2005 in Brussels, brought together participants from as far a field as Dublin and Turku. The participants represented a diverse cross section of interests ranging from regional decision-makers within administrative institutions to researchers on relevant subjects and different regions in Europe. Altogether 24 experts were present. Accordingly,

the workshop facilitated discussion on the subjects of the SPIDER project and widened the horizon of the project in Europe beyond the scope of the three regions participating in the project.

4. **DELPHI survey** *(”Expert gallup”).* A DELPHI survey was carried out during 2005. The first round was a web based survey and the results of the first round were reassessed and evaluated at the local action group workshops. More detailed information about DELPHI process will be presented in chapter three.
5. **Conference.** The closing conference of the SPIDER project was held in Brussels on March 13th, 2006, under the heading ”Rethinking Regions – Improving Regional Performance in the Knowledge Society”. The conference was the main dissemination event of the project, as well as an opportunity for experts to discuss the challenges regions face today, and the steps that they need to take to overcome those challenges.

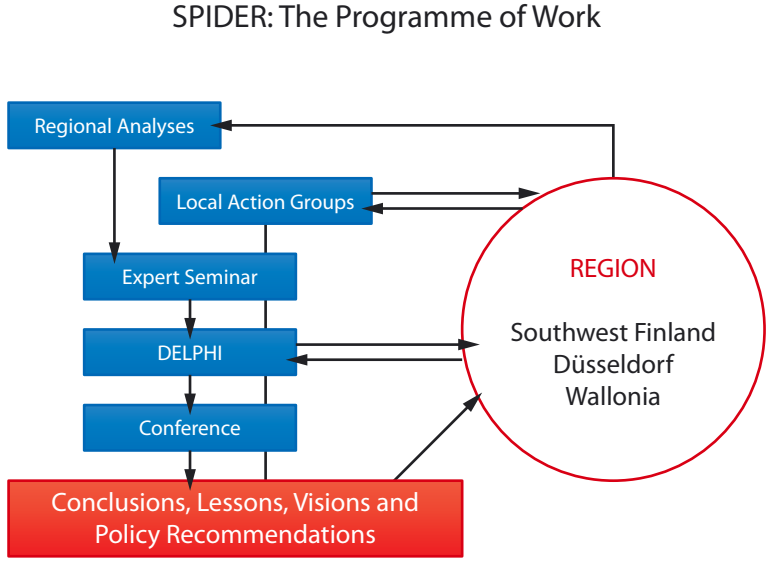

Figure 1. SPIDER process.

All the milestones of the process sketched above were used for making conclusions, for educating and informing all those involved public and for making the policy recommendations provided in the presentation of the SPIDER results in this publication.

1.2 The theoretical background

The project's theoretical background stems from an evaluation model of regional competition and innovation systems presented by Ståhle & Sotarauta (2003).

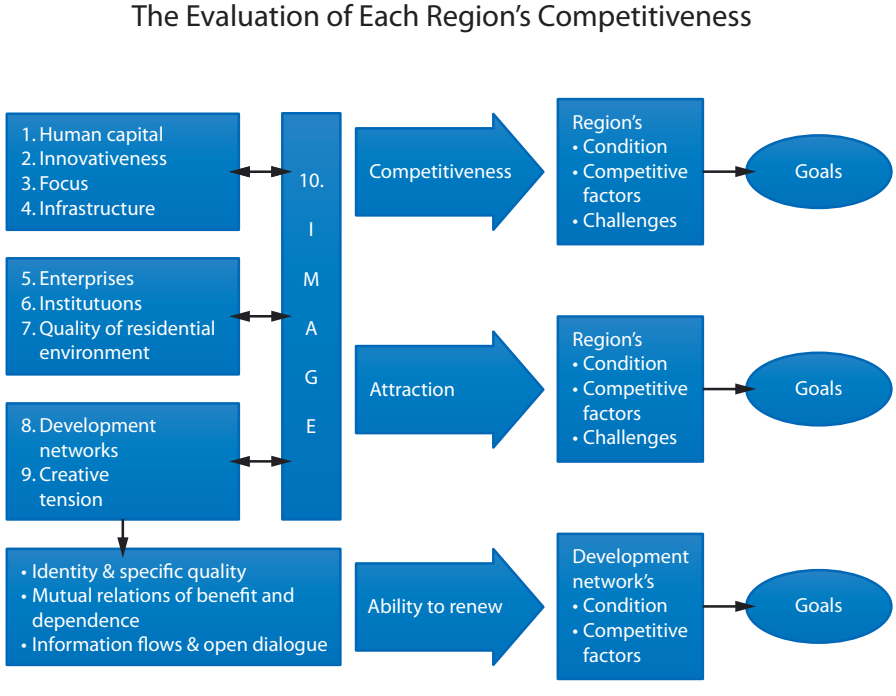

Figure 2. An evaluation model of each region's competitiveness[1].

The four basic requirements for an innovative environment, i.e. self-renewing development, which can be focused upon, are:

1. Players: identity, sense of belonging and charisma
2. Networks: links, trust and mutual dependence
3. Knowledge management: information flows and communication
4. Mastering timing: situation awareness and the courage to act.

[1] Ståhle, P. & Sotarauta, M. (2003). Alueellisen innovaatiotoiminnan tila, merkitys ja kehitysasteet Suomessa. Loppuraportti. Eduskunnan kanslian julkaisu 3/2003.

In addition to self-renewal, *creative tension* can be considered a key factor in innovation based regional development. The ability to self-renew is born spontaneously from creative tension generated by interaction and leadership.

Local and regional actors were seen, by the project, as networked innovators and "players", and nodes for creative knowledge and knowledge creation. Thus, making inter-regional (and international) comparisons provides information about creative ideas for future policy. Furthermore, from the implications of the actions taken emerges knowledge for reinforcing the economic progress of the regions.

SPIDER's initial key words with definitions:

- **Regional competitiveness:** Regional economic success factors, regional attraction forces and the ability to reform
- **Innovation:** The creation of new knowledge and applying it so that economic profit is achieved – All innovations are by nature technical, economic, social and cultural
- **Innovativeness:** This means the reformation taking place in all sectors of an organization during an action (products and marketing, production technology, organization and management, the relationship between an organization and its environment
- **Innovation system:** A complex cooperation and communication network which focuses on the basic elements (actors: organizations, companies, regions) and in particular the amount and quality of interaction between actors and how interdependent the actors are.
- **Regional innovation system:** This is made up of systematic connections between different knowledge producers (universities, research institutions), intermediate organizations (private and public innovation services) and enterprises (both SME's and large)
- **Regions of knowledge:** A region that has created conditions favourable to apprenticeship, research and innovation, thus helping to establish a society based on knowledge, savoir-faire and creativity in order to achieve lasting development. This society has the capacity to adapt to changes, thanks to networking, the promotion of creative tensions between players, as well as partnerships and private-public alliances.

1.2.1 Regions of knowledge

During the process there were two dominant concepts used in the context of SPIDER: A region of knowledge (or a knowledge region) and a regional innovation system. Generally speaking the SPIDER project dealt with three kinds of question: a) the concepts in action – how the theoretical concepts were perceived in the field of action (by regional actors) b) what was the link between the knowledge region and the regional innovation systems and c) the regions in a knowledge society – how can the performance of the knowledge region and the regional innovation systems be promoted and developed in practice and adapted for other regions?

For example, a question asked during the SPIDER January 2005 expert seminar was: "what is, in fact, a *knowledge region?*" The Results of the discussion provided 8 approaches, which formed the basis of the DELPHI questionnaire (the DELPHI results are presented in chapter three) the approaches determined that:

1. A knowledge region is a region where all citizens have the possibility to receive an education and continue with life-long learning.
2. A knowledge region is a region in which a permanent creative tension can generated and developed in order to build common knowledge.
3. A knowledge region is a dynamic region, a region of passion, with a real willingness to activate, interact with and motivate its citizens
4. A knowledge region is a region that develops science and technology through innovation.
5. A knowledge region is a region where sustainable connections have been developed between creators of innovative sectors, particularly sectors based on intangible assets, and capital risk investors (the importance of micro-banking).
6. A knowledge region is an attractive region, with a clear image, an improving quality of life (infrastructure, environment, culture, etc.).
7. A knowledge region is a region where regional decision-makers and citizens – especially workers and students – have a good understanding and ownership (these concepts are closely linked) of what a knowledge society is.

8. Finally, a knowledge region is a region that promotes excellence in education and in research, while being able to overcome the reticence of universities to deal with companies and is able to work with regional authorities in joint development efforts.

The initial link between a knowledge region and a regional innovation system was based on the observation that knowledge has become an ever more important factor of production during the last few decades. From this point of view a region of knowledge should be a favourable environment for a regional innovation system.

A regional innovation system generates value out of knowledge.

1.2.2 Regional innovation systems

There is no universal way to define the concept of innovation. Innovation is an abstract term which, one way or another describes remarkable developments (a significant positive qualitative change, improvement, development, fastened on processes, products, services, workings, methods, models, theories etc.). The core idea of innovation should be related to the concept of progress whilst bearing in mind that change is not the same as progress. Progress is based on valuable change and valuable is a context determined and bound fuzzy adjective.

It can be said that a definition of innovation includes a concept of improvement *("something is getting better").* A change is always relative and innovation should not be used as a synonym for something new. How then can change be assessed, for example in the case of totally new product for which there is no predecessor? If there is no point of comparison an assessment can not be carried out directly and that's why innovation is often determined or explained by its (possible) good effects. This is understood as the main difference between innovation and invention for the purposes of this work. For example from a company point of view it can be said that a new product invention is not an innovation until it is a commercial success i.e. until it has had a positive economic effect on a company.

Every innovation needs a critical mass of changes. In other words an innovation is a change. It also requires changes and/or produces changes in technology, markets and society. One opinion presented at the local action group workshop (Southwest Finland) was that every innovation needs several inventions.

The next figure connects innovation definitions with the concept of the innovation system. The idea of the innovation concept is based on a model known as Krupp's model. According to the concept an innovation has to gain acceptance from technology (feasibility), society (acceptability) and market (demand).

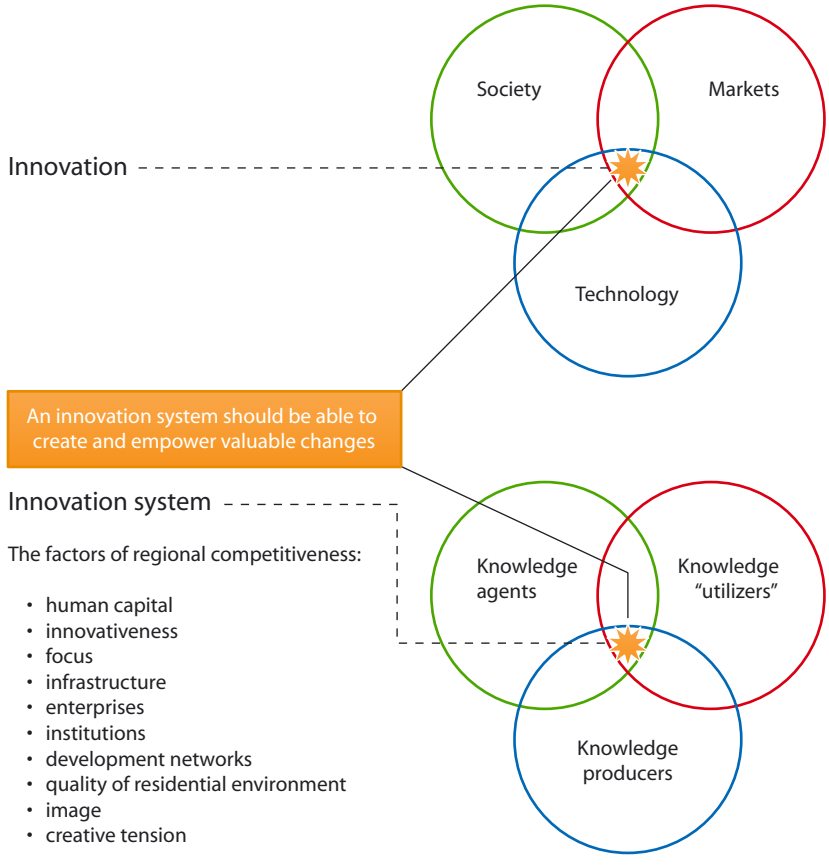

Figure 3. A framework for knowledge based innovation systems

The main actor categories within a regional innovation system are knowledge producers, knowledge intermediary organizations (agents) and knowledge users. Regional actors can be associated with more than one of the categories at the same time meaning that actors might have many different roles in a regional innovation system.

> The concept of a regional innovation system (RIS) is, in principle, fairly self-explanatory: A regional innovation system is a regional network based on its key regional actors. The actors are sources of and for innovation, and a RIS includes all the system connections between the actors.

However, this explanation begs further questions: Why should we pay attention to innovation systems or innovation networks? And why and in what sense do regions matter in the context of innovation? Let us try to tackle these two questions in turn.

Innovation in the classical sense is often associated with high technology industries, R&D figures, entrepreneurship and the like, often with a focus on new products. From that we can develop an emergent concept, whereby innovation can be taken to include those aspects *as well as* the social environments that foster innovation, plus non-technological innovation, i.e. innovations on the level of organization, service, networking etc. From the emergent perspective, it is clear that we need to think about networks of innovation rather than individuals or single companies that bring about innovation – after all, if innovation itself (and not only the diffusion of innovations) is a social phenomenon, one has to look at all the social actors that contribute to it. Consequently, we may conclude that the consideration and analysis of *innovation systems,* is extremely important. Currently, innovation systems may be conceived of in two ways, one can be thought of as classical and one as emergent.

Two further factors corroborate this view.

Firstly, it has long been noted that regional development is an innovation process, which crucially depends on interaction: Interaction is (...) the basis for learning, in-

novation and hence eventually for the economic prosperity of regions. Thus, as the need to keep pace with the rest of the world requires regions to organize regional development in a highly interactive, participative fashion increases, studying systems or networks of innovation and their functionality becomes all the more important.

Secondly, innovation in companies has changed as well. For most of the twentieth century, innovation within companies was informed by a process which is called "Closed Innovation" thinking by Henry Chesbrough (2003): *"Companies must generate their own ideas and then develop them, build them, market them, distribute them, service them, finance them, and support them on their own",* was how Chesbrough characterized this process. The institution most associated with this style of innovation is the central research laboratory pioneered by the German chemical industry in the early twentieth century. However, according to Chesbrough, things have changed. The growing mobility of knowledge workers, more widespread higher education, the growing presence of venture capital, and the increasingly fast time to market are among some of the factors that are leading to an erosion of the Closed Innovation paradigm. A new paradigm dubbed "Open Innovation" by Chesbrough is emerging: *"Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market".* Thus, even in a predominantly high technology context, it becomes necessary to study the structure of innovation systems.

As to the link between innovation and regions, an interesting development can be observed. When the discussion about the virtualization and globalization of economic structures peaked in the 1990s, many observers expected that place would cease to play a decisive role. *"Globalization brought with it numerous assertions that economic power is less and less rooted in a place",* writes designer John Thackara (2005): *"Distance is dead, geography is obsolete":* it was declared. As observed by economist Michael Porter in the late 1990s, things turned out differently. *"In theory",* Porter (1998) acknowledges, "*more open global markets and faster transportation and communication should diminish the role of location in competition. After all, anything that can be efficiently sourced from a distance through global markets and corporate networks is available to any company and therefore is essentially nullified as a source of competitive advantage."* However, as it turns out, that theory has

proved to be all encompassing. *"Today's economic map of the world is dominated by what I call clusters",* Porter argues. For him clusters are; *"geographic concentrations of interconnected companies and institutions in a particular field"* and *"are a striking feature of virtually every national, regional, state, and even metropolitan economy, especially in more advanced nations. Silicon valley and Hollywood may be the world's best known clusters."* Ultimately, Porter argues that in a global economy, clusters become all the more important: *"The enduring advantages (...) lie increasingly in local things – knowledge, relationships, motivation – that distant rivals cannot match."*

Clusters clearly matter, and there are many examples of successful ones. What is less clear, however, is how to actually *build* clusters that are economically sustainable. However, what's most important for our present context is that place *does* continue to matter for innovation in a global economy, and arguably, the importance of place and proximity has even increased. And of course, the key concept to consider when it comes to place and proximity today is the concept of a region. Therefore, we may conclude that regions are a basic spatial unit that any study about innovation systems has to do justice to. This is also a key reason why we need to study knowledge regions, rather than (or in addition to) studying abstract knowledge flows.

To sum up, we need to think about regional innovation systems because innovation itself is becoming increasingly systemic in nature, and because regions are becoming the primary context in which innovation systems are embedded.

2 REGIONAL PROFILES

In this handbook, we present only the basic insights of the analyses we made. More details can be found in the regional analyses for the three project regions available on the SPIDER project website at http://www.spider-project.net.

The assessment of a region is based on the information about the innovation environment presented previously.

2.1 Southwest Finland

Southwest Finland (covering 17,188 km2 in total of which land: is 10,666 km2 with a total of 453,745 inhabitants) is located in the Gulf of Finland. Its unique archipelago is a crucial part of Southwest Finland's identity and infrastructure. Turku, the oldest town in Finland, is the largest municipality, 174,284 inhabitants (the smallest is Velkua with 240 inhabitants). The total number of municipalities is 54.

Southwest Finland's regional production structure has emphasized technology in industries (especially electronics and electrical-technical industries, mechanical engineering, the metal industry, the maritime cluster). A major share of regional GDP (> 40 %) and workplaces (21.8 %, 2003) is based on such industrial activity. This high industrialization has generated a demand for business services. If services directly related to those industries would have been included in the above their share would have been even greater.

The regional focus of R&D development has been placed within the Bio and ICT sectors. The bio sector is a branch that is time, money and human capital intensive and contains a variety of innovation processes. It is also a line of business with high risks regarding the realization of business potential. Unsurprisingly then, during the last ten years regional economic growth has been driven by ICT. Though in the ICT-sector the lack of service development has been a problem.

One of the regional growth sectors in the future might be the so called "creative branches". It has been estimated that at the moment the combined turnover of the creative branches is even bigger than the turnover of the bio sector.

The next table includes regional characteristics categorized by an evaluation model, which is based on the region's competitiveness.[2]

Table 1. The characteristics of Southwest Finland

Human Capital	• In 2004 there were 453,745 inhabitants (44.9 inhabitants per square km) living in the Southwest Finland region. That is 8.5 % of the total Finnish population. A slow migration has been occurring towards Southwest Finland (+ 0.4 %, 2005). Most of the population (66.5%) is in the age-group 15–64 (about 80 % of workers are middle-aged.). • In 2004 the unemployment rate was 10.4 %. 24 % of people over 15 years old have an advanced degree. • There are over 30,000 students in universities and polytechnic schools but the region still lacks labour with technical skills.
Focus	• The structure of livelihood emphasizes the industrial sectors (over 40,000 workplaces). Southwest Finland has a great amount of value added and a high degree of processing in its businesses: but there is also great diversity in the production structure between local regions; for example Vakka-Suomi and Loimaa are deeply involved in primary production, Salo in ICT-manufacture and Turku in services.¨ The regional focus of R&D activities and development has been placed on the bio and ICT sectors.
Development networks	• According to the SPIDER DELPHI survey the lack of networks or instruments for networking are not perceived as development obstacles. However, the low productivity of networks and networking, which has generated so called "Net fatigue" has become a common phenomenon.

[2] Data sources used for the table:

- http://www.stat.fi
- Liikennetilastollinen vuosikirja 2002. Liikenne ja matkailu 2002:17. Tilastokeskus, Helsinki
- Länsi-Suomen katsaus 2003. Tilastokeskus, Oulu.
- Oppilaitostilastot 2003. Koulutus 2003:5. Tilastokeskus, Helsinki
- Suomen tilastollinen vuosikirja 2003. Tilastokeskus, Helsinki
- Suomen yritykset 2002. Yritykset 2004:1. Tilastokeskus, Helsinki.
- Varsinais-Suomen liitto (2004a): "Harmaantuva Varsinais-Suomi". Selvitys Varsinais-Suomen väestön ja työvoiman ikärakenteen muutoksesta ja sen vaikutuksista vuoteen 2015. Varsinais-Suomen liitto, Turku.
- Varsinais-Suomen liitto (2004b): Maakunnan tila 1/2004. Varsinais-Suomen liitto, Turku.
- http://www.varsinais-suomi.fi
- http://www2.varsinais-suomi.fi/maakuntasuunnitelma/tilastot/tilastot.html

Infrastructure and residential environment	• Generally speaking the quality of residential environments in Southwest Finland is good. • The share of land use is: agriculture 30 %, forestry 60 %, and built environment 7.5 %. • There are three harbours and one International airport (Turku airport). • Transportation is mainly vehicular and there are about 5,000 road kilometres. • The region's self-sufficiency in electricity is 30–35 %.
Enterprises	• In 2003 the number of enterprises was 23,020 and the amount of workplaces 195,312 of which: industrial enterprises made up (13 %), building (14 %), retail trade (22 %), services (39 %), others (13%). • The average revenue per place of business was 0.87 million euros and value added 23,290 euros per person.
Institutions	• The region has three universities and two polytechnic schools. • Turku Science Park is a development generator and a link organization for about 300 companies and public organizations. Its focus is on the bio and ICT sectors. • There are also many governmental, regional and local development organizations situated in Southwest Finland (Employment and Economic Development Centre, Regional Council of Southwest Finland etc.).
Image	• *"Southwest Finland has a certain reputation but not a certain image"* (This statement was given at local action group workshop 15.12.2005).
Innovativeness	• In 2002 patent applications from the Southwest Finland region totalled 8.5 % of all applications made in Finland and R&D investments were equal to €537 million. In 2002 R&D investments totalled about 12.6 % of all total national R&D investment. • "Innovation productivity" (measured by the amount of patents) is below the national average level.
Creative Tension	• There is a solid foundation for creative tension in southwest Finland (holistic education, wide research activity and working interaction between knowledge producers and users). Obstacles to creative tension are linked to the shortage of networks.

2.2 Wallonia

Wallonia is located in the southern part of Belgium, and has 3.4 million inhabitants in an area of 17,000 Km². Historically this region has been a leader in the steel and coal industry. But since 1960, it has suffered a crisis situation because it has not renewed its traditional production enough. Nevertheless, the region has an innovative profile thanks to high level research centres and businesses in biotechnology and pharmaceutical products.

Since 1980 the Belgian State has created a very advanced level of Federalism. The three Belgian regions have received the maximum amount of power and responsibility including legislative power.

Table 2. Characteristics of Wallonia

Human Capital	• Wallonia contains 3.39 millions inhabitants (2005) and represents 32.5% of the total population of Belgium. • It has about 200 inhabitants per square km. • The regional activity rate remained stable at 48.9% between 1995 and 2002. • The generation that entered the job market in 2004 was more qualified than in 1996. • 64.8 % of the population belongs to the age-group 15–64 and the region has a 17.3 % unemployment rate in the age-group 15–64.
Focus	• Five fields of activity are recognized as important in the region. They have been chosen to represent the competitiveness policy launched by the region in 2005 and are: biotechnology, transportation and logistics, aerospace and the aeronautical industry, the mechanical and machine industry and the food-processing industry.
Development networks	• The number of organized networks is increasing in Wallonia (Prométhée programme in 1999, the development of competitiveness 2005) • The development of several foresight exercises and action plans at a regional level, contributed to the strengthening of networks.
Infrastructure and residential environment	• The use of land is structured on an agricultural basis 54.2 %, forestry 29.5 %, built environment 6.6 % (1997). • The region is characterized by the good quality of its residential environment. There are two International airports (Liège and Charleroi). • Transportation is mainly vehicular (85.5%) and roads cover 729,000 km in total. Transport by water is significant (4.2% in 2000) and it held 41% of the market between 1996 and 2004.[3] • The region's electricity is mostly produced by nuclear power plants. • 40% of all Wallonian houses have access to the Internet[4]. In 2004, 89% of all SME's were connected to the Internet.
Enterprises	• The economic sector according to its regional added value (2002) is structured as follows: industrial enterprises (20.9%), building (5.4%), services (75.4%), agriculture (1.5%).[5] • The Wallonia entrepreneurial dynamic is still weak compared to the current density of enterprise structures. • The rate of business failure is also higher than the national average. • The indicators which indicate whether a region has a natural tendency to entrepreneurship show that more effort is required to boost the entrepreneurial spirit.
Institutions	• The Region is composed of nine universities and polytechnic schools. • There are many governmental, regional and local development organizations units (Chambers of commerce, Economic development organizations…). • Additionally, 206 business parks could host more than 4500 companies (and 115,000 persons)[6]. Of those parks, five are mainly dedicated to science and research.
Image	• The image of Wallonia varies according to the internal and external positions of the actors. The Wallonia region can be seen as a region that opens out onto the world and Europe. It is currently bridging the transition period from being an industrial economy to becoming a knowledge society and is facing many obstacles in that endeavour
Innovativeness	• In 2002, R&D investment represented 1.67% of the GDP. • There are high level research centres and businesses in biotechnology and pharmaceutical products. • Compared with the EU average, Wallonia performs well for R&D expenditure and staff, nevertheless the region must continue its efforts if it is to satisfy European objectives in this field. • Innovative activities with high added value are not developed enough in Wallonia and the region is characterised by poor market services, especially services for companies.

Creative Tension	• There is an interesting base for creative tension in Wallonia (human capital, institutions, research investments, etc). Problematically though, obstacles to creative tension are mainly linked to the behaviour of regional actors i.e. a lack of networking).

2.3 The Düsseldorf Region

The Düsseldorf region (formally called "Regierungsbezirk Düsseldorf"), situated along the banks of Rhine and Ruhr rivers and including the federal state capital Düsseldorf, is characterized by diversity and contrasts, ranging from large cities to rural areas, from new high-tech centres to remnants of the old industrial heartland "Ruhrgebiet". During the last few decades, the region has undergone a fundamental transformation, in the form of large scale structural shift, away from the old industrial sectors. In addition to this economic transformation process, the region has become a new centre for science and education as well as culture.

Formally, the region was a governmental district made up of several towns/cities and counties. It is important to be aware of the fact that the "Regierungsbezirk Düsseldorf" is more of a formal entity than a "real" region – it is inseparable from both the Ruhrgebiet and the larger metropolitan region RheinRuhr. At the same time, it does not form a consistent whole – e.g., the city of Düsseldorf itself is more oriented to the Rhine area, whereas Essen and Duisburg are more oriented to the Ruhr area. This is reflected in economic structures as well as in regional identities.

Currently, the government of the land North-Rhine Westfalia is planning to renew the structure of regional administration and to replace the five current regional administrations ("Bezirksregierungen") with three new, larger ones: Rheinland, Ruhrgebiet, and Westfalen.

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3 Service des Etudes et de la Statistique, Les chiffres-clés de la Wallonie, semestriel, n°6, 2005, p. 85.

4 Résultats de l'enquête 2004 de l'AWT concernant les équipements et usages TIC des ménages en Région wallonne (http://www.awt.be/web/dem/index.aspx?page=dem,fr,005,000,000).

5 Rapport économique et social 2004, CESRW, p. 21.

6 Service des Etudes et de la Statistique, Les chiffres-clés de la Wallonie, semestriel, n°2, 2003, p. 53.

The central problems of the region, that continue to hamper its progress, lie in the mismatch between the qualifications of the work force and their actual demand in the labour market (resulting in both unemployment and a shortage of skilled staff in certain areas) and in a sharp and rapid demographic change. At the same time, the regions "soft factors" seem to develop in a positive way – the Ruhrgebiet, for instance, has become attractive as a tourist destination.

One of the challenges for the future is thus, harnessing such positive developments and utilizing them to improve economic prosperity.

Table 3. Characteristics of the Düsseldorf region.[7]

Human Capital	The region is marked by population shrinkage (1995–2001: 0.6%) and the migration away of younger generations (the number of children of under 5 years old, e.g., diminished by 9.6% between 1995 and 2000). The population density is exceptionally high (993.2 inhabitants per square kilometre). The proportion of people in the active labour force is 53.9%, which is considerably lower than the German average of 57.5%. The proportion of students is comparatively high (28.7 students per 1.000 inhabitants).
Focus	The region is oriented towards the tertiary sector in much the same way as the rest of Germany in terms of employment (67.9% of the active workforce). In the service sector, the area of trade, tourism and mobility employs the largest amount (38%), with public and private service providers coming second (37%), and business services, financing and rental services coming third (25%). The number of employees in this last area is rising quite rapidly.
Development networks	The region has a strong historic record of attempts to organize regional development in network-like structures. A multitude of initiatives exists, often across the borders of the Regierungsbezirk. The regional actors often emphasize the fact that networks tend to be isolated from one another.
Infrastructure and residential environment	The density of the infrastructure is quite high (as is typical for urban agglomerations). The density of motorways, e.g., is 11.82 km per 100 km2. The region will face a quite dramatic increase in road traffic in the next couple of years according to government projections Several airports are located in the region or in close proximity (the most important one being Düsseldorf Airport), as well as several inland ports. Living conditions in the region as a whole can be said to offer good standards; financial problems restrict community potential.

[7] Main data sources used: Eurostat New Cronos data, data from the Eurostat Regional yearbook, data from the Landesamt für Datenverarbeitung und Stadtistik NRW (www.lds.nrw.de). Detailed references are available in the Regional Analysis Regierungsbezirk Düsseldorf available on the SPIDER-project website.

Enterprises	North Rhine-Westfalia as a whole has seen a steep increase in export orientation. Specific important lines of business include business services, energy supply, logistics, bio technology and mobile communication technology. Düsseldorf itself is also one of the leading German cities for advertising. Major energy suppliers have their headquarters or important branches in Essen and/or Düsseldorf. Logistics is, with 600,000 people employed in logistics-related jobs, another important service industry.
Institutions	The region has a high density of higher education and research institutions. There are 45 universities and polytechnics in the Rhine-Ruhr region, the two main universities being the University of Duisburg-Essen and the Heinrich-Heine University, Düsseldorf. Four institutes of the Max Planck and the Fraunhofer Society are located in the region.
Image	The change processes taking place in the region are more and more acknowledged throughout Germany, thus making the region appear in a more positive light than in previous decades. This shows, e.g., in the rising attractiveness of the region for tourists.
Innovativeness	There has been a quite remarkable increase in R&D spending (it rose approx. 30% from 1995 to 1999); also human resources in science and technology has also increased, as has the number of patents annually applied for. The number of patents left by the high technology industry quadrupled from 1995 to 2001.
Creative Tension	The structural tension between the "new" service sectors and the "old" orientation towards industry is still present and generates creative tension. The reuse of old industrial sites generates a specific feel of urbanity particular to the region. However, many of the tensions in the region relate to basic structural problems, and have not lead to a widespread feeling that there is a creative atmosphere.

2.4 Comparison

In the comparison section a table of regional strengths and weaknesses is firstly presented. Next regional parameters which characterize relative and absolute (total volume) differences between regions are shown.

Table 4. Regional strengths and weaknesses.

	Strengths	Weaknesses
Southwest Finland	• Location • Internationality • Environment (human made and natural) • History and culture • A good base for creative tension • Education (high quality , holistic) • Diversity of knowledge (innovations are made in different knowledge areas) • The Bio sector has great business potential… • Clusters and synergy potentials between clusters	• Aging • It can be assumed that Southwest Finland does not have the strong and unified identity that is needed to create a strong image in the long run. • Networking fatigue • "Low innovation productivity" (bio innovations are time intensive) • ...Business potential of bio sector includes high risks (acceptance from society) • Lack of labour with technical skills • Lack of service and content development (ICT)
Wallonia	For 20 years, Wallonia has worked on its weaknesses and has acquired serious advantages: • Its location is in one of the most dynamic regional clusters in Europe, with excellent communications to the rest of Europe. Train (TGV), Air, Road (Highways), Broadband. • A rich and creative network of Small and Medium Size Enterprises (SME's). • The high quality of competent manpower able to reach one of the highest levels of productivity in Europe. • A rising cluster of high tech enterprises in biotechnology, and pharmaceutical products. • An important level of RTD Research and Technology Development centres, and Universities. • the high quality of University education, and a dense network of Universities: 5. • One of the best broadband communication systems.	• Still too weighted towards traditional industrial sectors. • High added value sectors still too small. • The service sector is also not sufficiently developed. • The non-profit sector is well developed but is not taken into consideration in the statistical approach, although this sector is becoming a key competitive factor in the knowledge society. • The weak entrepreneurial spirit of the Wallonia mentality. Fewer new enterprises being created in the non industrial sector, although in the industrial sector, Wallonia is above the Belgian average. The non industrial sector is also suffering from the ongoing under investment in the whole of Belgium. • Wallonia exports are lower than the Belgian average, despite real recent progress. • In general, the global performances of the Wallonia region in the field of competitiveness and employment seem inadequate when we look at the main indicators of GDP per inhabitant, and the rates of employment and unemployment.

Düsseldorf region	• Many research institutions • Biotechnology has been turned into one of the assets of the region • A multitude of existing networks • The polycentric structure of the region is increasingly seen as one of its main strengths. • The size of the region leads to economies of scale • Diversity, both culturally and economically • The industrial past of the region has been turned into an asset on a cultural level and attracts tourists • The economically vibrant city of Düsseldorf	• Problems in organizing innovation processes • Slow in turning insight into action • Local actors sometimes block change • Mismatch between qualifications and demand in the labour market • Brain drain • The region suffers from a lack of attractiveness and urbanity in the opinion of people outside of the region

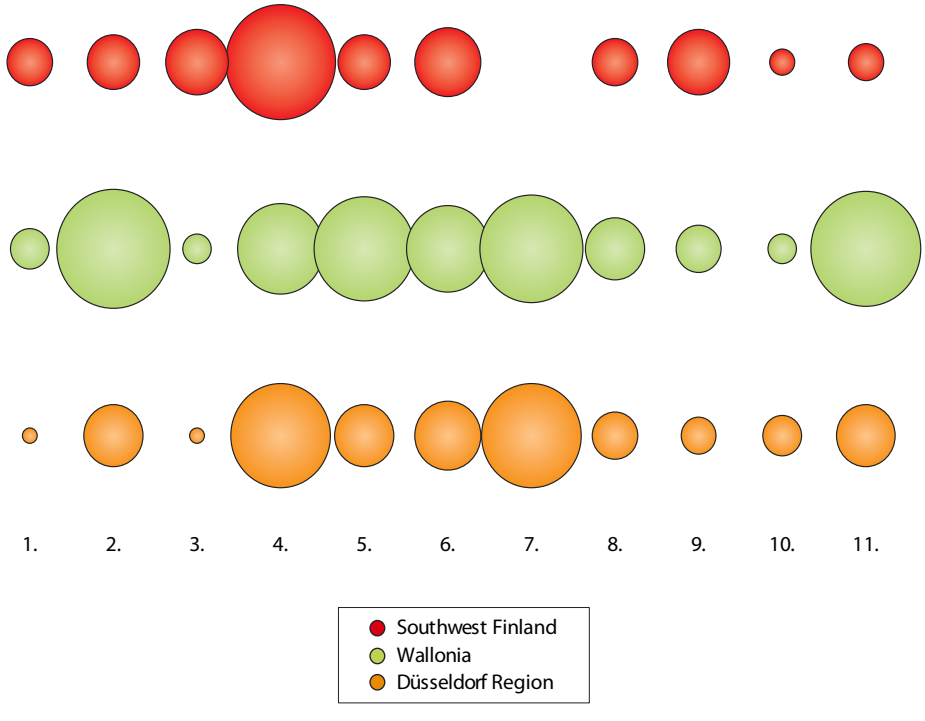

Figure 4. Regional parameter profiles

The parameters are defined in the next table.

Table 5. Parameters (n.a. = data not available).

Number	Southwest Finland	Wallonia	Düsseldorf	Parameter
1.	0,456 (2005)	3,4 (2005)	5,24	Population (/1,000,000 inhabitants)
2.	8.7 (2005)	32.2 (2005)	6.5	Population (% of national population)
3.	0.449 (2004)	2.01 (2004)	9.914	Population density (inhabitants per square kilometer/ 100)
4.	24,9 (2002)	18,3 (2002)	28,7	Regional GDP per person (/1000 euros)
5.	8.5 (2003)	23.7 (2002)	7.1	GDP (% of national total)
6.	10.4 (2004)	17.4 (2004)	10.2	Unemployment rate (%)
7.	24.1 (2003)	25.9 (2002)	n.a.	Educational level (% of active population with advanced degree)
8.	5	9	5	Number of universities and polytechnic schools
9.	3.15 (2003)	5.12 (2001–2002)	10	Number of universities and polytechnic students (/10000)
10.	3.7 (2001)	2.1 (2001)	1.5	R&D intensity (% of regional GDP)
11.	8.5 (2002)	29.1 (2000)	3.2	Patent applications (% of national applications)

It is clear that Wallonia is a bigger part of Belgium than Southwest Finland is of Finland or Düsseldorf of Germany. An interesting detail is that Düsseldorf has the lowest R&D intensity but the highest GDP per person.

3 THE SPIDER DELPHI

Today's intellectual landscape is replete with talk about the concept of a knowledge economy or knowledge society. We are witnessing the proliferation of concepts and initiatives (Intelligent Territories, Regions of Knowledge, Learning Regions, Creative Regions) that reconsider the challenges of territorial competitiveness in the new global context. This is due to the fact that many observers believe that the affluence countries is increasingly based on the production and distribution of information and knowledge.

Thus, knowledge is seen as both a productive asset and a business product. Knowledge creation, acquisition and dissemination are recognized as the driving forces of development, forming a basis for innovation and creativity capability. The focal points of learning and knowledge creation are the regions, which are increasingly accepted as having significant pools of innovation.

The next question to ask, then, is how is it possible to foster the development of an organization towards becoming a knowledge organization, and specifically, how can regions be helped to become knowledge regions, thus strengthening their competitiveness?

In order to do that we should first answer those two questions: What does a knowledge region really mean for the regions themselves? What strategies should the regions use?

3.1 Methodology forewords

DELPHI research process

The purpose of the questions we asked in the SPIDER DELPHI was to get a better feel of what regional experts think is important when talking about knowledge

regions and regional innovation systems. The structure of the DELPHI process is presented in the next figure.

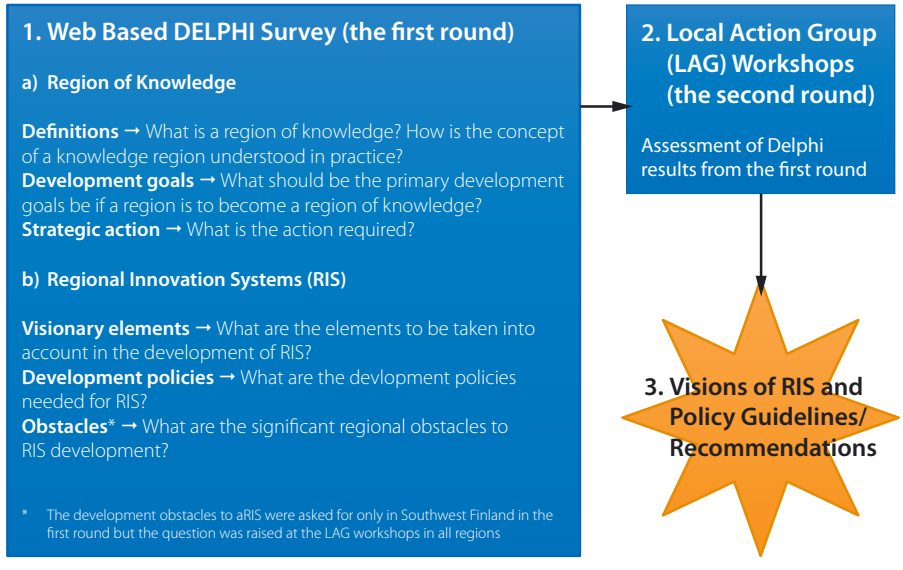

*Figure 5. SPIDER DELPHI process (***The development obstacles to aRIS were asked for only in Southwest Finland in the first round but the question was raised at the LAG workshops in all regions)*

The questions in the DELPHI questionnaire were mostly multi-choice questions but the participants also had the chance to give additional information and more detailed opinions through open answers. Regionally relevant questions were also included in the DELPHI survey but in the context of this report only common items are looked at.

The number of experts who participated (the first DELPHI round):

- Southwest Finland 58
- Wallonia 26
- Düsseldorf region 31

The main results of DELPHI process will be briefly introduced in the next chapters.

3.2 Characterizing knowledge regions

A grid of factors was developed (on the basis of the expert's seminar results), which were thought to be influential when discussing knowledge regions. For the DELPHI, we used more specific items for the participants to choose from.

The factors were:

- **Learning**, including the issues of life-long learning and education
- **Interaction**, which looked at topics such as networking (internally and externally) and cooperation as well as the structure of decision-making processes
- **Economy**, including everything that belongs to the business/economic sphere in a narrow sense (including economic policy)
- **Adaptivity**, a region's ability to adapt to change
- **Innovativeness**, a region's ability to bring about change itself
- **"Intangible factors"**, including all issues relevant to knowledge that are not immediately linked to knowledge or any of the previous factors (a term "soft factors" might be sometimes used as a synonym for "intangible factors")

Those factors are not claimed to be exhaustive; they were just a methodological tool. In the subchapters to come, these factors will be indicated in brackets behind individual items. We will also use them to enable a comparison across regions at the end of this chapter. They were not presented to the panel.

3.2.1 Characteristics

What is a region of knowledge?

The first question in SPIDER DELPHI was to assess the suitability of different characteristics in order to describe knowledge regions. The characteristics are presented in the list below. The respondents chose no more than five characteristics he or she thought to be the most characteristic.

The characteristics of a region of knowledge:

1. A region where the central aim is the acquisition of knowledge
2. A region that promotes the self-development of its inhabitants
3. A region that contributes to a greater sense of common welfare
4. A region that organizes life-long learning for its citizens
5. A region that involves and activates the interaction of the three spheres of governance: public sector, companies and civil society
6. A region that has a common vision and is driven by clear and shared ultimate aims
7. A region that constantly fosters both social cohesion and environmental cohesion
8. A region that has a highly transparent governance system – the governance processes can be monitored and observed in detailed fashion by its citizens
9. A region that endorses simultaneous competition and cooperation between its organizations, firms, universities and research centers
10. A region that strongly supports entrepreneurial and personal risk-taking through different financial instruments
11. A region that prepares for different possible developments in the future (proactivity) and aspires to rapid action when an opportunity arrives (fast reactivity)
12. A region that continuously maps and benchmarks the practices and policies of other regions and other organizations in order to strengthen its own practices and in order to find its own regional specialties
13. A region whose institutions are not just capable of learning and applying new efficient practices but are also capable of abandoning old practices that have proven to be inefficient
14. A region that produces gathers and utilizes the latest knowledge in all its activities and policies (research knowledge, best practices, financial procedures, the direction of regional policies etc.)

The DELPHI experts support for different characteristics is presented in the next figure.

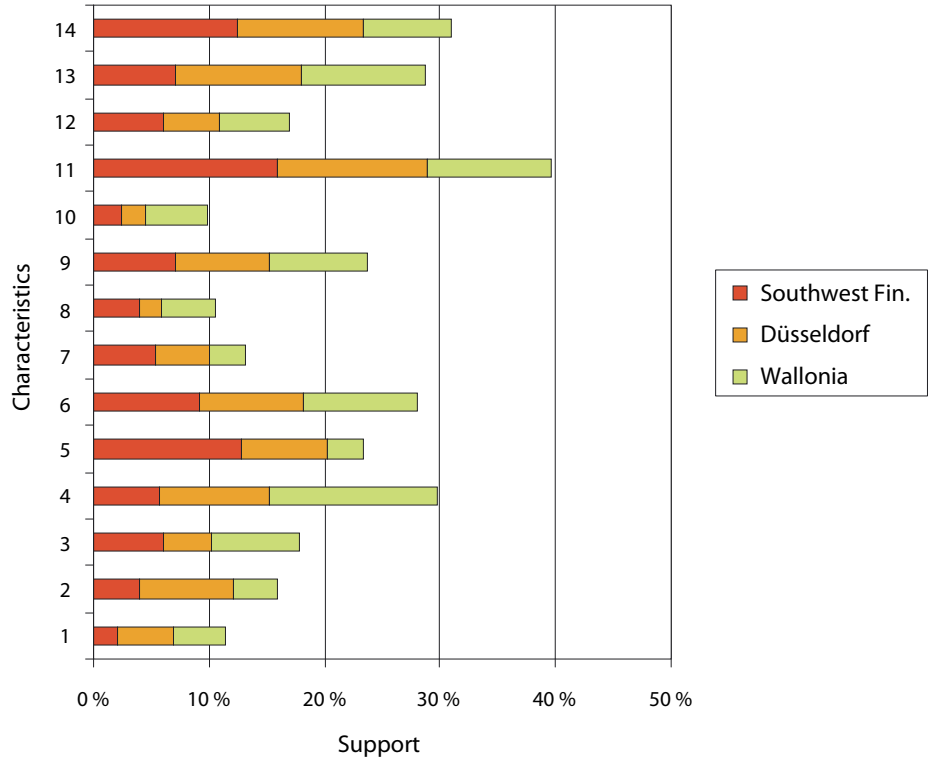

Figure 6. The suitability of different characteristics

The most chosen characteristics

By choosing the three most mentioned characteristics of each region we are able to describe and compare some of the main characteristics of how the regions define the concept of a knowledge region. The main characteristics that described a "region of knowledge" in the future are presented in the next table.

Table 6. The ranking of the characteristics that were seen as the main characteristics of a knowledge region

Characteristics	Rank (S. Fin)	Rank (Duss. R.)	Rank (Wall.)	Key characteristics
A region that prepares for different possible developments in the future (proactivity) and aspires to rapid action when an opportunity arrives (fast reactivity)	1	1	2	• Future-orientation and proactivity (look, plan and act forwards) • Readiness for change • Sense of timing • Flexibility • System knowledge
A region that involves and activates the interaction of the three spheres of governance: public sector, companies and civil society	2	8	13	• Intensive interaction between regional actors (networking) • Comprehension
A region that produces gathers and utilizes the latest knowledge in all its activities and policies (research knowledge, best practices, financial procedures, the direction of regional policies etc.)	3	2	6	• Innovativeness • Creativity • Being adaptive
A region whose institutions are not just capable of learning and applying new efficient practices but are also capable of abandoning old practices that have proven to be inefficient	5	3	3	• Institutional innovativeness Learning • Letting go of past learning and knowledge • Application
A region that organizes life-long learning for its citizens	9	4	1	• Lifetime learning • Individual knowledge

At the other end of the scale, the three characteristics that were least mentioned were:

- **Southwest Finland**
  - A region where the central aim is the acquisition of knowledge
  - A region that strongly supports entrepreneurial and personal risk-taking through different financial instruments (ENTREPRENEURSHIP)

  - A region that has a highly transparent governance system – the governance processes can be monitored and observed in detailed fashion by its citizens (TRANSPARENCY)
- **Wallonia**
  - A region that promotes the self-development of its inhabitants (LEARNING)
  - A region that involves and activates the interaction of the three spheres of governance: public sector, companies and civil society (INTERACTION)
  - A region that constantly fosters both social cohesion and environmental cohesion (WELFARE)
- **Düsseldorf Region**
  - A region that contributes to a greater sense of common welfare (WELFARE)
  - A region that has a highly transparent governance system – the governance process can be monitored and observed in detailed fashion by its citizens (TRANSPARENCY)
  - A region that strongly supports entrepreneurial and personal risk-taking through different financial instruments. (ENTREPRENEURSHIP)

One participant from the German panel remarked that the choices of characteristics offered in the DELPHI "mirror, how knowledge regions can develop in sometimes conflicting directions and how difficult it is to maintain a balance between social cohesion, an innovative spirit and political leadership".

Other notable characteristics picked from the DELPHI's open answers have been listed in the next table.

Table 7. Additional characteristics mentioned in the open answers.

Sustainable development	• A region that incorporates sustainable development at all levels of authority; • A region that encourages (and in some cases even imposes) a systemic approach on economic, environmental and social problems; • A region where "life is good" (the quality of life, living standards, etc); • The economy must be left in its rightful place, as tools; the objectives proposed should be ones that, whilst not neglecting the material conditions of the whole society, address all areas of life (individual fulfilment, social life, knowledge, culture, sciences, arts, exchanges with other countries, regions); • A region that stimulates learning among its youth, especially in schools and in the media.
Social capital, skills and being learning oriented	• Developing social capital and the dynamics of individual and collective networks; • Transforming knowledge into skills that can be mobilized to promote innovation; • A region where each citizen has access to knowledge and learning; • A region that fosters reflection and a critical mind in studies from the earliest age, thus avoiding education that proposes "ready-to-wear" ideas; this would enable the region to develop creativity, imagination and critical minds.
R&D, innovation and excellence	• Creativity and innovation at all levels • A region with an education system that performs excellently and competitively • A region where science and technology are seen as factors for growth and development; this implies that the universities should be open to regional development • Creating a critical mass effect in the production of knowledge through public and private research centres; • A region that supports innovation in both applied and basic research; • A region that does not settle for the lowest common denominator, but which allows its elite members to make the maximum use of their abilities, especially in the education system.
The renewal of economic development principles (co-operation, interaction and networking)	• A region that is open to and integrated into the world beyond its borders (participation in trans-regional networks, open to international competition); a region that is integrated in the development of other regions; • Fostering the development of skill transfers between research and businesses; • The sustainable development of highly innovative companies that focus on exporting; • The presence of a financial sector that offers financial products adapted to the needs of businesses under development (start-ups, SMEs, large firms); • A region that fosters the emergence of clusters; • A region whose companies understand that partnership is often a win-win solution.
Historical roots and specificity	• A region that takes care to promote its own history; • A region that looks outward without forgetting its own uniqueness.
Encourage global transfer of knowledge	• A region that encourages the sharing of knowledge and penalises the withholding of knowledge.

3.2.2 Development goals

What are the primary development goals of knowledge regions?

This question was included in the second of the DELPHI study aimed at specifying development goals in the construction of regions of knowledge. The list of primary development goals is given below.

The primary development goals of a region of knowledge:

1. To attract innovative and active citizens
2. To invest in basic research in the regions universities and research organizations
3. To attract innovative companies
4. To improve living conditions
5. To improve the region's cultural diversity and tolerance by attracting migrants and international labour
6. To improve education standards and the supply of a highly educated workforce
7. To increase the amount of university educated citizens by developing educational possibilities and standards and by attracting migrants
9. To attract public investment to the region
8. To implement and develop a strong regional innovation system
10. To condense regional co-operation in order to strengthen the feeling of regional togetherness
11. To attract private investment to the region
12. To develop unique regional governance processes and a regional governance culture
13. To invest in social innovations through social and economic research
14. To continuously search for new growth sectors and to adapt regional processes accordingly
15. To strengthen the traditional regional "core competencies", for example by investing in the metal industry or agriculture
16. To interconnect all the universities and research centres

The results of the development goals are shown in the next figure.

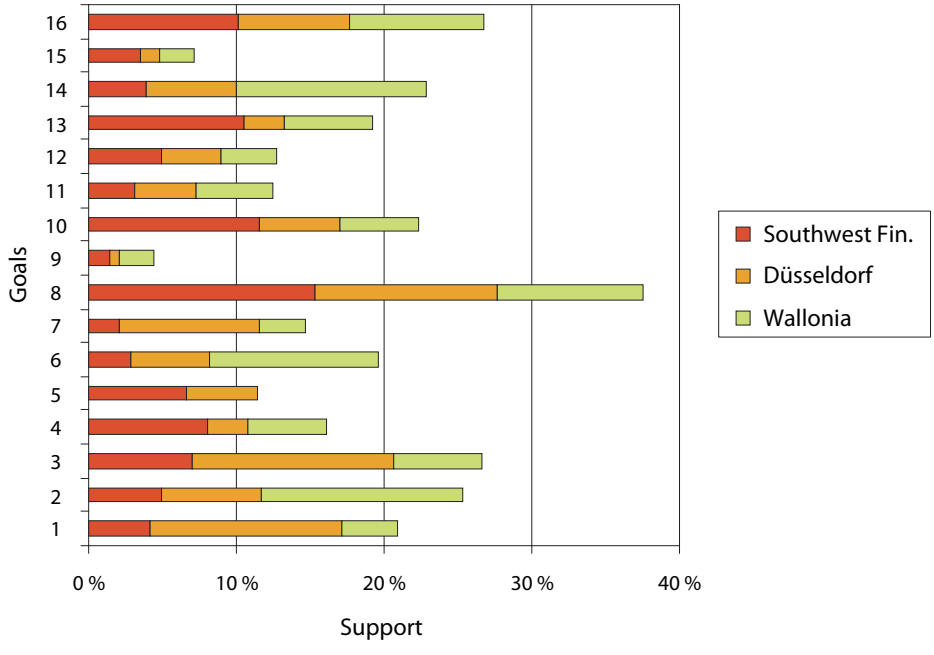

Figure 7. The assessment of primary development goals

The three main goals in each region are presented in the following table.

Table 8. Main development goals

Main development goals	Rank (S. Fin)	Rank (Duss. R.)	Rank (Wall.)	Orientations
To implement and develop a strong regional innovation system	1	3	4	Regional innovation system
To condense regional co-operation in order to strengthen the feeling of regional togetherness	2	9	9	Regional togetherness
To invest in social innovation through social and economic research	3	14	7	Social innovations
To attract innovative companies	6	1	6	Innovative companies

To attract innovative and active citizens	10	2	11	Innovative individuals
To invest in basic research in the regional universities and research organizations	8	6	1	Knowledge producers
To continuously search for new growth sectors and to adapt regional processes accordingly	11	7	2	Continuous seeking of possible business potentials
To improve education standards and the supply of a highly educated workforce	13	8	3	Growth of human capital

At the other end of the scale, the three goals that were least mentioned were:

- **Southwest Finland**
  - To attract public investment to the region
  - To increase the amount of university educated citizens by developing educational possibilities and standards and by attracting migrants
  - To improve education standards and the supply of a highly educated workforce
- **Wallonia**
  - To improve the region's cultural diversity and tolerance by attracting migrants and international labour
  - To attract public investment to the region
  - To strengthen the region's traditional "core competencies", for example by investing in the metal industry or agriculture
- **Düsseldorf Region**
  - To invest in social innovation through social and economic research
  - To continuously search for new growth sectors and to adapt regional processes accordingly
  - To attract public investment to the region

Additional goals picked from the open answers have been gathered in the next table.

Table 9. Additional development goals

Rethinking the system of technical and vocational education	• Improve the training and educational level of the workforce and foster lifelong training; • Review the education and training system. Motivate the teachers. • Structure and organize education and training at the regional level, conceived as a systemic whole (network, and the need for critical size), formalize selective agreements (not too many) with other Regions; • Improve educational standards and promote the means to offer a highly trained workforce; • Continuously monitor the quality of education; • Merge educational networks that are no longer justified (provincial,...); • Languages.
Reinforcing the economic potential and interaction of R&D	• Strengthen the entrepreneurial culture and dynamic; • Develop a balanced business fabric, based on existing skills whilst favouring the emergence of new specializations in growth sectors. • Make sure that the businesses based in the region maintain their R&D departments in the region; encourage regional synergies between the R&D departments of the region's companies as well as with universities; • Promote communication between research centres and companies; • Institute the right to make mistakes and don't make it so hard on the businessman who fails (for the first time); • Promote synergies among companies, for example through a clustering strategy; • Increase the budgets allocated to research and development in line with objectives; • Develop research projects undertaken jointly by business and the universities; • Develop synergies between academia and business; • Attract private investment in the region; • Invest in social innovation through economic and social research. • Develop an entrepreneurial spirit and build networks of capital and partnerships to support the entrepreneurs' efforts; • Invest in innovative research in the universities and research organizations (the border between basic and applied research no longer truly exists, but a distinction can indeed be made between research that is innovative and research that is not);
Putting individuals at the centre of knowledge development	• Launch initiatives to enable citizens to improve their social capital; • Further interconnections, not only through universities and research centres as proposed, but also by through instances of civil expertise (e.g.: associations rich in human expertise in terms of building social and socio-cultural links, methods for awareness and/or basic education, mediation between the theoretical formulation of an objective and its practical implementation). • "Living conditions" should be understood to mean not only financial resources, but also safety, an agreeable environment, as well as social, cultural and sports facilities that are well-designed and managed, in other words a nurturing standard of living; • Environmental sustainability / mobility; • Build a common cultural reference system; • Increase the number of innovative and active citizens through education;
Reinforcing the region's connectivity	• Develop transport infrastructures that reinforce the region's accessibility, and also networks of information and communication technologies; communication infrastructure (high speed and wireless internet); • Integrate with Europe and with international networks of excellence
The adaptation of a regulatory framework of knowledge	• Develop an institutional and regulatory framework that is stable and favourable to investment in production and the diffusion of knowledge. • Develop an institutional and regulatory framework that is stable and favourable to investment in production and the diffusion of knowledge.

3.2.3 Strategic action

What strategic action is needed for developing knowledge regions? The question was an assessment of the different strategic action needed to promote a knowledge region. The scale of significance was from 1 to 5 (1 = not important, 5 = extremely important). The strategic action options have been listed below:

1. Implement schemes to create an atmosphere of cultural creativity, e.g. by specifically attracting artists and innovative citizens and by establishing artist houses and creative centres
2. Increase international / European co-operation
3. Taxation measures
4. Invest in electronic communication networks
5. Foster specific promising business lines /sectors / clusters
6. Invest in traffic infrastructure (roads, railways, airports and harbours)
7. Construct research and development projects that are based on co-operation between universities and firms
8. Improve the region's image, marketing and branding
9. Renew the regional development measurement system
10. Strengthen regional soft factors (such as an attractive built environment and an open creative atmosphere) and build a soft indicators monitoring system
11. Maintain an expert driven approach, whereby regional development is directed by the viewpoints and opinions of "regional experts"
12. Investments in the research and development of different technologies
13. Citizen driven approach, where citizens' opinions are gathered, heard and taken seriously into account in regional development processes
14. Invest in the development of products and business competencies
15. Build up broad actor groups, which focus on different regional themes and which combine expertise from all the region's sectors (public, private, education, citizens)

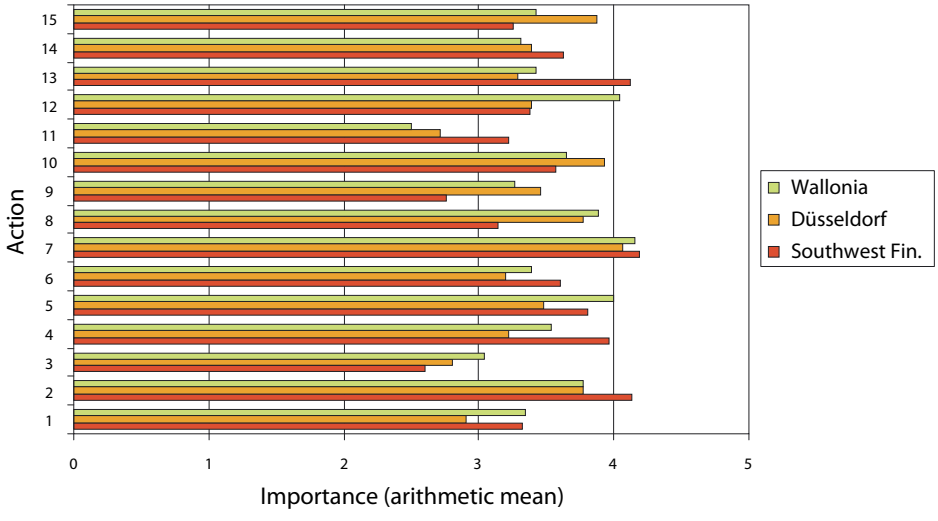

Figure 8. Mean value significance of action.

There are two noteworthy points in the results: the similarity of regional strategy profiles when mean values are used and there is a large deviation between single answers. The deviation of opinion shows in practice how difficult it's to find consensus over preferences (the valuation of aims, the directing of resources, the policies required etc.) between different interest groups (see chapter 4. "Mixing Effect"). This is a typical problem in the political decision making arena (often related to the use of public resources). "Paradox management" (limitless aims vs. limited resources) seems to be one of the core competencies for regional policy making.

The next table includes the seven most important actions of each region. There is also a reassessment of Southwest Finland's action choices. The reassessment was conducted by a local action group.

Table 10. The strategic action necessary for creating a region of knowledge.

Strategic action	Rank (S. Fin)	Rank (Duss. R.)	Rank (Wall.)	Rank after reassessment (Fin)
Construct research and development projects that are based on co-operation between universities and firms	1	1	1	4
Increase international / European co-operation	2	4	5	5
Create a citizen driven approach, where citizens' opinions are gathered, heard and seriously taken into account in regional development processes	3	10	8	
Invest in electronic communication networks	4	11	7	
Foster specific promising business lines /sectors / clusters	5	6	3	7
Invest in the development of products and business competencies	6	9	12	2
Invest in traffic infrastructure (roads, railways, airports and harbours)	7	12	10	6
Strengthen the region's soft factors (such as an attractively built environment and an open creative atmosphere) and build up a soft indicators monitoring system	8	2	6	3
Build up broad actor groups, which focus on different regional themes and which combine expertise from all the region's sectors (public, private, education, citizens)	11	3	9	
Improve the region's image, marketing and branding	13	5	4	
Renew the regional development measurement system	14	7	13	
Invest in the research and development of different technologies	9	8	2	
Implement schemes to create an atmosphere of cultural creativity, e.g. by specifically attracting artists and innovative citizens and by establishing artist houses and creative centres	10	13	11	1

When the development strategies were revaluated at the local action group level (Southwest Finland) creativeness (not only cultural) was chosen as the most important development goal.

3.3 Improving regional innovation systems

Visionary elements, development policies and development obstacles from the point of view of the creation of a regional innovation system are presented below.

3.3.1 Visionary elements

In the SPIDER DELPHI study participants had to assess and *choose the most important visionary elements [in the mid long term (2010) and long term (2020)]* to be taken into account in the development of a regional innovation system. The next table was made by selecting the ten most voted for future factors of each region. The total number of factors was 19.

The definition of the factors:

- Human and social capital (is there a highly educated and professional work force in the region; is there research and development potential and are there creative capacities?)
- Institutions (education, research and development activities)
- Networking (intensive networking inside the region; intensive networking with other regions)
- Learning environment (does the educational system in the region spur life-long learning; are there incentives and possibilities for carrying out independent searches for knowledge; does the educational system also spur social behaviour and team skills?
- Globalization (the regional consequences of the global economy)
- Infrastructure (investment in the basic infrastructure of the regions; traffic networks and electronic communication networks)
- Entrepreneurship (does the educational system spur entrepreneurship; is entrepreneurship seen as a positive factor for affecting the future?)
- Creative tension (are there aspirations between the regional actors for the renewal of regional practices and policies; are the regional actors engaged in confident and future-oriented dialogue, which tolerates conflict and differences and also raises "sensitive" regional issues on the agenda?)
- Regional culture, attitudes and habits (is there a confident and trustworthy atmosphere in the region with no harmful power blocs? What is the "regional way" of getting things done?)
- Regional growth sectors (is the regional strategy directed at the right growth platforms and activities, which can be influenced at the regional level?)
- Natural environment (agricultural or/and sea environments; the tranquillity of the countryside)
- Specialization and the search for a unique regional "niche" (what is the unique specialty of the region; can the region utilize its traditional competencies and be, for example, a leader in the agricultural application of information technologies?)
- Urban environment (the services and many alternatives of the urban environment; the creative "buzz" among the actors)
- The direction of the region's structure (what is the occupational structure of the region; is it agricultural, industrial or service-based?)

Table 11. The top ten ranking of regional visionary factors.

	S.Fin 2010	Duss. R. 2010	Wall. 2010	S.Fin 2020	Duss. R. 2020	Wall. 2020
Human and social capital	1	1	1	1	1	4
Institutions	2	2	3	2	4	3
Networking	3	4	(13)	4	5	10
Learning environment	4	3	2	3	2	1
Globalization	5	5	4	5	7	2
Infrastructure	6	7	5	9	9	6
Entrepreneurship	7	9	9	7	10	(12)
Creative tension	8	8	8	6	8	9
Regional culture, attitudes and habits	9	(11)	(15)	(12)	(12)	(14)
Regional growth sectors	10	(13)	6	(11)	(14)	8
Natural environment	(14)	(12)	10	8	3	5
Specialization and the search for a unique regional "niche"	(13)	(14)	(19)	10	(15)	(19)
Urban environment	(15)	6	7	(14)	6	7
The direction of the region's structure	(17)	10	(11)	(18)	(11)	(11)

Visionary factors which were not chosen in the top ten lists in any of the regions:

- **Diversification** (should regional investments be decentralized in order to ensure the successes of the future?; the basic idea is that one should not put all ones eggs in one basket)
- **Leadership** (can leadership be supported by a charismatic person or by a structured network of key regional actors? Leadership is based on a shared vision and the ability to adapt to different creative practices.)
- **Strictly planned built environments** (built environments are strictly planned in order to be unified, integrated and organized; ones place of work and home are separated)
- **Open, "emergent" built environments** (built environments are not strictly planned; buildings and houses are varied; places of work and residential areas occupy the same area and form a dynamic mosaic)
- **The public organization of the regions** (are there public organizations and actors that support the occupational structure of the region?)

According to the DELPHI study the basic group of visionary elements will remain fairly constant through "time and space".

The meaning of human capital and the learning environment, as well as the roles of institutions and globalization are obvious in all regions. In the long run it was thought that the importance of the natural environment will increase. The urban environment and the direction of its regional structure were more important factors in Germany and Belgium than in Finland. The rising significance of specialization and the search for the unique regional "niche" are characteristic factors of Finland.

3.3.2 Development policies

What development policies should be implemented in the regions?

The next table describes the importance of development policies [in the mid long term (2010) and the long term (2020) future] from the viewpoint of the effectiveness of regional innovation systems.

Any line between the groups of importance is artificial (differences in importance were low). Groups are presented by using "a traffic light model".

Table 12. Importance of development policies.

The importance of the development policies (high / middle / low)	South. Fin. 2010	Duss. Region 2010	Wall. 2010	South. Fin. 2020	Duss. Region 2020	Wall. 2020
1. The region emphasizes pleasant surroundings and well run *functioning services* (schools, day care services, health care, shopping etc.)	1	5	6	1	3	6
2. Universities, companies and public organizations in the region co-operate to produce *joint research and training projects*.	2	1	1	3	1	1
3. The region carries out active *foresight activities* which aim to analyze and understand the possible future directions of development and evaluate the impact of *megatrends and weak signals*.	3	3	3	2	2	3
4. *The common consciousness and goal-directive attitude of regional actors* (companies, universities, public organizations) is increased through regional action. All activities aim at reaching the goals stated in the regional strategy and/or vision.	4	7	2	5	6	2
5. The region aims to develop *new and "wild" ideas* and combine old ones in order to establish the region as an attractive place for living and doing business.	5	4	5	4	5	5
6. The region strongly supports SME's through *new funding instruments and incentives*.	6	2	7	8	4	7
7. In the region, *internal networking among actors* is developed through seminars, press conferences, joint projects etc.	7	6	8	7	7	8
8. The region forms *a lobbying team* that brings together all the regional actors. The main aim of the lobbying team is to influence national and international decision making and collect funds for regional projects.	8	10	4	9	11	4
9.) The region aims for strong *international networking* and tries to attract large international companies instead of developing internal networking.	9	11	12	6	10	12
10.) The region promotes itself via *heavy image marketing*. For example, by creating slogans and brands that would promote the region and raise public awareness of the region (e.g. "a region of green technology", "the place to grow", "a creative region" etc.).	10	8	9	11	8	9
11. *A specific regional organization* is developed which deals with all regional development questions.	11	9	11	10	9	11
12. The region creates political action models that try to *imitate the success factors of competitive regions* like Silicon Valley	12	12	10	12	12	10

According to the DELPHI study there will be no radical development in regional development policies during next fifteen years.

For example development policies aimed at joint research and training projects between regional actors, foresight activities, pleasant surroundings and well functioning services can be linked to the development goals, strategies and visionary factors mentioned before. One of the most interesting results is that the importance of lobbying teams has been ranked much higher in Wallonia than in other regions.

3.3.3 Development obstacles

The aim of the development obstacles assessment was to piece together the main regional shortcomings from an innovation systems' point of view. The evaluation was carried out by local action groups.

Southwest Finland

The regional obstacles were analysed by applying a mind map which was built using DELPHI answers. The obstacle mind map was used as a base for obstacle treatment planning which was carried out 15.12.2005 at the local action group workshop.

The obstacle mind map is presented in the next figure.

Figure 9. A mindmap of development obstacles in Southwest Finland

Regional development obstacles in Southwest Finland were divided into four categories which were:

1. Bad networks – Networking problems
2. Infrastructural shortcomings
3. Educational shortcomings
4. A lack of development instruments

Bad networks and the ineffectiveness of networking were perceived as one of the main problems. The lack of development instruments can be also attached to all other categories. The treatments suggested at the LGA workshop have been listed next:

Networking

- Motivation for networking
  - Essentially, human behavior is based on motivation
  - The voluntary principle – "holdouts out"
- No artificial networks only spontaneous ones
  - A significant part of essential information for innovation comes from outside the organization (there has to be a critical mass of "sub-innovations" behind innovation)
- Win-Win principle
  - Partnership
  - Shared work contribution must bring shared benefits
  - Systems complementary to each other
- Trust in networks
  - It must always be remembered that communication, interaction and co-operation is always between people
  - Without trust creative tension might turn into noxious friction
  - Human endeavour
- The improvement of awareness
  - Networking roles
  - Spheres of responsibilities (for example management)
  - The rules and policies of networking
  - The aims, highest goals of networking
    - Internal (the participants inside an organization)
    - External (between network participants)
- Tolerate unsure proposals and recommendations
  - A new idea need not be ready and complete beforehand"

Education

- The reinforcement of production and the commercialization know-how
  - Understanding the difference between basic research and applying research
- Reasonable education
  - The reduction of over education
  - Tailor made education
  - Education customization

- The management of pioneer enterprises
  - Research managers don't necessarily have the special know-how needed for the management of pioneer enterprises
    - "The management of know-how boards" for pioneer enterprises
  - The importance of human management skills in the creative branches
- Business needs patents
  - Funding for patenting
  - Patenting workshops for "self-reliant innovators"
- Universities are not encouraged to renew
  - Institutional innovations must be rewarded

Infrastructure

- A shortage of built environment planning knowledge
  - Bigger units for the supervision of building
  - A shortage of planning know-how
    - Sub-optimization leads to bad results without a holistic understanding and without control over the whole process
  - The totality of quality
    - Rethinking the choosing of criteria – what should a concept of quality be?
- Local barriers and internal power play
  - Break down municipal boundaries
    - Develop environmental knowledge
  - *"knowledge about the natural environment is increasing – the same should be done for urban environmental knowledge"*

There was also a question about the role of regional foresight activities and how foresight can be used for problem solving. The conclusion was that regional foresight activities are not only a part of future-oriented knowledge production but also a part of the regional management process as well. Informal discussion forums for future-oriented strategic dialogue are a base for foresight activity evolution. This development can be directed towards co-operative future workshops (focused on certain themes) and also on to visionary and strategy workshops. A data bank that collects foresight information from national and international sources and a regional foresight (e-)journal that includes analyzed and regionally

relevant foresight information would be useful tools for improving not only regional future awareness but the "buzz" of the innovation environment as well.

Wallonia

The question of the obstacles was not only developed in the DELPHI study but also in the local action groups.

Table 13. The five main obstacles that were tackled in the DELPHI analysis

The inadequacy of the economy and entrepreneurship development for knowledge society development (inadequacy is likened to a paradigm shift)	• Globalization (relocations, unchecked competition, the complete neglect of the individual in his/her own right; • Strong specialisation in traditional industries; • A lack of entrepreneurial spirit; • A classical and conservative vision of industrial policy; • A lack of awareness about the risks and challenges linked to the knowledge society and the considerable changes that need to be put in place; • The belief that commercial protection against the emerging economies of Eastern – Europe and Asia, and that downwardly adjusting salaries and working conditions in an attempt to "align" with these countries are solutions for the development of our region
Bad networking and knowledge exchanges	• A lack of co-operation amongst various public agencies; • Too little collaboration between academia and business; • No transfer of knowledge between basic research and applied R&D; • Difficulties in forming networks and sharing information by the actors in development processes.
A lack of consistent policies and long term visions	• A lack of coherence in public policies and a lack of support for measures that are not well targeted; • It is difficult for SMEs and start-ups to get access to funding and financing; • Public authorities and politicians have only short-term visions. • There is difficulty in reaching a consensus among all actors and there is no common vision for development that will benefit everyone; • The bad practices of public management which, through the mishandling of some elected officials and some administrations, distort the very meaning of assistance measures; • The failure to consider existing initiatives that have been fruitful in other regions as examples that can be adapted to the specificities of Wallonia; • Short-sightedness with regard to strategic issues. Not enough evaluation of the present assistance systems and a lack of benchmarking.

Social exclusion	• Defining objectives for a regional innovation system whose benefits would not be put to use for the whole region and its components; • Being insular; • Strategies are run by certain actors and not by groups; • The appearance of inequalities in jobs, training and access to culture, housing; • Insufficient communication about the need to reform social solidarity systems; this only heightens resistance to change, which in turn may lead to the breakdown of these systems for the following generations;
Conservatism, the lack of a culture of change	• The fiefdoms, acquired rights and vested interests, rigid thinking, conservatism, sub-regionalism, the search for short-term profits, the hand-out mentality that is spreading among a more or less large section of our youth; • Community problems; • The failure by the regional actors (both private and public) to understand the issues at stake for the knowledge society; a culture of resistance to change and a fear of risk, inculcated by a conservative educational system and a conservative society (trade/labour unions, school, political parties, etc.). • The weakness of the debate in Wallonia (feudalistic structures and a lack of participation/information by and for the whole population);

Thirteen negative behaviours to be overcome in Wallonia were identified by the Local Action group (the Regional Foresight College):

1. A general deficit in the culture of risk-taking and change (systemic and anticipative deficit);
2. The actors' unwillingness to take responsibility and the poor clarification of their goals;
3. Scant preparation as regards decision-taking and attention to the players' ownership of these decisions;
4. A decline in standards, deontology and ethics (moonlighting, misappropriation of funds by non-profit organizations, and so on);
5. Physical and mental rigidity when confronted with developments in training, jobs and the market;
6. Stereotyped concepts are preferred to real personal commitment at the individual level
7. Workers find it hard to act responsibly because they are not consulted in the decision-making process;
8. Self-satisfaction and the underestimation of the real problems facing society (poverty, for example);
9. The social partners are locked into their traditional role-plays;
10. Knee-jerk attachments to the 'pillars' leading to exorbitant costs;

11. An inability on the part of individuals and players to work in partnership and in networks;
12. The lack of continuity between traditional industry and the innovating sectors;
13. A lack of clarity in the tasks of public and company service operators.

The Düsseldorf Region

Eight key obstacles can be formulated by drawing together results from the regional analysis, the SPIDER DELPHI, and the work in the local action group:

1. The Regierungsbezirk Düsseldorf does not form a coherent spatial unit. Rather, it is a purely administrative entity. Actors see a shortage of strong regional institutions that are in line with the spatial realities.
2. Networking in the region tends to be less fruitful than it could be. Many networks are limited to ties within actor groups (business people, science people etc), but do not cross the boundaries of these groups.
3. There is a mismatch between supply and demand in the labour market. There is a lack of skilled people while at the same time unemployment is high (Eastern Germany is facing a similar structural problem). The fact that many young people are leaving the region amplifies this problem.
4. Actors see problems in the treatment of demographic change, which is developing rapidly in the region.
5. The region's "sub-units", the different cities and municipalities often compete. Ideally, they should co-operate on the basis of complementary strengths.
6. Regional stakeholders do not take an active enough interest with regard to issues of regional development.
7. Transfer problems between science and business limit innovativeness and economic development.
8. The region is still facing image problems. For instance, it is seen as less attractive in terms of its quality of life and its living environments than other regions in Germany.

3.4 Regional visions

When regional innovation system visions are used for processing, on a general level, there has to be enough open space left for the visions of actors (sub-visions). Here are the regional visions as presented from an innovation systems' point of view.

3.4.1 Southwest Finland

In 2020 Southwest Finland is a dynamic innovative environment for business and people to develop in. The regional innovation system (RIS) is able to predict and to act in advance. It is able to choose desirable development goals and is able to create and to empower valuable changes – alsowild ones. RIS is one of the nodes in a global innovation net. Southwest Finland is well-known for its creative buzz. The sense of creativity in the global economy driven by knowledge based innovations and innovativeness has been internalized as a factor of production in all branches. An extensive education system generates a holistic and creative breeding ground for knowledge capital. The sharp and fast exploitation of new information is a core competence of the actors in the region of knowledge. In 2020 Southwest Finland is an exhilarating environment for living and working in, where motivated and skilful people are the foundation for innovative organizations and companies.

3.4.2 Wallonia

In 2020, Wallonia is a region that is strong economically, capable of maintaining its current level of prosperity and well being for all its citizens, fully based on a sustainable development approach, differentiation, anticipation and openness to other cultures. Steps have been taken to address the needs of the whole society and help improve the quality of life for everyone. Anything that furthers this goal – the economy (especially jobs), social aspects (health, housing, quality of life), the environment (as healthy as possible) and culture – has been (re)thought and (re)extolled taking into account the greatest possible number of parameters. A level of training has been reached that enables the people of Wallonia to distinguish themselves from

other regions in terms of human skills and added value; a region has been built that generates redistributed wealth for its habitants in cooperation with neighbouring regions and through the selection of some support areas at the international level. The population's well-being is ensured through employment, training, the fight against inequality, openness to the world. Wallonia is an active actor, not just a follower, in major technological evolutions and a centre for excellence; the whole population profits directly or indirectly. The region is built on quality education and teaching, it invests in training its teachers and enabling adults to be fulfilled as parents. It is a region that rejects the image of the "child as king" or child as consumer – it is built on innovative research regardless of whether it is basic or applied.

3.4.3 The Düsseldorf Region

In 2020, a continuous strategy discourse has been implemented in the region. It involves a multitude of regional actors in multi-layered networks, combining short-term, mid-term and long-term processes. The region itself is networked both internally and externally. Policy-making is carried out via a heterarchical (rather than hierarchical) pattern of leadership. This pattern has been provoked by the polycentric structure of the region. At the same time, a centralized structure plays a role as well. In particular, a centralized innovation management pushes innovation. The region has learned to be adaptive to change and push change by itself. Having a multicultural population is seen not as something that has to be endured, but as a positive and significant part of the region's identity.

3.5 Conclusions

3.5.1 General notes

An open future has its holders: In practice it's extremely challenging to make "collective planning for the future" because there is often a very heterogeneous group of stakeholders and shareholders. In this case an abstract holder was a region which is not a homogeneous but a "multi headed actor".

For example if we look at strategies *("especially on the level of action; what should be done")* for reaching development goals we are not able to avoid the touch of the invisible hand guided by regional interest groups. A premise like "the common good" is a universal and used by proponents and opponents of certain development actions. It's reasonable to ask and raise the question is there anyone who is driven by "the regional common good" or is "the common good" a compromise derived from private interests? In addition stakeholders in the future have a tendency towards resistance if the possible effects of changes are unclear to them. In other words when feelings of insecurity increase we will start to reinforce our defence of present interests.

The main question driving the strategy is: *"How is the job to be done?"* Briefly speaking a good strategy involves desirable goals to reach, polices to follow, action to carry out , schedules and persons, areas in charge. Desirable goals, policies and action should be on schedule and interrelated to ensure that development goals are linked with definitions. A definition can be seen as the pre-stage of visionary thinking which guides and motivates strategy planning. The job in this case was "the construction of a knowledge region and a regional innovation system". It is maybe an exaggeration to talk about "construction" when we are talking about planning for the development steps to be taken towards creating a knowledge region.

3.5.2 The region of knowledge

According to the DELPHI study a region of knowledge was seen as a desirable regional vision with a high acceptance from the private and public sectors. However, disagreement or the deviation of opinions and priorities seems to increase arm in arm with the growth of concrete action.

It's almost unachievable to formulate an inclusive definition for a region of knowledge when there are only perspectives available. Definitions are useful tools for understanding and explaining but it should be brought to mind that they are interpretations and "true" only in a chosen context *(inside a certain theory or model).* For example an impression that arose from local action group workshops (Southwest Finland)

was that it's easier to accept the core of ideas than words; "conflicts" occurred when definitions were not congruent – misunderstandings were basically caused by a lack of communication, not by disagreement over the cores of ideas.

The best way to avoid conflicts seemed to be to break down the construction of the definitions and tolerate fuzzy definitions.

According to the DELPHI survey one of the inferences seemed to be that more stress has been put on the role of individuals in Wallonia. In contrast the core of the definition especially in Southwest Finland but also in the Dusseldorf region *(Dusseldorf was a middle ground between Wallonia and Southwest Finland)* was seen to be founded more on a system. In a way this *"system-centred approach"* seems to be a more traditional (or mechanical/ technical) way to define a region of knowledge. A region of knowledge is *"an effective machine with the best components",* which produces, gathers and utilizes knowledge. An *"individual centred approach"* emphasizes an individual's life-time development; the development of the system is based on the development of citizens, while the logic of *"the system- centred approach"* operates in the opposite direction.

An impression to be gained from the DELPHI results was that those who emphasized a system-centred approach saw the main development obstacles on an individual level and those who used an individual-centred approach saw deficiencies in the system. It might be thought peculiar to some that the biggest problems are the result of something or someone from outside.

Two possible perspectives exist on the region of knowledge; the conventional/ traditional perspective and the emergent perspective. The traditional one emphasizes a clearly defined and measurable sum of performance competences that regional actors have. The more holistic emergent perspective expands that context with "a state of regional wholeness"; *material and immaterial environment for motivation (ambition and will), competences and chances.* There is good reason to assume that the traditional and the emergent perspectives (individual and system approaches)

are going to mix when the definitions are placed in the real world (development goals, strategies and action).The 4th chapter will develop further this idea.

3.5.3 Regional innovation systems

Why has the importance of innovation and innovativeness been raised? Changes in the world of needs can't explain all of the hype in progress. The answer is not unambiguous but one of the main reasons can be traced to the global growth of competition; competition needs change and innovation is a "valuable change".

An innovation system should be able to generate or create new ideas and empower them. The seeds of innovation are usually found by overcoming problems (obstacles) or via the proactive identification of new possibilities and opportunities. An innovation process involves a rotation between divergence (new ideas, *criticism off*) and convergence (the realization of ideas, *criticism on*). One of the core competences of an innovation system is a tolerance of risk. That occurs because both known and unknown risks are included in any change.

While there were obvious differences between the regions under study, some generic improvement elements were also found. According to the SPIDER DELPHI the development policies for the regional innovation system should be aimed at:

- Creating well functioning services and pleasant surroundings for people and business
  - an attractive place for human and social capital – an attractive place for business
- The improvement of interaction and co-operation between local actors ("regional partnership;, joint research and training projects")
- transfer and the sharing of knowledge
  - the pairing of knowledge (innovations occur on the surfaces of different knowledge; thus there has to be a critical mass of "sub-innovations")
  - learning from each other

  - the reasonable sharing of resources and knowledge (shared benefits, win-win nets)
  - internal real networking amongst actors instead of formal networks
  - common consciousness (understanding definitions)
  - open and honest communication (trust)
- Creativity and Creative Tension
  - The concept of creative tension can be seen as a "social translation" from the concept of "disruptive development and creative destruction" which has been used in a technological context. The basic idea is that a certain development tends to continue linearly without disruption; tension and "counterforce" is needed for regeneration and for change. The most effective way to produce creative tension is friction and conflicts between people.
- Advanced foresight activities for decision making
  - There are two viewpoints regarding the mission of regional foresight activities. It can be seen as a producer of future-oriented knowledge and an intermediate activity in the system. Maybe the biggest challenge for foresight activity is to pilot (to test) current strategies and thinking and to indicate if something is desirable or not.

One of the most interesting characteristics is creativity because it can be generalized as a factor of production in an innovation system. From this point of view the question is bidirectional: to what degree do creative individuals create innovative organizations and creative organizations generate innovative individuals? The innovation process can be divided among two creative processes; internal ones and external ones. An internal process is based on an individual while an external process is based on interaction or co-operation between individuals and organizations. An innovation process will not occur if one of those process does not work. Judging from this point of view neither of the approaches is better than other but both should be happening at the same time.

A dangerous belief: Only new branches can be innovative – there are and will only be innovative people and innovative organizations.

One of the paradoxes seemed to be that institutions which should be leaders, forerunners, intercessors and contributors to regional creativeness and innovativeness are not perceived as being innovative themselves. Institutions are very often slaves of tradition and fields of old power games with inflexible structures and private obsessions at play. Thus, changes are taboo. The key to the solving of that paradox is that above all institutions need institutional innovation.

Another interesting aspect was that the main development obstacles were not caused by technical, infrastructural or instrument shortages "bad networks" were a good example. The main reason for obstacles seemed to be that changes in human behaviour are "bovine"; i.e. the basis of behaviour such as, values, attitudes, habits, customs, working methods, tradition etc. change slowly through the processes of learning and abandoning previous learning *(creation and abandonment)*

Will the biggest innovations in the future be social? Changes are often carried out by (or they need) social innovation.

4 LESSONS TO BE GAINED FROM SPIDER

One of the main purposes of the SPIDER project was to find out what the concept of a knowledge region involves from a practical point of view. What do practitioners feel is important about knowledge regions? These two questions resulted in a number of key lessons gained by SPIDER, which will be presented in this final chapter. As one of our purposes is to provide insights into our working methods with the local actors, this section will start with some mid-term results, and subsequently explain how they lead to some of the final results of the project.

4.1 Eight aspects of the knowledge regions

The question of what features would be apt to catch "the spirit of knowledge regions" was discussed at a SPIDER expert seminar with people from the three regions involved in the project. This seminar was held in Brussels in January 2005. The discussion resulted in eight aspects of knowledge regions that were meant to synthesize the findings of the regional analyses (cf. chapter 2) and of the expert seminar itself. These eight aspects formed the first "milestone" of the project, so to speak. They can be described as follows:

1. A knowledge region is a region where all the citizens have the possibility to receive an education and pursue their own life-long learning projects. In fact, the concept of a *learning region* is an integral part of the concept of a knowledge region, as a knowledge region needs to mobilize all its stakeholders and citizens and involve them in any continuous learning process ("knowledge creation must be linked to temporality"). This should involve three further points: All inhabitants should have access to knowledge in spatial terms; foresight should be employed as a common learning process; and citizens should be empowered to use foresight tools (e.g. understanding its concepts and the building of intangible assets, creativity, from benchmarking to learning, etc.).

2. A knowledge region is also a region where a permanent *creative tension can be* generated and developed in order to build knowledge. This creative tension may be found on three levels. Firstly, in the process of governance, including companies, the public sector, civil servants and university, and civil society. Secondly, by integrating creative people e.g. philosophers, artists, researchers etc into regional development processes. Thirdly, by including people from other levels of governance, e.g. from the European Commission, from the bordering regions, from national, federal or infra-regional levels (hybrid cooperation). Last but not least, creativity seems to be particularly needed in future studies, if we are to overcome the current limitations of our thinking.
3. A knowledge region is a *dynamic and driven region,* a region of passion, with a real willingness to instigate projects ("Knowledge arises from passions so how do regions attract and create passions?"). A knowledge region deals with risk thus a strong entrepreneurship with open-minded and curious CEOs is needed; as are new mental schemes that promote risk and security. It was stressed, how difficult it is to develop performing sectors alongside stagnating old industries while trying to avoid social exclusion.
4. A knowledge region is a region that develops *science and technology through innovation.* This means that intellectual work is needed and so is manual work. Talent is not only necessary for science it is also needed to develop craft industries, which are at the heart of knowledge. In that field, it is important to erase cognitive barriers to innovation.
5. A knowledge region is a region of *sustainable connections* between creators within innovative sectors, particularly with regard to intangible assets and capital risk investors (the importance of micro-banking). This question is linked with the problem of the undervaluation of intangible assets in the regional economies as well as the lack of serious tools to promote knowledge, the problems of the measurement of a qualitative driven knowledge society, low levels of trust with regard to companies and innovative products ("from an innovation climate towards a confidence climate"), the pertinence of GDP indicators ("the micro-changes of today can not be observed but will become macro trends of tomorrow") etc.

6. A knowledge region is an *attractive region,* with a clear image and an improving quality of life (infrastructure, environment, culture, etc.). A dynamic social climate oriented towards innovation better serves to keep the most innovate and creative minds in the region and attract equally qualified knowledge society workers from outside the region ("the economy will become local while creativity goes global").
7. A knowledge region is a region where regional decision-makers and citizens – especially workers and students – have both a good *understanding and ownership* (these are closely linked) of what a knowledge society is. They try to build long term views to define what the final aims of their own territory are within the context of global evolution and in the hypothesis of the building of a global knowledge society. They should also share a real confidence in the regional development plan, even if those investments in knowledge are long term investments for long term benefits.
8. Finally, a knowledge region is a region that promotes *excellence in education and in research* and is able to overcome the reticence of universities to deal with companies and regional authorities in working towards a common development effort.

4.2 Three key factors for knowledge regions

There was a great degree of agreement on the eight aspects sketched above at the SPIDER expert seminar 2005. This signalled a certain European common idea about knowledge regions, as experts from all over Europe had been involved in the expert seminar and three local action groups contributed to the analysis of the project regions. At the same time, however, we had to ask ourselves two questions:

1. Is it possible to further narrow down the results and find the common core of the concept of a knowledge region from the practitioner's point of view?
2. Given that the eight approaches are almost too good to be true, is there a hidden tension among them that needs to be made visible?

An important goal of the SPIDER DELPHI was thus to test the eight approaches and try to find out more about these two questions. The answers we found to the first question will be tackled in this section, the answers to the second question in section 4.3.

As table 14 (A summary of definitions, goals and development strategies) shows, the three DELPHI panels do not fully agree on what actually characterizes a knowledge region, nor on what its development goals and strategies should be. However, the factors introduced at the beginning of chapter 3 allow for a kind of common core to be made visible. As one can see in table 14, the three DELPHI panels seem to agree on the following:

- **Adaptivity** which forms the core of the concept of a knowledge region
- **Innovativeness** which is viewed as a fundamental development goal of knowledge regions
- **Interaction** which is of key importance when choosing development strategies

As the table also shows, there are also differences between the three panels' assessments. Life-long learning, for instance, is emphasized quite heavily in Belgium, while the development goal of innovativeness is given much more prominence by the German participants than by the panels from Belgium and Finland. Networking is seen as especially important in Finland. As we learned from the work in the SPIDER local action groups, innovativeness is something that is often felt to be lacking in the Duesseldorf region; similarly, the Wallonian participants expressed concern about the ability of their region to learn during the course of the SPIDER project; and in South-West Finland, people tend to regret the fact that existing networks are often dis-functional and even sometimes felt to be a waste of time.

Table 14. A summary of definitions, goals and development strategies.

Southwest Finland	**Düsseldorf Region**	**Wallonia**
Region of knowledge: • A region that prepares for different possible developments in the future (proactivity) and aspires to rapid action when an opportunity arises (fast reactivity) (ADAPTIVITY) • A region that involves and activates the interaction of the three spheres of governance: public sector, companies and civil society (INTERACTION) • A region that produces gathers and utilizes the latest knowledge in all its activities and policies (INNOVATIVENESS)	Region of knowledge: • A region that prepares for different possible developments in the future (proactivity) and aspires to rapid action when an opportunity arises (fast reactivity) (ADAPTIVITY) • A region whose institutions are not just capable of learning and applying new efficient practices but are also capable of abandoning those old practices that have proven to be inefficient (ADAPTIVITY) • A region that produces gathers and utilizes the latest knowledge in all its activities and policies (INNOVATIVENESS)	Region of knowledge: • A region that prepares for different possible developments in the future (pro-activity) and aspires to rapid action when an opportunity arises (fast reactivity) (ADAPTIVITY) • A region whose institutions are not just capable of learning and applying new efficient practices but are also capable of abandoning those old practices that have proven to be inefficient (ADAPTIVITY) • A region that organizes lifelong learning for its citizens (LEARNING)
Development goals: • To implement and develop a strong regional innovation system (INNOVATIVENESS) • To condense regional co-operation in order to strengthen the feeling of regional togetherness (INTANGIBLE FACTORS) • To invest in social innovations through social and economic research (INTANGIBLE FACTORS)	Development goals: • To attract innovative companies (INNOVATIVNESS) • To attract innovative and active citizens (INNOVATIVENESS) • To implement and develop a strong regional innovation system (INNOVATIVENESS)	Development goals: • To invest in basic research in the region's universities and research organizations (INNOVATIVENESS) • To continuously search for new growth sectors and to adapt regional processes accordingly (ADAPTIVITY) • To improve education standards and the supply of a highly educated workforce (LEARNING)
Development strategies: • Implement schemes to create an atmosphere of cultural creativity (INTERACTION) • Strengthen the region's soft factors (such as an attractively built environment and an open creative atmosphere) and design a soft indicators monitoring system (INTANGIBLE FACTORS) • Investment in the development of products and business competencies (ECONOMY)	Development strategies: • To produce research and development projects that are based on the co-operation of universities and firms (INTERACTION) • Strengthen the region's soft factors (such as an attractively built environment and an open creative atmosphere) and design a soft indicators monitoring system (INTANGIBLE FACTORS) • The creation of diverse actor groups, which focus on different regional themes and which combine expertise from all the regional sectors (public, private, education, citizens) (INTERACTION)	Development strategies: • Construct research and development projects that are based on co-operation between universities and firms (INTERACTION) • Invest in the research and development of different technologies (INNOVATIVNESS) • Foster specific promising business lines /sectors / clusters (INNOVATIVENESS)

Many of the more specific topics in the SPIDER project are also related to these three key factors. We cannot discuss all these more concrete issues here, but we would like to mention those related to the general topic of interaction as we feel that they are an important part of a larger body of key topics that regions have to deal with in the knowledge society.

What the actors told us over and over again in the SPIDER local action groups can be paraphrased as follows:

> *I already belong to half a dozen different networks. I don't want to be part of any more. The networks I belong to take up a lot of my time and often they aren't of much use to me.*

This is a clear indicator of *networking fatigue,* which is dangerous, if we consider that fruitful collaboration seems to be a key competency of successful regions. The general impression among regional actors – corroborated at the final conference of the SPIDER project – seems to be that in the past, networking has too often been seen as a cure to all sorts of problems, without any deep considerations about whether networking is really the best solution to the problem at hand. We feel that there is a great demand for entering a new era of critical thinking about networks. This involves rethinking network benefits: What is the collective added value of a network? What is the individual added value of a network? And who is to be networked, if at all? Often, new networks reinforce existing connections among actors, instead of creating new ones, which might be by far the most useful thing to do. It could be said that business people are connected, regional actors. However, regional developers are connected, and scientists are also connected. But who creates connections *across* these sectors? There also seems to be a new role for public authorities here: While the era of generous public funding seems to be largely over in a lot of areas, and civil society has been asked to take its place by many, the question remains: How can civil society be activated to an even larger extent? *"It won't appear out of the blue",* one regional actor remarked. So it is possible that public authorities may assume a new role as an enabler and facilitator of networking activities – without dominating the networks too much.

Another point worth noting is that too often in the past networks have been built by enforcing them in some way or other. That is, networks have not been built among those who are really interested in networks, but in some rather non-spontaneous way, also involving many who feel obliged to network – either, because, *"it has the reputation of being a good thing",* or because their respective organization told them to do so.

This point was taken up by one of the workshops in the SPIDER closing conference, where some points to be taken into account when doing bottom-up networking were discussed. The workshop group used networks such as the OpenBC, LinkedIn, Wikipedia, and Ebay as role models to outline some principles of bottom-up networking. These are networks of people who really *want* to network; they are networks of people within organizations, *not* networks of organizations as such. Bottom-up networking in these cases also builds on a global infrastructure, but has local relevance.

4.3 Two perspectives on knowledge regions

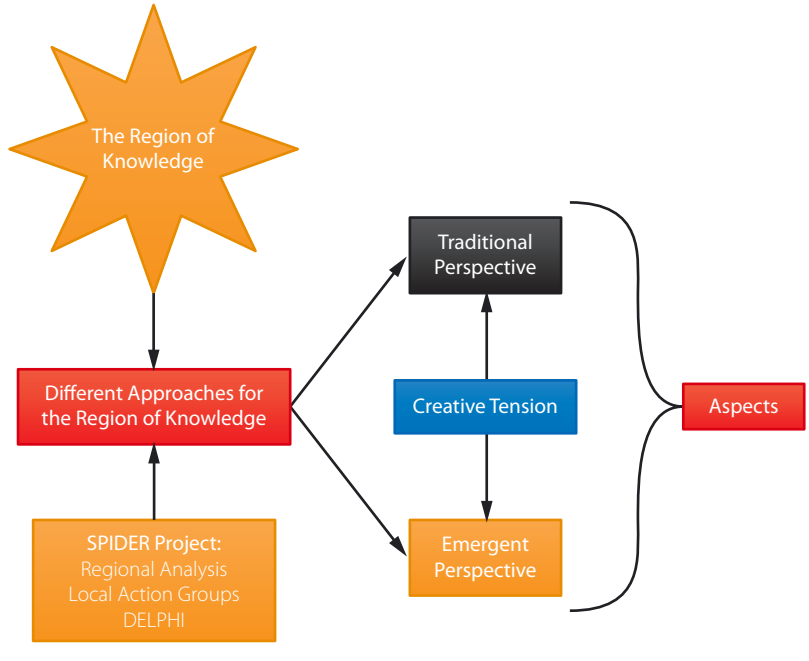

Figure 10. Two perspectives on the knowledge regions.

While the three characteristics explained in the last section – adaptivity, interaction and innovativeness – might be considered self-evident, it is interesting to note that they can be linked to two different perspectives on knowledge regions. As we found in the SPIDER DELPHI, those who emphasized innovativeness tend to favour a system-centred perspective on the knowledge region, while those emphasizing interaction seem to favour an individual-centred approach. Adapting to change may be seen on both levels, as we can consider both the system's and the individual's adaptive skills.

We can relate the three key factors to the distinction between structure and agency familiar from the social and cultural sciences. Structural thinking seems to come with an emphasis on the measurable hard factors and competencies of the region, while agency thinking seems to come with an emphasis on "regional wholeness", "regional identity", intangible factors etc. So there is actually a tension hidden inside the common core of the concept of a knowledge region.

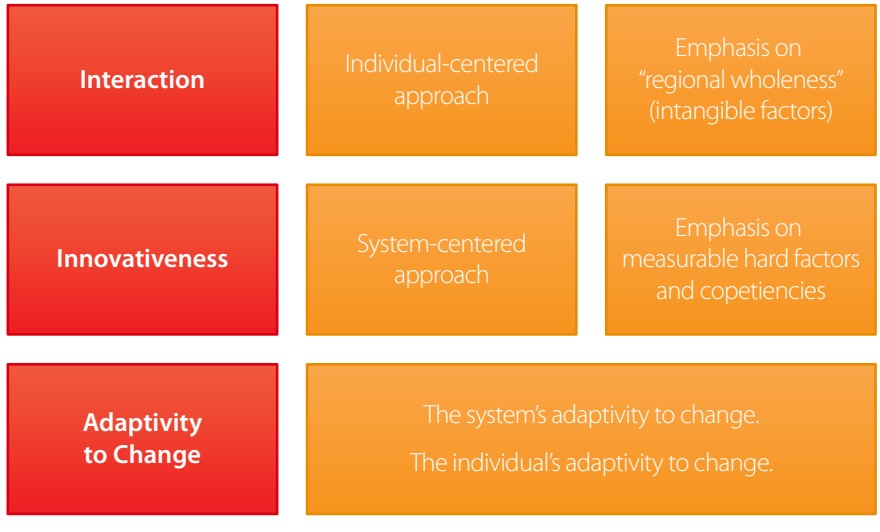

Figure 11. Key factors in the context of SPIDER perspectives.

We can thus identify a *traditional perspective* on knowledge regions that is factually oriented, and another perspective that opposes the traditional one in that it emphasizes exactly the opposite, the intangible factors. The challenge would be

to take a new perspective that neglects neither the hard nor the intangible factors. We call this the *emergent perspective* on knowledge regions. The *traditional perspective* focuses on knowledge as an abstract entity. The knowledge of an institution may then be described as the sum of all the competencies the institution has. Developing these capabilities would require the company to invest in developing new competencies that help them to become more competitive. That is, regions would try to invest in new, promising lines of businesses, R&D support would be intensified, plus the region could try to attract high technology industries and strong knowledge-based services sectors, and so on.

If the *emergent perspective* does not deny the importance of such measures how, then, does it differ? The main point seems to be that the emergent approach acknowledges, that, to quote Putnam (1995), *"the quality of public life and the performance of social institutions, (...) are (...) powerfully influenced by norms and networks of civic engagement"*. It is also inspired by research that demonstrates the vital importance of social networks for job placement and many other economic outcomes and research on the sociology of economic development that stresses the importance of dense interpersonal and inter-organizational networks (ibid.). Thus, the perspective shifts: from knowledge as an abstract entity resulting from some R&D process to knowledge as a social entity, embodied in concrete social relations, the density of which is seen as crucial for success. Consequently, strategies towards developing knowledge regions will have a strong social flavour, focussing not only on the factors mentioned above, but also on developing institutions, networking, and the like.

The new perspective is also linked to ideas about learning that became quite popular in organization theory and strategy theory in the 1990s. In this body of research, organizational learning is often seen to have two aspects, single-loop learning and double-loop learning: *"Single-loop learning is more conservative, its main purpose being to detect errors and keep organizational activities on track. Double-loop learning is learning about single-loop learning"* (Mintzberg et al. 2005). Learning regions, we can conclude, not only need to reflect upon their course of action, but also on how the learning process itself is framed – leading, again, to questions of collaboration and interaction. There is also a link to more recent innovation

paradigms, especially the so-called Open Innovation as advocated by Henry Chesbrough (2003).

Using the distinction between the traditional and the emergent perspective, we can formulate two main lessons from the SPIDER project. Firstly. there actually *is* a tension between the seemingly self-evident aspects of knowledge regions mentioned above. For instance, one impression we gained from the interpretation of the SPIDER DELPHI was that those who were thinking about knowledge regions in the traditional way saw the main development obstacles on the individual level and those who where viewing the region from the emergent perspective saw the main development obstacles on the system level. Thus, the biggest problems are seen to lie outside ones own area, so to speak. The tension also shows quite clearly in practice, when actors starting out from the traditional and the emergent perspective, respectively, have to cooperate to achieve a common goal. As the traditional perspective tends to emphasize hard factors and the emergent perspective tends to emphasize intangible factors, decision-making processes with a bottom-up flavour (involving many stakeholders,) often lead to results that combine soft and hard factor thinking in suboptimal ways. This is something we call the *mixing effect.*

The mixing effect, can also be illustrated using material from the SPIDER DELPHI. For this purpose, the next figure compares the regional significance profiles of development strategies.

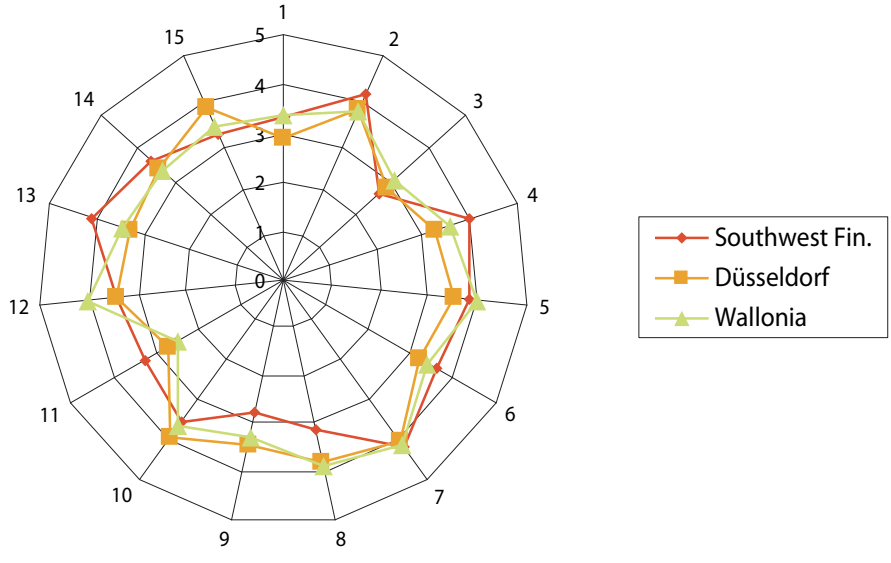

Figure 12. The mixing effect (mean value significance of strategic action).

There are two noteworthy points in the results: a similarity of regional strategy profiles when mean values are used and a large deviation between single answers. The deviation of opinions shows in practice how difficult it is to find consensus over preferences (the valuation of aims, the directing of resources, policies required etc.) between different interest groups. If a consensus is found, it can very well be the case that it is a mediocre consensus, combining the worst of both worlds.

The second key insight builds on the distinction between a traditional and an emergent perspective on knowledge regions. What became clear in the course of the project was that while many people are perfectly willing to adopt the second, more holistic perspective on knowledge, there is still a tension between the two views in practice. The emergent perspective sounds appealing to people, but there is a high degree of uncertainty about how to apply the insights of "emergent thinking" in practice. This links to an important question that resulted from the project: What new tools do knowledge regions actually need in order to deal with the new challenges they are facing?

The impression shared by most of the regional actors was that the world is full of new challenges; and that it is sometimes unclear how to tackle these challenges using the familiar methods of regional development. These tools may serve to gather information, evaluate the region's position in the wider European or global perspective, reflect upon the region's strength, and to spark off change. While there is a multitude of tools available right now (from the strategic planning approach used by the German IBA in the Ruhr area to the communities of practice concept as investigated by the EU-funded CRITICAL project to weak signals monitoring and spatial planning tools), some of these tools are maybe not used often enough yet. Building knowledge regions will thus also involve a lot of experimentation with new ideas, new concepts and new tools, testing whether they can be of any use to the region – something that cannot be easily determined in advance.

4.4 Four policy recommendations

SPIDER policy recommendations or policy guidelines concern networking, the performance indicators of a knowledge region, foresight, cultural change and behaviour. Selected subjects were made topics during the process. Although there were many noteworthy subjects and observations we decided that it is better to say more about something than something about everything. The SPIDER policy recommendations are presented next.

4.4.1 Rethinking networking

There are many types of good networks for example project networks for a certain task, networks for information distribution, knowledge networks for awareness development, networks with an exact structure, "cloud networks" with a dynamic structure etc. *but networks and networking are not answers for everything*.

There is currently a similar kind of development in networking as there was in teamwork about ten years ago. At that time the idea of teams and teamwork was implicated in everything everywhere. However, too many teams formed became

"an artificial wondering club". Because of that teamwork was perceived to be more or less a waste of time. Nowadays this seems to be the case with networks – there is a networking fatigue phenomenon. It can be said that the present "networking boom" is driven by frantic ICT development that offers almost limitless possibilities for interaction. At the same time an improvement in the quality of networks and networking methods has not been emphasized enough – networks are generated because there has to be one. It can be summarized that a network is useful and necessary but it should not be an end in itself and both practical tools and culture for networking are needed. More detailed information about networking was given in chapter 3.3.3.

4.4.2 Measurement/ indicators

The competitiveness of the knowledge territories and the need for new performance indicators and benchmarking

Today we can argue that it is as true for territories as it is for enterprises that the competitive edge no longer lies solely in having information at ones disposal – given its abundance – but in the capacity to use, process, interpret and assimilate it[8].

Along with those of other bodies, the studies of the Directorate-General on the Enterprises of the European Commission and more especially those of the high level Working Party on the Intangible Economy have highlighted the inadequacy of traditional economic concepts in the field of finance and management, to deal with intangible values[9].

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8 Christian LE BAS et Fabienne PICARD, Intelligence économique, analyse stratégique évolutionniste et compétences de l'organisation, dans Bernard GUILHON et Jean-Louis LEVET dir., De l'intelligence économique à l'économie de la Connaissance, p. 17, Paris, Economica, 2003.

9 HLEG report of DG Entreprise 2000-2001 on Intangible Economy, directed by Stefano ZAMBON (Université de Ferrara), with Baruch LEV (Stern School of Business, NYU). http://europa.eu.int/comm/enterprise/services/business_services/papers.htm - 10/11/03 -

The main objective of this recommendation relies on research into the development of new rationales, new forms of competitiveness as regards the Regions of Knowedge.

Examining in depth the meaning of regional competitiveness and its measurement as a series of new issues casts doubt on current indicators;

Thus updating the principles, instruments and indicators used for the measurement of intangible factors is necessary. Additionally, all the domains of territorial development (talent, expertise, know-how, cognitive heritage, notoriety, ethics, sustainable development, and so on); in association with other territories or international based approaches like the SOFI (State of the Future Index), should be used to deepen the concept of competitiveness in the Knowledge Society;

The identification of the real indicators for measuring development should be developed from an expert's perspective towards a more sustainable development and citizen-based approach.

4.4.3 Foresight

In our opinion the SPIDER project has shown that foresight has the potential to function as a kind of *meta tool* for regional development in the future. There are three main reasons why we think this is the case. First of all, foresight is *integrative.* Foresight processes are flexible, and may comprise the gathering of information, the evaluation of competitiveness, or reflection on possible steps and the development of possible plans within one framework. Secondly, foresight comes with a social approach – something which is definitely needed in today's intellectual landscape, taking into account the shift towards the emergent perspective on knowledge regions highlighted above. Thirdly, foresight may function as a *neutral networking agent,* bringing together a variety of actors and resolving tension by generating an orientation towards the future. For those three reasons, we think that foresight should be applied more widely in regional development. In doing so, the following three issues deserve special attention:

1. *Combine foresight with other approaches!* There are many instruments for regional policy making and there are more being developed each year. This diversification has to be managed through complementary efforts at integration. We think that it is worth exploring the integration of foresight techniques with other approaches used in regional development. An instance of a method akin in spirit to foresight is the strategic planning approach used in the context of the IBA project in the Ruhr region (part of which belongs to the Regierungsbezirk Düsseldorf) in the 1990s. An example of a project that tries to push the integration of foresight with other methods is the RegStrat project funded by the European Union, which aims at a combination of technological forecasting, foresight and benchmarking techniques plus other tools in a regional context.
2. *Employ foresight continuously and with a clear purpose in mind.* Foresight techniques are really useful only when applied in a long lasting, continuous process. The practice of foresight should not be a one-shot event, but part of on-going, systematic change process within regions. At the same time, there should be a clear purpose to any foresight exercise. We think that it is crucially important that foresight is tightly linked to decision-making processes within regions and to decisions regions have to take *today.*
3. *Use foresight to map and possibly change regional mindsets.* One feature of knowledge regions is that regional mindsets become all the more important. This is further explained in our recommendation on cultural change. We think that foresight techniques can be helpful in this context: if foresight is used to map and understand dominant mindsets within the regions! And, this is further enhanced if foresight techniques are employed in the social process of changing mindsets – where this seems necessary.

4.4.4 Cultural change and behaviour

Knowledge Regions and the behavioural patterns of individuals

The SPIDER project has focused on a new understanding of regional competitiveness within the Knowledge Society. Nevertheless, the study stressed the importance

of going further and analyzing how far all categories of regional actors, individuals, companies, administrations, universities, decision makers, etc are affected by the Knowledge Society and adapt their day-to-day and long term behaviours according to the new issues raised at the macro-level (the regional level in the case of SPIDER).

According to that perspective, it would be beneficial to develop practical studies with regional actors or companies to see how they organize themselves, what kind of networking they encourage, which information society tools they use and what new behaviours have been developed to face the challenges of Knowledge Society, etc?

Innovative approaches such as the cultural model based on values, beliefs, perceptions, feelings and behaviours presented at the final conference of SPIDER would support this kind of basic research.

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Turku School of Economics and Business Administration / Finland Futures Research Centre and Finlands Futures Academy (the coordinator of SPIDER project)

Finland Futures Research Centre was established in 1992 as an auxiliary unit of the Turku School of Economics and Business Administration. The Centre has offices in Turku, Helsinki and Tampere and it employs more than 40 persons. Finland Futures Research Centre refines visionary knowledge regarding alternative futures and the challenges and possibilities included in them. The Centre also offers well researched futures-oriented information in interesting formats to back up both national and international decision-making.

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RETHINKING REGIONAL PERFORMANCE IN THE KNOWLEDGE SOCIETY

Foresight as a Tool for European Regions

The lessons learnt in the SPIDER project provide valuable insight for future regional development within European. This report especially focuses on how to implement foresight and futures research practices within regional development projects and development networks. It is designed to be used and read by regional developers in public authorities, universities and research institutions. In addition private companies looking for a region to develop with them will find this essential reading, as will others who desire to take part in the creation of regions of knowledge in Europe.

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