



Bundesamt  
für Bauwesen  
und  
Raumordnung

# **ESPON 3.1 Integrated Tools for European Spatial Development**

## **Final Report Part A**

**Scientific and policy oriented conclusions  
of ESPON results until September 2004**

# A

Revised Version



This report represents the final results of a research project conducted within the framework of the ESPON 2000-2006 programme, partly financed through the INTERREG programme.

The partnership behind the ESPON programme consists of the EU Commission and the Member States of the EU25, plus Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON programme and projects can be found on [www.espon.lu](http://www.espon.lu)

The web site provides the possibility to download and examine the most recent document produced by finalised and ongoing ESPON projects.

ISBN number **3-87994-021-5**  
**2<sup>nd</sup> edition (revised version)**

This basic report exists only in an electronic version.

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**Bundesamt für Bauwesen und Raumordnung**  
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**Bonn, Germany, July 2005**

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## **Foreword**

This part of the final report of ESPON project 3.1 attempts to present the main findings and scientific and policy conclusions of the ESPON programme to a wider professional audience. Following the current debate in European spatial policies, the report focuses mainly on the state and trends of territorial cohesion and polycentricity in Europe. Following these two lines, the report presents synthesised findings from all the current ESPON projects – with emphasis on those that presented their final reports by the end of August 2004. Based on these overall ESPON findings, a number of policy recommendations have been developed. The combination of scientific findings and policy recommendations allows a deeper discussion of the policy conclusions in connection with and relation to scientific and analytical findings including methodological and data constraints and weaknesses.

With this report, we hope to encourage a debate on the combined findings of ESPON and their policy implications. The report consists of three parts, part (A) presenting the overall ESPON analysis, part (B) presenting selected findings from the single ESPON projects, and part (C) covering distinct activities of the ESPON 3.1 project. You are currently reading part A of the report. This part A of the report follows an approach combining scientific results and policy recommendations while addressing both an audience familiar with European spatial policies and ESPON as well as those coming from other disciplines and sectors. The authors hope that, despite the broad scope of addressees targeted by this report, the report will serve the interest of every reader.

This part A of the Final Report of the ESPON Project 3.1 has been co-authored by Kai Böhme, Nordregio, and Peter Schön, BBR



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The ESPON 3.1 project team would like to express its thanks to all persons who were involved in the work or who supported the team very much. Special thanks to all the colleagues from the administration offices which worked hard, pragmatically and unconventionally to overcome formal requirements of the programme.

The ESPON Programme was launched after the preparation of the European Spatial Development Perspective (ESDP), adopted by the Ministers responsible for Spatial Planning of the EU in May 1999 in Potsdam (Germany) calling for a better balance and polycentric development of the European territory. The programme is implemented in the framework of the Community Initiative INTERREG III. Under the overall control of Luxembourg, the EU Member States have elaborated a joint application with the title "The ESPON 2006 Programme – Research on the Spatial Development of an Enlarging European Union". The European Commission adopted the programme on 3 June 2002.

See <http://www.espon.lu> for more details.

The views expressed in this report do not necessarily reflect the opinion of the ESPON Monitoring Committee.

## Abbreviations used in this report

**Table 1**      **Abbreviations**

<b>Abbreviation</b>	<b>Term</b>
AC	Accession Country
CADSES	Central European, Adriatic, Danubian and South-East Space
CAP	Common Agricultural Policy
CDCR	Committee for Development and Conversion of Regions
CEMAT	European Conference of Ministers responsible for Regional Planning
Cf.	Confer
CIP	Community Initiative Programme
CNRS	Centre National de la Recherche Scientifique, France
CO <sup>2</sup>	Atmospheric carbon dioxide
CSD	Committee for Spatial Development
CSF	Community Support Framework
CU	Co-ordination Unit
DPSIR	Driving force, Pressure, State Impact Response
ECP	ESPON Contact Point
EEA	European Environmental Agency
E-ESDI	Environment – European Spatial Data Infrastructure now called INSPIRE
EMA	European Metropolitan Area
ENDS 2000	The National Strategy for Sustainable Development, Portugal
ERDF	European Regional Development Fund
ESDP	European Spatial Development Perspective
ESPON	European Spatial Planning Observation Network
ESRI	Environmental Systems Research Institute, company name

<b>Abbreviation</b>	<b>Term</b>
EU	European Union
FIR	First Interim Report
FR	Final Report
Fig.	Figure
FP	Framework Programme
FUA	Functional Urban Area
GDP	Growth Domestic Product
GERD	Gross domestic expenditure on R&D
GIS	Geographic Information System
HDA	Homogeneity and Discontinuity Analysis
ICT	Information and Communication Technology
INIRA	French National Institute for Research in Computer Science and Control
INTERREG	Community initiative which aims to stimulate interregional cooperation in the EU
ISPA	Instrument for Structural Policies for Pre-Accession
LEADER	Community initiative for rural development
LFA	Less favoured Areas
MAUP	Modifiable Area Unit Problem
MTA	Multiscalar Territorial Analysis
MSM	Multiscalar Smoothing Method
NUTS	Nomenclature of Territorial Units for Statistics
OMC	Open Method of Co-ordination
PHARE CBC	Programme for Central and Eastern European Countries Cross Border Co-operation, Small Project Facility
PIA	Polycentric Integration Areas
PIAPS	Public internet access points
PSS	Policy Support System

<b>Abbreviation</b>	<b>Term</b>
R & D	Research and development
RCE	Regional Classification of Europe
RDR	Rural Development Regulation
RIS	Regional Innovation Strategies
SME	Small and medium-sized enterprises
SPESP	Study Programme on European Spatial Planning
SUD	Subcommittee on Spatial and Urban Development (working group of the CDCR)
SWOT	Strengths, Weaknesses, Opportunities and Threats
TA	Technical Assistance
TEN	Trans-European Networks
TIA	Territorial Impact Analysis
TINA	Transport infrastructure needs assessment
TIR	Third Interim Report
TPG	Transnational Project Group
UK	United Kingdom

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## 1 Introduction

This report presents combined findings of a series of projects carried out under the framework of the **European Spatial Planning Observation Network (ESPON)**, a policy oriented research programme created to overcome the lack of information on European spatial development trends.

The ESPON programme has dealt with 29 European states: the 25 EU member states plus Romania, Bulgaria, Norway and Switzerland. Thus, compared to former exercises like the ESDP, ESPON has filled in many **gaps in the European map**. Nevertheless, some of the gaps still exist also in the ESPON context, like the Western Balkans (although some ESPON projects already considered some of the neighbour countries not yet participating in ESPON).

The "ESPON territory" (i.e. the combined territory of the EU25+4 partners of the ESPON programme) covers one of the **largest common markets in the world**. With its almost 500 million inhabitants living on an area of 4.700 thousand square kilometres this territory is one of the most populous and densely populated regions in the world. The total GDP is one of the highest in the world (with about 11.600 billion \$ compared to 12.300 billion \$ of the NAFTA zone, 4.300 billion \$ of Japan, and only 620 billion \$ of ASEAN and 580 billion \$ of Mercosur).

On the other hand, the economic growth rate is rather low and the labour market performance, expressed for instance in the unemployment rate, worse than in other parts of the world like the USA or some of the Asian countries. As the ESDP has stated, there are also **larger regional disparities** in Europe than for instance in the USA. The difference between rich regions and poor regions is rather high in Europe, and the disparities within the European Union have grown considerably through the last EU enlargement. Europe shows its highest population density and its highest rate of economic performance in the **geographical centre** which can be marked by the five cornerstone cities of London, Paris, Milan, Munich and Hamburg. Referring to this geometrical form, the ESDP has labelled this centre as the European pentagon and has judged that this is the only global economic integration zone in Europe (compared to three or four of such zones distributed over the territory of the USA).

### 1.1 Policy Background and Context of ESPON

The need for more **genuine European knowledge** was felt during the elaboration of the European Spatial Development Perspective (ESDP), when

it became evident that European spatial development is more than the addition of national development pictures. Thus, ESPON has been initiated to follow up the principle ideas and themes of the ESDP under a scientific perspective.

It is one of the basic assumptions of the ESDP that spatial planning or spatial development policy can contribute to a better, less costly and more efficient implementation of policy interventions. Or vice versa: without taking into account the spatial aspects of policy interventions, without spatial coordination and a spatial development perspective there is the danger that policy interventions might be contradicting, inefficient, and more costly. It is one of the intentions of ESPON to analyse and examine in more depth the need and **added value of spatial planning and coordination**. Prior to this, a study financed by the European commission has shown that non-coordination can be very costly in the end because **non-coordinated policy results can be less efficient** and sometimes even contradictory so that the intended goals of policies cannot be fully reached.

When talking about the spatial aspects of policies two different aspects have to be considered: firstly, there are **regional impacts and incidences** of policies where specific local and regional entities are affected in a certain way by those policies. Secondly, there are more general implications for the **spatial organisation** of the society, such as settlement structures, neighbourhood relationships or transport flows. Both aspects are closely linked. In this text we will use the terms spatial and regional in the above mentioned meaning, but also use the terms spatial as the more general term, comprising both specific meanings.

The importance of space also stems from the relationship between **individual behaviour and spatial contexts** and features. This relationship holds in both directions: spatial structures and spatial development can be regarded as the outcome and the aggregate of individual behaviour and decisions (where "individual" can be assigned to single persons, families and households, enterprises, political bodies and other organisations). Seen in the other direction, the spatial context is part of the conditions under which decisions are made.

In the **ESDP** (1999) the ministers responsible for spatial development have agreed on common goals for the future European spatial development. These ESDP goals correspond with the overall goals of the European Union. In general it can be said that spatial development goals are not goals in their own right but that they are agreed upon in order to serve other goals. For instance, the goal to support a more polycentric settlement structure can be subsumed to the more general aims to foster economic development and to

enhance environmental conditions. It is also this relationship that has to be explored in more detail.

The ESDP was elaborated by and mainly addressing the 15 countries that were EU Member States prior to the last round of enlargement. However, European spatial policies are not at all unfamiliar to the remaining 14 countries addressed by ESPON. These were involved in the activities within the framework of the **Council of Europe**. Indeed, the ESDP principles have also been acknowledged by the Council of Europe, and its conference of ministers responsible for spatial planning (**CEMAT**) in the year 2000 adopted the "Guiding Principles for Sustainable Spatial Development of the European Continent". Cooperation in the field of spatial and territorial development policy thus goes well beyond the EU and is also a field that the CEMAT has been active on for many years.

A landmark in the current debate on spatial development policies is the **Third Cohesion Report** published by the European Commission in the beginning of 2004. In this report the idea of territorial cohesion plays an important role and the report provides first indications on how to understand this concept, involving reference to preliminary ESPON results.

Territorial cohesion has been introduced in the **Draft European Constitution** as a third dimension beside economic and social cohesion as one of the general aims of the European Union. It is also for this reason that it will be necessary in the future to get a clearer common view on how this aim can be implemented by European and national and regional policies.

## **1.2 ESPON and the perspectives of European spatial development**

ESPON is a research action which is part of an initiative taken by the EU spatial planning ministers and the European Commission at the beginning of the 1990s to closer co-operate in the field of European spatial development policy. This process resulted in the European Spatial Development Perspective (ESDP) document that was adopted in 1999. Based on the aims outlined in the ESDP, the ESPON programme is a continuation of the ESDP process aiming at a scientific foundation and deepening of the ESDP principles.

## **What are the main goals for European spatial development?**

In the ESDP common aims, policy fields and options for a better coordinated European development policy have been outlined. These are thought to contribute to the more general European development goals such as cohesion, efficiency, worldwide competitiveness and sustainable development.

The main goals of the ESDP are to foster territorial cohesion in Europe, to support a more balanced development and diminish disparities and to strengthen regional competitiveness and cooperation within and between the European regions and territories. Following the ESDP this can be reached by strengthening the polycentric structure of the European territory, by developing a better and more balanced accessibility of the European regions, and by preserving and better managing the natural and cultural heritage of Europe and its regions. These elements are also part of the more general strategy to foster a more sustainable development in Europe.

## **What is the general approach of ESPON?**

The **ESPON** programme is the first step in exploring the basic features, structures and trends of European spatial and regional development, covering 29 countries – i.e. 25 EU Member States, plus Bulgaria, Romania and Norway and Switzerland. During its first phase 2002 to 2004, ESPON established a basic common database and developed new integrated approaches to the analysis of spatial development in Europe. Furthermore, ESPON explored the spatial and regional impacts and incidences of non-spatial, sectoral policies.

In its first two years of existence ESPON has covered a comprehensive spectrum of policy-relevant questions and produced a number of products and results which provide value added to both, the current policy debate and ongoing scientific discussions. At the same time it goes without saying that many open questions remain. A lot of further research is needed to develop the full potential of a scientifically well based and founded spatial development policy in Europe. In the end, this can only be achieved if a more permanent research infrastructure for European spatial development will be established.

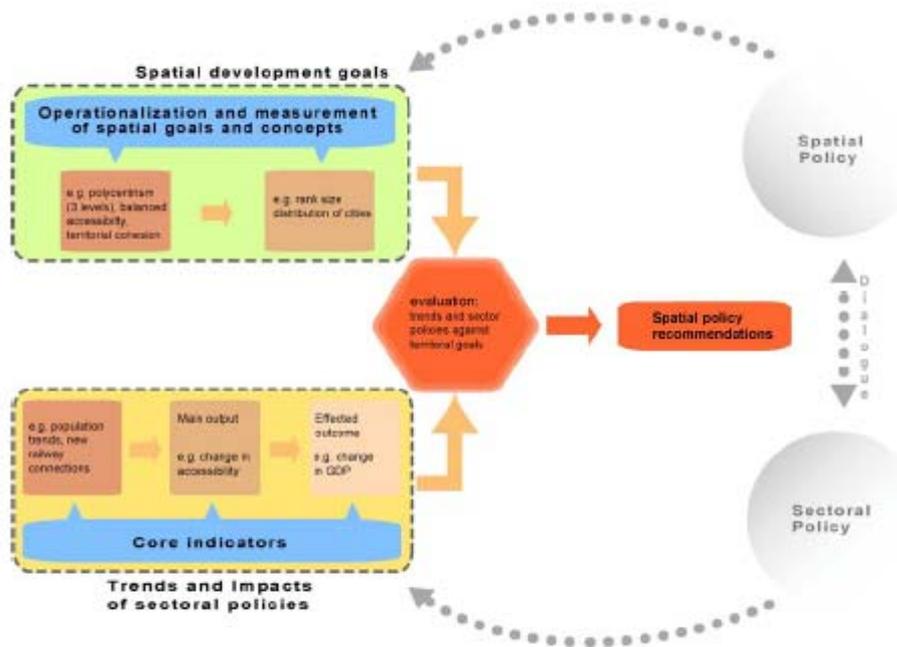
The three main strands of ESPON focus on (1) the **trends of European spatial development**, (2) the territorial incidences and **impacts of European policies**, and (3) the **scientific co-ordination** of ESPON projects and the **overall exploitation of ESPON results**. The third strand also includes the infrastructure work of developing a **joint scientific**

**platform** (like provision of a common ESPON data base and basic indicators for analysis) as well as the development of **innovative tools and products** (see in more detail in the following chapter 2). This summary report is also part of the third strand.

The main elements of the scientific task are to

- operationalise the goals and concepts of the ESDP and other policy documents, such as the Third Cohesion Report,
- make them measurable and find indicators and data describing spatial development trends and policy impacts, and
- compare and evaluate the empirical findings against the background of spatial policy goals.

**Figure 1 Methodological approach of ESPON (Matera Guidance Paper)**



Source: Matera Guidance Paper, by ESPON 3.1, February 2004, p.5

## **Fuzzy policy concepts, accuracy of science and the lack of data**

Given the ambiguous/fuzzy character of the ESDP policy aims, the scientific approach in the application of the ESDP goals and concepts is a first crucial step in the process of scientific research. The step of validation includes essentially also a specific interpretation. During the ESPON research process during the last two years a great effort has been invested in the attempt to discuss and unify different **scientific interpretations of political concepts**. This attempt has been successful and there has been a mutual approximation of different interpretations. Nevertheless, different views and interpretations of the ESDP goals still remain among ESPON participants which for itself forms an interesting part of the ESPON results which can foster future discussions.

It is a general phenomenon that social and economic and spatial phenomena cannot be directly measured. This is especially true for European questions where the lack of comparable data still hampers solid scientific research. Spatial objectives, like the concept of polycentricity, cannot be measured directly, but they can only be approached by a combination of indicators which throw a specific light on the subject but that will never cover it one to one. Consequently, indicators should not be mistaken for the object itself, **indicators only point to the object** (like the height of your body may be a good indicator for the size of your shoes, but its two different things anyway!). Especially decision-makers should be aware of the fact that if you cut off the head of a body you will not change the foot size of the corpse by this!

## **Conflicting policy goals and the Three-Level-Approach of ESPON**

In spatial and regional planning and implementation, policy measures become concrete and the inner ambiguities and **conflicts of aims and values** that might be inherent to a bundle of different policies applied at the same time become visible. Spatial planning, especially on the regional and local level, is therefore also a context where conflicting aims become apparent and have to be decided and solved.

Referring to the operationalization and interpretation of policy goals and concepts, it has been elaborated within the ESPON process (see also the Crete guidance paper) that goals and concepts can have **different meanings in different contexts**, and the same concept can even have contradictory and opposite meanings when applied in different contexts. For instance, the concept of polycentricity may mean different things depending

on whether one looks at it on a European level or on a national or regional level. And it might be even contradictory in the sense that if you foster more decentralisation on the European level you might need to a certain extent to support centralisation on the national or regional level. But also, looking at the national level, polycentricity might have a different meaning in densely populated member states like the Netherlands or Germany compared to low populated areas say in northern Scandinavia.

ESPON has adopted a **Three-Level-Approach** which means that the core topics and research objects have to be examined regarding their different (or similar) meanings on the macro (European), meso (transnational or national) or micro (regional) level (cf. From project results to 'ESPON results', First Guidance Paper, prepared by ESPON 3.1 for the First Lead Partner Meeting, Bonn, Feb. 2003, pp. 4ff.).

### **The policy relevance of ESPON results**

ESPON faces a double challenge, being a scientific exercise on the one hand and a part of the scientific policy consultancy process on the other. From this follows the request that the scientific results have to be addressed to and should be understandable and applicable by a broad range of European planners and policymakers belonging to different countries and regions with different spatial planning systems, but also stemming from a multitude of different sector policies. This challenge can only be met by implementing a close communication process between policymakers and scientists.

Referring to the **persistence of spatial structures** and development trends, two different types have to be considered (which in reality fluently mix to intermediate types):

- Some elements of spatial structures and development trends are very **stable in a long-term perspective** and cannot be changed fundamentally within a short-term or medium-term prospective. Nevertheless, they are of great importance as they set territorial contexts and constraints. Consequently, they have to be taken into consideration by policymakers (and other actors). For instance, the so-called geographically handicapped areas (cf. Third Cohesion Report) shape spatial development in policy-making, but the geography as such cannot be changed through policies.
- Other elements of spatial structures are more **open to change** (with different time horizons) and are more directly addressable by spatial or spatially relevant policies. Those structures that can be changed

open possibilities for policy interventions and for change induced by policies.

Discussing factors for spatial development (and changes in spatial structures), one needs to keep in mind that the influence of policies might be limited compared to other **socio-economic developments**. Therefore, the relations between input and output, between costs and effects have to be considered when policy interventions are to be evaluated.

Despite these caveats, spatial development policies can provide a policy framework which is needed to find the right **combination of sector policies** and the best policy mix to foster and strengthen the development of Europe and of its cities and regions.

The ESPON programme also reflects on the changeability of factors, the time horizons of change, and the strengths of the effects induced by specific policy interventions.

## **2 Innovative tools and territorial indicators**

This chapter describes the work on co-ordination, territorial data and indicators and innovative tools developed in the ESPON 3.1 framework. These activities form an important element to create a common scientific platform for the ESPON programme. In particular this includes: elements of co-ordination and guidance; the ESPON data base and mapping tools; various spatial analysis and support tools for other TPGs; a proposal and first test for building up a Regional Classification of Europe; and the preparation for future innovative projects and tools including Europe in the World, Transnational Cooperation (Interreg) and a first version of an ESPON Policy Support System.

### **2.1 Elements of co-ordination and guidance**

#### **2.1.1 Guidance Papers**

From the very beginning on, one central aim of the ESPON programme was to achieve more than just additive results of single projects but to aim at integrated results of the ESPON programme. A first and basic step to get integrated ESPON results was to create a basic common ground for all projects. The intention was to secure integrated approaches and results for the whole ESPON programme. This was basically done by the co-ordinating project ESPON 3.1 using the instrument of so-called guidance papers.

Already the First Guidance Paper, prepared by ESPON 3.1 for the First Lead Partner Meeting in Feb. 2003, was titled: *From project results to 'ESPON results'*, and thus had a programmatic message.

Three further guidance papers were developed and delivered since the start of the ESPON Programme:

- Crete Guidance Paper
- Matera Guidance Paper
- Lillehammer Paper

The '**Crete guidance paper**'<sup>1</sup> proposed the standard layout for ESPON maps and the "3-level-approach" which established a concerted approach and common platform of all TPGs.

In Crete all TPGs agreed that common elements were needed that could be used by different TPGs. These common elements were necessary

- to make things simple and efficient by facilitating the use of results from other TPGs; and
- to achieve coherent ESPON results.

The most important elements of the common platform are:

1. the ESPON data base (core indicators), including
2. a collection of ESPON maps (visualising the ESPON data base)
3. typologies of regions;
4. the analysis of trends and policy impacts related to different types of regions;
5. the operational definition and measurement of policy goals and concepts, as a base for
6. the assessment and evaluation of results (trends and policy impacts) with reference to these policy goals and concepts

For all ESPON Projects the '3-level-approach', which defines the levels for research and analysis, was and still is important. This approach was discussed and agreed during a TPG-lead partner meeting in Brussels, 26.02.2003, and then during the ESPON Seminar in Crete. The final agreement was for all on-going projects of that time as well as for all later projects to concentrate on the three-level-approach for the policy contexts:

- macro scale - European level
- meso scale - trans-national/ national level
- micro scale - regional/local level.

The '**Matera Guidance Paper**'<sup>2</sup> (MGP) started from the base provided by the 'Crete Guidance Paper'. The Matera paper mainly focused on the analysis of trends and policy impacts and the evaluation of trends and sector policies against territorial goals to reach spatial policy recommendations.

A central part of the paper was the "Matera Guidance Paper Figure" (cf. fig. 1, above) which sketched out the methodology used by the TPGs. The main focus is on how to define operational models of policy goals and to confront statistical data about the real world with these models of spatial development goals.

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<sup>1</sup> Sent out on 02.06.2003 by the 3.1 Project

<sup>2</sup> The Matera Guidance Paper was sent out on 20.02.2004

The guidance paper strengthened the common platform of the whole ESPON exercise. It has given all participants guidelines that helped them to work towards common programme results. The Matera Guidance Paper has been an especially important milestone for the work that went into the Final Reports.

The '**Lillehammer Paper**' concentrated on orientations and a check-list for the writing of the final reports. The paper was based on discussions which took place during the Lillehammer Seminar. These concerned a number of questions for orienting final results as well as policy recommendations.

The Guidance Papers strengthened cross-project links and created significant added value. They assisted the first round projects on their way to successful project results and their final reports and will also inform the work of later rounds of projects.

### **2.1.2 Territorial Impact Analysis (TIA) and its implementation**

Another important element of guidance, especially for the ESPON projects belonging to priority two, the policy impact projects, was the guidance on Territorial Impact Analysis. In the ESDP, Territorial Impact Assessment was advocated for transnational projects and plans, and the method was regarded essentially as a tool for evaluating major projects. However, the ESPON programme sought to apply this idea to EU policies and programmes that, while not having explicit territorial development goals, nevertheless influence spatial development considerably. ESPON aimed to assess how and to what degree these policies and programmes are affecting territorial development. Because this is a rather different application, compared to Territorial Impact Assessment, a different term, Territorial Impact Analysis, has been used for this approach.

The analysis is restricted to:

- a compilation of the policy measures in certain regions (input side, e.g. financial interventions), recording what spatial development goals they follow and
- the structural status/changes in these regions (output side) evaluated against the chosen spatial development goals.

As a check-list for the ESPON priority two projects, the TIA minimum requirements were elaborated by ESPON 3.1. This revealed that very different approaches and methods had been used in these projects to analyse impacts of policies and programmes. This led to the conclusion that it hardly seems possible to cover the whole range of sectoral EU policy

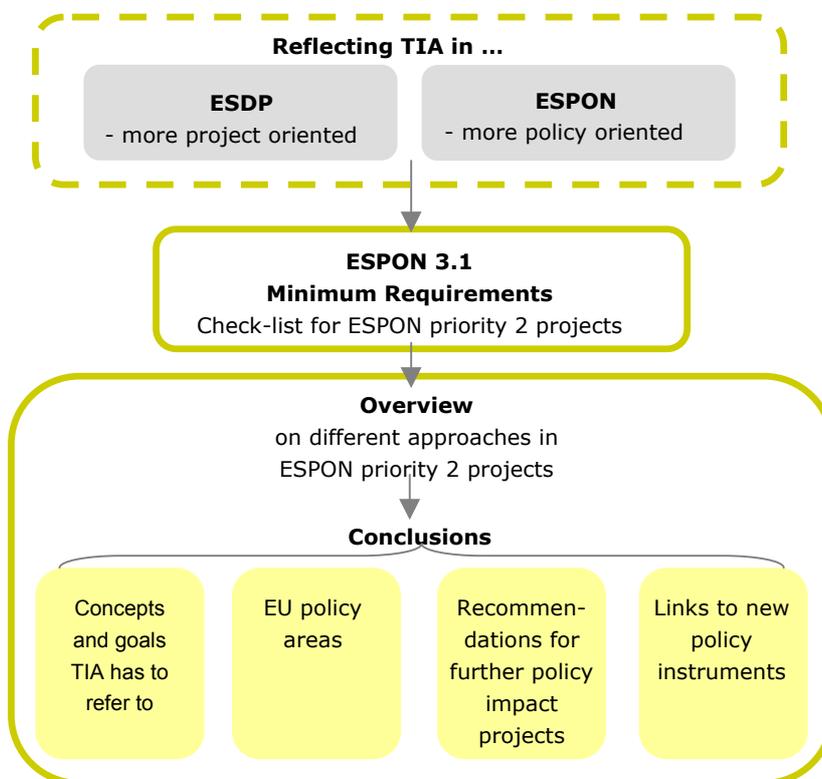
issues by one assessment methodology. The conditions for such a 'general model' are lacking for at least two reasons:

- the very different character of the spatial dimension and implications of the policy areas concerned (in particular their different affinity to spatial goals) and
- the rather different theoretical state of the art of applied research and planning in the different sectors.

Finally four main conclusions were drawn from the ESPON experiences concerning TIA:

- Need for better definition of spatial development goals which any kind of TIA has to address – focusing on territorial cohesion and polycentric development
- Recommendations for monitoring and documentation of EU policy areas
- On the basis of the ESPON policy impact projects recommendations are made to the different EU policies for Transport and TEN policy, Research and Development, CAP and Rural Development Policy, and Regional Policy
- Finally, links to other new policy instruments like impact assessment or the open method of co-ordination are discussed.

**Figure 2 ESPON 3.1 work steps concerning the TIA concept**



Thus, the recommendations are primarily seeking to establish the conditions for elaborating TIA in the future on a sounder basis than is feasible now, by addressing:

- the particular orientation of the relevant EU policy programmes;
- the lack of territorial differentiation currently provided in data generated by policy implementation (due to the lack of a territorial dimension in the sectoral policies); and
- the fact that spatial development goals and concepts are still not operational in a way that allows them to be used to do impact assessments.

The future potential roles of Territorial Impact Analysis in the context of the new policy instruments 'Impact assessment' and the 'Open method of co-ordination'<sup>3</sup> have been discussed.

The Open Method of Co-ordination (OMC) "is designed to help Member States to progressively develop their own policies by:

- fixing guidelines for the Union with specific timetables in the short, medium and long terms for achieving the goals which they set
- establishing, where appropriate, quantitative and qualitative indicators and benchmarks against the best in the world and tailored to the needs of different Member States and sectors as a means of comparing best practice
- translating these European guidelines into national and regional policies by setting specific targets and adopting measures, taking into account national and regional differences
- periodic monitoring, evaluation and peer review organised as a mutual learning processes. (par. 37, Lisbon European Council conclusions, 2000)."

## **2.2 ESPON database and mapping tools**

### **2.2.1 ESPON Data base**

One important result of the ESPON programme is the establishment of the ESPON database. It was created through the combined efforts of the Transnational Project Groups and co-ordinated and maintained initially by project 3.1, and then after October 2004 by project 3.2.

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<sup>3</sup> CEC (2001) European Governance; White Paper, Brussels, 25-7-2001, COM(2001) 428 def. Luxembourg: Office for Official publications of the European Commission

The database contains fundamental regional background information necessary for the analysis of European regional structures and trends. It also integrates ESPON results. The compilation of data for 29 European states makes the ESPON database a unique achievement and resource.

The ESPON database has developed by give and take. All TPGs contribute to this common base and all TPGs benefit by using its data and indicators for their own research.

The ESPON database has been developed and designed according the ESPON Data Navigator categories. In this way the data and indicators provided have been quality checked and adjusted. Updated EUROSTAT data have been included also.

All this was managed to allow transfer to the interactive version of the ESPON database which is now operational, and includes all TPG data delivered up to mid-September 2004.

The ESPON database is divided into two areas. One of these is raw data (e.g. Eurostat data); the other is indicators (derived from original calculations by ESPON TPGs). This arrangement address some legal concerns while also making it possible to provide ESPON results in the form of regional indicators to interested persons outside the programme.

**Table 1 Overview on ESPON database content (main categories)**

- 01 Spatial Typologies
- 02 Population
- 03 Employment and Labour Market
- 04 Wealth and production
- 06 Transport
- 07 Research and Development
- 09 Communication technology
- 10 Household oriented infrastructure
- 11 Land use
- 12 Environment
- 13 Agriculture
- 14 Social situation
- 17 Tourism
- 18 Public sector

Starting from the ESPON database a set of core indicators has been developed. In this list fundamental regional information needed for regional analysis and research is defined on cross-border, transnational and Europe-wide structures and trends to support spatial policy recommendation in the European context.

It has been elaborated on the base of the suggestions by the TPGs. It takes the final reports of the project related into consideration, the contributions in the run-up of the final reports and also includes the new projects that started later. However, the investigation of the reports underlines that the joint definition of fundamental indicators, future oriented in elaboration and up date possibilities, is not consequently mirrored in the view of all the projects.

By now, 103 core indicators have been identified. Various indicators could only be realised on the NUTS 2 level due to data availability. Those indicators will build the base of those regional statistics which have to be verified for further updating. This updating could be done yearly for most statistics which are originally based on the Regio data of Eurostat.

A specific part of the indicator set relates to regional classifications and typologies. Typologies of regions and territories can be used as background of spatial structures and pictures against which trends and policy impacts can be checked.

Based on indicators, types of spatial clusters and regional groups can be identified which are defined by similar structural characteristics. On the basis of more elaborated typologies, statistical measures and indices can be developed to summarise spatial structures and trends with a quantitative, visual insight into spatial structure and trends in Europe.

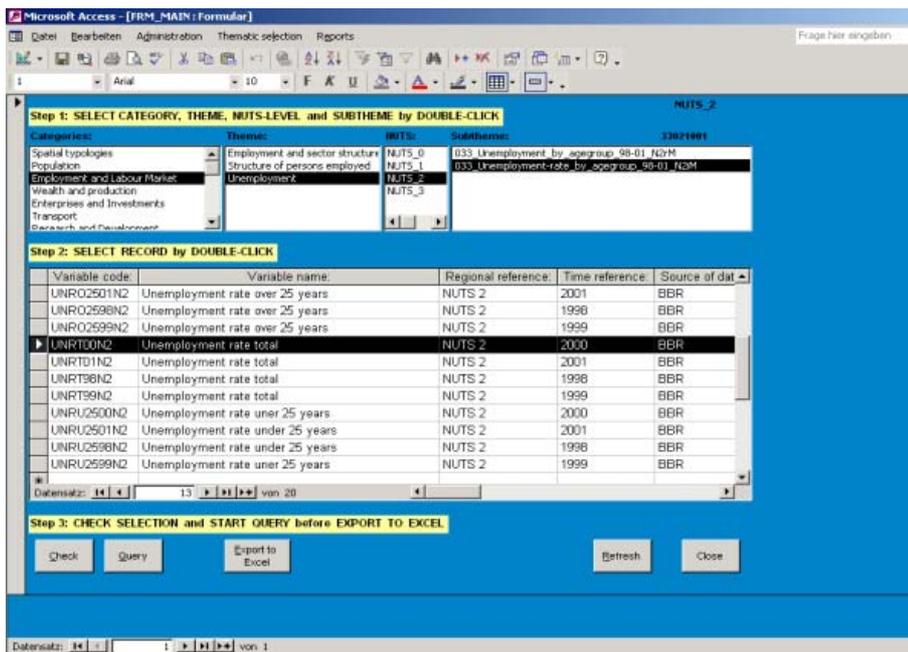
More detailed information about the ESPON data and indicator base can be found in ch.5 of part C of this ESPON 3.1 final report.

In technical terms, the ESPON data base is organised as an Access data base file with a special structure that includes meta-data information.

The selection of indicators is organised in a narrowing process, via the steps indicated below, leading to the appropriate meta-data file.

The first selection criterion is the main theme, e.g. population, employment and labour market. Further specification is done with the help of the sub-theme, in the case of population e.g. population structure, structure of persons employed.

**Figure 3 Screenshot ESPON Data Base**



The next step is to choose the regional level by NUTS. After this the list of relevant tables appears fitting the selection. These are the associated meta-information tables.

In the central window the meta-information of the selected table now appears, giving all information included, like variable short name and description, NUTS level, Project responsible, contact and so on.

After the table of interest has been selected, all the indicators will be listed according to the regional and the time reference. The same indicator for a series of years will be listed for each year.

The choice of the indicator is done by double clicking on the appropriate variable. Up to a maximum of 25 variables or indicators can be selected out of a maximum of 3 tables.

After making this choice, the user has the opportunity to finalise the selection immediately, via 'run', or to verify the selected indicators first, via 'check'.

By returning to the indicator screen, an ACCESS table of the 'run' selected can be created, which can be exported into EXCEL.

### **2.2.2 The ESPON map kit**

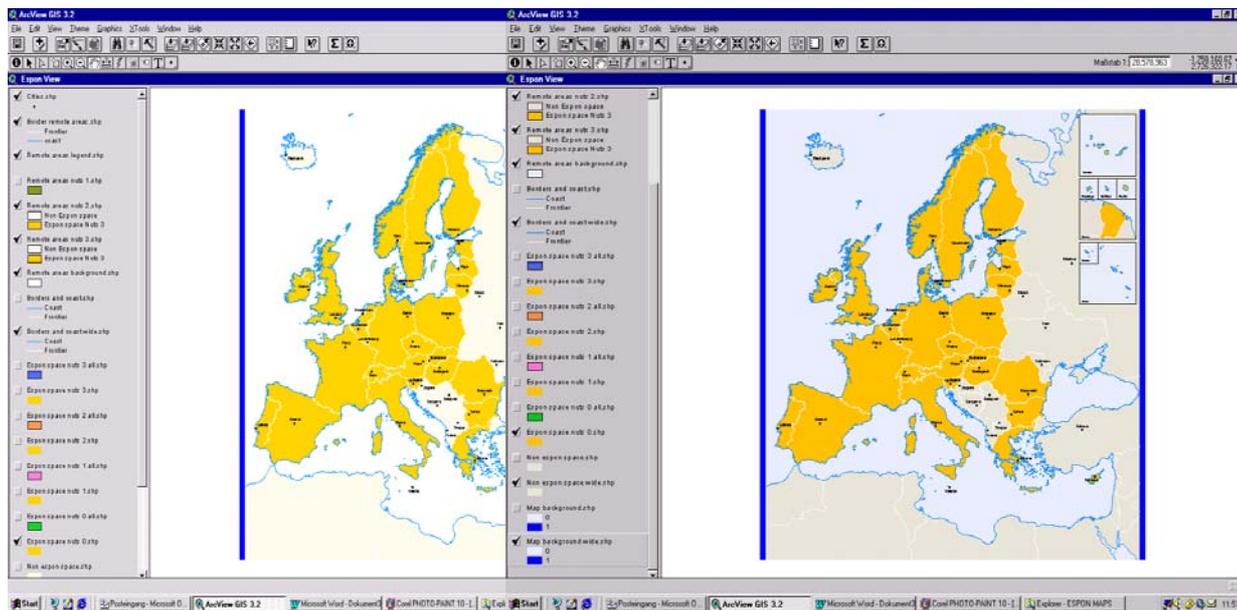
One of the tasks for the ESPON Project 3.1 was to develop new cartographic and spatial analysis tools that could be used by all other TPGs of the ESPON Programme, and at a later stage also by end-users. Therefore the project plays a very important role in the collection, unification, further development and elaboration of the results of all other TPGs, by incorporating these and using them to create easy to handle applications and tools for the scientific and policy communities.

Specific results from these tools have been provided in each of the ESPON 3.1 TPG interim reports (FIR, SIR and TIR). These were discussed during the ESPON seminars in order to gain feedback from the other scientists and policy-makers present. The completed work is of significant interest for further developments of common tools in the ESPON programme. Three main tools have been developed during the project's lifetime: the "ESPON Map Kit", the "ESPON Web based GIS" and the "ESPON Hyperatlas".

ESPON is not a single institution. Rather it consists of a network of research projects, each of which comprises a team of partners from different European countries. It was realised from the very beginning that ESPON needed some common base and means to steer the various TPGs so as to achieve coherence and identity in the ESPON results.

As ESPON is above all about spatial patterns and trends, it was clear that most of the results would be represented on maps, and therefore a common ESPON map layout, for use by all the separate TPGs, was essential. Project 3.1 designed a first draft map layout, which was discussed at the Mondorf ESPON Seminar. On the basis of the agreed map design, the ESPON map kit in the form of an ArcView3.2 project was developed. It gives coverage of all regional levels for the ESPON countries.

**Figure 4** Screenshot of ArcView version of the ESPON map design

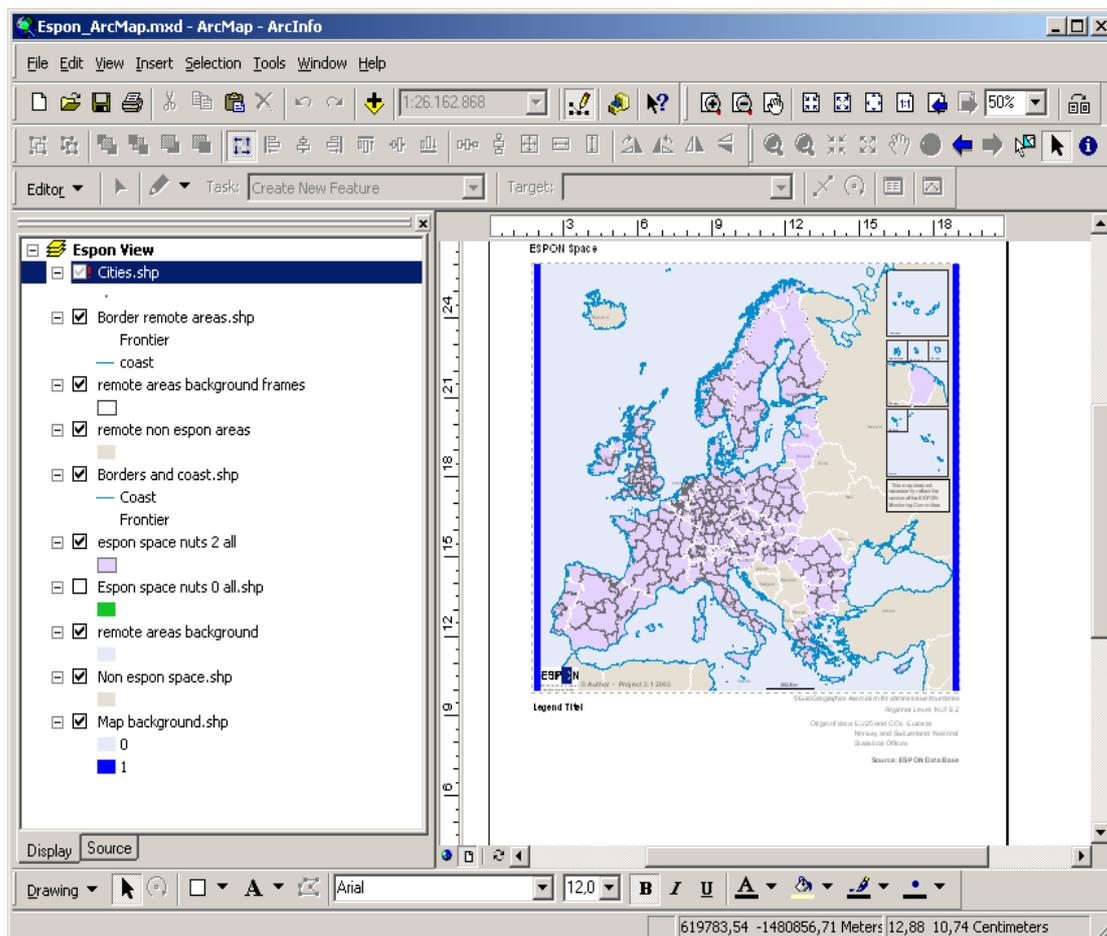


The cartographic elements and data provided (shape files) enable the construction of a map covering the EU 25+2+2 territory on different regional levels (NUTS 0, NUTS 1, NUTS 2, NUTS 3 and NUTS 2-3). For a complete cartographic presentation adjacent parts of the surrounding countries were added (the “non ESPON space”), including the map background, borders and coasts. The Remote Areas and islands are included as insets.

Thus, the ESPON TPGs obtained a unique tool to produce regionally based thematic maps. Intensive technical help and support by project 3.1 was given to assist the diffusion of the idea of a common map design among the projects. The standard ESPON map began to be used in the cartographic representations in the Second Interim Reports of the first round TPGs, and increased use followed thereafter.

In addition to the geographical data of the ESPON regions (NUTS 1 to NUTS 3) each TPG obtains a data set with vector data for the municipalities of the ESPON countries. This allows all regional and sub-regional territorial levels to be mapped and used for analytical purposes.

**Figure 5 Screenshot of ArcMap layout view of the ESPON map design**



Technical progress continues to be made on GIS, and so the ESPON GIS has not come to an end. The ESPON map kit has been designed and distributed on the base of ESRI ArcView 3.2. To enable all TPG's who might be interested in a transfer to the newer ESRI ArcMap, the project 3.1 will provide each interested TPG with the appropriate means for successful transition.

It is important to stress that this is not a change in the overall ESPON map world. Rather it is an alternative independent GIS approach. The advantage of the use of ArcGis is that it enables easier integration of the ESPON design elements into the layout, including scale and other cartographic standards.

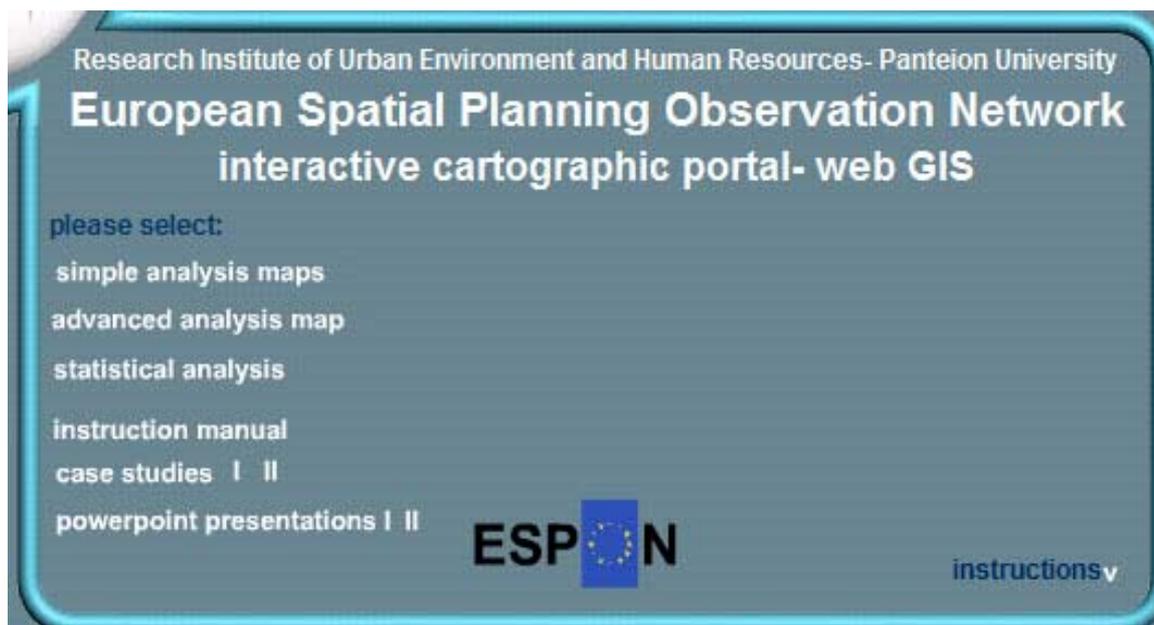
The ESPON mapping kit provided by 3.1 has been revised according to the TPGs' suggestions for corrections and improvements. Considerable progress has been achieved. Use of the ESPON map kit by several TPGs provided examples for other TPGs. The easy and ready to include ArcMap version in particular has helped some TPGs to overcome cartographic challenges and even anxieties about entering the cartographic world.

### 2.2.3 Web-based GIS

The "ESPON Web based GIS" or "ESPON Web GIS" is a tool that has been developed, as the title implies, for use via the internet. It is simultaneously a geographical database, a tool for spatial analysis and for harmonised cartographic presentations and dissemination of results. Maps (enhanced with spatial analysis tools), tabular data, metadata and monovariate statistical analysis are at the disposal of the user to explore the contents of the ESPON Data Base. The web based GIS uses the results (statistical data, spatial indicators) which are included in the ESPON Data Base. The data is organised following the "ESPON Programme Guidelines for the ESPON Data Navigator" in categories and subcategories.

The web site contains three main parts:

- Simple Analysis Maps
- Advanced Analysis Maps
- Statistical Analysis



Source: (<http://www.uehr.panteion.gr/espon/>)

#### - **SIMPLE ANALYSIS MAPS**

These include predefined maps, each giving to the users the following capabilities: Query and Spatial Selection, Buffer, Toggle and Zooming tools.

## **- ADVANCED ANALYSIS MAP**

To begin to work properly with the Advanced Analysis Map, a java plug-in is needed. This can be downloaded from the internet.

This part of the WEB GIS offers users the possibility to create active maps, corresponding to a Data Navigator category/subcategory, from the Geodatabase that has been developed; to alter the geographical layer properties - changing the symbols and the labels for the selected attribute; to classify a layer-data table, and to utilise Advanced Query. There are built-in Statistics.

The user has the opportunity to Add Layers (which allows him/her to select and add data from the ESPON geodatabase). Users need to open the "ArcSDE – Add ArcSDE Connection" in the Catalogue window and complete the fields that are required.

In the Geodatabase Connection section the user can, by activating the selected layer, view an analytical description of the capacities that the Layer Properties part provides.

The query builder tool (Advanced Query) allows the searching of records (e.g. polygons, points) of a selected layer, based on their attribute values. The user can search by numeric or string value. The user also can calculate statistics for a layer's numeric fields. Moreover, at the end of the Map site the user has a view of the metadata with some information about all the data contained in the database.

## **- STATISTICAL ANALYSIS**

This part of the application allows the user to search the database for statistical\indicator data. The results depend on the parameters that the user defines. After making a data compilation, the user can see the selected data as a chart, the corresponding metadata and some basic statistical information (Min, Max, Average, Coefficient Variation and Standard Deviation).

## **Web based GIS technical outline**

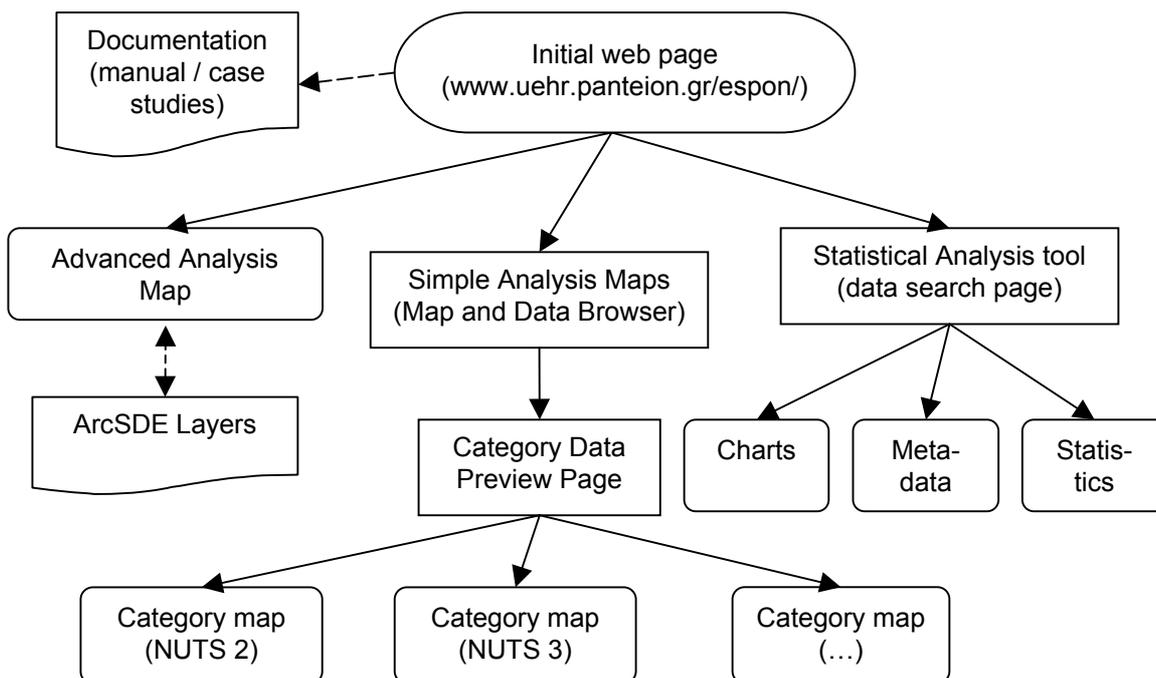
Due to the advanced demands of GIS capabilities and the range of needs within the ESPON programme, the WebGIS tool has combined many different platforms, elements and techniques into a common web interface.

## Web GIS Security

Since the data of the ESPON project are not intended for public access, security measures are necessary in order to restrict access only to the ESPON partners. Unfortunately, the variety of components used in order to offer maximum GIS and analysis capabilities does not allow the building of a single security platform, where the end-user could logon once in order to use all of the available functions. Thus, in order to secure all the data-providing areas of the site, each component has been locked separately. So:

All the pages produced from ArcIMS Advanced Analysis, ArcIMS Simple Analysis and Statistical Analysis tools have been unified in a common web interface. Thus all maps, tools and functions are accessible from a single web address ([www.uehr.panteion.gr/espon/](http://www.uehr.panteion.gr/espon/)), in other words a single web site. The structure of this site is show in the figure below:

**Figure 6 The Web based GIS final structure.**



## 2.3 Hyperatlas and spatial analysis tools

### 2.3.1 Hyperatlas

The ESPON Hyperatlas is a specific web application developed for ESPON 3.1 by a French research network called Hypercarte. It resulted from the "Hypercarte" project, which is financed by French public funds (CNRS, INRIA). The Hyperatlas covers a particular research question of Hypercarte.

The **Hyperatlas** proposes a package of modules for interactive cartography. The development focuses on a methodology that is easily understood and which allows the analysis and visualisation of a spatial phenomenon taking into account its multiple possible representations. Statistical observations of the territory are complex, and any one representation, directly linked to a specific objective, is the result of a combination of different choices relative to the territories and geographical scales, and the statistical indicators.

The Hyperatlas consists of:

- the development of fundamental cartographical modules
- the application of these modules to different geographical databases.

The **Multiscalar Territorial Analysis** (MTA) is the first package of very specific spatial analysis tools and gives the opportunity to derive several indicators on the basis of the ratio of two initial geographical indices according to different spatial contexts. The *Multiscalar Territorial Analysis* is based on the assumption that it is not possible to evaluate the situation of a given territorial unit without taking into account its relative situation and localisation. Regions belong to territorial and spatial systems. Indeed, from a policy point of view and in a social science perspective, contrasts and gradients are of much more interest than absolute values. Furthermore, aggregating and disaggregating territorial units make it possible to see how local values add up to form territorial contexts and regional positions.

The necessary **input data** are:

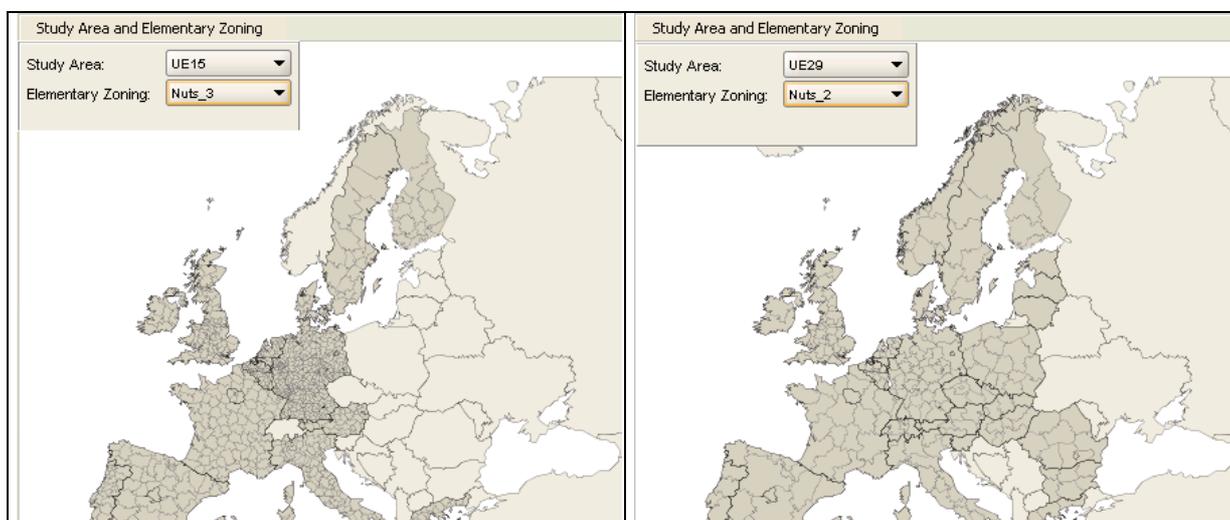
- the geometry associated to the elementary zoning.
- the statistics associated to the elementary units
- the dictionary that gives the composition of the upper territorial units in terms of elementary units
- the definition of some specific areas within the whole observed area.

The **work with the Hyperatlas** is based on interactivity. It works with three sets of parameters, which are linked to one or more maps. At any time, the user can change the different input parameters, and the linked maps are immediately updated. The user is also able to configure each map individually, e.g. the number of equivalence classes, statistical progression (arithmetic or geometric), the palette of colours, etc. This makes it possible to generate a very accurate collection of maps.

Hyperatlas works with only one window, which is composed by: a menu bar, a tool bar, three boxes for the parameters, and a collection of the seven calculated maps.

For the **definition of the Study area and elementary zooming** two parameters have to be selected in the two respective pop-up lists: The different propositions are internal and come from the *a priori* implementation. "Study Area" indicates the spatial extension that will be mapped. "Elementary zoning" indicates the set of elementary units that will be studied. The associated map (see the thumb index: "Study area and elementary zoning") allows the user to follow his/her choices: the selected area is mapped when the chosen elementary zoning is drawn.

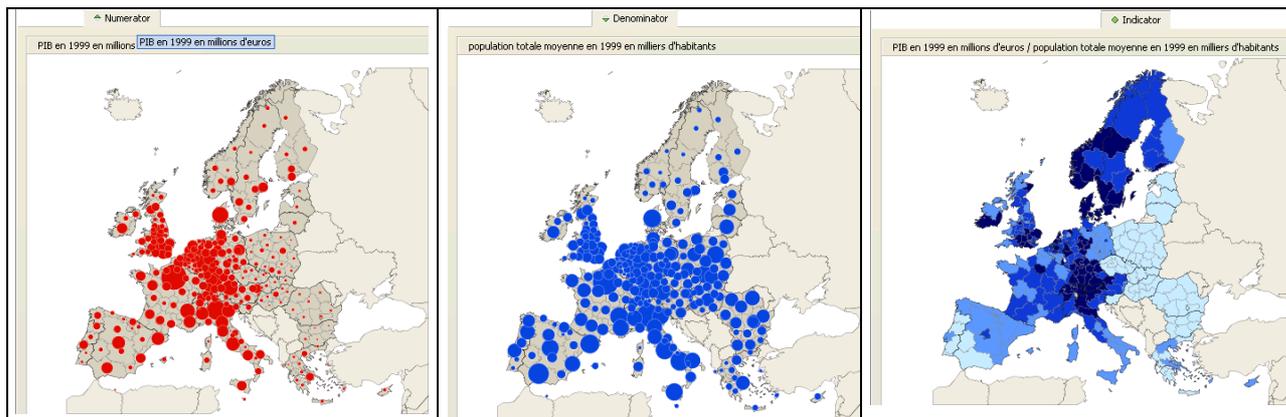
**Figure 7** Different combination between "Study area" and "Elementary zoning"



Hyperatlas only works with size variables (that is only variables that may be aggregated to an upper level by summing them). It proposes a multiscale cartography of the ratio of two size variables.

Three maps are linked respectively to these three choices. There are two representations with proportional circles for the size variables, and one representation with graduated colours for the ratio.

**Figure 8 Elementary maps : from size variables to the ratio**



Three different levels of spatial observation can be defined: global, medium and local.

The *global context* may be the whole “study area” chosen. In this case the associated map will be the same as the map associated to the ratio itself. The user may choose another global context or a reference value. For instance, in the example of the EU, even if the study area is the 29 potential countries, it may be of interest to observe the spatial differentiations according to another global reference, for instance the global value associated to EU15. For this level, the user may also exogenously enter a value. At first this value is initialised with the global area’s value.

The *medium context*, on the other hand, has to be a geographical zoning that is an aggregation of the “*elementary zoning*” previously chosen.

The *local context* indicates which proximity relation will be the basis of the neighbourhood’s definition for each elementary unit. That is usually “contiguity”, but it may be also a relation based on distances since they have been introduced in the HYP file (units that are at distance less than X km), or time-distances. Then, each elementary unit’s value will be compared to its neighbourhood’s value.

### **2.3.2 Spatial Analysis Tools**

One of the general objectives of TPG ESPON 3.1 has been the elaboration of new innovative cartographic and spatial analysis tools.

A *general methodology for the elaboration of spatial analysis tools* of common interest has therefore been developed that can assist further development of common tools in the ESPON program. This general methodology has been fully applied in the case of a specific group of tools

called *Multiscalar Territorial Analysis* for which special computer software has been produced called ESPON Hyperatlas (cf. previous section). For a second group of tools called *Homogeneity and Discontinuity analysis*, the methodology has been fully validated from scientific and policy points of view, though it was not possible to complete the last step which would be the design of specific software. A third group of methodological problems has been revealed by previous analysis. This concerns the biases introduced by territorial divisions of NUTS 2 and NUTS 3 levels. This *Modifiable Area Unit Problem* was discussed at the ESPON meeting of Matera in the workshop on polycentrism, and it was suggested that there should be a more detailed exploration of the feasibility of a NUTS 2-3 division in the future of the ESPON Program. Therefore, we present preliminary findings on this question in order to provide guidelines for further research on the topic. Finally, we have explored innovative spatial analysis tools of borderless representation of spatial phenomena based on *Multiscalar Smoothing Methods* which are actually in the early stage of scientific and political validation in the framework of the ESPON programme. These methods could provide interesting solutions for the measurement and representation of polycentrism and for the elaboration of long time-series maps when territorial divisions are changing.

***General objective : bridging the gap between scientists and policymakers***

The aim of the research on spatial analysis tools developed by ESPON 3.1 is to define coherent “packages” of indices and maps which could be easily computed and applied to a wide range of variables from the ESPON database. Those packages are not selected on a purely scientific basis (the most sophisticated and recent index of heterogeneity is derived from entropy), or purely on criteria of political acceptability or spatial planning tradition (like the Gini coefficient or the coefficient of variation, which are very poor measures of disparity). They are rather an attempt to transform into objective measures the rather fuzzy concepts in the ESDP. In the ESPON 3.1 final report (part C), we examine in more detail the contribution of spatial analysis tools to the clarification of four major problems of European policymakers working on spatial planning and regional development.

**Table 2 Political concepts and spatial analysis tools**

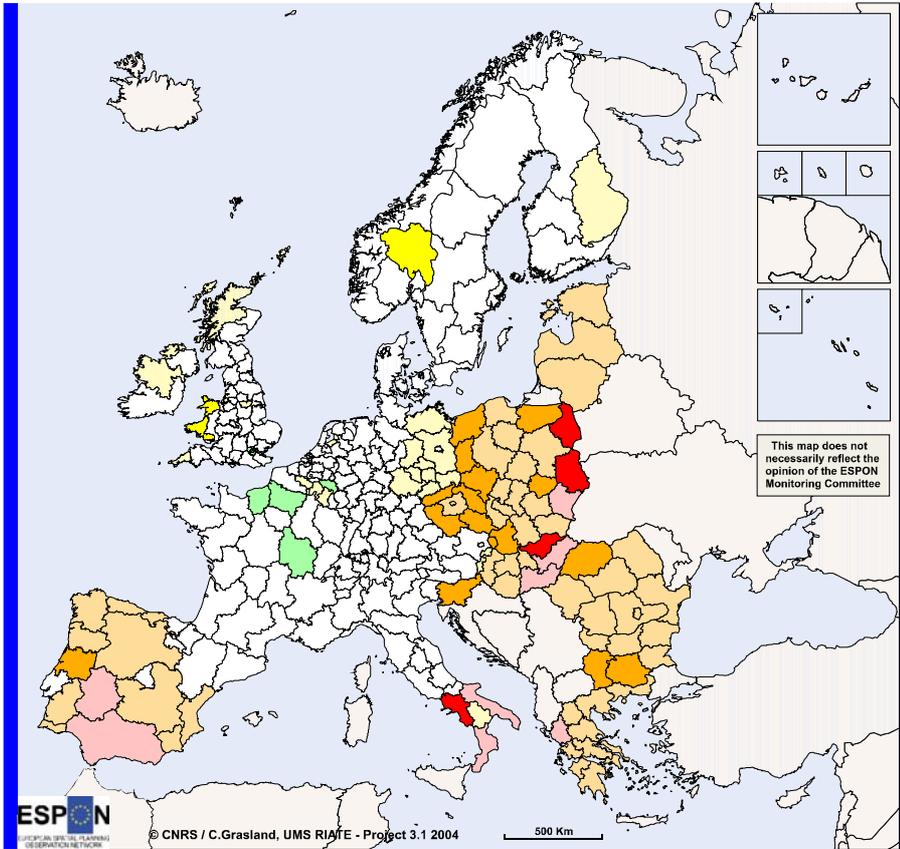
POLITICAL CONCEPT	SPATIAL ANALYSIS TOOL
<b>Subsidiarity &amp; Legitimacy of Regional Policy:</b> According to this principle of subsidiarity <sup>4</sup> , the regional policy of EU should not duplicate the actions of member states and should avoid contradictions between levels of intervention.	<b>Multiscalar Territorial Analysis (MTA):</b> To compute the relative deviation of a region at European, national or local level helps to measure the potential contradiction between levels of action.
<b>Territorial Cohesion &amp; Integration of Sectoral Policies:</b> The originality of this new concept lies in taking into account the spatial dimension of the EU's sectoral policies.	<b>Homogeneity and Discontinuity Analysis (HAD):</b> Those tools are centrally concerned with the analysis and the measurement of spatial heterogeneity, which is not the case with classical econometric indices.
<b>Gerrymandering and manipulation of territorial divisions :</b> The allocation of structural funds is related to official NUTS divisions which can be manipulated by states in order to "maximise their benefit".	<b>Modifiable Area Unit Problem (MAUP):</b> The effect of changing territorial divisions on statistical and cartographic results is well known. But the best division from a scientific point of view can be politically unwelcome (NUTS 2-3).
<b>Polycentrism &amp; Accessibility:</b> The connection of a territory to the rest of Europe or to the rest of the world should be organised around selected nodes or networks which can be defined at different scales.	<b>Multiscalar Smoothing Methods (MSM):</b> It is possible to derive multivariate maps of potential economic and demographic flows induced by the unequal distribution of population and wealth.

Each of the four family of tools are illustrated by a map briefly commented.

The map below proposes a synthesis of the situation of European most lagging regions according to the situation of GDP/inh. 1999 (in euros) at three levels of analysis. A region is considered as lagging, if its level of GDP/inh. is lower than 25% to the mean level of (a) European situation, (b) National situation, (c) Local situation (neighbouring regions). Only 4 regions appears to be "lagging for all criteria". Such a typology provides an interesting tool for the analysis of contradiction and complementarity between various levels (European Structural Funds, National planning policy, Local cooperation).

<sup>4</sup> "In areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community".

**Map 1 Selected result from Multiscalar Territorial Analysis**



This map does not necessarily reflect the opinion of the ESPON Monitoring Committee

**Under 75%**

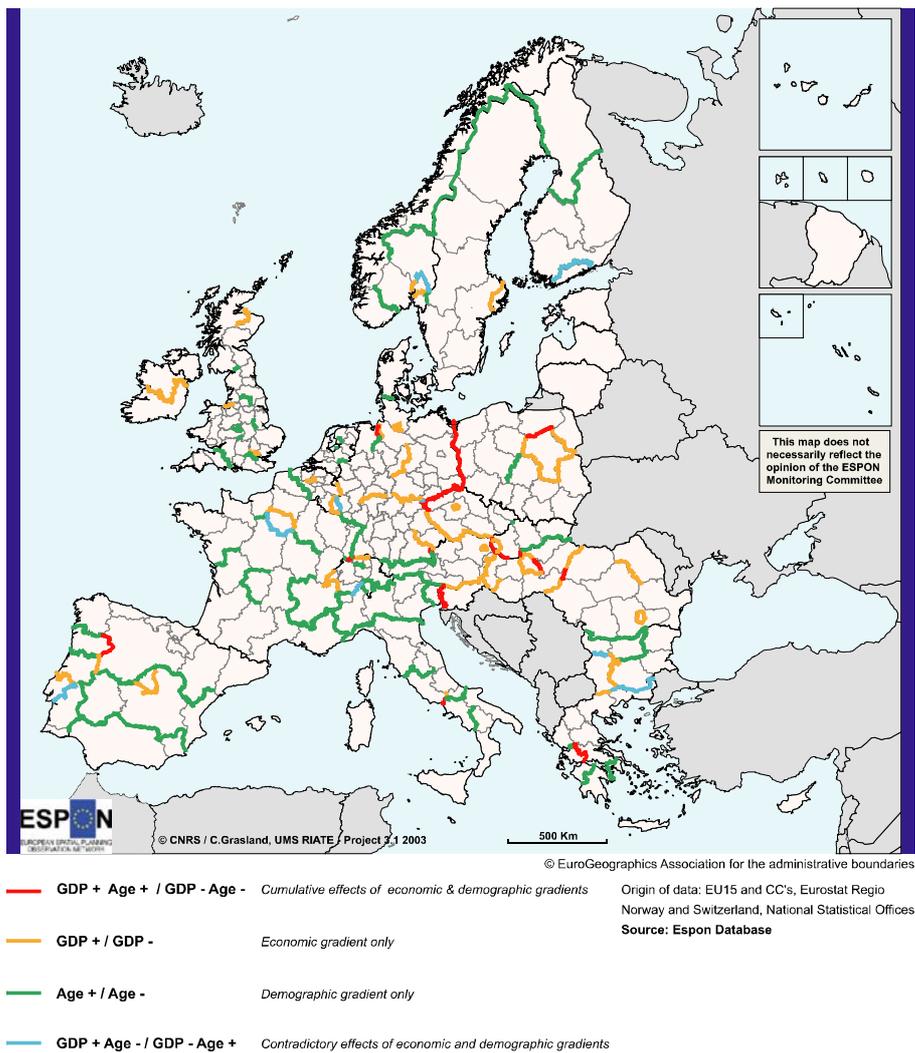
	European deviation	national deviation	local deviation
Green			X
Light Green		X	
Yellow		X	X
Light Orange	X		
Orange	X		X
Pink	X	X	
Red	X	X	X

© EuroGeographics Association for the administrative boundaries

Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espon Database

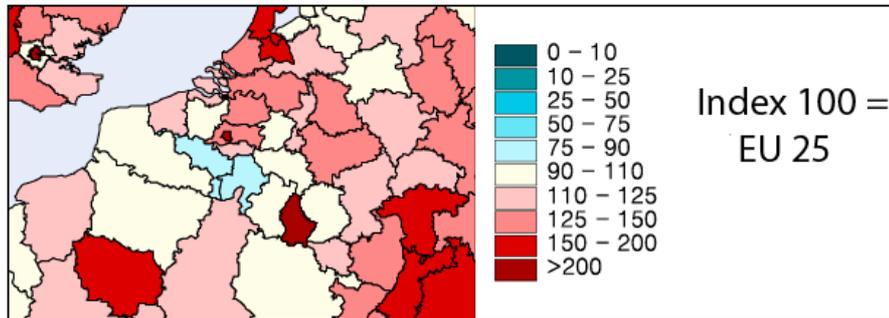
**Map 2 Selected result from Homogeneity and Discontinuity Analysis**



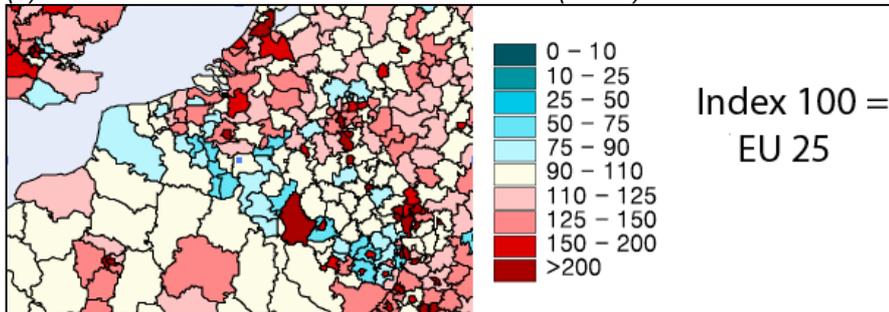
The map above illustrates how to combine several criteria for the analysis of cross-border situation. This example shows an approach to evaluate potential migrations induced by the joint of effect of economic differences (gradient of GDP/inh.) and demographic differences (gradient of median age of population). Sometimes, the factors can produce cumulative effects (a region with young population and low level of GDP/inh. is neighbour of a region with old population and high level of GDP/inh.) but sometimes they are contradictory or only one factor is active. This method should be generalised with more criteria, including accessibility factors (common language, permeability of borders, ...) and institutional rules (cooperation agreements).

### Map 3 Selected result from Modifiable Area Unit Problem

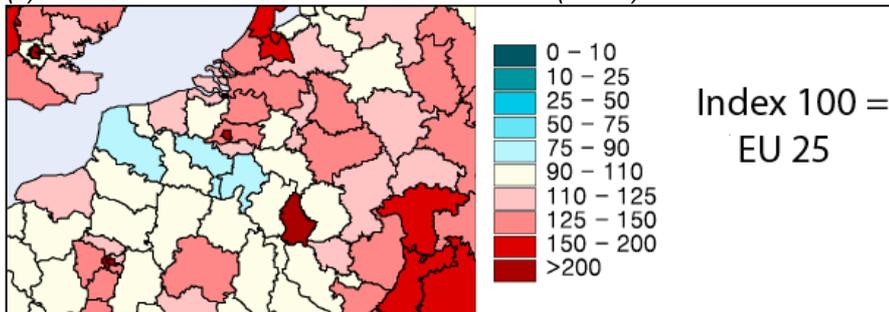
(a) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 2



(b) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 3

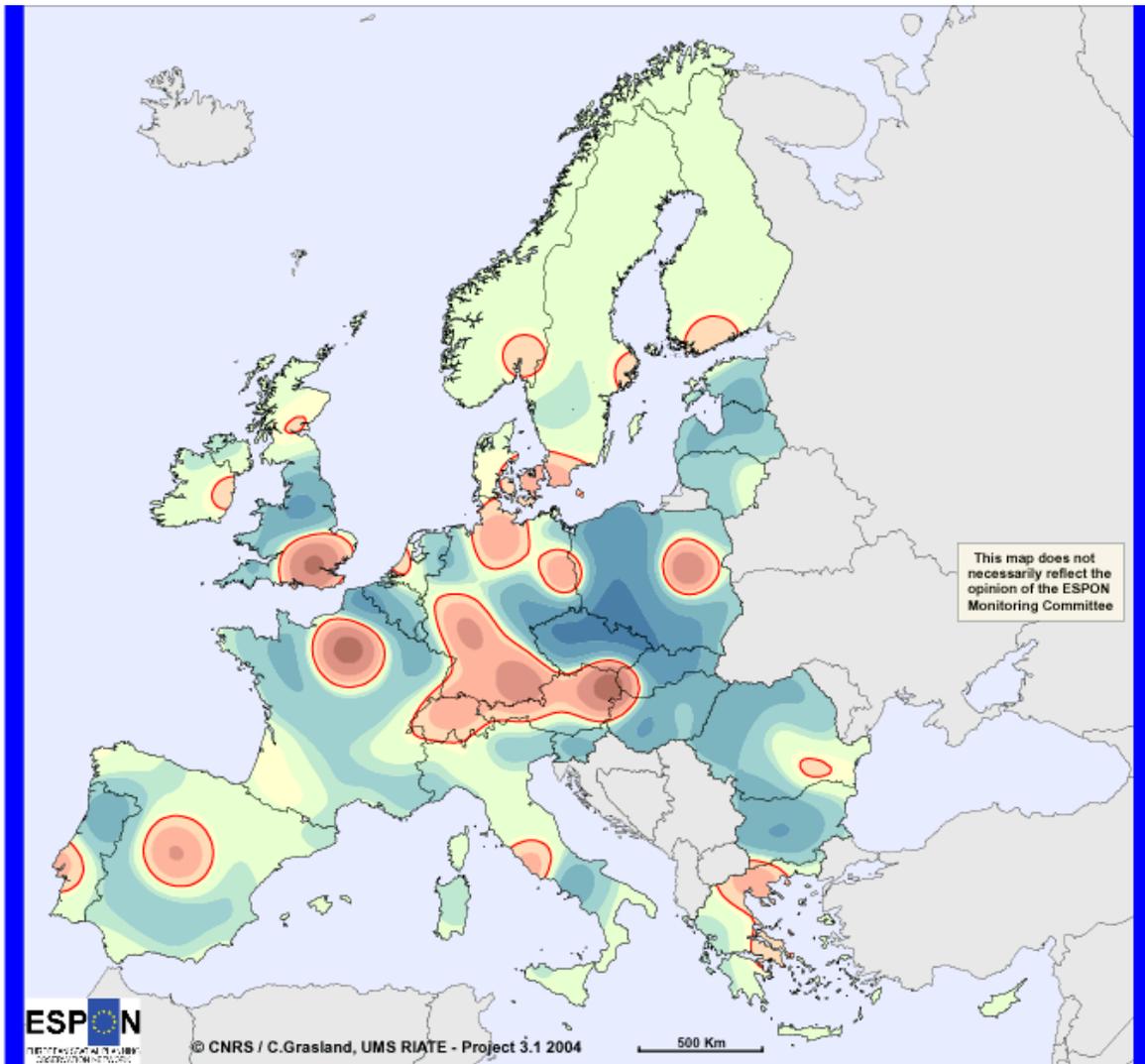


(c) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 2-3



The maps above illustrate how the choice of territorial division can heavily influence the political decision on crucial topics like allocation of structural funds or the simple description of spatial structures. The regions located under a given threshold (ex. Index 75 of GDP/inh. 1999 in euros) are clearly not the same according to NUTS 2 or NUTS 3 levels, simply because added value is concentrated in urban areas where private companies and public administration declare their activity. From a scientific point of view, it is obvious that the territorial divisions should be as homogeneous as possible in terms of mixture of urban and rural areas, which suppose a compromise between NUTS 2 and NUTS 3. The question is, if this is "politically correct"?

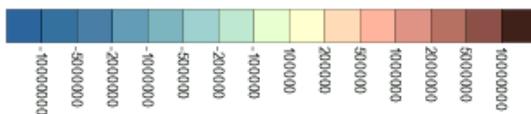
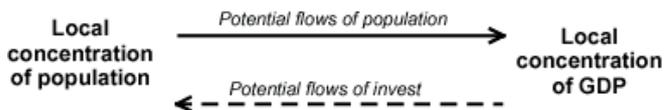
**Map 4 Selected result from Multiscalar Smoothing Methods**



© EuroGeographics Association for the administrative boundaries

Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espon Database



A new family of tools based on Gaussian smoothing methods could probably help to solve some of the difficulties which are related to the choice of NUTS division. This method introduces accessibility as a crucial parameter in the analysis of spatial distribution and propose to evaluate the potential flows which can be induced by unequal repartition of attributes in a given territory. The maps above presented shows the approach to evaluate the local flows

(100-200 km) of labour force or invests which can be potentially induced by the unequal distribution of GDP/inh. in Europe. Alternative maps can be produced under more or less flexible assumptions on the effect of distance.

## **2.4 Cross-sectoral analysis of Europe**

The major aim of the ESPON programme is to provide an overview of the spatial situation in Europe, including the identification of trends and constraints, and to give evidence-based guidance to policy-makers. Such an ambitious aim is hard to achieve with a broad range of separate thematic projects, each working with a strong focus on its own field of research. Therefore there is a need for instruments or procedures to put the different parts of the thematic puzzle together in order to illustrate the total European spatial picture and to carry out a cross-sectoral analysis.

### **2.4.1 The methodological approach of a Regional Classification of Europe (RCE)**

The task of the Regional Classification of Europe (RCE) was to bring together sectoral strengths and weaknesses in a wider perspective and to evaluate the cross-sectoral situation of the EU 27+2 regions. The RCE enables researchers to identify which parts of Europe show high accumulations of strengths or weaknesses, and which parts show a more average level, with some sectoral strengths, but also some sectoral weaknesses.

To meet this need ESPON 3.1 initiated a first attempt at a procedure that should lead eventually to an overall analysis of European spatial development. The starting point for the so-called Regional Classification of Europe is the recognition that the typologies and indicators developed by the TPGs define strong and weak regions with reference to their sectoral aspects. One major reference point for this analysis is the territorial structure, with particular focus on the ESPON core typologies for polycentrism (FAU classification), urban-rural relations and accessibility.

The cross-thematic SWOT analysis and the Regional Classification of Europe (RCE) were designed to bring out the findings for a cross-sectoral analysis and divisions for territories. Obviously the quality of such an analytical approach depends largely on the quality of the TPGs' input.

The original approach was focused on a SWOT analysis that summarised the descriptive results of all TPGs, and that served as a pathfinder for the

Regional Classification of Europe. ESPON 3.1 has undertaken many attempts to motivate the TPGs to actively participate in this two-step SWOT-RCE procedure by identifying the main strengths and weaknesses of regions based on qualitative experts' judgements as well as on indicators and thresholds for values indicating problems. However, this attempt has not been successful.

Thus a new approach was introduced by ESPON 3.1 to enable the completion the Regional Classification of Europe as a cross-sectoral analysis. This second approach aims at identifying indicators and applying simple quantitative methods, with the selection of indicators being done by ESPON 3.1 itself. The selection of indicators is based on the analysis of the available sources: core indicator list, core typologies, ESPON data base, ESPON map collection and interim reports. The outcomes of the attempted SWOT analyses were taken into account to identify indicators with a high thematic relevance, since the SWOT was an important source of sectoral information.

Following intensive internal discussion and taking into account data availability ESPON 3.1 chose (for analytical reasons) seven thematic fields of spatial development to be the core of further RCE analysis: economy, labour market, demography, environment, hazards, accessibility and spatial structure.

This formed a solid base for the ESPON ranking of European NUTS 2 regions with the intention to draw a broad picture of the spatial situation and development in the EU 27+2. The aim was to back each of the seven fields with a broad spectrum of indicators characterising the status quo as well as the future perspective.

There is a strong relationship between RCE and the ESDP core concepts. Two core concepts of the ESDP – accessibility and spatial structure (FUAs and polycentrism) – form a substantial component of the RCE. Sustainability, the third core concept, plays an important role in the process of aggregation and weighting the indicators.

The data for the final analysis had to fulfil several requirements. First of all, it should have been available without gaps for the EU 27+2 on a level as up-to-date as possible (at least for the year 2000). Ideally the data should have been available for all regions for the same period and at the same point in time.

The ESPON database became the starting point for the analysis. In addition, the ESPON 3.1 project made extensive and time-consuming efforts to close the gaps and to generate a substantial area-wide data base for the EU 27+2. Some of the missing data have been obtained from Eurostat's Regio database and enquiries at several national statistical offices.

Depending on the particular indicators and based on plausibility considerations the following procedures were made use of:

- filling gaps by setting national mean, minimum or maximum
- approximation through NUTS 1 data or neighbouring regions data
- re-coding national data based on the allocation of related variables
- trend extrapolation of data available for previous time periods

One major outcome of this work is a unique database covering the whole EU 27+2 area. In itself this is already a very valuable output of the RCE-process.

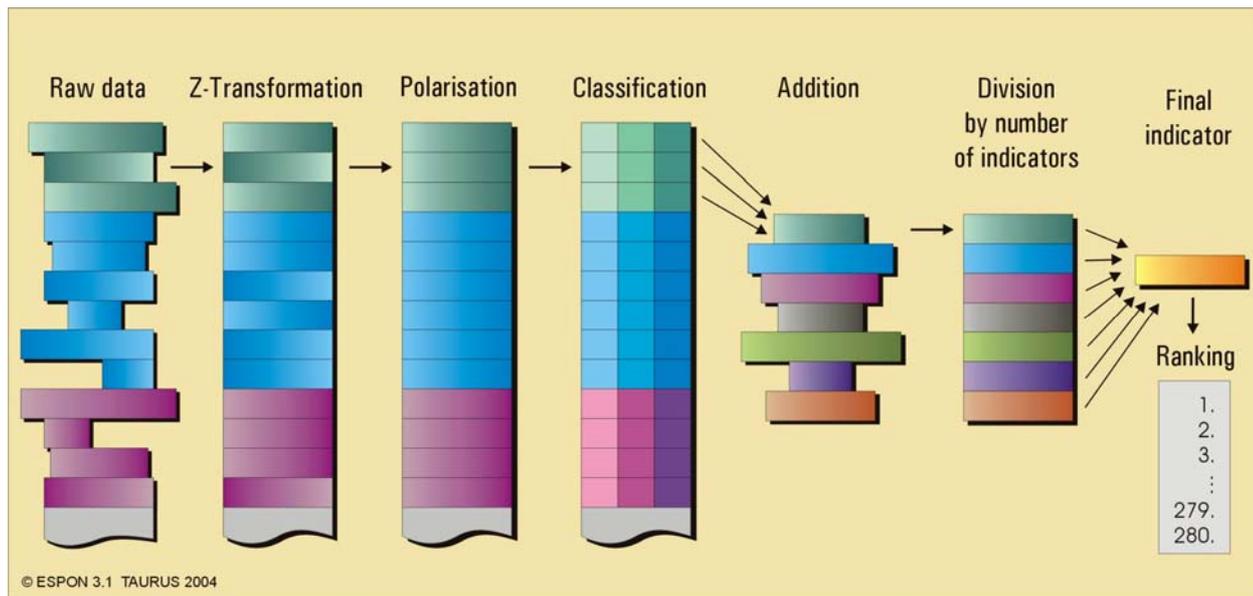
The following table 3 shows the set of indicators used for the RCE.

Seven thematic indices were constructed by aggregating the individual indicators. This was done by using their mean standardised values which were given the right "polarity" (indicating "favourable" and "unfavourable" situations) and classified into three classes (with equal weightings). From these seven indices even an overall index was derived – again by aggregation with equal weights – which forms the basis for an overall ranking of regions. Of course, one should be aware that with each step of aggregation the original information based on 38 different single indicators becomes more and more condensed ending with a one-dimensional ranking of regions which might well be disputed. Figure 9 (below) shows the steps that lead from the raw data to the seven thematic maps and finally to the RCE ranking.

**Table 3 Set of indicators used for RCE**

Theme and indicators	Description	Polarity
<b>Economy</b>		
GDP per capita	In PPS	+
Expenditure on R&D	Share of GDP	+
R&D Business Enterprise Sector	BES R&D personnel per 1.000 active person	+
GDP per capita growth	In Euro	+
Firms with own website	Proportion of all firms	+
Employment in tertiary sector	Share of total employment	+
Employment in primary sector	Share of total employment	-
<b>Labour market</b>		
Unemployment	Unemployment rate 2001	-
Development of unemployment	Change 1998-2001 in percent	-
Youth unemployment	Unemployed < 25 years per 1.000 inh. 15-<25 years	-
Labour force replacement ratio	Population ages 10-19 / population ages 55-64	+
R&D personnel	Total R&D personnel per 1.000 active person	+
High educated population	Highly educated population / total educated pop.	+
Employment density	Number of persons employed per km <sup>2</sup>	+
Internet users	Share of all inhabitants	+
<b>Demography</b>		
Population density	Number of persons per km <sup>2</sup>	+
Ageing	Share of population in the ages over 65 in percent	-
Reproduction potential	20-29 years in 2020 per 20-29 years in 2000	+
Population growth	Change 1995-2000 in %	+
<b>Environment</b>		
Artificial surface	Share of total area (Corine)	-
Natural surface	Share of total area (Corine)	+
Agriculture intensity	Output/input ratio	-
<b>Hazards</b>		
Flood events	Regional average number of flood events	-
Winter storms	Probability of having winter storms	-
Risk of radioactive contamination	Distance from nuclear power plants	-
Earthquake hazard potential	Mean value of grid points inside NUTS 2 boundaries	-
Volcanoes	Number of all volcanoes in NUTS 2 area	-
Oil hazards	Average of 3 indicators (harbours, pipeline, refineries)	-
<b>Accessibility</b>		
Potential accessibility	By road	+
Potential accessibility	By rail	+
Potential accessibility	By air	+
Potential accessibility	Multimodal	+
<b>Spatial structure</b>		
Settlement structure	Count of types with population=0	-
Concentration of population	Change of region 's share of EU 27+2 pop. in percent	+
Concentration of GDP	Change of region 's share of EU 27+2 GDP in percent	+
Time to market meso-scale	Accessibility by rail and road, weighted by pop.	-
Time to market macro-scale	Accessibility by rail and road, weighted by pop.	-
Functional Urban Areas	Share of population living in FUA	+

**Figure 9 From raw data to ESPON ranking**

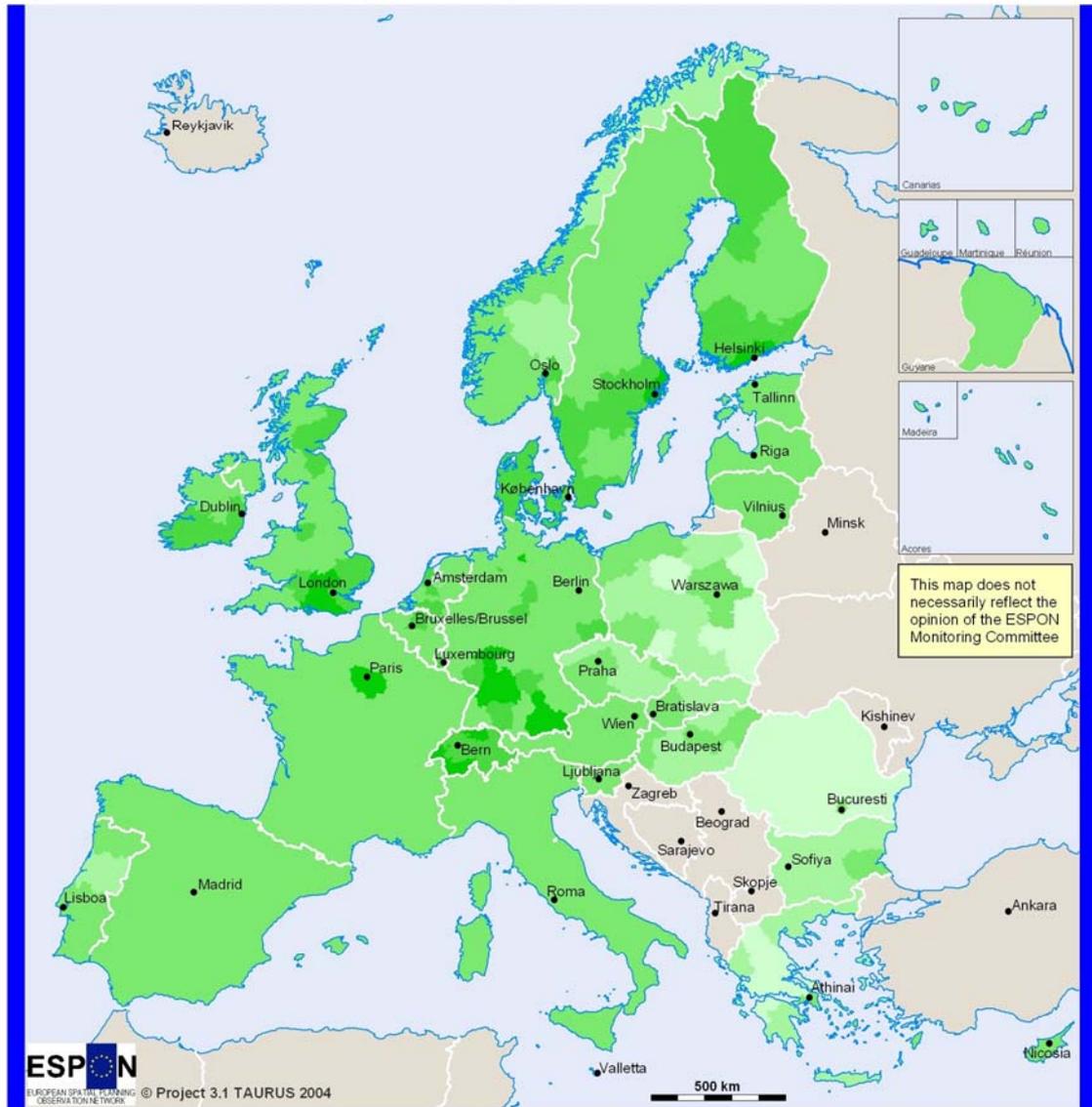


The following maps give two examples for the results in the seven thematic fields of the RCE (economy, labour market, demography, environment, hazards, accessibility and spatial structure).

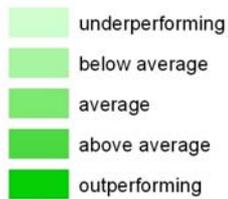
For the economic situation a set of seven indicators (GDP per capita, expenditure on R&D, R&D Business Enterprise Sector, GDP per capita growth, firms with their own website, employment in the tertiary sector, and employment in the primary sector) has been used. Map 5 identifies out-performers, regions that - related to these seven indicators - can be seen as economically successful, strong, and R&D and service based as well as their counterparts of weaker regions.

## Map 5 Regional Classification of Europe – economy

### Regional classification of Europe - economy



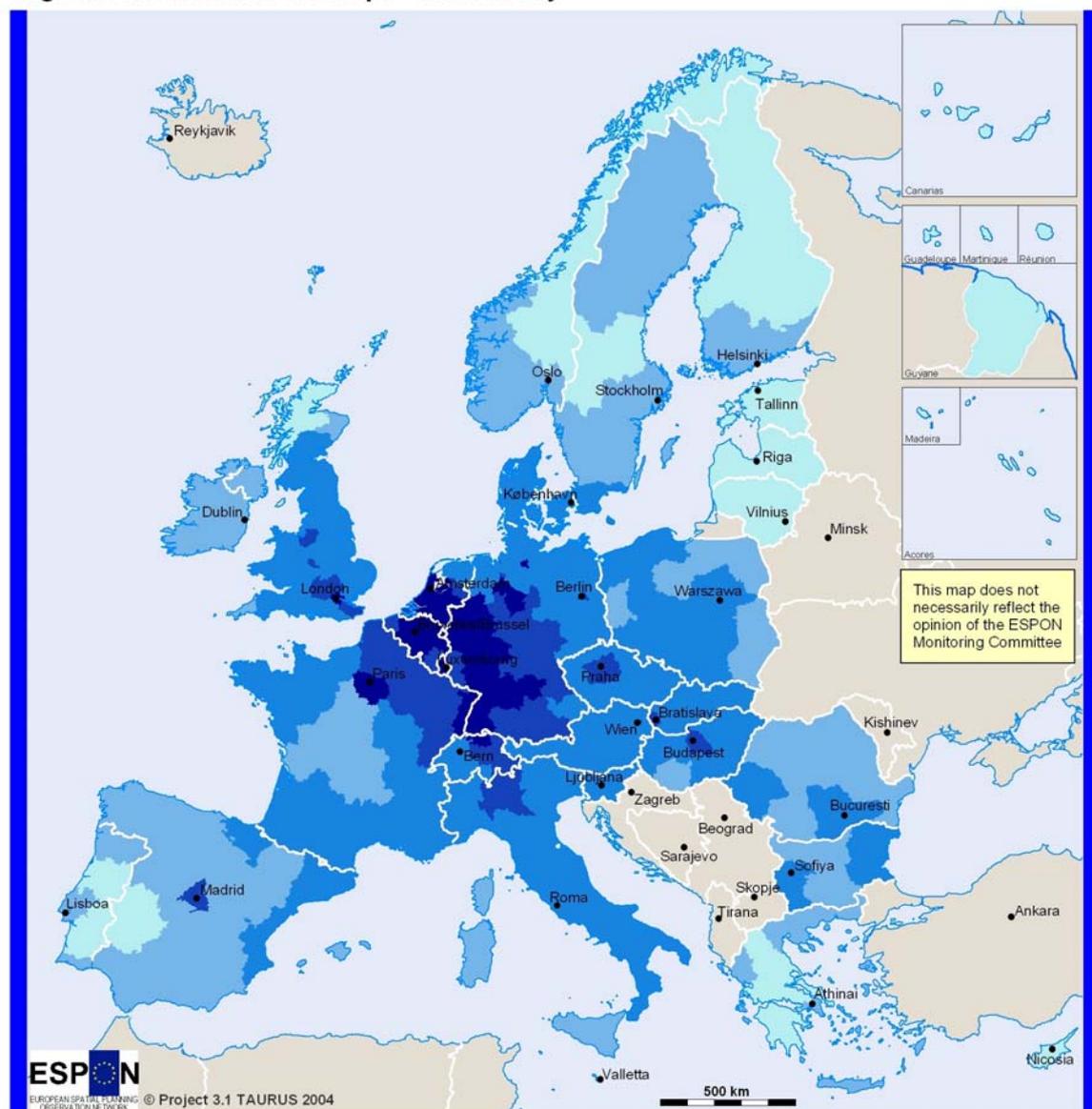
#### Performance on economic indicators



© EuroGeographics Association for administrative boundaries  
 Regional Level: NUTS 2  
 Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
**Source: ESPON Data Base**

## Map 6 Regional Classification of Europe – accessibility

Regional classification of Europe - accessibility



### Performance on accessibility indicators

- underperforming
- below average
- average
- above average
- outperforming

© EuroGeographics Association for administrative boundaries  
Regional Level: NUTS 2  
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
Source: ESPON Data Base

Map 6 is a representation of the regional characteristics of four accessibility indicators (By road, By rail, By air, and Multimodal). Out-performers are very accessible by air, rail and road in comparison with the under-performers.

### **2.4.2 Overall classification and ranking**

After analysing performance on the different thematic fields (Economy, Labour Market, Demography, Environment, Hazards, Accessibility, Spatial Structure), the RCE brings together all the separate thematic results into one overall classification – a combination of all advantages and disadvantages through aggregation of information.

One approach to characterise the specific regional situation according to the seven thematic categories was to identify in how many of these categories a region is situated above, about or below the EU25+2+2 average of the 280 NUTS 2. By this, the amount of thematic problems or opportunities can be shown in an integrated, summarizing way, outlining the regional situation.

To do this, the z-transformed scores of the seven thematic categories, were classified for each of the regions as follows:

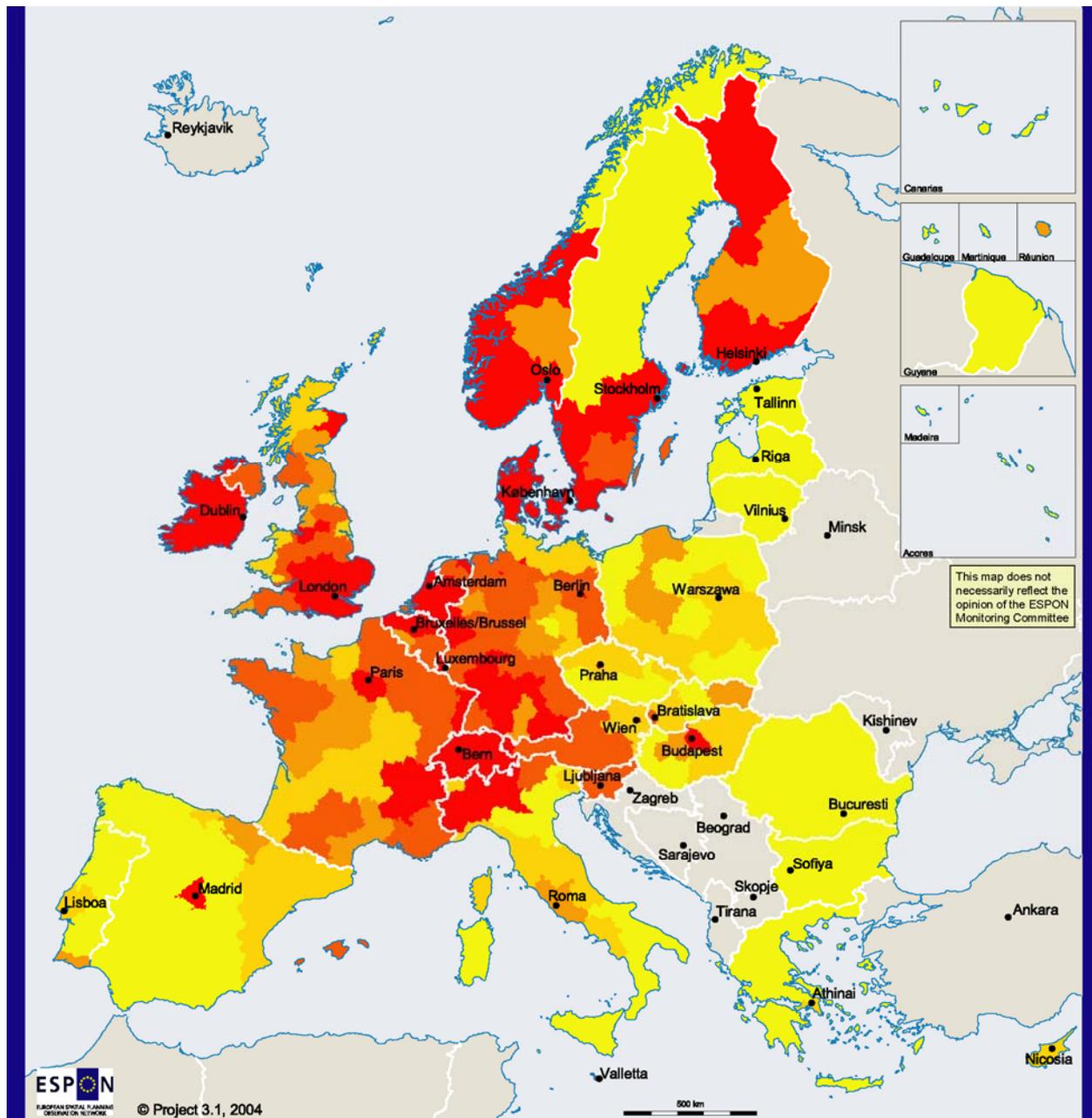
- > ½ standard deviation = above average
- +/- ½ standard deviation = average
- < ½ standard deviation = below average

The sum of categories for which a region is evaluated as above average, around and below average determines the classification of the region into the five classes:

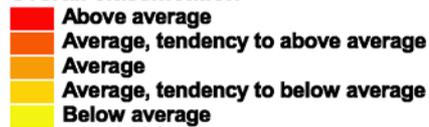
- 1: above average - the region is in the majority of the fields above average
- 2: average with tendency to above average - the region is in the majority of the fields average, in the remaining mostly above average
- 3: average - the region is in the majority of the fields average
- 4: average with tendency to below average - the region is in the majority of the fields average, in the remaining mostly below average
- 5: below average - the region is in the majority of the fields below average

The results of this analysis are shown in the following map 7.

## Map 7 Regional situation



### Overall classification



© EuroGeographics Association for the administrative boundaries

Regional level: NUTS 2

Origin of data: Eurostat, National Statistical Offices, Project 3.1

Source: ESPON Database

The above average regions are easily to identify in their core areas as regions of the Global cities, the European engines and the strong MEGAS of the FUA typology of the project 1.1.1. The average regions with positive tendencies are either presented by the potential MEGA regions or could be interpreted as growth axis between the strong regions connecting the strong centres of highest importance including the main economic centres of the Pentagon as well as the emerging centres in the New Member States like Bratislava or Budapest.

Another approach ESPON 3.1 has developed was a ranking of the 280 European NUTS 2 regions by simply replacing the numeral values of the RCE with ranks between 1 for the best situated region and 280 for the region with the strongest accumulation of problems of all different kinds.

These RCE ranking results show a relatively favourable picture for the prosperous urbanised, but not so densely populated, areas in the centre of Europe, because they perform well on combinations of environment and/or accessibility and/or spatial structure, which represent intrinsic qualities of regions. Similarly, some agglomerations where the welfare measure is quite high come out worse (compared to GDP indicators) when applying a wider focus like the RCE, since they have really serious problems in fields like environment, hazards or demography.

All in all, good and outperforming regions are located mostly in the centre of Europe, except from some peripheral capital regions. Nevertheless, compared with traditional spatial analyses the RCE produces a clear shift in favour of regions with good, but not excellent economic performance, combined with excellent performance on other indicators. Conversely, some agglomerations do not retain their traditional high rankings, because they have serious disadvantages in environmental or demographical aspects or may be threatened by various hazards.

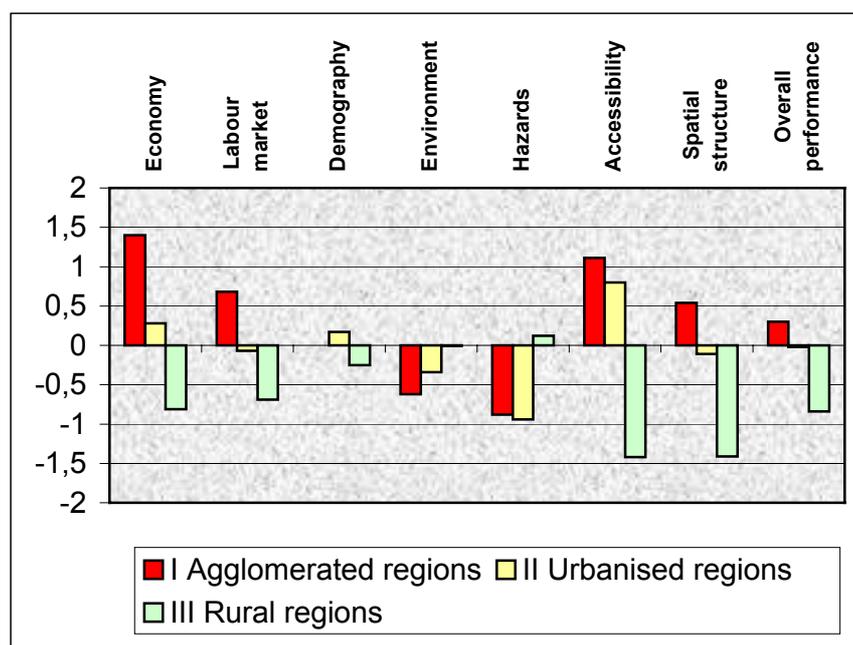
What conclusion can be drawn for regional and spatial policy based on these findings? A regional policy with a strong and narrow focus on economic factors - in analysis as well as instruments - runs the risk to be based on an incomplete identification of problem regions, and thus to apply an inappropriate set of policy measures. A cross-sectoral analysis could help to define problems and potentials in a more multi-dimensional setting which would allow for a more multi-faceted policy approach. The ESPON 3.1 RCE is a first step into this direction which will be further developed in future ESPON projects. The aim is to gain information on which to build the argument for a widely focused spatial development policy, as a complement

to traditional regional policy. Such a new policy should take a strong co-ordinating role and combine the sectoral policies, using the spatial goals, put forward by the ESDP, as a guideline.

### 2.4.3 RCE performance and its relation to settlement structure

A first attempt has been made to shed some light on the question what is characterising the well-performing and bad-performing regions.

**Figure 10 Average Performance of different types of settlement structure**



Source: ESPON Project 3.1

For this purpose the RCE results are brought together with a typology of settlement structures recently developed by the Federal Office for Building and Regional Planning (BBR) for the NUTS 2 regions of EU 27+2. In its simplest form this typology, based on regional population density and the existence of a big regional centre, is differentiating between three types of settlement structures on NUTS 2 level: 72 agglomerated regions, 94 urbanised regions and 110 rural regions.

Figure 10 is summarizing the average performance depending on settlement structure for the overall RCE, as well as for the seven thematic fields. A clear picture is emerging. On all thematic fields except for demography, environment and hazards a stable pattern can be identified. The agglomerations are always showing the best average performance, while the

rural areas are forming the lower end and the urbanised regions are ranging somewhere in the middle between those extrema. Except for accessibility there is always a remarkable clear difference between agglomerated and urbanised regions.

Turning to demography urbanised regions are showing the best performance. Reasons for this may be found in phenomena like suburbanisation, rural-urban migration or migration of young families out of agglomerated regions. But concerning demography all in all, the differences between the three types are rather small.

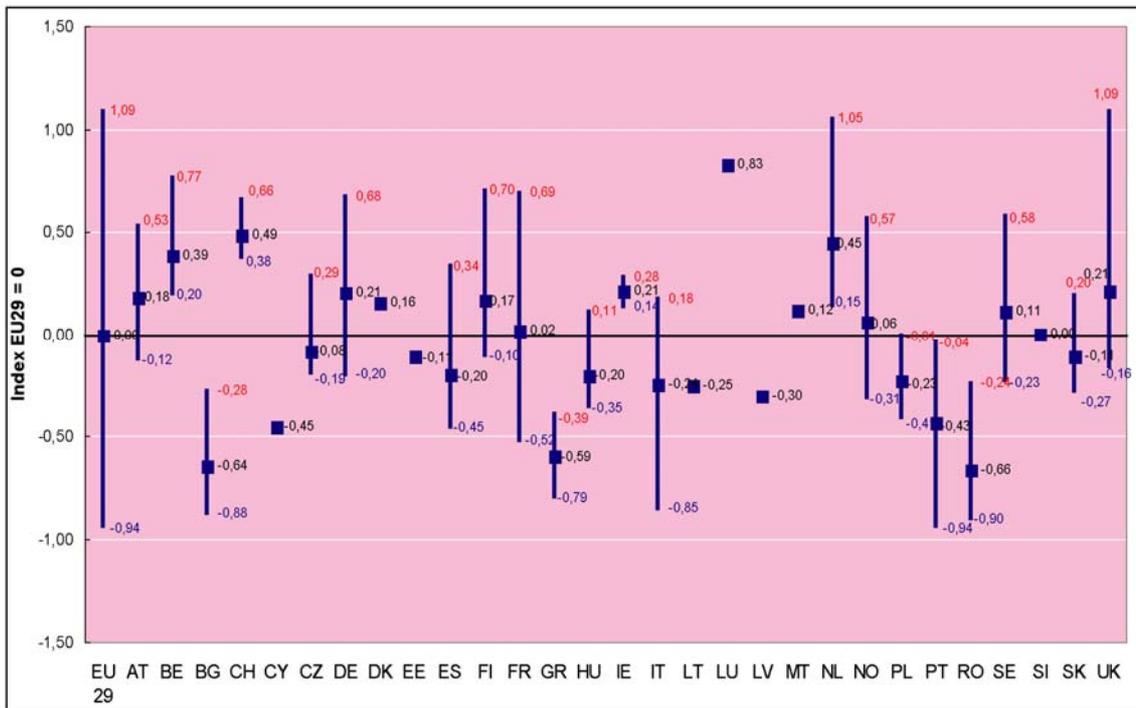
With regard to hazards and environment rural areas are taking the lead, what is not really surprising. While urbanised regions can exceed the agglomeration regarding environment, they are even more endangered by hazards on average.

#### **2.4.4 National and transnational breakdown of ESPON results**

The indicators developed in the RCE, have also been used to investigate further the spatial patterns and situations within the ESPON member states.

The following chart shows for each country the regional disparities in the thematic fields as the range between minimum (blue) and maximum (red). The national average values are indicated by the black square. The regional distribution is based on NUTS 2 values.

**Figure 11 Regional disparities within countries (overall thematic field)**



Considering the regional disparities based on an overall picture, which results from an additive linkage of the seven z-transformed thematic indicators, the differences between the EU15 countries and the 10 new Member States are obvious, but a general distinction is not so clearly to detect. Bulgaria and Romania have the lowest national values and regional disparities on a low total level, but on a regional level also Portugal, Italy and Greece have low values.

The Netherlands, Belgium and Switzerland have high national values above the EU25+2+2 average. Luxembourg has the highest national value of all countries.

The highest regional value can be found in the United Kingdom, which also has the highest regional variation. France and Italy have high regional variations on both sides of the EU25+2+2 average, too.

Among the new Member States, Czech Republic; Hungary, Malta, Slovenia and Slovakia show best values with at least one region above the EU25+2+2 average.

### ***The new Member States***

Using the method of discriminant analysis the question has been investigated: What (in terms of statistical analysis) is the difference between the new Member States and the rest of the ESPON countries? The discriminant analysis reveals that the 10 new member states are significantly different from the EU15. The highest F-Ratios were GDP per capita (F-Ratio: 27.8), proportion of firms with own website (22.2), internet users (21.8), development of population (18.3) and the proportion of the population over 65 years old (17.6). Next, with significant separation but slightly lower F-ratios, come the following indicators: changes in natural growth potential of the population; development of GDP; input-output ratio in agricultural production; R&D personnel and proportion of the population that is highly educated. In contrast, indicators like employment density, artificial and natural surface, youth unemployment or the risk of earthquakes show no significant difference from EU 15.

Referring to sectors instead of single variables, especially the telecom sector seems to be important in (statistically) "explaining" the differences between the new Member States and the other countries, underlining the need for improvement in this sector.

The above average relative increase in the development of GDP in the new Member States, even allowing for the low starting base, might point to future improvement.

European comparisons have been prepared for each thematic field of the RCE. In addition, ESPON 3.1 has provided fact sheets based on RCE-indicators for each of the 29 ESPON countries (see ESPON 3.1 Final Report, part C).

## **2.5 Preparing the grounds for new projects and deepening aspects**

### **2.5.1 Europe in the World**

The ESPON Programme focuses mainly on the European territory, but Europe is not a self-contained system. It is important to have a look at external connections of the EU to get a complete picture of the status quo and possible future developments of the EU. Most studies developed in the framework of the ESPON Programme are based on databases limited to the EU and the candidate and neighbouring countries (EU27+CH+N) and do not take into account the relations between European territories and the rest of the world. However, many aspects of the internal differentiation of Europe are related to existing and potential flows between Europe and the rest of the world. This is especially true for the identification of gateway cities, polycentrism, spatial and social integration.

According to its terms of reference, the TPG ESPON 3.1 was not responsible for a complete study on "Europe in the world". But it has established a small work package on this subject because part of its mission is to "fill the gaps" of the ESPON programme and to propose new directions for further research.

Three different strands were followed:

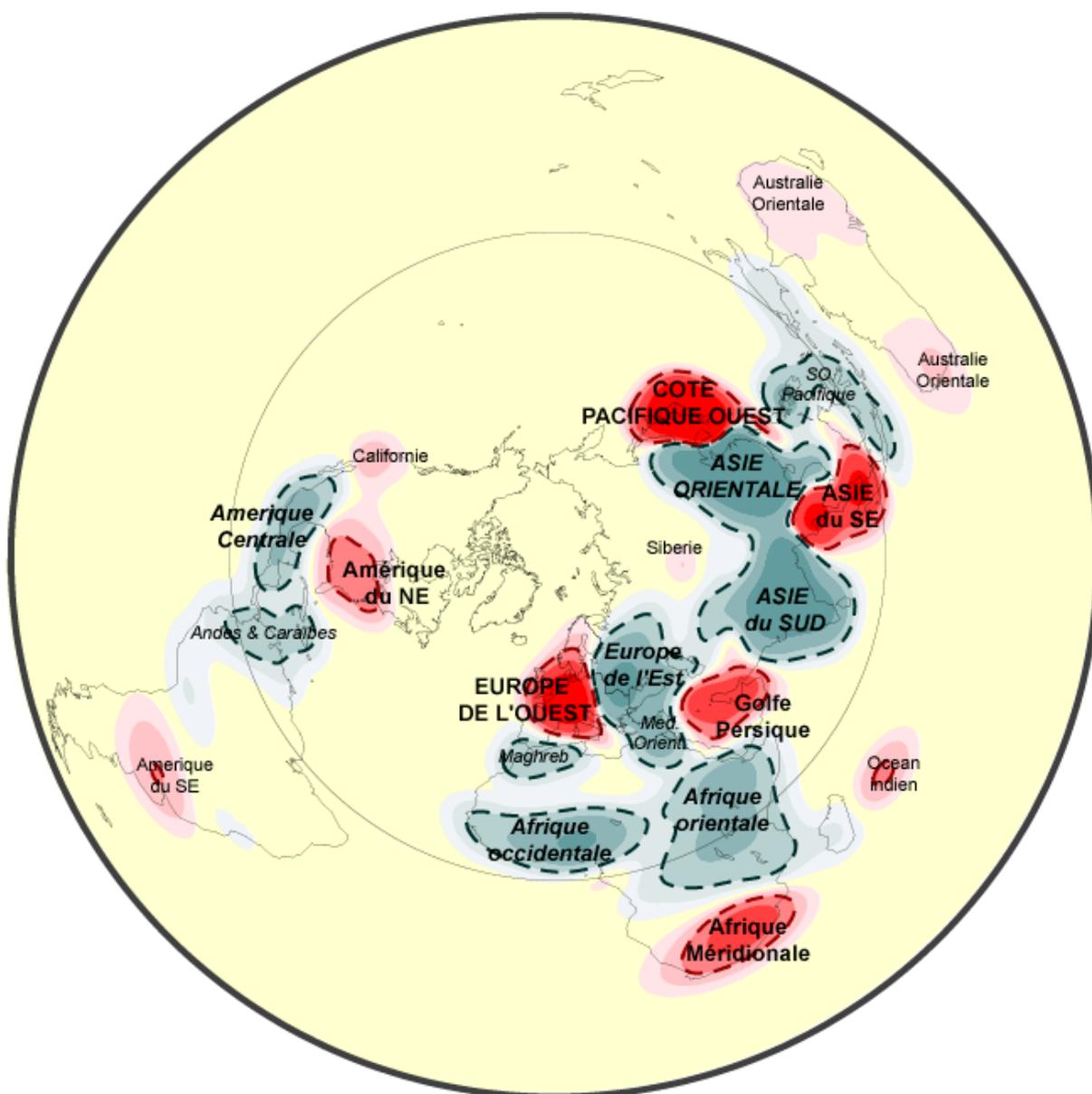
First, the question of the representation of the world was addressed with its different connections: geographic projection, delimitation of "world regions", and joint analysis at different scales;

Second, smoothed representations of Europe in a world without boundaries have been provided, for different criteria (surface areas, density, GDP/inh. and CO<sup>2</sup> emissions);

Third, the functional influence of Europe has been drafted by two criteria, air flows and trade flows.

The work done in the 3.1 framework in the Working Package "Europe in the World" enhanced awareness and interest about this topic among the ESPON Community, and the MC decided to launch a specific ESPON project (TPG3.4.1) on this theme.

**Figure 12 Preliminary definition of potential flows of labour force and invest at world scale in 2000**



Source : Grasland C., 2004, Draft version of a paper to be published in 2005

Comment: This map is a preliminary attempt to define potential flows of migration and investments at world scale, using the multiscalar smoothing method discussed and applied to European regions. This map presents in red (or green) the areas which are locally richer (or poorer) than their neighbourhood and has sufficient population or GDP to be subject to massive flows of migration (from green to red areas) or investments (from red to green areas).

## **2.5.2 INTERREG III B**

At the beginning of ESPON 3.1, a specific work package was set up on "Networking with INTERREG III B". Then the new Interact programme was created with similar networking tasks, and the project 3.1 was asked not to go further in this direction.

The 3.1 work with INTERREG III B followed two strands: showing how the ESPON projects dealt with INTERREG (i.e. collecting from the TPG reports the different ways of treating INTERREG III B areas); and using the results to propose new avenues of research.

A number of ESPON projects have addressed INTERREG co-operations. The territorial implications of INTERREG co-operation have been discussed in respect of three different aspects. A number of projects focused on the spatial dimension of programme foci, whereas others looked at spatial co-operation patterns and others on the effects in terms of learning.

At the transnational level, the building of a common identity and of trust is a good starting point for future developments towards greater polycentricity. The establishment of enduring co-operation patterns can actually then be regarded as the first step in the implementation of relational polycentricity.

Findings about INTERREG co-operation can be used to identify a number of possible foci for future ESPON activities in the field of INTERREG. The first is to support INTERREG projects in learning about and applying European spatial policy aims. At the same time, a systematic review of experience and results gained through INTERREG projects may also deepen some ESPON findings.

The question of flows represents another interesting track for further research in the INTERREG framework. Currently the INTERREG III B is organised on a morphologic basis, i.e. joining contiguous regions with similar characteristics. But recent research shows that flows are increasing between Europeans at a transnational level, so that the relational side should also be taken into account while thinking about the relevance of existing INTERREG III B zoning.

In the same way as INTERREG projects can benefit from utilising ESPON results, also ESPON may benefit from insights gathered in various INTERREG projects. This applies, in particular, to the questions of main conclusions on issues such as morphology, transportation links, socio-economic functional specialisation or co-operation at cross-border or transnational level (possibly involving information on trends, i.e. time series, and flows).

### **2.5.3 Integrating ESPON information and knowledge tools into an ESPON Policy Support System**

ESPON 3.1 developed a first version of the integration of ESPON results and related information and knowledge tools into an ESPON Policy Support System (EPSS). The need for such a system was obvious from the beginning of the ESPON Programme 2006. The homepage of the ESPON Co-ordination Unit cannot fulfil such a requirement. In future a way should be found to combine or connect the Policy Support System and the CU web page.

Why is such a system needed? ESPON is a highly decentralised networking process, with many different networks of universities, research institutions, consultancies and independent experts working to provide sound scientific support to European policy makers for the construction of the European Union. One of the goals of ESPON 3.1 was to deliver harmonised materials, maps and indicators to the Commission for consideration in the Third Cohesion Report. The consolidation of information and knowledge generated by ESPON in such a service-oriented approach is what is called a Policy Support System.

Technically the EPSS consists of four modules. These are: a user interface understood as an "Executive Information System" for top policy assessment and project appraisal; an information base to answer "What's up" questions and, together with the model base, "What if" questions (impacts of alternative policies into the policy indicators); a forecast base to predict the behaviour of the system under different exogenous scenarios and alternative policy decisions; and an evaluation base integrated into the knowledge-base, where a directory with the main policy questions that the system must address can be included.

As a step in this direction an internet web page has been considered.

The need for and feasibility of a number of initiatives are worth considering:

A portal website with links to other TPG webs with their own project material.

In addition to policy indicators, TPG raw databases to be integrated into the system or become available somehow.

Data storage and retrieval through the Internet and Internet mapping services.

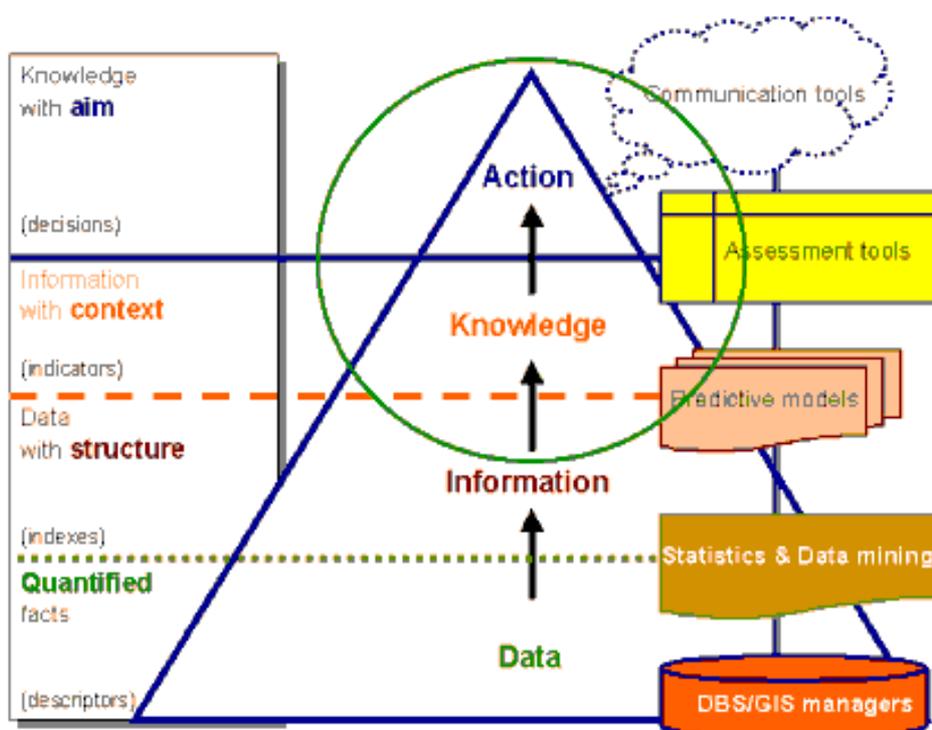
Availability after ESPON of computer models used by TPGs, and if so, for what type of analysis, and under what commercial conditions? Creation of a directory of models and modellers with the specific services they can provide.

Interactive simulators available on the Internet focusing on key policy questions and scenarios, using the knowledge gathered.

In the current ESPON-PSS web-site visitors can find a variety of resources to support an improved understanding of the present situation of the EU and possible future scenarios of the Union: European policies, Spatial Policies, Data resources, Methods & Results, Research on ESDP, and Map resources containing a Map Catalogue for free downloading. It can be seen under:

<http://www.mcrit.com/pss>

**Figure 13 Conceptual scheme of a Decision Support System**



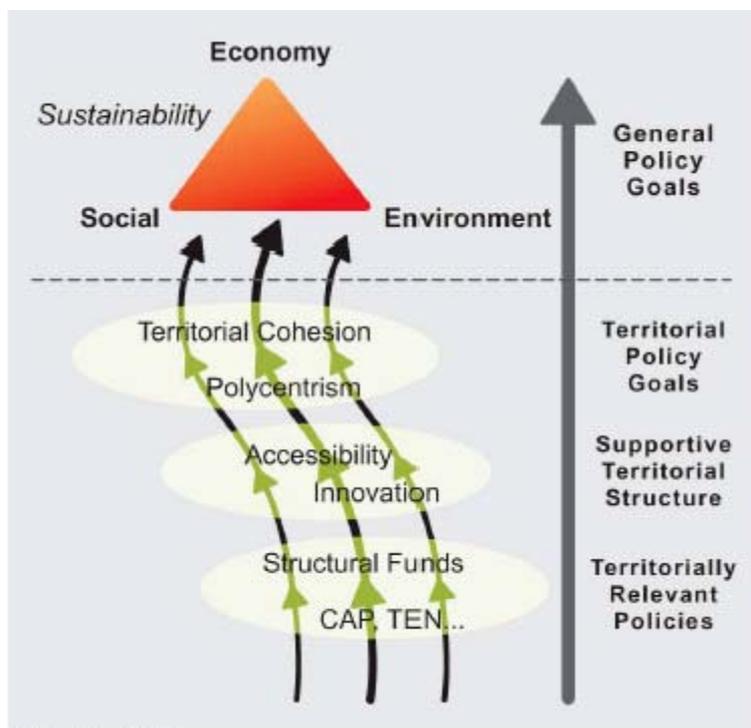
Source: [www.mcrit.com/assembling/assembly\\_central/WhatESS.htm](http://www.mcrit.com/assembling/assembly_central/WhatESS.htm)

Example of a Policy Support System diagram, prototype from ASSEMBLING Research

### 3 Evaluation of empirical findings against goals and concepts

As has been said before, goals and concepts for the European territorial and spatial development can be seen as helping to implement the more general goals of the European Union. The relationships between overall policy goals, territorial goals and supporting territorially relevant policies and territorial structures have been illustrated in the following figure taken from the 3.1 TIR.

**Figure 14 European General and Territorial Goals**



Source: ESPON Project 3.1, Third Interim Report, August 2003

**Territorial Cohesion and Polycentricity** have been identified in the ESPON process as the two main territorial policy goals to form the background against which the specific project results, the empirically stated and proven trends and impacts had to be evaluated. The two goals, as shown below in more detail, can be seen as interlinked, and other territorial goals can be related and subsumed to them. This is why territorial cohesion and polycentricity are specifically apt to take over the role of key territorial goals in the context of territorial development policy.

Territorial Cohesion is a twofold concept, as it aims to strengthening endogenous territorial potentials in territories and thus to overcome

imbalances between territories. On the one hand territorial cohesion is related to the ideas of equity and balance and on the other hand it refers increasingly to territorial capital and development potentials:

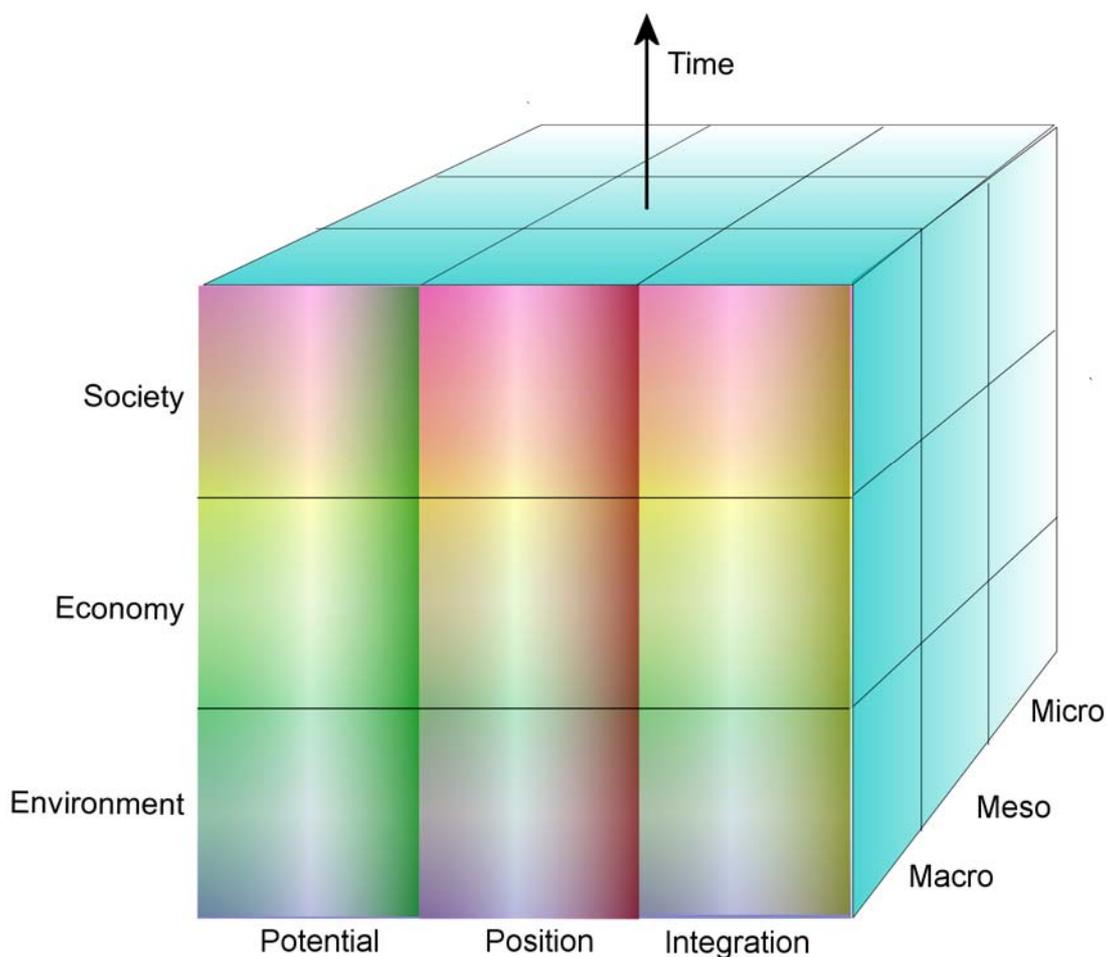
Territorial cohesion is associated to the political aim to diminish inequalities and disparities between the different parts of the European territory. But equity of living conditions is not sufficient as a policy aim to orientate policies and measures at. Rather, it is also the **quality and niveau** of living conditions that is of utmost importance. Thus, to achieve a **high level of living conditions on a regionally balanced basis** can be regarded as the central aims connected to territorial cohesion.

At the same time, territorial cohesion is associated with "opening-up the territory", identifying and strengthening the economic development potential of all territories in order to achieve sustainable economic growth. **Place-based comparative advantages**, or territorial capitals, are important assets for endogenous development. Thus, to achieve a **high level of global competitiveness**, the utilisation of this territorial capital can be regarded as central aim connected to territorial cohesion.

Given this twofold understanding of territorial cohesion, it might be argued that there is an inherent conflict of goals. This conflict, is however, resolved by operationalisation of territorial cohesion through the idea of polycentric development. Indeed, polycentric development is a 'bridging concept' between the goals of 'economic growth' and 'balanced development'. When 'economic growth' is associated with centralisation and 'balanced development' with de-centralisation, these two goals obviously have a very similar ambiguity compared to that which is implicit to the concept of polycentricity. Polycentricity thus promises to overcome the dichotomy between competitiveness and balance which makes it, like all ambiguous goals, especially interesting for use in the policy arena.

All these approaches can be found in ESPON research, and there are a number of communalities regarding their operationalisation and measurement. This concerns in particular, the "**hypercube**" approach, which was introduced by ESPON 3.1. The hypercube visualises the various components of territory, including the three levels of analysis, the three dimensions of sustainability and the three components of regional situations, which are the region's own potential, the relative position to other regions and the integration with other regions (in a dynamic perspective which makes the cube a "hypercube").

**Figure 15** The four-dimensional “hypercube” of territorial approach



Source: Ph. De Boe and Th. Hanquet (PhDB consultant); part C 4.2 of this report

The **3-level approach** of ESPON is a first step in this direction, assessing results on three different geographical levels (macro, meso, micro). In its original form, introduced in the first, the so-called “Crete” Guidance Paper, it was suggested to explore the 3 levels not just additively but simultaneously considering the upper level as a spatial context for the lower level. The idea to situate studies and compare results on three spatial levels has been very successfully implemented in ESPON. However, a true multi-level approach requires more sophisticated analytical models and is part of future research needed.

### **3.1 Cohesion and the balancing effects of EU policies**

The **measurement of territorial cohesion** in most of the ESPON projects – dealing with territorial assessments of EU sector policies – starts from the concepts of inequalities and disparities. In this sense, trends and policies are judged as contributing to more territorial cohesion if they are in favour of

the economically less developed, lagging, peripheral, or handicapped regions in Europe. In more operational terms this is to say that a negative correlation between indicators that stand for positive trends or beneficiary policies (like the regional incidences of money spent by the EU Structural Funds) and indicators that stand for favourable regional situations (like GDP per capita or accessibility to other regions) are supporting territorial cohesion while positive correlations would be seen as being directed against territorial cohesion, as deepening inequalities and disparities.

Recent socio-economic developments illustrate that although cohesion between the EU Member States increases, the disparities between the regions are constantly growing.

Referring to the Dissimilarity Index, the actual development trends differ regarding the level in question, e.g. there are trends towards increased territorial cohesion at the *national* level (NUTS 0) while at the *regional* levels the trends predominately point towards decreasing territorial cohesion (NUTS 2 & 3).

**Table 4 Dissimilarity indices of GDP in PPS in 1995 and 2000 at NUTS 0, 2 & 3**

EU15 at:	Dissimilarity index		Units change 1995-2000	indicating:
	1995	2000		
NUTS 0	0.465	0.460	- 0.005	increasing cohesion
NUTS 2	0.339	0.341	+ 0.002	decreasing cohesion
NUTS 3	0.531	0.620	+ 0.089	decreasing cohesion

Source: New Cronos – ESPON 2.2.1 TIR

Cohesion between territories means more equality and a smaller degree of disparities between them. While this view basically relates territorial cohesion to **socio-economic differences** and inequalities, a second connotation relates territorial cohesion to geographical features and disadvantages of regions. For the **geographically handicapped regions**, like islands, mountain areas etc. (cf. Third Cohesion Report), deficits related to their connection to and interaction with other European regions can be assumed. A policy in favour of territorial cohesion would have to reduce the negative effects of these geographical handicaps. A third aspect, which is related to the former one, refers to **regional integration** and communication, exchange, cooperation and flows amongst and between territories. Regional integration is an important element and prerequisite of European integration and, as an element of territorial cohesion, contributes to social and economic cohesion.

The latter aspect also answers the question what territorial cohesion genuinely adds to social and economic cohesion. Indeed, following a definition of the ScadPlus glossary, social and economic cohesion already includes a regional, structural view: *"Economic and social cohesion is an expression of solidarity between the Member States and regions of the European Union. The aim is balanced development throughout the EU, reducing structural disparities between regions and promoting equal opportunities for all individuals."* But the focus of **social cohesion** is strongly directed to the **individual level of persons or households** and the avoidance or diminishing of poverty and unemployment of individuals. At the same time, **economic cohesion** is oriented towards the **intermediate level of institutions**, such as enterprises, unions and institutional settings like tax systems. In contrast to these, **territorial cohesion** refers more clearly to the regional aggregate and **regional context of social and economic cohesion**. With the inclusion of territorial cohesion, the European Convention, when drafting the EU Constitution, clearly recognised and acknowledged that territory as the aggregate of individual situations as well as an important context for individual acting has a weight of its own which forms a specific reality for individuals and institutions.

Territorial cohesion was already mentioned in the ESDP and the Second and Third Cohesion Report, but with its recent introduction as a new objective in the draft Constitution it became much more prominent than before. In article I-3 of the draft **Constitution** it reads: "the Union shall promote economic, social and territorial cohesion and solidarity among Member States". Article III-116 (ex Article 158 EC Treaty) demands an "overall harmonious development of the Union" and stresses the need to pay special attention to "rural areas, areas affected by industrial transition, and areas which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density, and island, cross-border and mountain areas".

Until now, there is not yet a clear definition for territorial cohesion nor a clear common understanding for its implementation on the basis of the new (draft) Constitution. But the basic elements, as explained above, are already visible.

The **Third Cohesion Report**, in its chapter on territorial cohesion, focuses mainly on territorial imbalances and on regions with geographical handicaps.

The **Galway Conference** on territorial cohesion (25-27 May 2004) saw territorial cohesion as follows:

*"As a policy objective, territorial cohesion aims to contribute to the harmonious and balanced development of the Union by reducing economic*

*and social disparities, by preventing territorial imbalances from emerging and by making sectoral policies that have a spatial impact more coherent with regional policy. Territorial cohesion also aims to improve territorial integration and encourage cooperation between regions."*

Referring to the "severe and permanent natural or demographic handicaps", article III-116 of the draft Constitution conveys the idea of the relative inertness of territorial features. This suggests that the aim is not so much to reduce territorial disparities presented as permanent, hardly reducible, than to **compensate** them in order to progress towards a similar level of sustainable development.

Based on this policy background a number of conclusions can be drawn to what degree EU sector policies contribute to territorial cohesion.

### **3.1.1 ... Common Agricultural Policy (CAP)**

Rural development policy is a spatial policy. As such, it must serve the needs of broader society in rural areas and contribute to cohesion. In other words, rural development should be more than just a sectoral approach linked to agriculture. It clearly has an important territorial dimension.

Considering CAP not only as agricultural policy but also as rural policy, it has to be noted that the CAP works against the ESDP objectives of balanced and territorial development, and does not support the objectives of economic and social cohesion. Moreover, in terms of polycentricity at the EU level, Pillar 1 of the CAP appears to favour core areas more than it assists the periphery of Europe, and at a local level CAP favours the more accessible areas.

The Rural Development Regulation (RDR) within the CAP is a cohesion measure, however, and while evidence on Pillar 2 is more mixed, expenditure under the RDR does not appear to support cohesion objectives either. The stronger tendency for Pillar 1 support to go to richer regions of the EU15 may have to be attributed to their larger farms, their location in the core of Europe, and their farm types. The rural development Pillar 2 may in some cases be more consistent with cohesion within countries, but runs counter to EU wide cohesion in the way it is currently structured. The latest reforms of the CAP will do nothing to remove the existing inconsistencies between the CAP and cohesion policy.

Consistency with cohesion objectives would be improved if the allocation of the RDR budget to Member States would follow criteria of relative needs for

rural development and environmental management, as was proposed by the Commission in 2002.

A clear focus on integrated (rural & urban) development has the Community Initiative LEADER. This is the programme which is most closely related to the concept of integrated rural development, and provides a multitude of good/bad examples of rural development under different contexts. Beyond the economic sphere, the programme is important for other spheres of rural life and policy, due to its multi-sectoral and integrative character.

### **3.1.2 ... Transport Policy**

Access to transportation contributes only under certain circumstances to cohesion. Measured in absolute terms TEN & TINA tend to increase disparities, in relative terms contributions to cohesion are possible at European level. Significant positive economic effects for the new EU Member States can only be expected if the TINA projects linking the new Member States to the major centres of economic activity in Western Europe are implemented. Transport policies which reinforce polycentricity at the European level, may increase the dominance of capital cities within their national urban systems and so contradict the goal of the ESDP to achieve a balanced polycentric urban system.

Indeed, all transport infrastructure examined accelerate the decline in polycentricity of national urban systems because they tend to be directed at primarily connecting large urban centres. At national level secondary networks can contribute to prevent too much focus on TEN/ TINA hubs (aim conflict). At micro level regional enlargement can contribute to creating bigger hubs to show up at higher levels of polycentricity. There is a conflict between transport and environment and spatial policies, because road pricing, for instance, has anti-cohesion effects.

With regard to the different modes of transportation, rail policy has little effect on territorial cohesion, road investments are pro-cohesion, higher prices for road transport are anti-cohesion. There are differences between countries, however, the overall picture shows larger relative losses in poorer regions.

This reinforces existing polarisation as less accessible rural areas seem to find it harder to diversify their economic base when the agricultural sector at the same time is becoming increasingly marginal as a source of income.

### **3.1.3... Information and Communication Technologies**

In the field of ICT, the core-periphery picture does not hold. This is however a rather random result of ICT policies, as these tend to be spatially blind.

Discussing spatial effects of ICT policies, the lack of spatial awareness and symmetry of knowledge between private and public actors especially at regional level are two main characteristics.

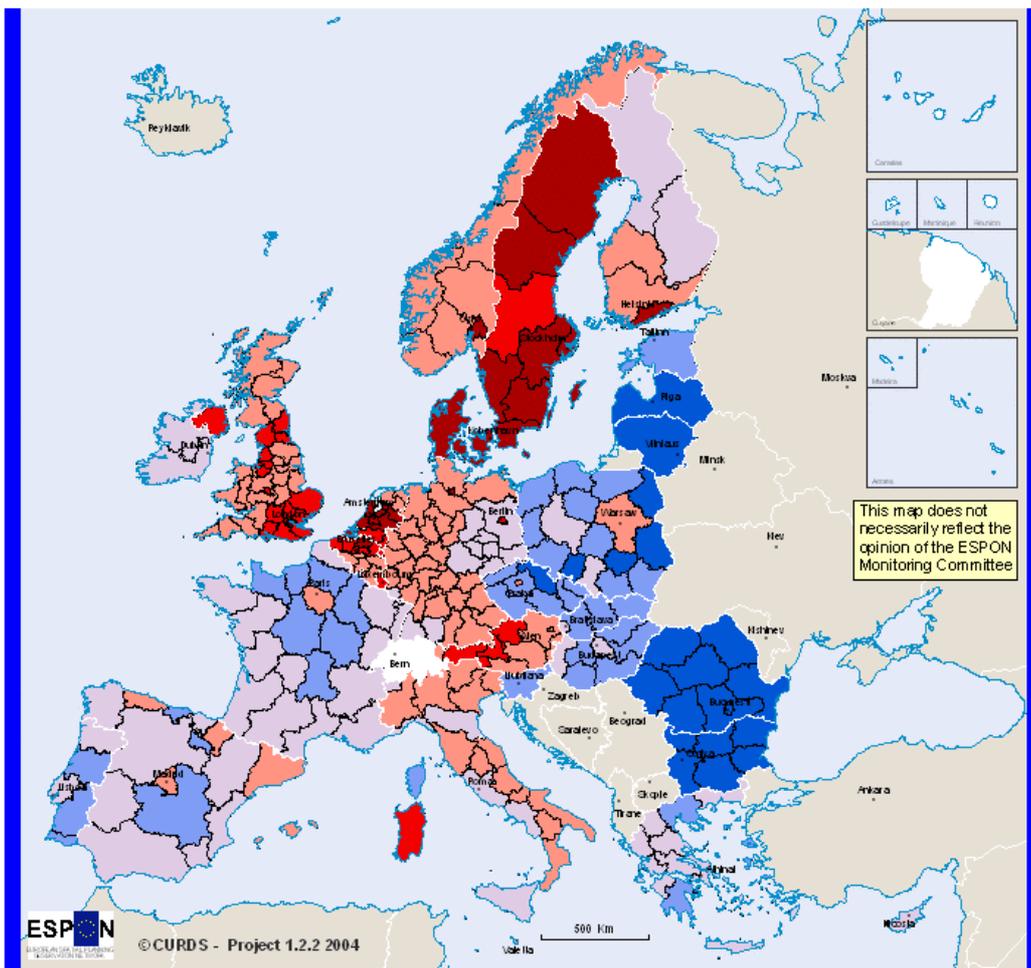
So far the European picture of ICT access and use is characterised by the strength of the Nordic periphery, but in the case of mobile telephony, the Mediterranean periphery also outpaces the core, and for broadband uptake Spain and Portugal have so far outpaced some core countries, notably UK and France. The one area in which the core clearly leads is in access to internet backbone networks for large corporate users and Internet Service Providers.

In general, there is a North-South divide across the EU 15+2. The main factor in this pattern is the strength of the Nordic countries which lead the way in uptake of all most all technologies. A number of other northern countries join the Nordic countries in the top cohort, but which particular countries do vary from technology to technology.

As regard the New Member State they are on average behind in ICT applications. However, there are severe differences. Malta, Slovenia and Estonia are ahead on the leading edge technologies and applications (broadband and e-commerce). Bulgaria and Romania can be identified as lagging across all technologies and applications.

Overall, national differences in telecom cultures are crucial. In the case of PCs and Internet, high uptake is generally associated with developmental status, with non-objective 1 regions and those with higher GDP performing best. In the case of broadband, high uptake is usually associated with non-objective 1 status, relatively high levels of GDP, density of population and position relative to the core (i.e. Pentagon regions). In the case of mobile technology the core-periphery distinction was the most useful discriminate, though interestingly, the most marked distinction was the high levels of mobile telephony adoption in non-Pentagon regions.

**Map 8 Combined household and business telecommunication infrastructure**



© EuroGeographics Association for administrative boundaries  
Regional Level: NUTS 2

**Level of telecommunications development**

- Highly advanced
- Advanced
- Moderately advanced
- Moderate
- Lagging
- Highly lagging
- No available data

Origin of data: CURDS

Source: ESPON Data Base

### **3.1.4... Research and Development**

The pattern of R&D activities in the EU is one of spatial concentration in a limited number of regions, with strong disparities existing between these and other regions. A pattern reinforced by EU R&D policy, and only slight support for change is given through R&D related activities under Structural Funds.

The regional innovation leaders are located in Germany, Sweden, Finland and the Netherlands. These regions have highest per capita GDP, business R&D expenditures, patent applications, high-tech patent application and lowest unemployment. Concentrating on regions that have highest per capita GDP, business R&D expenditures, patent application, FP4 and FP5 participation and lowest unemployment, the six leading regions are located in only two countries, Germany and France.

Framework Programmes do appear to be supporting a large number of project partners located outside the core of the EU and an important number of actions (14% of total participation in FP4 and FP5) in Objective 1 regions. This said, participation is skewed towards non-objective 1 regions, reflecting numerous factors, including, in particular, available infrastructure as well as the nature of the respective economies. Project participation tends to relate strongly to regional and local strengths, with patterns of participation within regions generally reflecting the location (or concentration) of research facilities.

With regard to socio-economic specialisation, there is a current dichotomy between cohesion and polycentricity. However, the main pattern is also here a strong centre-periphery pattern, with modifications. This depends not least on the geographical level and the type of specialisation, i.e. administration, education, tourism, business headquarters or research and development. R&D is probably the sector where most actors and policy-makers are inspired to highflying visions for areas that do not belong to the hotspots of today.

### **3.1.5... Structural Funds**

Structural Funds are programmes for enhancing regional economic development. As such there is certain degree of correspondence with the goals and concepts of European spatial development policies, and Structural Funds can contribute to achieving increased territorial cohesion.

At micro level the strongest effect occur as the result of direct programme measures. In addition to socio-economic and infrastructure measures also aspects of empowerment of the regional and local levels of governance

make important contributions to territorial cohesion. By stimulating work and 'bottom up' policy-design, in-line with the subsidiarity principle, the Funds have also facilitated the tailoring of policies to needs and preferences expressed by those living and operating in affected territories.

At meso level, the rural-urban dimension of Structural Funds, the relationship to spatial discontinuities, the type of contributions made to spatial development and the leverage effect of Structural Funds on national policies, are at stake when discussing territorial cohesion. Measuring the theoretical economic impact of Structural Funds pending reveals that the correlation between Structural Fund spending on the one hand and increased economic cohesion between neighbouring regions on the other seems to be fairly strong.

At the macro level, the geography of Structural Fund spending makes only a minor contribution to territorial cohesion. As regards the fields of intervention, direct contributions towards spatial development aims are mainly visible in the field of accessibility. However, considering both direct and indirect effects, the field of socio-economic specialisation is of even higher importance than that of accessibility. This is particularly so when it comes to the international positioning of areas outside the pentagon.

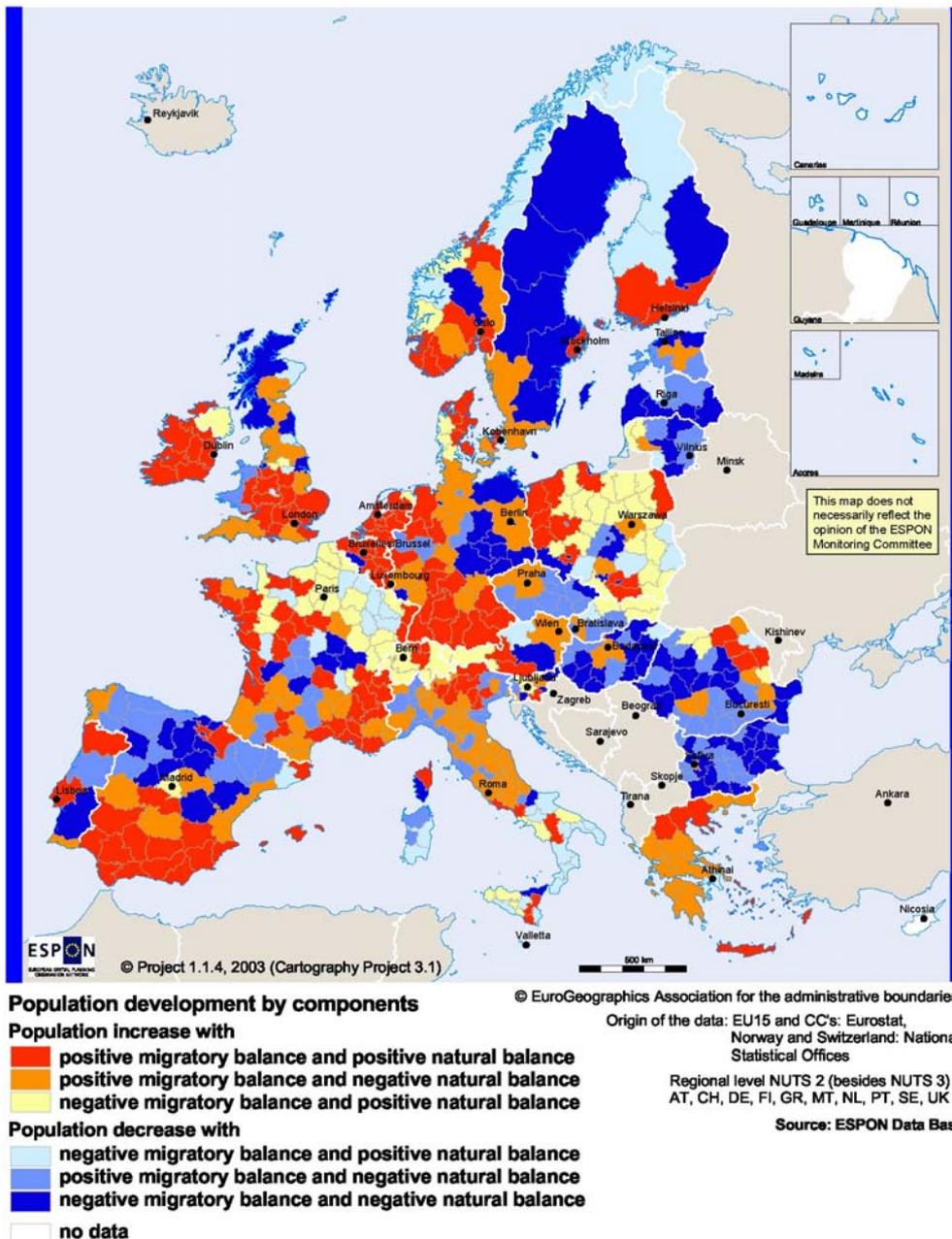
### **3.1.6 Cohesion and disadvantaged and handicapped regions**

Disadvantaged and handicapped regions play a major role in the current spatial planning discussion on territorial cohesion. The European Commission, in its Third Cohesion Report, not only devoted a chapter to this topic but also commissioned some special studies on this topic in preparation of this report. This is one of the reasons why it was not necessary within the ESPON framework to have additional projects on handicapped regions like mountain areas, island, outermost regions etc. Apart from this remark, also ESPON results have been used in the cohesion report chapter, and there will also be additional ESPON projects that will more specifically breakdown ESPON results to different kinds of regions. Also, as a first attempt, a Regional Classification Analysis has been produced by ESPON 3.1; some results of this are shown below.

### 3.1.6.1 Common problems of areas with geographic handicaps

The Cohesion report correctly states that all handicapped regions have common problems of accessibility and of remoteness from major markets. In many cases, the size of the regional market is below critical mass thresholds, which in turn initiates vicious circles of out-migration of young people, ageing and declining population.

**Map 9 Components of population increase, 1996-99**



Source: ESPON 1.1.4, p.24

### **3.1.6.2 Regions with specific hazards and risks**

ESPON 1.3.1 has analysed the spatial effects and management of natural and technological hazards. The affected regions, for instance regions threatened by flooding, can be seen as one type of handicapped regions.

Recent climate change studies reveal that the frequency of extreme climate events (including floods) is increasing, while the magnitude of these events is not necessarily changing. Based on these climate change scenarios, the international scientific community is starting to perceive that the probability approach for flood prone area mapping used so far is to be revised and flood prone areas are presumably to be re-estimated.

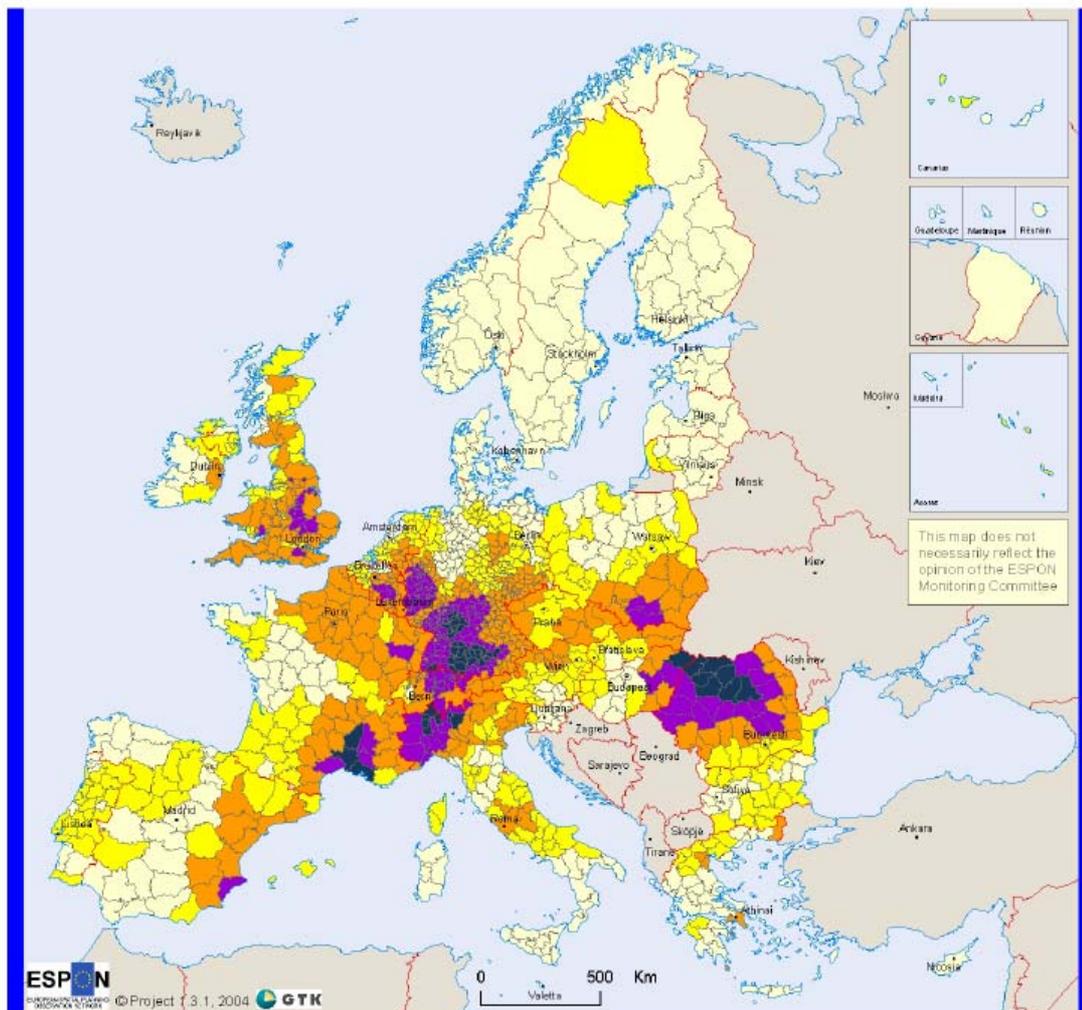
Map 3 (next page) shows a synthetic classification which points out the frequency of large flooding events in Europe based on a relatively coarse raster size (25km x 25km). Representing this data on NUTS 3 level is therefore mainly useful as a generalized overview. The map shows that the highest amount of large flood events during the period 1985-2002 is concentrated in North-Western Romania, South-Eastern France, Central and Southern Germany and in the east of England.

### **3.1.6.3 The CAP notion of less favoured areas**

When focussing on sectoral policies, it is especially the CAP which for many years has used the notion of handicapped and/or less favoured areas. Regulation EEC No. 2328/91 provides for payment of Compensatory Allowances in designated less favoured areas characterised by one or more of the following attributes:

1. permanent handicaps (altitude, poor soils, climate, steep slopes),
2. undergoing depopulation or having very low densities of settlement, and
3. experiencing poor drainage, having inadequate infrastructures, or needing support for rural tourism, crafts and other supplementary activities.

**Map 10 River flood events**



- Flood recurrence**
- Very low
  - Low
  - Moderate
  - High
  - Very high
  - Non ESPON space

Origin of the data: ©EuroGeographics Association for the administrative boundaries  
 Large flood areas ©Dartmouth Flood Observatory  
 Flood areas ©ESA - Earth observation - Earth online  
 Rhine Atlas 2001 IKRS-CIPR-ICBR  
**Source: ESPON Data Base**

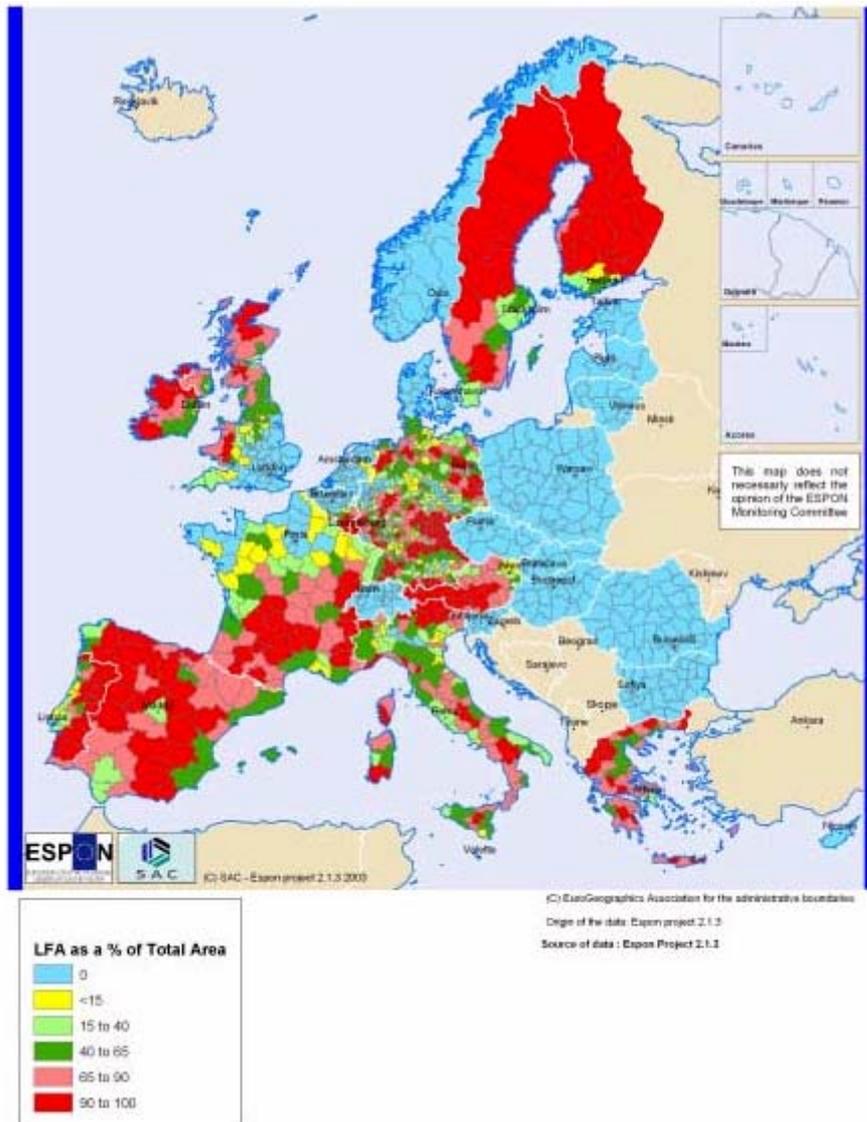
This map shows the hazard recurrence based on average number of large flood events on NUTS 3 level during 1987-2002. Each NUTS3 region has been given an average of the large flood event that fall inside it. To the first class "Very low hazard intensity" only the regions without large flood events are included.

**Flood intensity**  
 Average value of flooding events on NUTS 3 area  
 Very low hazard 0  
 Low hazard 1  
 Moderate hazard >1 - <=2  
 High hazard >2 - <=3  
 Very high hazard >3

The second pillar of CAP opens agricultural policies to overall rural development and could facilitate turning some of the natural handicaps of mountains and other LFA into advantages: for instance, cultural heritage,

landscape, high-quality products, and diversification. The following map shows Less Favoured Areas as a percentage of the total area of a region.

**Map 11 LFA Area as a Percentage of Total Area by NUTS3 Region**



Source: FR\_ESPON 2\_1\_3 p. 306

### **3.2 Territorial cohesion and regional potentials – some analytical results**

The **measurement of territorial cohesion** relates only in a few ESPON projects to the identification of endogenous development potentials, place-based comparative advantages or territorial capitals. In this sense, trends and policies are judged as contributing to more territorial cohesion if they are in favour of the exploitation of not fully used potentials of a region – comparative territorial advantages.

There is clearly a relation between the inertness and uniqueness of territorial features and the wish to progress toward harmonious and balanced development. There is more than the strategy to strengthen the unique combination of different features, which give regions their specific assets, and to evolve the specific regional potentials. Regional development also can be fostered by **strengthen a region's relative position** to others, by "correcting" the disparities through interactions with other areas, and by enhancing potentials and comparative advantages through complementariness and synergies with other regions.

#### **3.2.1 Potentials of existing settlement patterns**

Discussing European spatial planning, one's mind easily focuses on settlement patterns and the European urban system.

The basic elements of the European urban system are functional urban areas, defined on the basis of travel-to-work areas. The European ranking of the functional urban areas takes into consideration the number of inhabitants (demographic mass), as well as the European accessibility of these areas, their importance as centre of public administration and private decision making centres, plus selected aspects related to the functional specialisation, i.e. importance for higher education.

An analysis of the functional urban areas in Europe revealed a considerable spatial concentration of these within the core of Europe. The picture of Europe is dominated by Metropolitan Agglomeration Areas in the core, i.e. a Pentagon defined by the corners London, Hamburg, Munich, Milan and Paris. Looking at the potential urban strategic horizons of the European urban structure an enlarged version of this Pentagon occurs with the corners of Manchester, Berlin, Venice, Genoa and Paris.

Outside this dominating area there are only a few functional urban areas with a certain potential to counterweight the predominance, these are Madrid, Barcelona and Athens in the South, Dublin in the West, and

Stockholm, Helsinki, Oslo and Gothenburg in the North. Major urban areas with high scores (in terms of polycentricity indicators) in the new Member States are mainly located close to the Pentagon with Warsaw representing the only exception.

However, a wide range of cities have the potential to increase their demographic mass through increased co-operation with their neighbouring areas, i.e. the enlargement of their potential integration zone. Basically, they can improve their position in the European urban hierarchy by co-operating and creating an integration zone which means to create an enlarged co-operation area of a city. By doing so they can improve their position in the European urban hierarchy, i.e. the enlarged region has a greater number of inhabitants is thus considered being of higher importance at European level.

The European effect of regional polycentric co-operation can be illustrated by analysing the difference between the European ranking of an individual city and that of the corresponding potential integration zone (i.e. an enlarged co-operation area of a city).

Most easily cities situated along an area similar to the "Blue Banana", with some extensions into Hungary, the Czech Republic and Slovakia can increase their European standing by establishing regional polycentric co-operation patterns. Outside the core of Europe, there are a number of regions high demographic potentials, such as the Ostrava-Katovice area, the areas around Dresden-Prague-Wroclaw and Vienna-Nitra-Budapest, the Mediterranean axis from Valencia to Naples and the Atlantic coastline from Lisbon to La Coruna. At a more narrow scale, potentials can for example be identified in the Glasgow-Edinburgh region, as well as around Lyon and Nantes in France. At the other end of the scale, the relative isolation of cities in the Northern Peripheries, in central Spain outside Madrid, as well as in peripheral parts of Greece, Bulgaria, Romania and the Baltic countries appear.

### **3.2.2 Potential for socio-economic specialisation**

Obviously, the main potentials for an area lie in the fields of profiling. During the last decade we have seen increased activities in the field of local and regional "branding" and various types of "ranking" and the growing profession of city developers are not at least a result of this.

A socio-economic profiling of regions, showing strengths and weaknesses, is important for further development and in defining common priorities for territorial cooperation. ESPON projects have made progress in analyzing disparities as well as regional specialization, i.e. the dominance of one type

of industry or service. However, the level of detail is a challenge for further ESPON research in mapping better the territorial capital of regions.

A preliminary typology is based on the analysis of regional specialisation and geographic concentration, usually analysed in terms of production structures and trade patterns. The analysis is based on data on employment and GDP as well as the amount of traded goods for the different industries. Within this framework following definitions apply:

- 1 specialisation as the (distribution of the) shares of industries in a specific region,
- 2 concentration as the (distribution of the) share of the regions in an individual industry.

This has been brought together into a preliminary territorial typology based on each region's position relative to EU averaged in GDP per capita and overall regional specialisation (Herfindal index). The result shows a significant core-periphery pattern.

The first results show that in Norway, Denmark, large parts of Sweden, UK, Ireland, the Netherlands, some parts of France, Spain, Germany, Austria and Italy, regional specialization is above European average. The main areas showing specialization below EU average can be found in Portugal, Spain, Greece, Eastern Germany, some areas in Finland, France and Italy and the New EU Member States.

Based on this, first typologies taking into account trends have been developed. These seem to reveal patterns where regions with low specialisation and GDP (in Spain and Poland, for instance) are experiencing higher growth rates (GDP per inhabitant) and faster specialisation than the EU average while for most of the UK these opposite seems to be true. These realities call for caution in the evaluation of policies: not all regions will respond equally to policies that promote specialisation or differentiation of the economic base.

Analysis and typologies of regional specialization should not be considered complementary to more rigorous convergence analysis. More scientific work is needed to support an enhanced cooperation and development based on the territorial capital that every area entails.

In this context one of the ESPON project looked into R&D. Indeed increased specialisation is more and more seen as an opportune strategy for developing endogenous potentials. In this respect innovation and R&D intensity is often seen as a promising strategy. Considering the capability of attracting R&D funding as an endogenous potential, some regions outside

the core of Europe have a clear ability to further develop this, e.g. List name of red areas in Adrian's map

A commonly used indicator of the overall R&D intensity of a country or region is the share of R&D (GERD) expenditure of GDP, Gross Domestic Product. The indicator measures the relative emphasis placed on R&D activities within a given economy, but does not reveal the absolute level of R&D expenditure. It has to be noticed that a high R&D intensity does not necessarily indicate a high R&D effort in absolute terms which can become important for the assessment of regions with low GDP.

R&D intensity varies through out Europe. At a European scale, the regional figures for R&D intensity demonstrate a weaker position of the periphery of the EU with the exception of Nordic Countries. Areas with lowest R&D intensity are outside the core of Europe, e.g. in Greece, Southern Portugal, the Spanish inland, parts of Italy and Greece, and areas in Latvia, Poland, Czech Rep., Slovakia, Hungary Bulgaria and Cyprus.

The highest shares of R&D are found in England, Finland, Sweden, France, Germany, Austria, Slovenia and Bulgaria. Five of the European regions with the highest R&D intensity are in Germany, of which the top three were Braunschweig, Stuttgart and Oberbayern, with an R&D intensity for 1999 of 6.34%, 4.84% and 4.76% respectively, compared with a EU-15 average of 1.93%. The regional top ten includes two Finnish regions (Pohjois-Suomi and Uusimaa), Midi-Pyrénées and Sweden as a whole (as there regional expenditure data are not available).

However also a small number of regions from the new Member States perform well. In the Czech region of Stredni Cechy (the area surrounding Prague), R&D expenditure accounts for 3.3% of GDP, placing it third in the regional ranking. The Prague region itself, the Polish region of Opolskie and the Hungarian region of Kozep-Magyarorszag (which includes Budapest) belong to the top 25 regions, along with more traditionally recognized research centres such as Berlin, the East of England and Ile de France. (Unfortunately Norway and Switzerland do not dispose of comparable data).

### **3.2.3 Potentials in the field of accessibility**

Related to the question of R&D attraction is often also the ICT infrastructure endowment. Here again some regions which are normally not listed among the top show a high potential utilisation of telecommunication in this respect.

Information and communication technology (ICT) is a complex sector. The spatial pattern depends on technical solutions, which again reflects national

differences in telecom cultures. Furthermore, patterns differ between household and business uptake of telecommunication technologies.

ESPO has provided a cross-analysis bringing together uptake for fixed telephones, mobile phones, PC accesses, internet access and broadband internet access with a focus on households keeping in mind the regionalised data are rare in ICT.

In general, there is a North-South divide across the old member states plus Switzerland and Norway. The main factors in this pattern are the strength of the Nordic countries, which lead in almost all technologies. A number of other countries join the Nordic countries among the leading countries, but normally only within a particular technology.

However, for mobile telephones, the Mediterranean countries outpace the core of Europe. For broadband uptake, Spain and Portugal are so far ahead of core countries, notably the UK and France. The technology in which the core clearly leads is access to internet "backbone networks" for large corporate users and Internet Service Providers.

The New Member States are on average behind in ICT applications. However, there are differences. Malta, Slovenia and Estonia are ahead on leading edge technologies and applications such as broadband and e-commerce. Bulgaria and Romania can be identified as lagging across all technologies and applications.

At local and regional level there are clear disparities between metropolitan, urban and rural areas. This is not a surprising finding as currently the most commercially developed forms of broadband technologies are highly driven by demand and serve areas of high density population first.

In the field of information and communication technologies, a European core-periphery picture found in many other fields does not hold true. The strength of the Nordic countries is apparent. For specific technologies also some Southern European countries are more advanced than the core of Europe.

In general, it is obvious that national differences in telecom cultures have a clear impact on the services available in different parts of the European territory.

Access to information and knowledge is an important part of the current accessibility debate – also related to the provision of services of general economic interest – an other part of the debate focuses on physical accessibility and transportation.

In terms of transport the potentials are currently mainly related to the core of Europe and the areas close to airports. Indeed, accessibility studies conducted within ESPON show twofold core-periphery pictures, (a) at European level and (b) at national level. However, as the scenarios developed by 2.1.1 show, this may change.

A series of transport policy scenarios has been developed and assessed regarding the policy impacts on accessibility and economic development. One of the scenarios shows the regional economic impacts of (a) a full implementation of trans-European network projects including the corresponding infrastructure in Norway and Switzerland and (b) a socially marginal increase of transportation costs (cf. road pricing) for all transport modes. The assumption is that all modes are charged an additional price of ten percent of the present costs of transportation.

The scenario on building all TEN (Trans-European Networks – EU 15) and TINA (Transport Infrastructure Needs Assessment – new EU Member States) projects foreseen and applying a road pricing system would lead to prevailing European polycentric pattern. The immediate benefits for more central regions resulting from pricing systems seems around 2020 to have counter balanced by the higher benefits TEN and TINA projects offer for areas outside the core of Europe.

Focusing on the change of regional welfare measured in GDP per capita in this transport scenario, the core of Europe can expect a slight loss above the average of EU 29. The losers in this scenario are mainly located in Southern Ireland, the East and West coast of the UK, large parts of coastal Norway, Northern Sweden and Finland, South Eastern France, and single areas in France, Germany, Denmark and Italy.

Apart from Sicily, most of the areas benefiting from this scenario are located in the new EU Member States and Bulgaria and Romania, with an emphasis on regions in Poland, Czech Republic and Slovakia. In the old EU Member States a few benefiting regions are located in Greece, Portugal, Spain, Western France, Southern Italy and Southern Sweden plus spots in Southern Denmark and North-East Germany.

The effects with regard to the type of settlement structure illustrates that rural regions will relatively benefit the most, while dense urban agglomerations might benefit the least.

Scenarios are building on assumptions about the future and different spatial impacts future development may have. However, implementing the envisaged European transport projects with a slight raise of transport cost seems to be a plausible scenario.

### **3.2.4 Regional Classification Analysis – some first results**

Bringing the different thematic analysis together, ESPON 3.1 examined and classified the European territory drawing on indicators and data available through the ESPON network. The Process of the so called Regional Classification of Europe combined indicators from the fields: economy, labour market, demography, environment, hazards, and accessibility. Therefore a very specific spatial structure of the Europe 27 +2 was created. (See above, ch. 2.4)

Regarding cohesion one interesting finding is that there are a couple of regions scattered all across the new member states which are able to reach the EU 27+2 average. These regions are even performing better than some parts of the EU15 which can be found at the lower end of the scale. Especially the direct neighbours to the former EU 15, as Poland, Hungary, Slovakia and the Czech Republic, show remarkable areas with a good overall performance. These findings are obviously good news in the sense that promising starting points for future development are already existing in the new member states.

### **3.3 Polycentricity**

Polycentricity as a spatial planning concept that tries to combine equity (poly) with the strengthening of potentials (centricity).

Polycentricity is one of the central terms of the ESDP as well as of ESPON. It is a genuine spatial development concept that is seen to improve territorial cohesion and balanced spatial development in Europe. How can polycentricity be understood, what looks Europe like in terms of polycentricity, and how can public policies contribute to achieving more polycentric development?

#### **The definition and measurement of polycentricity**

The concept of polycentricity was first mentioned at the European level in the Leipzig principles that formed the basis for the European spatial development perspective.

Four dimensions of polycentricity can be distinguished. These are:

#### **Morphological – settlement patterns**

The most prominent dimension of polycentric development regards settlement structures, i.e. the distribution of population, buildings, and

infrastructure over a territory. The location of smaller, medium sized and larger cities is characterised by long term stability and inertia, gradually influenced by location decisions and migration tendencies. These trends are difficult to influence through public policies, and the effects of particular policy instruments will only become visible in the long run.

### **Functional socio-economic specialisation**

The attractiveness of a place is largely influenced by its specialisation. Thus the aspect of socio-economic specialisation development of key competences and clusters needs to be considered. This aspect can be influenced through public policies, in particular with regard to the aim of structural change.

### **Accessibility in terms of transportation and ICT**

Polycentric development is also about the connections between nodes in a polycentric pattern. In particular, the proximity to transport nodes and the accessibility of information determines the endowment of places and regions that enables specific activities including co-operation and competition between different regions. It is here that public policies can exercise influence, e.g. through infrastructure investments.

### **Co-operation and Interaction**

Whereas accessibility and specialisation target the potential for the development of relational and functional polycentric development, its network 'embeddedness' illustrates the use of such potentials. However, this aspect is rather difficult to measure. Nevertheless, public policies have huge potentials for developing this aspect.

## **Background of the polycentricity goal**

The judgement that economic activities in Europe, at all three levels, from European to national and regional, are often too much concentrated whereas peripheral parts suffer from a lack of critical mass, led to the political aim to foster a more balanced and polycentric development in Europe.

Polycentricity can be seen as being opposed to monocentricity on the one hand as well as to urban sprawl on the other hand. Thus the concept of polycentricity is based on the view that the optimal pattern and distribution of urban centres in a territory lies somewhere between monocentricity and total sprawl. This view is one of the reasons why the concept of polycentricity is ambiguous. Some territories might show a too spattered settlement pattern and would need more centralisation to reach a well-balanced polycentric structure, while others might already be too centralised and would be in need of more decentralisation. This ambiguity also holds true when different spatial levels are compared. In some European areas

outside the central pentagon more powerful and centralised urban structures might be needed to better compete with other high-ranked centres in Europe and to take a greater share in the high-level European functions. This may foster more polycentricity on the European level, but at the same time can weaken polycentricity at national or regional level.

It seems to be this very ambiguity that makes the concept of polycentric development a 'bridging concept' between the ESDP goals of 'economic growth' and 'balanced development'. When 'economic growth' is associated with centralisation and 'balanced development' with de-centralisation, these two goals obviously have a very similar ambiguity compared to that which is implicit to the concept of polycentricity. Polycentricity thus promises to overcome the dichotomy between competitiveness and balance which makes it, like all ambiguous goals, especially interesting for use in the policy arena.

Following the ESDP, polycentric development implies the encouragement of settlement patterns at all geographical levels (European to local) that enhance competitiveness, regional balance and new urban rural relations. This implies an understanding of regional development more sensitive to the need to focus on the potentials (e.g. possible specialisations) of the regions. Furthermore, it implies an integrated territorial approach, where urban centres are considered as being the motors of development: global economic integration zones to integrate the European macro regions, small and medium sized cities to integrate and promote regional development in more peripheral and rural regions.

Before it was introduced in the European debate, the concept of polycentricity had some ancestors and relatives in national contexts. For instance in France, a policy of fostering polycentricity has been adopted in the 1960s, and in Germany the concept of central places has been implemented at the regional level for the last 50 years. This is one of the reasons why there are different national connotations with the European concept of polycentricity.

As a scientific concept, polycentricity can be traced back into the 1930s when W. Christaller developed his central place theory. Central places theory refers to an urban hierarchy where higher ranked cities offer more specialised goods and services that need larger hinterlands. Thus one of the basic assumption of this theory is the provision of central goods and services in Central places and customers of these goods and services who have to go to these Central places in order to use them. The theory and concept of central places indeed has a strong connection to the concept of polycentricity as far as the national and regional level is concerned.

At the European level, however, things look a bit different. The special importance of big metropolises like London or Paris is not primarily linked to their role as a centre of the region providing central goods for their hinterland. It is rather linked to the agglomeration of specific functions, like government and economic headquarters and transport hubs, mainly linked to the steering of society and the provision of worldwide exchange (Gateway function).

At the European level, polycentricity is associated to the model to enhance regional development more evenly across the European territorial and to strengthen regional development outside the pentagon. The main connotation of this macro perspective of polycentricity is the aim of avoiding a too high degree of concentration of activities in the European pentagon area. Currently the European pentagon has about 14 per cent of the EU 27 area, 32 per cent of its population and 43 per cent of its GDP. Seeing the pentagon as one large zone of global integration, and the only one of this kind in Europe, the European territory appears to be monocentric and the creation of more global integration zones outside of the pentagon would help to strengthen a more polycentric structure on the macro European level.

The meso level has been interpreted by project 1.1.1 as the interregional level. The strategic idea here is that cities can cooperate and complement each other and by this create larger, conjoint hinterlands. This strategy can allow to jointly provide urban functions that would usually only be offered by higher ranking cities. In some European countries this strategy is also known as the concept of "enlarging regions".

At the micro or intra-regional level the strategy to create more polycentricity is essentially based on the same idea. An urban region can improve its economic performance through better cooperation and improved links within the region. An intraregional application of polycentricity thus promotes integrated spatial development strategies for city clusters.

For project 1.1.1 strategies for a more polycentric development are closely connected to the development of specialised regional competences which are implemented in regional networks and produce singularities that are difficult to reproduce elsewhere.

### **3.3.1 Morphology**

Although Spatial Development Policy goes well beyond physical planning, the physical, morphological elements of space and territories which are visible as

settlement patterns, transport networks, urban structures etc. form the fundamentals from which spatial policies and spatial analysis can start. For instance, these physical structures shape the core-periphery patterns that have dominated the debate for decades. Although these structures will only change slowly and over generations, we need to be aware of the imbalance and disparities on the settlement structures.

### **Trends: Morphological imbalances and disparities**

The morphological picture of Europe shows aspects of imbalances and disparities at all geographical levels. This regards to the urban structure at European and national level, the reinforcement of these imbalances through current demographic trends, and developments in rural areas. The processes of 'rurbanisation' and contradictions of imbalances at different levels, make the picture even more complex.

### **The pentagon: core-periphery differences in Europe**

Today, the morphological picture of Europe is dominated by the core, i.e. the Pentagon defined by London, Hamburg, Munich, Milan and Paris as the five corners. Looking at the physical structure of high density and high urbanity, the Pentagon might even be enlarged to the five corners of Manchester, Berlin, Venice, Genoa and Paris.

Outside this dominating space, there are only a few urban areas with a certain potential to counterweight the predominance. These are Madrid, Barcelona and Athens in the South, Dublin in the West, and Stockholm, Helsinki, Oslo and Gothenburg in the North.

Major urban areas with high scores in the new Member States are mainly located close to the Pentagon, with Warsaw being the only exception.

### **Identification of additional potential global economic integration zones**

Considering large clusters of cities (comparable to the Pentagon in central Europe), two areas in the new EU Member States might be seen as one example for possible future global economic integration zones (cf. ESPON 1.1.3):

Tallin/Tartu/Riga/Daugavpils/Vilnius/Kaunas

Poznan/Krakow/Dresden/Prague/Bratislava/Vienna/Budapest

In the enlargement process, a never before in Europe experienced number of border regions will have the potential to merge into dynamic functional relationships with new neighbours.

In a complementary approach, ESPON 1.1.1 started from larger functional urban areas which could form the core of potential integration zones and identified three such areas:

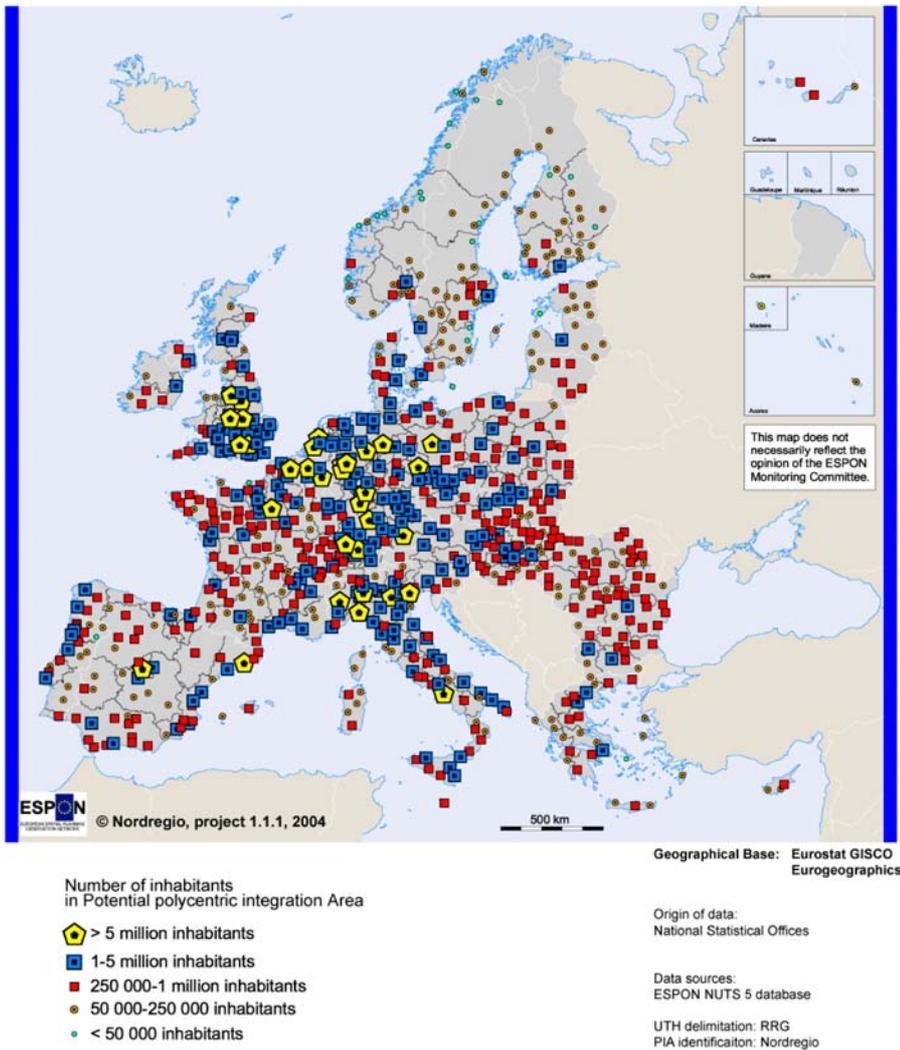
- Madrid and surrounding
- Barcelona and surrounding
- Naples and surrounding

In addition to the hubs discussed above, some larger urban regions have been identified, so called Potential Polycentric Areas of Integration (PIA), which are more peripherally situated and show potentials for improving their position mainly through increased regional integration. These areas are Montpellier, Decin, Rimini, Palermo, Messina, Copenhagen, Bari, Allicante, Oslo, Belfast, Porto, Glasgow and Valencia.

The Potential Polycentric Areas of Integration (PIA) were identified by ESPON 1.1.1, based on the hypothesis that neighbouring cities with overlapping travel-to-work-areas have potentials for functional integration and can gain from co-operation.

The following map illustrates the potential population mass each PIA can aim for in absolute terms. It shows the population of PIAs. These population levels can of course not be obtained simultaneously by all PIAs, as their delimitations overlap. Here again, the concentration of PIAs with an exceptionally high population potential from the UK Midlands to Northern Italy and over most of Germany is apparent. Outside this extended Pentagon area, Madrid, Naples and Barcelona are the only PIAs with more than 5 million inhabitants.

**Map 12 Potential Polycentric Integration Areas in EU 27+2**



## National Urban Structures

In the national contexts, urban structures are rather diverse depending on the history, political organisation and urbanisation processes of a country, combined with current demographic trends in terms of national centre-periphery patterns.

In general, it can be concluded that the most polycentric countries (considering morphological aspects such as size, location and connectivity) are Slovenia, Ireland, Poland, Denmark and the Netherlands, though they are to be seen as polycentric for rather different reasons. Other countries generally judged as polycentric score less when this index is applied, as e.g. in Italy, Germany and the UK cities are concentrated in one part of the country. The most monocentric countries are Norway, Finland, Spain, Hungary, Portugal and Sweden.

New Member States have on average a more polycentric urban system than the old EU Member States, but polarisation has increased since the beginning of the transition period. In Poland Warszawa, Poznan and Gdansk are losing their positions. But in terms of wealth contribution to the total of the ESPON Space, Poland is almost entirely on the rise. Polycentric developments are assumed to coincide with the total favourable wealth contribution at least to some extent. (1.1.3 p.10)

### **Demographic tendencies reinforce existing imbalances**

Current demographic developments are challenging Europe as they affect the future of the social welfare system as well they forecast increased concentration tendencies. The challenges are in particular related to the aspects of fertility rates, aging, and migration.

The timing, pace and courses of developments in fertility change varied substantially between different types of local communities and regions, for instance according to dimensions commonly associated with rural-urban, centre-periphery.

Mapping the aging in Europe shows that it is a phenomenon both in expansive in-migration areas and traditionally out-migration areas. In the new EU Member States and in Northern and Southern Europe, the aging process seems to have impact on total population change, but the impact on the components differ among them.

With regard to external migration, Europe has become globally attractive, even former emigration areas, such as Greece and southern Italy. In Eastern Europe the countries face a different situation, as richer countries are immigration countries and poorer countries emigration countries.

Taken together the various segments of population development, we see increasing challenges in depopulation tendencies. Spain, Italy, Bulgaria, Slovenia, Hungary and the Czech Rep. come out as countries with depopulation areas. No depopulation regions occur to high degree in Greece, UK, France, Poland and northern Italy.

Looking more on the micro level, it can be observed that metropolitan areas are the most attractive areas for external immigration, and there are in addition tourist areas that have become areas of immigration due to high life quality, attracting retired persons (grey-migration), followed by people from poorer countries.

On the other hand there are also shrinking communities. Regions with poor demographic structure, negative population trends and low population mass

and density are involved in a vicious circle of cumulative causation, with declining regional markets for the private sector and increasing per capita costs for public services.

### **Rural areas**

The demographic trends affect especially peripheral and rural areas. Neither the Structural Funds nor the Common Agricultural Policy (CAP) have developed means which are particularly effective for reversing demography and economic trends in rural areas.

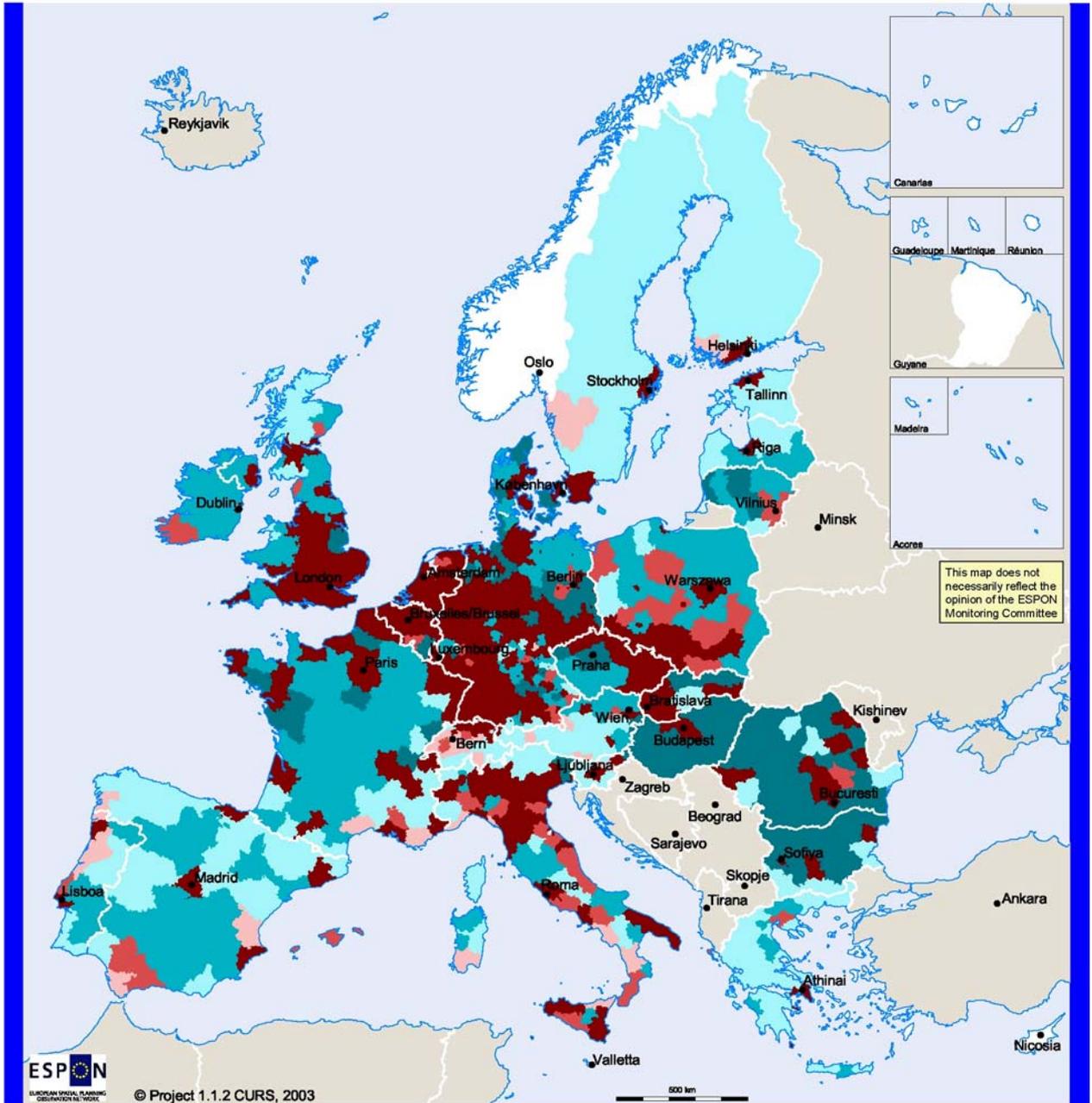
Both as regards Structural Funds and CAP, it is not so much the tangible resources themselves that matter for economic performance, but the way the local people are able to exploit the means that are available to them. This regards not only the availability of EU or national funds, but even more private sector money, not least in forms of bank loans, as will be discussed when considering banking systems in the section on socio-economic specialisation.

### **'Rurbanisation' and the outdated dichotomy between rural and urban**

Especially for increasing polycentric development at European level, the stronger regional integration in the Potential Polycentric Areas of Integration (PIA) is required. This implies also an integrated view on urban and rural areas within one region. It is high time to overcome the outdated dichotomy between rural and urban areas.

Whereas more integration is needed at the policy-front, the physical reality shows forms of integration, since long. Indeed, we witness an increasing process of 'rurbanisation' where the physical environment loses qualities that were traditionally associated with urban and/or rural settings.

**Map 13 Urban-rural typology**



**Urban-rural typology, based on population density, FUA ranking and land cover**

- High urban influence, high human intervention
- High urban influence, medium human intervention
- High urban influence, low human intervention
- Low urban influence, high human intervention
- Low urban influence, medium human intervention
- Low urban influence, low human intervention
- no data

© EuroGeographics Association for the administrative boundaries

Ranking of Functional Urban Areas (FUAs):  
 Origin of data: Eurostat, National Statistical Offices, National experts  
 Source: Nordregio, ESPON Database

Population density:  
 Origin of data: EU25: Eurostat, Norway and Switzerland: National Statistical Offices  
 Time reference: 1999

Land cover types:  
 Origin of data: EEA, Corine Land Cover 90  
 Source: ESPON Database

It is increasingly difficult to tell rural and urban apart, even statistical definitions are missing. Seeing Europe through rural-urban-glasses (see above, Map 13), areas under high urban influence and with high urban intervention (type 1) cover 19 percent of the ESPON area, but house 60 percent of the population and produce 70 percent of the total GDP. The corresponding figures for the sum of all three types with high urban influence are 26 percent, 69 percent and 77 percent. This means that nearly four fifths of the GDP of the ESPON space is produced in slightly more than one fourth of the territory that is under high urban influence. The regional types 5 and 6, with low urban influence and medium or low human intervention, count for 53 percent of the total territory but only 20 percent of the total population and 16 percent of the GDP.

The degree of human intervention was estimated by the relative share of artificial surfaces of the total land cover. On the average, this criterion correlates with population density, but there are remarkable deviations, which are closely connected to national territories. The east of Europe (excluding Poland) as well as Sweden, Denmark, Belgium and part of France are characterised by a higher share of artificial areas per capita than would have been expected by the regression analysis on population density, i.e. in those areas is the degree of human intervention and thus discontinuous urban land considerably higher than population density would suggest.

### **Are there positive effects of polycentricity on economy and sustainability?**

As regards the horizontal integration of the goal of polycentric spatial development with goals of sustainability and economic growth, positive correlations can be reported. Polycentric countries use less energy and are economically more successful than non-polycentric countries. Among the new Member States, more polycentric countries have smaller differences in income levels between central and peripheral regions than monocentric ones. (cf. 1.1.1 p. 8)

### **3.3.2 Socio-economic specialisation**

Despite immense differences in morphological terms, even comparably small areas can be important nodes in national or European networks and polycentric constellations concerning specific questions. Luxembourg and its importance in the banking sector or Oulu in the field of telecommunications are good examples showing that regional expertise and specialisation can outweigh size as location factor. This sub-chapter explores the aspects of socio-economic specialisation and its importance for polycentricity.

#### **Strengthening pre-conditions for attracting R&D investments**

R&D is probably the sector where most actors and policy-makers are inspired to highflying visions for areas that do not belong to the hotspots of today. The pattern of R&D activities in the EU is one of spatial concentration in a limited number of regions, with strong disparities existing between these and other regions. It is the less favoured regions (e.g. Obj 1) that experience the greatest disparities in performance, particularly those located in the Mediterranean region. Nevertheless, pockets of poor performance can be identified across the EU. However, one needs to keep in mind that the limited funding from EU R&D programmes is unlikely to have a statistically significant, or even measurable, effect at national or regional levels.

In terms of R&D funding through Structural Funds, the support is designed to increase the capacity of a region to do and exploit research, rather than to finance research. It can be argued that Structural Funds can be employed for supporting the creating of pre-conditions for attracting R&D activities.

In general there is a shift from supply side infrastructure support towards activities focused on the demand side of the innovation system, such as technology transfer and networking. The largest improvement were generally reported in the technological capacity of firms and research centres receiving funding. Structural Funds, and in particular funding directed through the Regional Innovation Strategies (RIS) and Innovative Actions, have also had a significant impact on governance in the field of R&D and Innovation.

Spain, Italy and Ireland have all established national programmes for allocating R&D funding to their Objective 1 regions. In Objective 2 regions in Spain and Italy and everywhere else, allocation of funds to R&D related activities has been decided on a regional basis, leading to very considerable variations in emphasis placed on such interventions, within and between countries.

## **Importance spatially based financial institutes**

For the financing of regional development and initiatives deriving from local actors and social capital building measures, adequate private funding measures are required. Spatially oriented bank systems are generally more polycentric than finance based ones. Moreover, a polycentric banking system can irrigate in a better way in the whole economy of a country. Thus the move to a more finance based system generally provokes the concentration of financial activities in the main financial centres at the national or international scale. Peripheral regions and SMEs could therefore suffer from credit rationing.

### **3.3.3 Preconditions for interaction: Accessibility**

One focus of the socio-economic specialisation is certainly on the attractiveness of areas in terms of location or search for co-operation partners. Thus the question of accessibility becomes an important element for establishing co-operation which allows actors of an area to network with actors in other areas and thus become part of a polycentric system. Of importance are both the physical accessibility – i.e. how easily and under which time and funding expenditures can a place be reached – as well as the access to information and communication networks – i.e. various types of internet and telephony solutions.

As regards physical accessibility, Europe shows a clear core-periphery pattern, with small modifications due to air links; also at national level we see mainly core-periphery patterns.

In the field of ICT, the core-periphery picture does not hold. This is mainly due to the strength of the Nordic periphery, but in the case of mobile telephony, the Mediterranean periphery also outpaces the core, and for broadband uptake Spain and Portugal have so far outpaced some core countries, notably UK and France. The one area in which the core clearly leads is in access to internet backbone networks for large corporate users and Internet Service Providers.

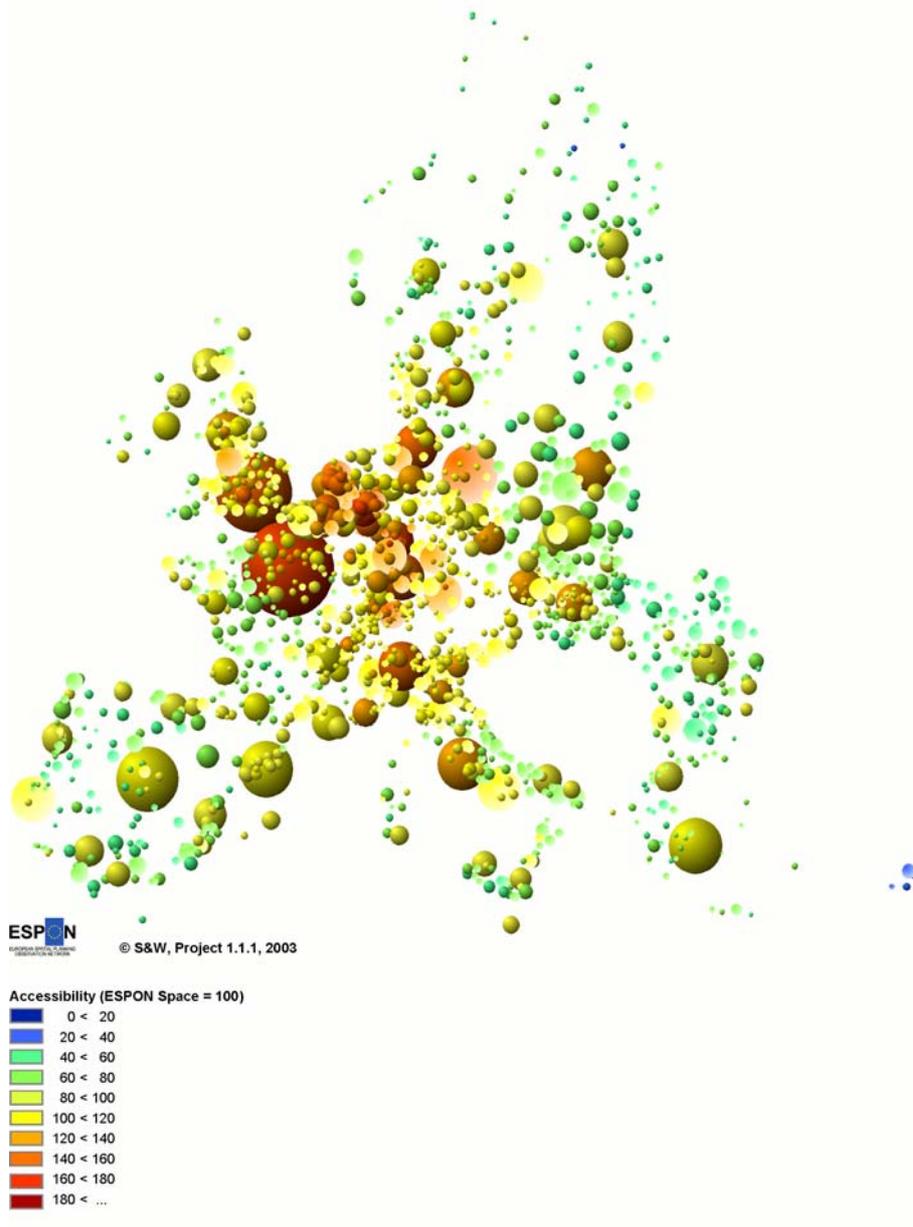
## Trends: Physical meetings in the core – Information society in South and North

The overall effects of transport infrastructure investments and other transport policies are small compared with those of socio-economic and technological macro trends, such as globalisation, increasing competition between cities and regions, aging population, shifting labour force participation and increasing labour productivity.

Even large increases in regional accessibility translate into only very small increases in regional economic activity. However, the magnitude of the effect seems to depend strongly on the already existing level of accessibility, which is reflected by the European core-periphery pattern.

### Map 14 Potential Accessibility of FUAs, multimodal, 2001

The quality of transport infrastructure in terms of capacity, connectivity,



travel speeds etc. determines competitive advantage of location relative to other cities or urban regions. This can be measured as potential accessibility, i.e. based on the assumption that the attraction of a destination increases with size, and declines with distance, travel time or cost. Applied to European urban regions it describes their relative geographical position in the European transport systems as one of their most important competitive features.

The map (ESPON 1.1.1 TIR) shows the results of applying the multimodal potential accessibility concept of ESPON 1.2.1 to functional urban areas in Europe. In the map the areas are represented in two ways. The size of the circle represents the size of the population. The colour of the circle reflects multimodal accessibility, i.e. a combination of road, rail and air accessibility in one single indicator.

Very peripheral areas can be found in remote parts of Portugal, Spain, and Greece, on Cyprus, in Bulgaria and Romania, in the Baltic States and in the very north of Europe. Smaller areas in Portugal, Spain, Italy, Greece, and Ireland, in the Nordic countries and in the acceding countries are classified as being peripheral. The larger agglomerations in those countries are on the European average, some are even central. Areas with highest accessibility values are mainly located in the UK, northern France, Benelux, in Germany, Switzerland and Austria and in northern Italy. Here, even smaller places have very high accessibility values. Overall, the largest agglomerations do not necessarily have the highest accessibility.

## **Two overlaying core-periphery patterns**

In terms of accessibility there are two overlaying core-periphery patterns, a national and a European one. The national pattern is due to the fact that spatial interaction is much more intense within countries than between them. Hence, not only regions in the European periphery, but also regions in the periphery of their respective national markets suffer from increasing transportation costs, because their interaction with the markets is more dependent on transportation than that of more central regions. This also explains why losses in border regions and coastal regions are above average.

Referring to polycentricity, the effects of access to transportation are ambivalent. Transport policies which reinforce polycentricity at the European level, may increase the dominance of capital cities within their national urban systems and so contradict the goal of the ESDP to achieve a balanced polycentric urban system. Indeed, all transport infrastructure examined

accelerate the decline in polycentricity of national urban systems because they tend to be directed at primarily connecting large urban centres.

### **Scattered European ICT-picture**

When it comes to ICT, the picture becomes more complex, as it is very different for each technical solution. Spatial patterns depend on technical solutions, which reflect mainly national differences in telecommunication cultures. Indeed national specificities remain crucial in understanding territorial differences across Europe.

At local and regional level there are disparities between metropolitan, urban and rural areas. Thus it is not surprising that the currently most commercially developed forms of broadband technologies are following a hierarchical roll-out pattern, with areas of high density population being served first.

Last but not least, it has to be noted that telecommunications is an exceptionally fluid sector where things change rapidly. Thus the picture presented today could be rather different tomorrow.

### **3.3.4 Co-operation and Interaction**

Socio-economic profiles of interest and good accessibility facilitate interaction, however for achieving polycentric development and thus territorial integration we need to strengthen interaction between actors across sectors and geographical entities.

So far very little knowledge is available on the actual degree of integration and interaction between actors located in different areas.

With regard to EU policies, two main aspects have been identified: (a) the importance of interaction at local and regional level, i.e. partnership, governance, empowerment, social capital building etc., and (b) the importance of trans-national networks for developing polycentricity.

## **Trends: Social capital building and increased trust on local development actions**

Almost all studies on EU policies show that the aspects of social capital, partnerships, governance, empowerment and networking are significant factors showing more long-term impacts than the so called tangible results (CAP, R&D, SF). Social processes are fundamental to local and regional development. In this sense, social capital has a vital role along with appropriate structures of governance. The role of public policy and development agencies is seen increasingly as to trust, foster and enable local action. In particular with regard to Structural Funds, it has been shown that indirect and leverage effects of funding on social capital etc can have more effects on spatial development than the actually financial investment. With regard to R&D it has been shown that spatial effects of investment depend on the integration of the R&D activity in a wider institutional, local or regional context. Only then the effects and results of R&D can be employed by in the area. With regard to rural development, LEADER is frequently mentioned as a good example for an EU policy instrument stimulating local capacity building. Corresponding results can be found for URBAN in the urban policy field.

It is important to reflect a plurality of cultural identities and to link this to cultures of everyday life through a broad participative process. Newly constructed regional identities will only succeed in mobilising common efforts towards shared objectives where these supplement and build on multiple local identities.

## **Trans-national co-operation, an under-utilised instrument**

Interreg in particular illustrates the importance of international networks and combined learning forces. Trans-national networking within meso-regions such as e.g. Interreg regions, contributes to the development of polycentricity if regional integration and competitiveness results from such co-operation.

This regards both the stimulation of social capital and activities within single regions, as well as the co-operation between regions through the solution of joint challenges or the exchange of experience on common challenges. Furthermore, Interreg as a top-down stimulation of bottom-up co-operation on selected issues is an opportunity for disseminating policy ideas and filling them with content according to the local or regional context given.

## **4 ESPON Policy Recommendations**

The policy recommendations provided in this report are based on the work of the various ESPON projects. Thus, they are based on varying sets of more or less implicit premises and assumptions about the world in which those recommendations might be applied. Before turning to the policy recommendations, we would like to say some words about the premises on which they seem to be based.

### **4.1 Premises of ESPON policy conclusions**

The tacit premises regard mainly the field of policy-making and the polity. Firstly there are a number of premises regarding EU policies in general. These see e.g. a growing "Europeanization" of politics, "determining" influence of European policies, Member States which will remain as they are and retain their power as well as a continued manageability of an enlarged EU.

Secondly, there are premises dealing with European regional policies. This regards in particular the aims and values behind it, i.e. assumptions that European integration, territorial cohesion and polycentric development are aims to be sought after. More particular the tacit assumptions regard the Structural Funds, such as that a fair distribution of Structural Funds is possible or that Structural Funds do affect territorial development in Europe.

With regard to the spatial policy aims generally advocated in the wake of the ESDP, tacit premises concern the fact that spatial impacts of different policies should be taken into account for developing more efficient policies and make use of synergy effects.

With regard to the economic development, the main premises concern the possible convergence of old and new Member States at slow pace, but also the idea that "economic development motors" have a positive effect on surrounding areas for economic growth. Furthermore, physical infrastructure is viewed as important premises for economic development. In general, there is an economic growth paradigm underlying the policy recommendations developed. Maybe more interesting is also that the policy recommendations largely are based on the assumption of the availability of (fossil) energy at modest prices.

Furthermore, the policy recommendations developed are based on a number of premises regarding the societal development in Europe, basically focusing on a stable society in Europe. Examples of these are the assumption that territorial equity serves individual equity, that everybody has similar ideas of

a “good life”, that ethnic and religious tensions do not take threatening dimensions, or that demographic decline does not require mass immigration.

Interesting to note is that rarely any premises regarding the environmental dimension have been detected. The basic assumption seems to be that sustainable development does not require major changes. One could also argue that the economic and the social dimension of the sustainability triangle seem to be predominant when drawing policy recommendations in ESPON.

These premises indicate caveats when applying the policy recommendations in a world that is characterised by change rather than notorious continuation of current trends and developments.

In order to check the robustness of the policy recommendations, they have been contested by applying a series of wild cards to them. Indeed, most of the policy recommendations seem to be reasonable robust to changes in current developments. This is mainly because of the rather general nature of the policy recommendations provided in this report. As this report is a synthesis document only the overall lines of the policy recommendations have been addressed and thus the recommendations are of rather comprehensive nature.

Still some possible developments will make it necessary to reconsider the recommendations provided. For instance, a WTO agreement on free trade would affect the policy recommendations provided in particular in relation to CAP and Structural Funds. Indeed, a free world market might not be reconcilable with the existence of structural aid and present forms of EU structural and agricultural policy. Other possible developments such as increased energy prices or new preferences in settlement patterns will cause considerable changes, but the policy recommendations are likely to be still pointing towards the “right” direction.

So far political wild cards have been excluded, as we will leave it to the policy makers and their ability to sense changes in the policy environment and adapt policy recommendations accordingly.

In the following we will present the policy recommendations based on these findings. Firstly, we will briefly discuss the main challenges and introduce some overall policy recommendations, relating to the need for a more integrated approach to policy making involving mechanisms for the horizontal and vertical integration of policies, e.g. through co-operation and governance. Secondly, we will discuss various elements of possible policy combinations addressing the European morphology. Thirdly, components of possible policy combinations in the field of functional regional specialisation will be discussed. Fourthly, the issue of accessibility is at stake and also here

possible policy combinations will be outlined. Fifthly, the issue of co-operation and interaction between actors in various territories and a few policy recommendations in this field are addressed. Last but not least, the need and focus for future research will be discussed.

This report tries to present policy recommendations for various aspects of territorial cohesion and polycentricity. For those interested in a discussion of policy recommendations according to geographical levels (European, national, regional) reading the Third Interim Report of the ESPON 3.1 project is recommended.

## **4.2 General policy recommendations**

EU Enlargement and on-going macro trends are challenging the territorial cohesion within the Union. Over time, enlargement will mean the emergence of an EU with much wider income disparities, and, at least initially, it would leave practically unchanged disparities within EU countries. The overall effects of European policies are small compared to those of socio-economic and technological macro trends, such as globalisation, increasing competition between regions, ageing populations, shifting labour force participation, increases in labour productivity, high-migration flows and multiculturalism. These overall macro trends do not necessarily work in favour of territorial cohesion at the European level.

The challenge is therefore to identify what types of measures, in which particular areas can strengthen territorial cohesion throughout Europe.

Growth enhancement is also the main concern of current European policies with regard to territorial cohesion, in the enlarged Europe, and in the countries lagging behind. In particular, in these countries two types of capital expenditure are likely to have a significant impact on growth: human capital investment (R&D, education, training) and physical capital investment (infrastructure). Given the limited financial resources of EU policies, they can only become an efficient tool when combining financial instruments with non-financial instruments, particularly in the field of agenda setting.

As regards the ESPON policy recommendations, there is a general focus on funding in structural policies, changes in sector policies, governance, including the need for integrated approaches, and the need for further research, data collection and better typologies. The topics addressed are the functional specialisation of territories, the competitiveness of territories and the role of urban areas as development engines, and the ambiguous relationship between transportation and territorial cohesion. Issues

regarding social and environmental policies are however rather under-represented here. Especially, because of the growing disparities within EU Member States, social cohesion might deserve more attention in the discussion on spatial development policies.

Thus far, three main conclusions as regards the ESPON work can be drawn, two of which are inline with conclusions presented in the report on “an agenda for a growing Europe” and in the report on the “spatial impacts of community policies and costs of non-co-ordination”. The main emphasis is on the policy framework, which is needed for a coherent policy addressing the spatial challenges. Permanent solutions for horizontal and vertical policy co-ordination are also being sought. Furthermore, the need for a more place-based policy is underlined, and not least in the context of the concept of polycentrism trying to strengthen specific development potentials.

### **Strengthening of sector co-ordination**

European integration has reached a stage where the juxtaposition of two logics that ignore each other can no longer be continued without crystallising tensions with detrimental effects on integration. Parallel to the continuation of the Community sectoral model, a strong structuring of territories can be observed throughout Europe. However, in practice the degree of horizontal co-ordination between the various Community Institutions is relatively low and no procedure exists which aims at creating spatial coherence between all Community policies (Spatial impacts of community policies and costs of non-co-ordination). For achieving territorial cohesion and polycentric development, action towards more horizontal policy integration thus needs to be taken.

### **Governance approach to EU policies**

In an environment of limited funding, European policies need to employ indirect measures more effectively.

Effective implementation of EU policy thus frequently depends not only on the explicit co-operation of various national and sub-national government bodies in the implementation of common policies, but also on their willingness to set their own priorities and develop their own agenda in accordance with EU priorities, or to shape their local policies in the light of wider European reference points. The EU thus needs to act as a facilitator, following an incentive-based approach that treats Member States as partners willing to participate in various forms of cooperation, provided that they have a genuine interest in it (An agenda for a growing Europe – page 125-126). For achieving territorial cohesion and polycentric development, actions towards vertical integration through governance processes thus need to be taken.

### **Strengthen spatial policy concepts**

Focusing more directly on the spatial dimension, the concept of polycentric development appears to be particularly important for strengthening territorial cohesion, despite its ambiguity when applied at different scales. Generally, polycentric development concerns functional urban areas, their functional specialisation, the links and interaction between them and the morphological urban system. The application of the concept and importance of the single elements differ depending on the geographical scale, i.e. European, national and regional or even urban. At the European level e.g., the main emphasis is on stimulating the development of regions beyond the so-called Pentagon into becoming global integration zones. A more polycentric structure, with several strong urban regions of European and global significance, can contribute to the competitiveness of Europe as well as to cohesion between different territories. In order to achieve territorial cohesion and polycentric development this however needs to be made more explicit in the context of the necessary policies and implementation instruments.

The ESPON work has shown that the policy aims of territorial cohesion and polycentric development can be applied at various geographical levels, i.e. European/trans-national, national or regional/local (three level approach). The meaning and implication of the concepts change depending on the level in question and can even contradict each other, e.g. strengthening polycentric development at the European level may weaken polycentric development at the national level, and vice versa.

This three level approach to spatial policies needs to be considered when discussing the tentative policy recommendations. The following section on the EU approach to spatial policy-making addresses, among other things, the vertical integration of policy aims across these three levels of government while the section on EU structural and sector policies mainly addresses territorial cohesion at the European level. The discussion on polycentric development is split into a section on the European level and a section on the national and regional levels.

### **EU Policy Approach**

Spatial policy-making is moving towards a spatial orientation aiming at the co-ordination of sector policies at each geographical level. In this increasingly complex policy environment, the EU needs to be a platform for the formulation of policy aims and implementation instruments, as well as a facilitator leading joint efforts regarding the spatial challenges and opportunities ahead. The interdisciplinary nature of spatial development

requires an approach to policy-making that involves horizontal and vertical interaction. Therefore, the approach to EU policy-making, in terms of interdisciplinary frameworks, governance and capacity building needs to be addressed.

### **Develop an interdisciplinary policy framework**

The report on the "spatial impacts of community policies and costs of non-co-ordination", pointed out that parallel to the continuation of the Community sectoral model, a strong structuring of territories can be observed throughout the whole Union, which mobilises not only the public and the semi-public structures, but also all the dynamic forces of society. The territorial approach applied in the ESDP and by ESPON illustrates the currently high degree of sector orientation and the need to consider conflicts of goals/aims between various policies as well as the demand for a more integrated policy framework.

The lack of integration between different EU structural and sectoral policies can act as a barrier to the development of territorially integrated policies at the national and local levels and to the promotion of urban-rural relationships and partnerships. The conflicts of interests between rural and urban policies are a key obstacle to the development of integrated spatial initiatives.

Another example of this is the need to regard the tension between prosperity and regional culture, which e.g. has been expressed by the slow-city movement. This tension may suggest more spatially tailor-made approaches to policy making instead of sector-oriented approaches.

More explicit are the conflicting goals in relation to transportation policy. Transport has been used as an agent for structural and spatial development policy without regard to its other consequences, or to the less positive implications for spatial development. In particular, the potential goal conflicts that stem from the negative effects that improvements in transportation tend to have on territorial cohesion and on the environment, need to be addressed in policy-making.

Another example of the need for an interdisciplinary policy framework is illustrated in the demand for an integrated rural development policy. As regards CAP, improved subsidiarity and its harmonisation with regional policies are among the key recommendations. Generally, it is necessary to tailor rural development policy more appropriately to the diversity of territorial needs across rural Europe, to build on the lessons of LEADER and Objective 5b, and to require greater harmonisation with regional policy and an approach to multi-level governance. When it comes to R&D efforts to achieve synergies are proposed as regards the Framework

Programme and the Structural Funds within eligible regions. The findings of various ESPON reports suggest that a permanent solution to the overcoming of cross-sectoral conflicts on spatial matters is needed. This may take the form, as suggested in the report on "spatial impacts of community policies and costs of non-co-ordination". This report calls for the creation of an inter-institution co-ordination committee responsible for the spatial coherence of Community policies and the introduction of a spatial impact sheet - obligatory for each service - that will draw up proposals for Community legislative acts. Undoubtedly however, obligatory territorial impact assessments/analysis of sector policies would be another option in this regard (cf. Territorial Impact Assessment).

### **Facilitate incentive-based governance and further research**

In particular in the cases of limited funding resources the Structural Funds could be used to promote the goals and concepts of European spatial development policies in less direct ways, such as by agenda setting policy discourses, funding studies, evaluations and the promotion of new thinking in this area. This addresses two aspects, firstly the approach to European policy-making, and secondly the possibility of influencing the policy agenda through knowledge production.

As regards policy co-operation, reduced funding opportunities and increasing challenges calls for broader co-operation on European policies. What is required is a much more incentive-based approach creating a partnership between the EU and Member States that are willing to participate in forms of co-operation that they have a genuine interest in. This is what the report on "an agenda for a growing Europe" calls the concept of the EU as a facilitator.

This also includes the need for further research on European spatial development and on the spatial effects of European policies, including data collection over a longer period of time, and the development of policy relevant spatial typologies. Thus far ESPON has delivered initial samples on this.

In the report on the "spatial impacts of community policies and costs of non-co-ordination" it is argued that the anticipation of the territorial impacts of Community policies requires constant observation by experts. This would therefore call for setting up a network with good knowledge of the operation of Community policies (as well as their national or regional translation) on the related territory, and one that can react quickly to the requests of the Commission.

### **Set frameworks and build national, regional and local capacity**

For the implementation of the spatial policy aims, it is important to

achieve understanding and commitment at all levels of governance. To achieve this it is recommended that resources for the development of local community capacity building in the relevant EU funding programmes need to be dedicated. This relates both to the promotion of urban-rural complementarities and partnerships, and to the introduction of polycentric development at various levels and the general juxtaposing of sectoral and spatial policies aims.

Actors at the EU, national or regional levels must set a coherent framework within which local development initiatives can best add value to European spatial development aims. In particular, they should secure co-ordination at the highest levels where mainstream policies and strategies are formulated, so that policies can effectively be integrated at the local level by local development agencies and so that vertical integration can be achieved between local, regional and national policies. This relates in particular to rural policies that are expected to be more effective if the role of intangible factors such as governance, innovation, social capital and knowledge assets are acknowledged.

### **4.3 Morphology - Recommended Policy Combinations**

The ESDP challenges us to move towards a more holistic and integrated approach to both the understanding and the implementation of spatial development. The need for such an approach appears to be greatest in the poorest regions of the Community, eligible for Objective 1, where a dominance of sectoral policies prevails. But it is also required elsewhere.

With regard to morphological issues very little can be done to change the morphological set-up of Europe. Accordingly, the main policy recommendations lie in the field of awareness-rising, social capital building, considering sector policies as spatial policies, and spatial monitoring.

**Awareness-rising:** The influence of policies on the European morphology is limited. However, awareness rising is advisable regarding (a) current development trends, (b) the need for rural-urban policy integration and (c) use of integrated regional development strategies. At micro level also the investigation of forms of institutional settings in relation to handling morphological development trends might be of interest.

**Focus on processes for social capital building:** Public policy should support social processes which are as essential to rural (and urban) development as 'hard' economic interventions (in the same sense that software is as necessary as hardware to a computer). In practice this means supporting (rural) community development, understood as an approach to working with and to building the capacity of individuals and groups within

their community. Offering grants and other support, development agencies should prioritise collective action which is both inclusive and reflexive and should support new arenas for interaction. Appropriate structures of governance are also essential to facilitate local leadership and innovation. Effective and open governance is needed, with a positive attitude to small and local enterprises and entrepreneurs, and local public institutions with sufficient autonomy to adapt policies and specific measures to assist with the collective needs of local enterprises. Furthermore, open and inclusive 'soft' networks are positively related to the mobilisation of entrepreneurial capacity and local initiative.

**Monitoring of co-funding rates:** As already mentioned earlier it is advisable to keep an eye on the rates of co-financing in the cohesion countries. In particular with regard to CAP there is evidence that the difficulties to match funding may have led both to lower level of RDR expenditure and to a distorted composition of RDR spending in the poorer countries and regions.

**The integration of polycentricity into Structural Funds programming:** Utilisation of the *meso* and *micro* levels (i.e. the individual programme level) are the most efficient way of introducing spatial concepts into the discourse of Structural Fund policies. The present guidelines for the programmes could be amended to include an analysis of how the funds could contribute to 'the development of a balanced functional region' or 'a balanced urban system'.

**Structural Funds' area designation:** Area designation, paying attention to functional urban areas (e.g. by not fragmenting these into different programme areas), may increase the possibilities of contributing to polycentric development. Fuller consideration of the type of functional areas to be supported might thus be issues worthy further discussion.

**Spatial dimension of CAP:** To remove inconsistencies between CAP and cohesion policies, CAP needs to be accompanied by specific national priorities aimed at regional specific programme implementation. A progressive increase of Pillar 2 could path the way for changing this. This might be achieved either through continuing increases in the rate of compulsory modulation or preferably through the more substantial realignment of EAGGF towards Pillar 2. This is desirable because the RDR incorporates cohesion objectives, in contrast to Pillar 1.

Furthermore, in the ESPON 2.1.3 report it is recommended that the new Rural Development Regulation 2007-2013 should contain a broader range of permitted measures under the four proposed axes, building on the lessons from LEADER and Objective 5b by including more measures which address

sustainable rural development beyond the agriculture sector and which have a territorial dimension.

Also consistency with cohesion objectives would be improved through allocation of the RDR budget to Member States according to criteria of relative needs for rural development and environmental management.

In relation to direct Single Farm Payments, it is suggested that the Commission explores models through which these might be modulated more progressively in richer regions of the EU, for example through relating rates of modulation to farm business size. Voluntary modulation could previously be applied in this way with a positive territorial impact, and this would be worthy of further investigation.

**Focus on socio-economic specialisation:** At national and trans-national level, a policy for increasing polycentricity and spatial balance at European level will strengthen the already strongest urban regions. Investments will have to be concentrated in these regions, and as a result, the urban system of the countries in question may actually then become more monocentric. Consequently, a European polycentricity must build upon functional specialisation.

**Caveats with one-size fits all policies:** On the one side European diversity is considered as one of the main assets of Europe, while on the other hand, there are demands for harmonisation in terms of concepts, definitions and policies. The diversity in culture and policy-making styles as well as spatial developments, does however suggest an openness and diversity also for EU analysis and policies which could rather be framework oriented than "one size fits all approaches". This becomes not at least obvious when discussing rural or urban policies and the varying understandings and profiles of rural and urban areas in Europe.

#### **4.4 Specialization - Recommended Policy Combinations**

Utilising socio-economic specialisation for creating a more polycentric Europe and working towards a more spatially balanced territory, three general recommendations can be formulated:

Focus on socio-economic profiling at European level for establishing counterparts to the pentagon, i.e. strengthen regions that have already now important international profiles, and show further development potentials.

Focus on socio-economic profiling at national and trans-national level for strengthening second tier cities and national polycentricity.

Strengthen 'spill-over effects' of policy interventions, i.e. social capital building and institutional learning, which make R&D and Structural Funds measures more than temporary support measures.

Last but not least, it has to be noted that not all regions will respond equally to policies that promote specialisation or differentiation of the economic structure. Attention should be focused on developing the regional enterprise base to promote innovation and develop human capital in all region types. However, differences in regional conditions mean that there is no single appropriate development model.

More concretely, the above principles can be applied when locating EU or national institutes, supporting tourism, and building of industrial clusters. With regard to the EU policy mix, research and regional policies are of particular interest.

**Better co-ordination of research and regional policy:** The Framework Programmes and Structural Funds, with the differing objectives are potentially complementary. Better co-ordination would assist in achieving common goals, particularly aims relating to increasing levels of economic activities and the promotion of territorial cohesion.

A concrete possibility for this is the consideration of Framework Programme activities (Integrated Projects and Networks of Excellence) should form a central part in the development of new trans-national co-operation programmes. Structural Fund programmes should seek to add value to these by supporting knowledge transfer vehicles and facilitating networks of firms. An example of this might be improved co-ordination between those running R&D aspects of Structural Funds and Framework Programme participants at the regional level;

Full advantage should be taken of the opportunity to co-fund Framework Programme projects through the Structural Funds in Objective 1 areas and this mechanism retained in the period 2007-2013. The ESPON project on

R&D recommends a minimum level of funding at least 5% in Structural Fund Programme be targeted at R&D, to counter the current variations (Structural Funds should, however, be directed to ensure that capacity exists to absorb any planned increases in spending on R&D-related actions).

**Structural Funds priorities and measures supporting polycentric development:** In general, the existing Structural Funds interventions seem to be sufficient for addressing territorial cohesion and polycentric development. Thus, no direct polycentric development at measure or priority level is needed. However, issues supporting polycentric development at various levels could be strengthened. Particular consideration should thus be given to the fields of functional, socio-economic specialisation and accessibility matters.

**Knowledge Centres at inter-regional level:** Knowledge Centres with a critical mass and linked to European Centres of Excellence should be developed at an inter-regional level. Knowledge centres should have a critical mass of research activities, with investment in physical social and human capital as required. The development of trans-national knowledge centres might provide an even better link to the ideas of European Centres of Excellence as support for regional development.

**Dynamics of European Innovation Systems:** The dynamics of European Innovation Systems should receive similar attention as work on national and regional innovation systems. It is the complex interplay of these different territorial scales that will influence the sustainable development of the European territory in future.

**Territorial Monitoring and Impact Assessment:** There is need for improved, consistent regional data availability to facilitate continued monitoring of spatial trends to support policy development as a recommendation concerning Future Research and Data Requirements. At a European level, a Territorial Impact Assessment should be undertaken of all proposals for the development of new pan-European research facilities to assess the likely effects and potential responses to these effects.

**Structural Funds as levers for national practice:** There has thus far been no effective mechanism for linking the objectives of the Lisbon Agenda with EU regional policy. One solution to this problem may be that of using the EU Structural Fund and the Cohesion Fund as levers for national policies.

#### **4.5 Accessibility - Recommended Policy Combinations**

Competitiveness as well as efficiency and growth should be enhanced, while paying attention to a balanced spatial development and environmental sustainability. This implies conflicts of aims when it comes to investment decisions between removing bottlenecks in the transport system, counteracting the vulnerability of the current system and making the, in economic terms, most efficient investment.

An additional aspects that needs to be considered is the question of decoupling economic growth and increase in traffic, also related to the question of sustainable transportation, which might imply an reduction of traffic or at least a reduction of environmental and social costs of traffic. Ideas regarding changes in the current modal split need also to be taken on board.

Transport policy cannot be designed such that all goals are favoured at the same time. One possibility is to revise those policy measures in the direction of a more balanced spatial development, if one is willing to give up a certain degree of short term economic efficiency.

#### **Systematic monitoring of spatial benefits of transport policies:**

Infrastructure policy that neglects the spatial dimension runs risk of re-concentrating on the highly congested central regions that are threatened by a collapse of traffic. The advice is therefore to monitor systematically the spatial distribution of benefits generated by newly installed infrastructure capacity. This involves, monitoring large transport infrastructure projects promoting better transport infrastructure management and supporting spatial development and environment policies.

It might even be possible to go so far to say that transport projects should be defined according to territorial visions (especially the few of them included in explicit territorial and multimodal National Plans). The detailed territorialized analysis of this kind of projects is also needed to assess political decisions.

**Structural Funds promoting trans-national links:** Territorial cohesion and polycentricity comprise morphological aspects as well as the flows between various centres. Europe, in the context of the Structural Funds, may support polycentric development. However, even more important that a sensible utilisation of Structural Funds resources seems to be the co-ordination of spatial development aims, Structural Funds and TEN/TINA.

**Continuation of efficiency based transport policies and introduction of economic transfer mechanisms:** Although TEN and TINA projects

contribute to accessibility and growth in the new EU Member States, they improve even more the accessibility in the central regions which already have a relatively high income. In order to compete with the higher developed European centres, the accession countries will have to exploit the economies of agglomerations, such that a movement towards polycentricity at the European scale encounters a loss of polycentricity at national scale. The conflict between efficiency and equity should not be solved by revising the TEN and TINA plans such that the centres are favoured less. Instead, the poorer countries should receive compensating transfers such that they can develop their secondary networks and let their peripheries gain from the spread effects of more rapid growth in the centres. The decision on those secondary networks, however, should be assigned to the national and local level, where the respective benefits appear. (cf. 2.1.1. p.30) However, this needs to be considered with a "health warning", for spatial bottlenecks in the transportation system, a reconsideration of the efficiency aim of TEN and TINA seems to be advisable. Indeed, in case of bottlenecks economic transfer might not be a sufficient instrument.

**More sustainable transport through pricing policies accompanied by economic transfer mechanisms:** With regard to sustainability, the aim should not only be to shift transport in favour of less damaging modes, but to reduce the overall amount of transport. This actually means increasing transportation costs. This is most unfavourable for lagging regions, rural regions and peripheral regions, those that in general are less affluent than the centres. A pricing policy worsening regional income disparities should be accompanied by transfer in favour of those regions suffering from losses. Again, also this policy recommendation is to be considered in relative terms, in cases where the reduction of transport would lead to dramatic consequences, a shift in favour of less damaging modes will be the second best solution.

**Specific recommendations for European macro-regions:** More concrete recommendations for the macro-regions Atlantic, Mediterranean, Nordic, Central and Eastern are elaborated in the ESPON 1.2.1 report.

**Increase supply with ICT-infrastructure also in less favourable areas:** The key question from a regional perspective is how competition can be developed where there is little appetite amongst the telecommunications providers to address those markets. This regards both the question of liberalisation and regulation as well as what the public sector and regional and local actors can do to stimulate broadband rollout etc. An important aspect is the increase of knowledge or 'institutional capacity' amongst public authorities.

**ICT Regulation:** Most regulation is 'spatially blind'. The use of regulation to stimulate competition – e.g., local loop unbundling – can exacerbate territorial disparities, as new entrants target the most lucrative localities. One of the few types of regulation which is actually designed to address territorial disparities are those relating to universal service provision. To date both the (European) Universal Service Directive and national universal services orders have confined themselves to narrowband services. ESPON 1.2.2 suggests that regulators should be required to take into account broader regional or territorial development goals – Ireland provides an interesting example of such 'joining up' of policy. Further, regulators should be mandated to collect information on territorial disparities in provision.

**Aggregation of demand:** Some interesting examples can be found of regional agencies aggregating public sector demand in order to reduce the costs of broadband procurement, and instances in which the networks so procured can then be made available to SMEs.

**Public interventions in ICT:** (a) Public access points: There are many examples across Europe of public intervention to stimulate public internet access points (PIAPs), for example in rural areas. (b) Direct subsidy to private operators: Examples of this approach are evident, but it is clearly high-risk in terms of value-for-money for public investment, given the asymmetry of information about telecoms networks costs between operators and public agencies. (c) Public-private partnerships: a number of successful examples show the added value of public private partnerships. (d) Public construction and /or ownership of networks: a growing range of examples is evident. Municipal networks are particularly well established in Sweden. Such networks can also be used to experiment with alternative technologies, including wireless and satellite.

#### **4.6 Interaction - Recommended Policy Combinations**

With regard to the importance of the social capital and discourses, the non-funding oriented parts of the EU policy apparatus can be employed more efficiently.

**Agenda setting:** Many EU policies have agenda setting effects, as e.g. the Structural Funds lead to adoption of multi-annual programming, partnership principle etc. also in other fields of policies. A more active use of agenda setting is made within the field of environmental policies, where the idea of naming, faming and shaming has developed into a successful mean of policy making with little financial resources.

**Social capital building and institutional learning:** All fields of EU policies reviewed with regard to spatial effects have shown that indirect effects, social capital building and institutional learning are important effects. This could be utilised in particular outside the pentagon and in lower tier cities for stimulating development of polycentric nodes counter weighting the European or national core.

**Institutional settings:** Institutional settings and partnership have been proven to be of particular importance for both stimulating development potentials but also for facilitating horizontal and vertical co-operation. However, every solution seems to be utterly depending on its context.

#### **4.7 Last thoughts**

The ESPON exercise and the discussions during the ESPON seminar in Nijmegen (October 2004) have shown that researchers are not necessarily best skilled for drawing policy conclusions and recommendations from their research. This is in particular true when there are conflicting demands on the nature and level of detail of these recommendations and especially when the recommendations are to be drawn and presented before the actual research is finalised.

In the light of this, the policy recommendations deriving from ESPON are to be considered with serious "health warnings". For the future more continuous and in-depth dialogues with the projects about their findings might make it possible for policy makers to draw policy conclusions of the research and discuss these with the project groups.

Furthermore, collaboration between DG Regio and DG Research might offer possibilities for designing projects that better suit their aims.

As regards the need for future research, ESPON results so far illustrate the lack of data covering the entire ESPON space but also allowing for building time series and thus analysing developments and trends. Here considerable additional research is necessary.

The conceptualisation of spatial policy aims into researchable questions has been a challenge for most ESPON projects. ESPON has made considerable success when it comes to the translation of aims such as "territorial cohesion" or "polycentric development" etc. into measurable indicators. However, these are only first steps and more needs to be done.

The same is true when it comes to the analysis of territorial impacts of EU policies. ESPON has for the first time worked with the assessment of spatial effects of policies in a series of policy fields. For each of these, approaches to

territorial impact analysis have been developed. However, these are still only first products and more research is needed for developing research approaches in these fields.

Innovative tools have been employed for both describing the European territory and assessing spatial impacts. ESPON has facilitated the development of new analysis and mapping tools moving from sectoral or regional views towards more genuine spatial analysis and illustration. The research done is promising and requires more work on the development of the tools but also on regarding the education of the audience for understanding the new types of analysis and reading the more innovative maps.

There are various thematic issues that can be further deepened. Proposals are listed in the single ESPON studies. With regard to the overall ESPON set up, integrated analysis bringing the statistical information from various thematic studies together into one overall analysis seems to be a challenging task which deserves more attention. So do also aspects rarely touched up by ESPON so far, such as social and environmental issues or the economic role of various types of territories (major urban areas, medium sized cities, small towns, rural settlement etc.).

Further research is also needed for the identification of the spatial dimension and location of regional development potentials. So far a lot of research has centred on disparities and imbalances. Following current policy developments, more focus needs to be put on potentials and territorial capital.

Given this a lot remains to be done for understanding European spatial development and being able to draw conclusions suitable for future policy recommendations. Given all ambitions of understanding spatial development trends and where they take us, we may want to remind ourselves of Antoine de Saint-Exupéry: As for the future, your task is not to foresee, but to enable it.

## **Literature**

From project results to 'ESPON results', First Guidance Paper, prepared by ESPON 3.1 for the First Lead Partner Meeting, Bonn, Feb. 2003

Crete Guidance Paper, by ESPON 3.1, August 2003

Matera Guidance Paper, by ESPON 3.1, February 2004

European Commission, Third Cohesion Report, 2004

Furthermore, all ESPON reports delivered before September 2004 have been examined and reviewed for this report.



Bundesamt  
für Bauwesen  
und  
Raumordnung

**ESPON 3.1**  
**Integrated Tools for European Spatial  
Development**  
***Final Report Part B***  
**Synthetic summary of ESPON projects**  
**(final and third interim reports)**

**B**

Revised Version





# **Integrated Tools for European Spatial Development**

## **Final Report Part B Synthetic summary of ESPON projects (final and third interim reports)**

### **REVISED VERSION**

The Final Report of the ESPON project 3.1 „Integrated Tools for European Spatial Development“ was delivered on 15 November 2004. This is the revised version.

The Final Report comprises three main parts (plus annexes):

Part A: Scientific and policy oriented conclusions of ESPON results until September 2004

Part B: Synthetic summary of ESPON projects (final and third interim reports)

Part C: New tools and instruments for European spatial analysis

This revised version of the Final Report takes on board the results of the discussions during the ESPON seminar in Nijmegen, 10-11 October 2004, which was based on the “draft Final Report of the Project 3.1” and includes the final deliveries of TPGs as well as feedback given by ESPON members.

This report represents the final results of a research project conducted within the framework of the ESPON 2000-2006 programme, partly financed through the INTERREG programme.

The partnership behind the ESPON programme consists of the EU Commission and the Member States of the EU25, plus Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON programme and projects can be found on [www.espon.lu](http://www.espon.lu)

The web side provides the possibility to download and examine the most recent document produced by finalised and ongoing ESPON projects.

ISBN number **3-87994-021-5**

**2<sup>nd</sup> edition (revised version)**

This basic report exists only in an electronic version.

**Editor:**

**Bundesamt für Bauwesen und Raumordnung**

**BBR**

**Bonn, Germany, July 2005**

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## Foreword

This is PART B of the draft Final Report of ESPON Project 3.1 "Integrated Tools for European Spatial Development ". Project 3.1 was the cross-coordinating and one of the first round ESPON projects which commenced in July of 2002 and ended in December 2004.

This report bases mainly on the research activities of the other ESPON projects. It is a thematic compilation of the most important findings of projects, based on third interim respectively final reports delivered in August 2004.

Not all projects started their work at the same time. Table no. 1: Actual ESPON projects, nick names, interim reports and lead partners of the ESPON Programme 2006 (see Chapter 1) shows which project has to deliver which kind of report. This differs between 2<sup>nd</sup>, 3<sup>rd</sup> and final reports. The compilation of findings concentrate mainly on the third interim reports and first final reports.

The compilations has been provided by a team from eight institutes (cf. list of institutes and staff members involved further down). The co-ordination for this part of the final report was realised by Nordregio and the BBR.

We would like to take the opportunity to thank all ESPON participants for their work and co-operation.



The present Final Report PART B of the ESPON Project 3.1 is a team effort of all project partners under the leadership of the BBR.<sup>1</sup>

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(Germany)



UEHR - Institute of Urban Environment and  
Human Resources (Greece)



UMS RIATE - Interdisciplinary Network for European  
Spatial Planning (France)



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<sup>1</sup> Alphabetic order by names or titles of the institutes or companies



## Synthetic Summaries by partners

The list below describes the responsibilities of the ESPON 3.1 project team for the different ESPON Projects. The co-ordination and compilation for this part of the final report was realised by Nordregio and the BBR.

**Figure 1 Synthetic Summaries by partners**

<b>Project Number</b>	<b>Project Title</b>	<b>Report</b>	<b>Corresponding 3.1 partner</b>
<i>Theme 1</i>	<i>Thematic Projects</i>		
1.1.1	THE ROLE, SPECIFIC SITUATION AND POTENTIALS OF URBAN AREAS AS NODES IN A POLYCENTRIC DEVELOPMENT (2002-04)	Final Report	Nordregio
1.1.2	URBAN-RURAL RELATIONS IN EUROPE (2002-04)	Final Report	Nordregio
1.1.3	ENLARGEMENT OF THE EUROPEAN UNION AND THE WIDER EUROPEAN PERSPECTIVE AS REGARDS ITS POLYCENTRIC SPATIAL STRUCTURE (2002-06)	3 <sup>rd</sup> IR	ÖIR
1.1.4	THE SPATIAL EFFECTS OF DEMOGRAPHIC TRENDS AND MIGRATION	3 <sup>rd</sup> IR	Nordregio
1.2.1	TRANSPORT SERVICES AND NETWORKS: TERRITORIAL TRENDS AND BASIC SUPPLY OF INFRASTRUCTURE FOR TERRITORIAL COHESION (2002-04)	Final Report	MCRIT
1.2.2	TELECOMMUNICATION SERVICES AND NETWORKS: TERRITORIAL TRENDS AND BASIC SUPPLY OF INFRASTRUCTURE FOR TERRITORIAL COHESION (2002-04)	Final Report	TAURUS
1.3.1	THE SPATIAL EFFECTS AND MANAGEMENT OF NATURAL AND TECHNOLOGICAL HAZARDS IN GENERAL AND IN RELATION TO CLIMATE CHANGE (2002-04)	3 <sup>rd</sup> IR	UEHR
1.3.2	TERRITORIAL TRENDS OF THE MANAGEMENT OF THE NATURAL HERITAGE (2002-04)	3 <sup>rd</sup> IR	UEHR

<i>Theme 2</i>	<i>Policy Impact Projects</i>		
2.1.1	TERRITORIAL IMPACT OF EU TRANSPORT AND TEN POLICIES (2002-04)	Final Report	MCRIT
2.1.2	TERRITORIAL IMPACT OF EU RESEARCH AND DEVELOPMENT POLICY (2002-04)	Final Report	TAURUS
2.1.3	THE TERRITORIAL IMPACT OF CAP AND RURAL DEVELOPMENT POLICY (2002-04)	Final Report	UMS/RIATE
2.1.4	TERRITORIAL TRENDS OF ENERGY SERVICES AND NETWORKS AND TERRITORIAL IMPACT EU ENERGY POLICY	3 <sup>rd</sup> IR	MCRIT
2.2.1	TERRITORIAL EFFECTS OF STRUCTURAL FUNDS (2002-05)	3 <sup>rd</sup> IR	UMS/RIATE
2.2.2	TERRITORIAL EFFECTS OF THE "AQUIS COMMUNITAIRE", PRE-ACCESSION AID AND PHARE/TACIS/MEDA PROGRAMMES	3 <sup>rd</sup> IR	ÖIR
2.2.3	TERRITORIAL EFFECTS OF STRUCTURAL FUNDS IN URBAN AREAS (2002-04)	Final Report	Nordregio

IR = Interim Report

The ESPON 3.1 project team would like to express all persons its thanks who were involved in the work or who supported the team very much. Special thanks to all the colleagues from the administration offices which worked hard, pragmatically and unconventionally to overcome formal requirements of the programme.

The ESPON Programme was launched after the preparation of the European Spatial Development Perspective (ESDP), adopted by the Ministers responsible for Spatial Planning of the EU in May 1999 in Potsdam (Germany) calling for a better balance and polycentric development of the European territory. The programme is implemented in the framework of the Community Initiative INTERREG III. Under the overall control of Luxembourg, the EU Member States have elaborated a joint application with the title "The ESPON 2006 Programme – Research on the Spatial Development of an Enlarging European Union". The European Commission adopted the programme on 3 June 2002.

See <http://www.espon.lu> for more details.

The views expressed in this report do not necessarily reflect the opinion of the ESPON Monitoring Committee.



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Note: For passages marked with an asterisk (\*) no information was available, because the project was ongoing at the time of writing this PART B of the 3.1 Final report or the corresponding project did not provide the requested information in its report.

# **1 ESPON Project 1.1.1 Potentials for polycentric development in Europe**

**Final report**, August 2004

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## **1.1 Findings**

### **Findings related to territorial structures, trends and impacts**

At the micro level it is clear that there is a significant variation in polycentricity within countries. Germany and Italy, for instance, have regions with very different levels of polycentricity. At the meso level, the national urban systems were analysed on the basis of the three dimensions of polycentricity: size, location and connectivity. A comprehensive index of polycentricity was constructed for 26 countries. The most polycentric countries are

Slovenia, Ireland, Poland, Denmark and the Netherlands, though they are so for rather different reasons. Slovenia and the Netherlands have a high score for all three dimensions,

Poland has a balanced size distribution and Ireland and Denmark have a good distribution of

FUAs over their territory. Other countries generally thought to be polycentric score less well because they are deficient in one of the dimensions, e.g. Italy, Germany and the UK where cities are concentrated in one part of the

country. The most monocentric countries are Norway, Finland, Spain, Hungary, Portugal and Sweden.

A dense urban structure covers the central parts of Europe, stretching from the UK in the north via the Netherlands, Belgium, western Germany and northern France, and continuing both east and west of the Alps in the south; in the west to Italy, and to the east through the Czech Republic, southern Poland and Slovakia, into Hungary. The countries to the north and to the south of this area are less populated and have less dense urban systems. This is particularly true of Ireland, the northern areas of the UK, Norway, Sweden, Finland, Estonia, Latvia and Lithuania, but also for parts of Spain, Portugal, Greece, Bulgaria and Romania.

The strengths of the strongest FUAs, the 76 MEGAs, were analysed further in a discussion of where the most likely counterweights to the Pentagon are to be found. This analysis has identified the strongest urban regions in Europe. Many of them are located within the Pentagon, while others such as Rome, Vienna, Berlin, Manchester and Copenhagen are located in relatively close proximity to the Pentagon. There are only a few top category MEGAs in the peripheral parts of Europe: Madrid, Barcelona and Athens in south, Dublin in west and Stockholm, Helsinki, Oslo and Gothenburg in north. MEGAs with high scores in the new member states are also located close to Pentagon, with Warsaw being the only exception.

### **1.1.1 Main territorial structures (polycentricity)**

#### **Findings related to the spatial structure in terms of SIZE (population, GDP etc.)**

The demographic weight of an urban system constitutes an important factor in the settlement of people and activities. For both private and public-sector investments it naturally constitutes the most favoured indicator for choosing the location of certain services and facilities. The demographic criterion also corresponds to human resources, i.e. being able to tap into a labour force that is large enough to offer sufficiently diversified skills.

At the meso level the size index measures whether the urban system consists of a balanced mixture of large and small cities and is not dominated by one major capital city. This is persuasively demonstrated by the high scores of the Size Index for the Benelux countries,

Germany and Italy with their long tradition of merchant cities and small independent territories. (Population findings in meso level are also summarized in tables p. 87-88)

At the macro level population is concentrated to the Pentagon, but there are three extensions to the Pentagon, one reaching down to the east coast of Spain, one to Southern Italy and one to central Eastern Europe where there is a strong concentration of large urban agglomerations. In more peripheral Europe most of the large urban agglomerations are more insular.

The polycentric nature of the urban system of Europe is clearly apparent. In both respects, with regard to population and economic activity, there is a wide range of medium-size urban centres with no overpowering "European capital". It may even be said that from an efficiency point of view, even the largest urban areas in Europe are too "small" for a continent of Europe's size. There is a remarkable drop in the rank-size distribution of population below a threshold of 50.000 inhabitants, probably caused by an uneven selection of cut-off points in different countries. However, the similar drop in the rank-size distribution of GDP below 500 million € can be explained by the lower GDP per capita in the accession countries. A correlation between polycentricity and GDP per capita was found, confirming that countries with a more polycentric structure are economically more successful.

### **Findings related to the spatial structure in terms of INFRASTRUCTURE NETWORKS**

The connectivity of the FUAs constitutes one of the central factors of polycentricity. Any sharing of economic functions cannot be really effective unless accompanied by transport infrastructure and good accessibility. Transport intensity is measured through traffic levels at the main airports and the number of tons handled at major container harbours (excluding bulk), in order to identify explicitly transport-oriented cities. As a result, the general picture is rather monocentric, both at the European level and nationally, in particular in geographically small countries. The busiest transport nodes are, of course, located in the Pentagon. However, maritime transportation has more weight in the Mediterranean region, where several major transport hubs are located. Not one of the new EU member states or accession countries has a transport node of European significance.

The transport system favours polycentricity particularly in Austria, Germany, Italy, Finland,

Norway and Sweden. The transport system is however more monocentric than one would expect on the basis of the settlement structure in the Czech Republic, Hungary and Slovakia in particular.

## **Findings related to the spatial structure in terms of SOCIO-ECONOMIC SPECIALISATION**

At the macro level, most crucial economic functions such as the location of European decision centres are concentrated within the Pentagon. The knowledge function is more balanced due to the location of universities in national educational systems all over Europe. The tourism and transport indicators are different, showing a pattern of the functional division of labour at the EU level. Thus, tourism is concentrated in the Alps and the Mediterranean coastal regions and transport within the northern-most parts of central Europe.

In the MEGA typology the analysis was based on indicators for each of the following four qualities: mass, competitiveness, connectivity and knowledge basis. The MEGAs are compared with each other for each quality, ranked and divided into five groups. As a result, two global nodes are identified, London and Paris. There are 17 Category 1 MEGAs, large city regions with a good score on all indicators: Munich, Frankfurt, Madrid, Milan, Rome, Hamburg, Brussels, Copenhagen, Zurich, Amsterdam, Berlin, Barcelona, Stockholm, Vienna, Düsseldorf, Cologne and Stuttgart. Ten of these are located within the Pentagon.

At the next level comes the 8 Category 2 MEGAs, cities that are relatively large, competitive and often with a strong knowledge basis. Most MEGAs in this category has one or two qualities that are notably weaker than the others, usually relating to either mass or accessibility. These are Helsinki, Oslo, Geneva, Manchester, Athens, Turin, Dublin and Gothenburg.

25 MEGAs are labelled Category 3 MEGAs. These are usually smaller, with lower competitiveness and accessibility levels. They often have one quality that is stronger than the others. The four strongest city regions in the new member states are in this category: Prague, Warsaw, Budapest and Bratislava together with the three other capitals Bern, Luxembourg and Lisbon. The rest are non-capital cities in their countries: Lyon, Antwerp, Rotterdam, Aarhus, Malmö, Marseille, Nice, Bremen, Toulouse, Lille, Bergen, Edinburgh, Glasgow, Birmingham, Palma de Mallorca, Bologna, Bilbao and Valencia.

The remaining 24 regions are the Category 4 MEGAs. Most of these have a low score on all four qualities. 11 of them are located in the new member states or accession countries (Bucharest, Tallinn, Sofia, Ljubljana, Katowice, Vilnius, Krakow, Riga, Lodz, Poznan, Szczecin, Gdansk-Gdynia, Wroclaw, Timisoara and Valetta), four are cities of north-western Europe situated outside the main transport corridors (Cork, Le Havre, Southampton and

Turku) while the remaining five are non-capital cities in the southern part of EU15 (Naples, Bordeaux, Seville, Porto and Genoa).

### **Findings related to the spatial structure in terms of CO-OPERATION**

At the micro level, and in regard with inter-municipal cooperation, it is clear that partnerships require more robust political and policy frameworks if they are to operate successfully. The issue of resources (funding) was also seen as critical to continued and improved partnership working. Another key issue is the ability of a partnership to integrate its programme of action with existing EU funding regimes. A final point to note here is that improvements in the co-ordination of partnerships, by the partners themselves and from interests outside of the partnerships who may have an impact on its activities, are considered essential to successful partnership working.

The experiences of transnational partnerships indicate that visits from areas that have successfully developed partnerships to areas where polycentricity is not yet operative may be a constructive idea.

Examples of specialised and thematic networks and co-operation between cities at the European level illustrate the fact that size should not be considered as a comprehensive indicator when identifying nodes of polycentric development. Transnational networks between universities, private companies and other urban functions are particularly important for the development of polycentricity if networking is established between 2<sup>nd</sup> order cities and are thus able contribute to stabilising the position of these cities in the national urban hierarchies. The transnational networking within *meso*-regions such as e.g. the Interreg regions, contributes to the development of polycentricity if regional integration and competitiveness results from such co-operation.

### **Summary**

At the European level (*macro*), polycentricity is seen as a useful alternative model to enhance regional development more evenly across the European territory. A polycentric Europe is thus seen as an attractive alternative to a European space dominated by *the Pentagon*, the area delimited by London, Hamburg, Munich, Milan and Paris, i.e. the European core with approximately 14% of the EU27 area, 32% of its population and 43% of its GDP. This situation is often contrasted with that of the USA, where there are several *global integration zones*. A European wide application of polycentricity is designed to promote several larger zones of global economic integration in the EU in addition to the Pentagon.

At the interregional or *meso* level, urban complementarities are important. Two or more cities can complement each other functionally by offering the citizens and companies in their conjoined hinterlands access to urban functions that would usually only be offered by higher-ranking cities. Rather than competing to build up the same urban functions, the ESDP recommends that cities should co-operate by joining existing assets, in particular assets that are complementary.

In the context of intra-regional development (*micro*), urban functional and economic complementarities are emphasised. An urban region can improve its economic performance through better co-operation and improved links within the region. An intra-regional application of polycentricity thus promotes integrated spatial development strategies for city clusters.

One conclusion here is that the definition of the European core as 'the Pentagon' is too narrow. In terms of population and dense city networks, Manchester, Berlin, Venice, Genoa and Paris define the corners of the European core.

A second conclusion is that polycentricity at the European level must build upon functional

specialisation, i.e. stimulate cities outside the core area to develop functions for the whole of Europe. Increasing the demographic mass of cities through regional polycentric integration is, if it is done everywhere across Europe, likely to further enhance the contrasts between the European core area and the rest of the European territory. We cannot currently identify any region in the European periphery where the polycentric integration of

neighbouring cities could increase the population mass sufficiently to the extent that the potential for a new global integration zone was created.

### **1.1.2 Spatial Disparities and territorial cohesion**

The empirical data reveals at the macro level a situation with significant differences between the core and the periphery regarding the urban tissue. There are large variations regarding income levels and development endowments between centrally located regions and peripherally located regions, as well as significant variations within each of the groups. This observation is even more valid at the EU 27+2 level than for the EU 15 level. After enlargement, several new EU Member States with dense urban systems are located relatively close to the Pentagon, thus increasing the core-periphery differences.

At the meso level the types of urban disparities addressed are different from country to country. In countries such as Denmark, Estonia, France, Ireland

and Latvia the focus is on the gap between the capital regions and the rest of the cities. In Germany, Italy, Norway and Poland there are north/south or east/west disparities, while countries such as Finland, Greece and Portugal lack medium-sized cities in their urban hierarchies. Urban disparities within a given country are often coined in terms of population development, economic growth, productivity, average income development, accessibility to public and private services (education, medical facilities, cultural facilities etc.) and/or the number and diversity of jobs available.

### **1.1.3 Dynamics and flows**

The major difficulty here is actually finding comparative data on flows or co-operation for any level.

Regarding the network of air traffic, over the last decade a noticeable trend has emerged towards the increasing polarisation of flows through London and Paris. The highest growth in passenger numbers are thus to be observed between the peripheral capitals and the centrally located capitals, with the largest traffic growth in cities such as Lisbon, Madrid,

Barcelona, Prague, Munich, Berlin and Warsaw. The most significant flows between Europe and the rest of the world go through London. Paris and Frankfurt are also important gateways, as is Madrid, which acts as a gateway to South America.

A second example is the network of student exchanges between universities, supported by the EASMUS programme. The dynamic of student exchange flows primarily reflects the location of national capitals. Secondly, there is a significant concentration at the European level towards Paris, Madrid, Barcelona, London and Berlin. With regard to the new member states and to the accession countries the numbers here are rather small, with the concentration to one city region being quite high. Thus, while we can see that a rather balanced network exists in this regard between universities across Europe, in the smaller countries only a limited number of cities are actually involved.

### **1.1.4 Contradictions between levels**

The study questions the possibility to achieve polycentricity simultaneously at all spatial levels. At the macro level, it is possible for urban regions beyond the Pentagon to enhance their status compared with other regions through the development of a polycentric structure with better functional integration. But if polycentricity is successfully implemented across Europe, regions located within, and in proximity to, the Pentagon will inevitably gain most. At the meso-level, a policy for increased polycentricity and spatial

balance at the European level will strengthen the already strongest urban regions. Investment will have to be concentrated in these regions, and as a result, the urban systems of the countries in question may actually then become more monocentric. Consequently, a European level polycentricity must build upon functional specialisation, rather than population size.

### **1.1.5 Findings at transnational level (Interreg III B areas)**

The studied Interreg programmes illustrate the multiple scales involved when trying to assess the degree of poly- or monocentricity of a network: The organisation of cities at the national scale influences the spread of partners in each country, while contrasts between Member states can create an imbalance in the number of partners on each side of the border.

### **1.1.6 What is new?**

Two concepts have been constructed as a basis for the description and typology of the urban network in Europe. First, 1595 Functional Urban Areas (FUAs), with more than 20,000 inhabitants have been identified in Europe, of which London, Paris and Madrid have more than 5 million inhabitants, and 44 FUAs have 1-5 million inhabitants. A FUA, a building block of polycentricity, consists of an urban core and the area around it that is economically integrated with the centre, e.g. the local labour market. Each FUA was ranked into three groups according to its importance for each variable of functional specialisation. The 76 FUAs with the highest average score have been labelled Metropolitan European Growth Areas (MEGAs).

Two additional concepts have been coined in order to analyse the territorial context of cities and the potentials for polycentric integration based on morphological proximity. *Potential Urban Strategic Horizons* (PUSH) were identified based on morphological proximity and on the hypotheses that new functional entities, created through increased integration and co-operation, may change the European urban hierarchy and be strong enough to counterbalance the Pentagon. Several countries are almost entirely covered by PUSH areas, while large parts of the most peripheral countries are located far away from any FUA centre. On average, 66% of the EU27+2 area is covered within 45 minutes travel time of a FUA centre. The values range from 98-93% in Luxembourg, Belgium, Denmark, the Netherlands and Germany, to 36-33% in Cyprus, Sweden, Malta and Finland, down to only 25% in Norway.

In the next step, Potential Polycentric Integration Areas (PIAs) were identified, based on the hypothesis that neighbouring cities with overlapping travel-to-work-areas can be functionally integrated and can gain from co-operation. A total of 249 areas were found where at least two PUSH areas

shared more than 1/3 of their area with each other. These areas concern 1,139 PUSHs, while the remaining 456 PUSHs are more isolated. The 249 areas are well distributed across Europe, with the exception of Ireland and the northern parts of the UK, Norway, Sweden and Finland.

## **1.2 Methods and data**

### **1.2.1 Spatial analysis methods**

Several different methods were utilised. Literature reviews form the basis for the discussion of the background to the concept of polycentricity and for the construction of the critical dictionary of polycentrism. A questionnaire was used to collect information on the use of polycentricity in plans and strategies at the national level throughout the ESPON space. Co-operation is also an important precondition for polycentric development. To investigate networking, data for air traffic, student exchange and Interreg programme participation was used. These European datasets provide examples at the macro level. Two questionnaire surveys were undertaken to provide an overview of institutional networking and partnership arrangements around spatial strategic issues. The first survey concerned inter-municipal cooperation at the level of FUAs, with 21 countries responding, while the second dealt with examples of inter-regional and trans-national co-operation at the European level. These surveys cannot produce a fully comprehensive picture, though they do provide an overview of the issue.

Data for the size of FUAs, their distribution across the territory and their accessibility was used to analyse the urban system and its degree of polycentrism in European countries, as well as to produce an index of polycentricity. The multimodal accessibility of FUAs was calculated as part of this exercise. Thereafter, this index was confronted with indicators for economic competitiveness, social equity and sustainable development and used in an assessment of the benefits of polycentric national urban systems. The results of course depend upon the quality of input data and the availability of indicator data.

The functional specialisation of FUAs was described by means of a mapping of seven functions expressing crucial factors such as size, administrative functions in the private and public sectors and a region's attractiveness to business and to residents. The strongest FUAs have been labelled Metropolitan European Growth Areas (MEGAs), and they were analysed further in a discussion of where the most likely counterweights to the Pentagon are likely to be found. This analysis was based on a slightly different indicator set, including data from the ESPON database. The MEGAs were compared with each other on four different themes, ranked and divided

into five groups in a new typology. The results are again dependent upon the indicator weighting.

At the meso-level, the hypothesis was that cities with overlapping travel-to-work-areas have the best potential for developing synergies. For each of the FUAs, the potential area that can be reached within 45 minutes by car from the FUA centre was calculated. These isochrones were then approximated to municipal boundaries to make it possible to use population data at the NUTS 5 level. These new urban areas are called Potential Urban Strategic Horizon (PUSH). The strength of this method is its independence from national definitions of travel-to-work-areas. This delimitation of potential Polycentric Integration Areas (PIAs) is in the next step used to map the areas in Europe with the largest potential for polycentric development. PUSHs are considered to have major potential for polycentric integration if they share over 1/3 of their area with each other. This leads to the identification of 249 PIAs, comprising 1139 PUSHs.

### **1.2.2 Indicators**

The indicators used were produced through a combination of European and national data sets. At the next level, indicators for the seven functions (mass based on FUA population, transport (traffic in airport and harbour), tourism (number of beds in hotels), industry (gross value added in manufacturing), knowledge (number of students in higher education institutes), decision-making (location of headquarters of top-500 companies) and administration (administrative status) were combined into a typology of FUAs in EU27+2. For analysis of MEGAs indicators on mass, competitiveness, connectivity and knowledge basis have been developed (based on population, GDP, GDP per capita, location of top-500 companies, passengers at airports, multimodal accessibility indicator, education level and R&D share of employment. The choice of indicators for this analysis was somewhat pragmatic, since available comparative data sets are rare. Data was collected by national experts and based on available regional statistics. In addition, some pan-European data sets were utilised. Used at the European level, the results are robust enough. However, differences in national definitions and data access do produce a number of anomalies, which make the results less useful for analysis at the national and regional levels. Another issue is the choice of indicators and their relative weight, as changes here do make a difference in the final typology.

The major difficulty was actually finding comparative data on flows or co-operation for any level. This has limited the analysis of the relational aspects of polycentrism.

A number of qualitative indicators were used to draw conclusions on the main polycentrism discourses throughout Europe.

### **1.3 Policy Recommendations**

There is currently no single definition of what a polycentric policy is, with the understanding of the concept being different from country to country. In most cases, a policy that may be interpreted as contributing to a change in the urban system is *not* labelled “polycentric”.

The meaning of polycentricity depends upon the context and territorial level within which it is applied - the *micro*, the *meso* or the *macro* level.

#### **1.3.1 Uncomfortable trends**

At the macro level current trends towards mono-centrism were identified. This has to do with growth in the accessibility, economy and population of the larger metropolitan areas.

The urban systems in the accession countries are, on average, still more polycentric than those of the old EU member states, however, the tendency towards increased monocentricity is more pronounced in the new member states, and is likely to continue in the future. For economic forces to bring about a more polycentric outcome the main alternatives are probably to increase transport costs or to encourage regional specialisation.

At the meso level current trends are moving in the direction of more monocentricity. Since the 1990s many European countries have experienced increasing regional polarisation between centrally located city regions on the one hand, and peripherally located regions and regions undergoing structural change on the other. Particularly in small peripheral countries, and in countries with rapid economic growth, we have seen the development of a tendency for the largest cities to have the strongest growth. At the national level the challenge is therefore to make higher-order services available for all parts of the countries in order to stimulate economic competitiveness and improve territorial cohesion. The urban system does have an impact here, as it organises important parts of economic life.

#### **1.3.2 Uncomfortable policy effects**

All transport policy scenarios examined in ESPON, with the exception of the scenario on transport pricing, are likely to accelerate monocentric development. Furthermore, priority is often given to operational tools such as special funding programmes and planning and governance methods. However, the focus on operational tools must be supplemented by a search for broader strategies dealing with the structural trends of spatial

development in Europe, which seem to enhance mono-centricity rather than polycentricity.

### **1.3.3 Recommended changes in policies**

At the *macro* level, the main issue is to stimulate the development of *zones of economic global integration* beyond the Pentagon. Cities in the periphery can gain in size through integration regionally. However, the preconditions for gaining strength through polycentric development are more likely to be present in the core than in the periphery. At the European level, polycentricity must build upon functional specialisation, not size. One should therefore strategically use the opportunity to locate EU institutions in cities outside the Pentagon, and to consider the possibility of supporting functional specialisation when making these decisions.

The EU can use structural fund regulations to encourage countries and regions to analyse their urban structures. The EU can also use instruments such as Interreg and Interact in the promotion of networking, the development of common strategies covering several cities (also cross-border) and for the dissemination of 'good practice' themes between the city regions that are in the forefront of polycentric thinking. There is also a need for the identification of complementary policy instruments for those areas and regions not favoured by polycentricity policies through, for instance, policies directed at the improvement of urban-rural partnerships and thematic networking.

At the *meso* level, polycentricity is about the balance within the urban system. The EU can influence national and regional policies directly in countries where large parts of the territory are eligible for structural support. This is particularly so for the cohesion countries, where investment in transport and environmental infrastructure may be co-funded by the Structural Funds. The EU can also contribute to a more polycentric national urban structure by agenda setting, i.e. by encouraging national spatial planning and regional policy agencies to elaborate spatial development strategies and to do so within trans-regional and transnational horizons.

Spatial strategies are primarily concerned with economic development and urban competitiveness. The urban structure and the degree of polycentrism are however considered in only a limited number of countries and regions. In order to promote the body of professional knowledge and skills with regard to national and transnational planning, a systematic examination of the professional standards, methods and paradigms of strategies related to spatial development at the national and trans-national levels should be initiated.

The observations of the morphological polycentricity of national urban systems were to some extent hampered by the differences in national definitions on functional urban areas.

In order to improve the validity of comparative studies on polycentricity, a pan-European definition of Functional Urban Areas should be developed and data at this territorial level collected. It is also necessary to analyse the trends in the national urban system towards

monocentricity or polycentricity in each country. Both functional and morphological aspects should be considered, as well as the forces behind the trends and the possibility of influencing them through public policy.

The options for enhancing functional polycentricity at the regional level should be facilitated by structural fund regulations. A geographical zoning of programme regions that covers economically functional regions should be encouraged. Discussions of the urban structures or the functionality of an integrated urban region are rare in economic development

programmes. Therefore, it should be considered whether this could be included in the regulations for programming a paragraph that encourages regions to describe their urban structure and its impact on economic development, e.g. as a part of the SWOT analysis.

At the micro level, cities should be encouraged to co-operate and join forces, with the aim of improving their urban ranking in the national urban systems. One possibility here is to take the list of PIAs as a frame of reference for locally based considerations of the options for forming new inter-municipal co-operations. To enhance economic integration, urban policies should focus on the development of linkages between cities. It is also necessary to document concrete examples of the advantages as well as the bottlenecks of inter-city cooperation.

#### **1.3.4 Recommended changes in polity and governance**

Governance is a key issue when promoting collective action across administrative borders. More could however be done by national governments to improve the framework for local governance, to create more robust policy frameworks and greater political commitment. The variety of organisations, methods and achievements of governance show a significant potential for further learning. There is therefore a need to facilitate the exchange of methods and achievements of local governance. In the context of Structural Fund

programmes, it could be possible to allocate resources to enhancing governance relations at a variety of scales, and to the building up of institutional capacity at the local level.

The formation of strategic policy documents has shown itself to be a key instrument of inter-city governance and co-operation. National governments and the EU could do more to encourage the development of regional spatial strategies by inter-city co-operations, explicitly considering the potentials of enhancing urban functional complementarity. For this to be effective, a set of guidelines for the understanding of polycentricity at the regional level would however be necessary.

## **2 ESPON Project 1.1.2. Urban-rural relations in Europe.**

**Final report**, August 2004.

Trans-national project group: Helsinki University of Technology - Centre for Urban and Regional Studies (lead partner); Centre for Urban Development and Environmental Management (CUDEM); Leeds Metropolitan University, OTB Research Institute for Housing, Urban and Mobility Studies (OTB), Technical University of Delft; The TAURUS Institute at the University of Trier (TAURUS); European Agency Territories and Synergies (EA-TS); Centre for Geographical Studies (CEG), University of Lisbon; Regional Development and Policy Research Unit (RDPRU), University of Macedonia; Faculty of Economics (Sefemeq), Università' Degli Studi di Roma Tor Vergata; National Institute for Regional and Spatial Analysis (NIRSA), NUI Maynooth; Mcrit sl.; Austrian Institute for Regional Studies and Spatial Planning (ÖIR); Nordregio.

### **2.1 Findings**

#### **Findings related to territorial structures, trends and impacts**

The discussion on urban-rural relations gains momentum in the context of regionalisation, because the regional perspective implies the salience of urban-rural relations compared to the previously prevailing national perspective. Moreover, regionalisation actively pursued as a way for increasing local markets by creating larger functional regions based on daily commuting, is a tendency that can be traced all over Europe today. This tendency induces enlarged and intensified urban-rural relations and influences the continuously altered spatial configuration of Europe.

A clear-cut visual divide between urban and rural areas in Europe is simply gone, being replaced by rurbanisation, a process where the physical environment loses qualities that were traditionally associated with urban or rural settings. In most countries, urban centres have long since lost their particular privileges and there is no longer a clear difference in administrative status between town and countryside, or it is blurred. Economic enterprises locate where they want to, and the functional division of labour between town and countryside is increasingly indifferent. Only activities of a very space-consuming and bulky type clearly prefer the countryside.

In terms of structural properties of regions in Europe it is noteworthy about land cover/land use in Europe, that the relative amount of agricultural land is so stable, being an attribute of areas with high as well as low population density, and being an attribute of all kinds of regions regardless the status

of leading urban centre. This indicates the fact that agriculture is an integrated function of all the different parts of Europe, also the most urbanised parts of Europe. Agricultural land loses in relative importance only in those parts where residual land cover is prevailing.

The prevalence of agricultural land across Europe is an asset of tremendous importance. Firstly, it provides for the option to produce food locally. Secondly, the abundance of agricultural land in regions of high urban influence provides for the possibility to utilise agricultural land for recreational purposes. It is an environmental asset that cannot be underestimated. Consequently, the protection and conservation of agricultural land and Greenfield land in general in the densely populated parts of Europe in particular should be a high priority.

The degree of human intervention was judged by the relative share of artificial surfaces of the total land cover. On the average, this criterion correlates with population density, but there are remarkable deviations, which are closely connected to national territories.

The east of Europe, (excluding Poland) as well as Sweden, Denmark, Belgium and parts of France are characterised by a high share of artificial surfaces per capita: degree of human intervention is considerably higher than population density would indicate. This could be conceived as an ecological indicator, which places the mentioned countries in an unfavourable position, and should initiate new policies for a more prudent management of land. A high share of artificial surfaces also indicates a high share of discontinuous urban land, which indicates urban sprawl.

One could argue, however, that even if the share of artificial surfaces per capita may be conceived as an ecological indicator, it does not add much to the issue of sustainable development, which should include the economic dimension as well. In order to scrutinize this question, the share of artificial surfaces (per capita) was compared to economic output (GDPpps per capita), which could be conceived as an indicator of sustainability. According to this criterion, the situation in Eastern Europe as well as in Sweden and Belgium is depressing.

### **2.1.1 Main territorial structures (polycentricity)**

As a result of the developed urban-rural typology, the following six different regional types were identified according to their urban-rural characteristics:

1. High urban influence, high human intervention,
2. High urban influence, medium human intervention,
3. High urban influence, low human intervention,
4. Low urban influence, high human intervention,
5. Low urban

influence, medium human intervention and 6. Low urban influence, low human intervention.

### **Findings related to the spatial structure in terms of SIZE (population, GDP etc.)**

When GDP per capita is considered in relation to urban-rural relations in EU15+1 the highest economic output was produced in type 1 regions, while the rest of the regional categories had an astonishingly uniform performance. In EU10+2, the pattern was the same, but on a substantially lower level.

### **Findings related to the spatial structure in terms of INFRASTRUCTURE NETWORKS**

The regional typology was investigated in relation to connectivity to transport terminals as defined by the ESPON project 2.1.1. The overall tendency is very clear: accessibility seems to gain according to degree of urbanity, but the variations are small between the regional types (4-6) of low urban influence. When EU15+1 and EU10+2 were studied separately, EU15+1 has got a better accessibility in all regional types. In EU15+1, the tendency is very clear: degree of accessibility corresponds to degree of urbanity. In the EU10+2, only type 1 performs comparatively well, but even in this regional type, the required travel time on the average is 79 percent higher than in the case of the same regional type in EU15+1. The spatial pattern of accessibility to transport is very clear as well. In the west, the densely populated areas of regional type 1 have an accessibility that is generally speaking above European average. In the east, this is reached only in the regions of the national capitals.

### **Findings related to the spatial structure in terms of SOCIO-ECONOMIC SPECIALISATION**

As much as 91 percent of the global category tourism was located in regional type 1, and the rest of this category in regional type 2. Also a majority of the other categories of tourism level were attributes of regional type 1. Generally speaking, tourism seems to coincide with population density, which may indicate two things: international tourism is canalised through major centres and the density of attractive locations corresponds to population density in general.

The typology on education level was compared to the harmonised urban-rural typology.

Most university institutions of the European level were located in regional type 1. Out of the total population of NUTS3 regions close to European level university education, a huge part lived in regional type 1. Also the share of

national level institutions located in type 1, was significant. The importance of national level institutions in regional type 5 was somewhat surprising.

### **Findings related to the spatial structure in terms of CO-OPERATION**

Co-operation refers to the principles of good governance as well as fairness and even emancipation. Urbanisation and spatial development involves a number of players who all pursue to maximise their own interests. In questions related to land use and cooperation between territorial units, the appropriation of land for development is the central question. In most national legislations, the right to determine land use is the prerogative of public authorities. The proper way of carrying out this prerogative would be to promote public interests in spatial development, and in addition, to promote competition in development. If the right to steer land use and development is passed over from a public body to private interests through co-operation, the whole idea with co-operation has obviously failed. Privatisation is often pursued with the argument to facilitate for more competition, but this is not accomplished if a public monopoly is replaced for a private one. Consequently, co-operations relates to interests involved and the kind of promotion that is foreseen to take place. Co-operation should be understood in the tangible context of factual spatial development and the dissemination of gains.

### **Summary**

Europe is presently characterised by significant out-migration flows of certain segments of the population from the large cities towards rural areas. In terms of polycentricity, it contributes to limiting the growth of large cities, but concentration in and around medium-sized and small towns is generally insufficient. Trends work against sustainability in its environmental dimension because of increasing motor car-related mobility and dispersed urbanisation, threatening valuable open spaces. It however contributes to the maintaining, profitability and development of services in rural areas, which is also profitable to the indigenous rural population. Medium-sized and small towns benefit from increased demand in services from the part of the new rural population. However, this new population puts natural areas under high pressure. Not all rural areas benefit from out-migration of population and activities from large cities, bringing with them income, purchase power and employment opportunities. A number of rural areas are characterised by declining population and/or employment (agriculture, manufacturing activities) and by progressive marginalisation. Most of these areas show significant weaknesses in their settlement structure (dispersed settlements, weak driving functions of small and medium-sized towns, abandonment of villages etc.).

### **2.1.2 Spatial Disparities and territorial cohesion**

In terms of GDP the difference between EU15+1 (Norway missing) and the EU 10+2 is striking: the former countries count for 95 percent of the GDP while the rest, that is, the new member states and two accession countries, count for only 5 percent of the GDP.

In relation to the urban-rural typology, the regional type 1 (high urban influence, high human intervention) covers only 19 percent of the total area (29 countries), but houses 60 percent of the population and produces 72 percent of the total GDP. The corresponding figures for the sum of all the three types with high urban influence are 27 percent, 69 percent and 78 percent. This means that nearly four fifths of the GDP of Europe is produced in slightly more than one fourth of the territory that is under high urban influence. The regional types 5 and 6, with low urban influence and medium or low human intervention, count for 53 percent (22 + 31) of the total territory but only 20 percent (12 + 8) of the total population and 16 percent of the GDP.

When the typology of development prospects was compared to the urban-rural typology, the relative share of non-lagging regions was highest in regional type 1 and under the average in the rest of the regional types. In regional type 4 (low urban influence, high human intervention), the share of non-lagging regions was only 18 percent. A remarkably low performance was also to be found in regional type 2 (high urban influence, medium human intervention) where the share of non-lagging regions was only 25 percent. Of course the share of lagging regions correspond invert with the share of non lagging regions. (See also page 163). The spatial distribution of lagging regions is very clear-cut, including the EU10+2 countries, northern Finland, eastern Germany, substantial parts of Greece, southern Italy and Sardinia as well as substantial parts of Spain. This means that development prospects are very much bound to the national context and to some degree to the regional context as well.

### **2.1.3 Dynamics and flows**

Regarding population dynamics, the EU15+1 had a positive population change and in all, there seems to have been a slight decentralisation in the three regional types with high urban influence. In the three regional types of low urban influence, a centralisation seems to have taken place. In the EU10+2, the overall change was negative. In this category it is striking that the loss of the centres (type 1) was considerable while the other two classes of the types under high urban influence had a slightly positive population change, which could be interpreted as a kind of suburbanisation. In type 4, that is, the type where EU15+1 experienced the strongest grow, EU10+2

had the most severe decline. In the most rural areas of regional type 6, the losses were higher as well. The spatial distribution of population change indicates a situation where most countries have regions with population growth of both above and under European average. In some of the new member states, there are no regions with a population growth above the average.

For the whole territory of EU25+3, the variations in change of GDP during the period

1995–2000 were from 13 percent (type 4) to 25 percent (type 2). The low performance of type 4 is remarkable, because it is caused by low performance in the west as well as in the east. In all the three regional types under high urban influence, EU10+2 was performing better than EU15+1, with a growth from 24 percent (type 3) to 31 percent (type 2). There seems to be a certain correspondence between economic performance and degree of human intervention: the types (2 and 5) representing medium human intervention were performing best in the EU10+2 category. In EU15+1, there are small variations between the different regional types, only the low performance of type 4 is notable.

The spatial distribution of economic growth is interesting. The new member states have done very well, but not Romania and Bulgaria to the same extent. In west, some of the periphery (Spain, Portugal, Ireland, South Italy, Greece) was doing well. So did large tracts of UK and the Netherlands. France is noteworthy for lower than average performance all through.

#### **2.1.4 Contradictions between levels**

An aim of regional policies in many parts of Europe is “regional enlargement”, which implies the idea that investments in infrastructure would enlarge labour markets and commuting areas, with the effect that the enhanced complexity of enlarged labour markets would foster economic growth and the region would profit from a more poly-centric structure. The implications for urban-rural relations are very important, because extended rapid railway lines and highways do not only mean that existing towns are functionally integrated into core regions on a daily commuting basis. It could also mean extensive investments in development along the new transport corridors. This could mean a further “rurbanisation” of rural Europe, and the destruction of abundant environmental and cultural assets.

#### **2.1.5 Findings at transnational level (Interreg III B areas)**

Many of the Interreg III’s priorities for action address the issues of integrated territorial development and within that context the strengthening of the

functional and spatial links between urban and rural areas. Under the Interreg IIIB key examples include the following:

- Elaborate operational spatial development strategies on a transnational scale, including co-operation among cities and between urban and rural areas, with a view to promoting polycentric and sustainable development
- Promote efficient and sustainable transport systems and improved access to the information society
- Promote the environment and the good management of cultural heritage and of natural resources, in particular water resources.

The current INTERREG Programme clearly acknowledges the significance of rural development in the European regions and stresses that there is a need for urban-rural and inter-rural co-operation to provide a decent level of services and to solve common problems.

#### **2.1.6 What is new?**

The project has developed a typology of regions in Europe according to urban-rural characteristics. The task was to carry out statistical analyses and cartographic renderings of European regions (NUTS3) in order to identify the character of regions on a successive grading from urban to rural. The analyses and the elaborated typology imply both structural and functional urban-rural relations.

The harmonised typology indicates a situation where the various countries are comparable. The "blue banana" or "pentagon" is clearly visible as an area of high urban influence and high human intervention covering almost all of the Benelux countries, a huge part of western Germany, most of England, most of northern Italy and parts of middle and south of Italy as well. A strong line of high urban influence and human intervention stretches from the west of Germany through the east to southern Poland, northern Czech Republic down to the west of Slovakia and Hungary. Scattered areas are to be found around the national capitals in particular and some of the seashores of the Mediterranean and the Atlantic.

The peripheral countries such as Finland and Sweden in the north, Ireland in the west and Greece in the southeast are characterised by very huge areas of low urban influence and low human intervention. Countries like France, Spain, Italy and Poland are characterised by a huge variety of different regional types.

A striking feature concerning parts of EU10+2 (i.e. Lithuania, former GDR, Hungary,

Romania, Bulgaria) is the large share of regions where urban influence is low but human intervention is high. Parts of Denmark and France follow the same pattern. This could indicate a variety of things: careless land use, generous spatial standards in building and infrastructure, the strength of the construction lobby, etc.

The opposite, that is, high urban influence but low human intervention, are characteristic of parts of the North (Finland and Sweden), the alpine countries (Austria, Switzerland) Portugal and the Mediterranean countries (Spain, France, Italy). This may be explained by sparse population under influence of MEGAs in the North, or natural conditions such as topography in the alpine regions. In South, the explanation may be early urbanisation and historic urban environment with modest spatial standards in building and infrastructure.

It is important to notice that urban influence and human intervention correlate, but that there are remarkable inconsistencies as well. Degree of urbanity versus rurality is genuinely dependent on both factors. With regard to sustainable development, it is encouraging to realise that development in terms of urbanisation does not by necessity imply extensive building. The option of prudent management of earthbound resources is statistically evident.

The developed typology is dynamic in two respects. Firstly, it provides for the employment of statistical time series according to which changes over time can be visually represented.

Secondly, it can be applied on different geographical levels in a way that the renderings of the different levels are comparable with each other. Applying the same logic (above/below average) it is possible to switch from one geographical level to another and still get cartographic representations that are somehow comparable. Although the scale changes, the logic of the rendering keeps the same and this provides for comparability.

## **2.2 Methods and data**

### **2.2.1 Spatial analysis methods**

With respect to urban-rural relations, a point of departure was a distinction between structural and functional properties. Structural properties refer to those physical characteristics that are comparatively stable over time and in most cases have emerged as a result of human endeavour spanning over centuries. Such structural properties are established land-use patterns, settlement structure and the distribution of population.

Functional properties refer to the factual use of the physical environment such as various forms of production, consumption and communication.

It was assumed that urban-rural relations can be defined in terms of structural as well as functional relations. Urban-rural structural relations are determined by the way the physical environment is constituted and shaped while their functional relations are determined by the way the physical environment is utilised. Over time, particular functions of any given location change as production and consumption patterns change. An effect of this is that also the physical setting is reworked over time. From this point of view, all urban-rural relations are part of a perpetual reshaping process. Structural relations are, however, characterised by a certain degree of stability, because the physical world cannot be rebuilt over night. Therefore they provide a comparatively inert context of functional relations. Functional relations on the other hand can be changed over night, given the flexibility of the physical setting to house a multitude of various activities as well as the flexibility of various functions to adapt to various physical settings.

The procedure of the investigations was the following. First, national definitions of urbanisation were analysed and tested. On the basis of this work an initial, not fully harmonised typology of urban-rural Europe was developed. Subsequently, a set of indicators was chosen and investigated by applying a multivariate statistical analysis. Based on the results a smaller set of indicators was chosen for further analyses, and interrelations between the various indicators were identified. A final, harmonised typology of urban-rural

Europe was elaborated and this typology was compared to a set of indicators concerning the socio-economic development of Europe. The model was tested on the national level in two cases as well.

The elaborated typology is based on the idea of two main dimensions, that is, degree of urban influence on the one hand, and degree of human intervention on the other hand.

Urban influence is here defined according to population density and status of the leading urban centre of each NUTS3 area. Land cover is supposed to reflect both the degree of human intervention and actual land use. Degree of human intervention was determined by the relative share of land cover according to the main land cover classes of the CORINE data set. The main classes are artificial surfaces, agricultural areas, and residual land cover.

In determining degree of urban influence, two factors were taken into account: population density and status of the leading urban centre of the region. Only two classes were defined, i.e. high urban influence, which included all NUTS3 areas with a population density more than the European

average (107 persons per square km) and/or the areas where the leading urban centre of the NUTS3 area has been labelled "Metropolitan European Growth Area (MEGA). The rest of the NUTS3 regions were classified as being under low urban influence.

High urban intervention corresponds to a situation where the share of artificial surfaces (and possibly one of the two other land cover categories) is above European average.

Medium human intervention equals the cases where the share of agricultural land (and possibly the share of residual land cover) is above European average. Low human intervention concerns all cases where only the share of residual land cover is above European average.

The two classes of urban influence and the three classes of human intervention were combined into a six-type model where the main division is in two classes of urban influence, that is, high and low, and a three-class subdivision into high, medium and low human influence of the two main classes.

### **2.2.2 Indicators**

The project started the work on indicators with an extensive and detailed list of indicators that were judged as capable for the identification of the structures and the flows between urban and rural regions. The pool of indicators was divided in main dimensions. The comprehensive list gave an opportunity to all project partners to comment on it and to discuss and decide about the most relevant indicators. The list was discussed from several perspectives, namely in relation to the conceptual background of the project, to the reviews of analyses on key trends shaping urban and rural areas in Europe and to the interests of the policy makers.

The indicators that would form the basis of the typology were chosen: population density, the status of the leading town of the NUTS3 area, and the shares of artificial surfaces/ agricultural land/residual land of the total land cover. All the three criteria indicate, more or less, structural as well as functional properties. The interrelations of these indicators were studied and each indicator was reviewed according to economic performance, population change and development prospects.

After checking the availability and quality of the respective data of the indicators "wish list" the list of actual operational indicators seemed to remain rather short (for more details, see Annex 2). In conclusion, to the ESPON database the project contributed the following indicators and typologies:

- share of urban population based on national classifications
- share of rural population based on national classifications
- typology of urban/rural population based on national classifications
- typology of urban-rural characteristics based on harmonised criteria
- artificial surfaces
- artificial surfaces per capita
- artificial surfaces per GDP pps
- immigration (2000)
- tourists' overnight stays (1995 and 2000)
- tourists' arrivals (1995 and 2000 )
- level of education, i.e. number of pupils/students by school level (1995 and 2000).

The main purpose of the indicator was to feed the typology work, namely the construction of a typology on urban-rural characteristics and the statistical analysis of various data in relation to the typology.

## **2.3 Policy Recommendations**

In order to strengthen the attention to urban-rural relations, it would be important to attempt to influence EU policies with major budgets. Other options include the continued efforts to use the Community Initiatives for reaching a greater urban-rural sensitivity.

If the aim, at the micro level, would be to appropriate the unearned profit of development for the community, the solution involves the foundation of municipal land banks, a planning policy that would require piecemeal development based on approved land use plans, the possibility for user-driven non-speculative modes of development to operate undisturbed, and a municipal building site release that would not favour the establishment of territorial production monopolies. All this can take place only providing the financial sector offers a wide array of alternatives, including long term mortgage loans and non-speculative banking.

### **2.3.1 Uncomfortable trends**

For urban regions the economic benefits of increasing urban-rural interaction have been quite obvious, but the social and environmental sustainability of the trend is far from self-evident. The development of public transport routes has usually not kept the pace with motorway investments, which has tempted or forced private car use. As this development may have several

unsustainable effects, it is increasingly important to study the nature of increased interaction and not to advocate interaction for its own sake.

The overall tendency in Europe during the last decades is characterised by decentralisation of the decision-making procedure influencing land use and development as well as the de-regulation of property markets. In most European countries the planning and building codes have been amended toward increased liberalism by disqualifying previously existing hierarchical planning systems and providing for the possibility of instant, investor-driven development. The trends provide for an increase of speculation in real estate and decreased competition in building, because speculators want to establish territorial production monopolies.

A development based on speculative gains seems impossible to combine with the request for sustainable development, which implies long-term considerations and a territorial differentiation of future prospects in terms of scale and extent. Project based haphazard development is simply impossible to fit into such considerations. Case studies have provided a realistic picture of the magnitude of unearned profits in the development of rural land to urban areas. These profits are not just a marginal and reasonable surplus for creative entrepreneurs, but a major cost for dwellers and a crucial loss for taxpayers.

### **2.3.2 Uncomfortable policy effects**

The review of the relevant EU policies and the analysis of their key weaknesses and strengths, undertaken in Interim Reports 1, 2 and 3 of this study have made it clear that:

- There is no explicit and pro-active (as opposed to permissive) EU policy measure, which promotes complementarities and integration in urban-rural relationships.
- As regards EU Community Initiatives, with the exception of INTERREG III, there is hardly any recognition or promotion of urban-rural linkages.
- Lack of integration between different EU structural and sector policies can act as a barrier to the development of territorially integrated policies at the national and local levels and to the promotion of urban-rural relationships and partnerships.
- The existence of separate measures for 'urban' and 'rural' policies is a key obstacle for development of integrated urban-rural initiatives at the EU level. The narrow definition of geographical boundaries of areas that are eligible for funding limits the development of a wider spatial perspective

and the inclusion of neighbouring urban and rural areas within the policy space.

- The lack of dedicated financial support (through EU funding) for strengthening and building institutional and local community capacities hinders the effective implementation of urban and rural partnerships in the context of EU policies and initiatives.
- The cumbersome and inflexible procedures of most EU funding programmes inhibit wider participation of rural partners in EU initiatives.

Uncomfortable effects of regional enlargement, which is an aim of regional policies in many parts of Europe is, could mean a further rurbanisation of rural Europe, and the destruction of abundant environmental and cultural assets.

### **2.3.3 Recommended changes in policies**

Regarding the ongoing mainstream Structural programmes as well as for the Community Initiatives Urban and Leader, promotion of urban-rural complementarities and partnerships should be introduced where possible. In relation to the Programming period 2007–2013, it is worth noting that, with the exception of the ERDF contribution to rural development policies, the urban-rural dimension is never explicitly mentioned, although the eligible activities and assets described in the draft ERDF Regulation may have an urban-rural dimension. In this respect, it is recommended that the urban-rural dimension be more strongly emphasised in the final Regulation. Another additional possibility for stressing the urban-rural dimension in future structural policies would be to mention it explicitly in the Overall strategy for cohesion policy, being currently prepared by the European Commission. (see pages 265-266)

Various EU sector policies could be more beneficial to efficient urban-rural relationships and partnerships in the sense defined by the ESDP, provided these issues are made more explicit and considered in the implementation of sector policies. It is therefore recommended to draw the attention of authorities involved in the implementation of related EU sector policies on the potentialities of these policies for urban-rural issues. Practical solutions with model character should be worked out and disseminated in order to raise awareness on concrete possibilities. (see pages 266-267)

The project has identified also policy recommendations concerning functional as well as structural urban-rural relations. The former comprise e.g. the strengthening of the settlement patterns, promotion of indigenous economic activities, development of new innovative solutions for public transport, protection of valuable natural areas and functional strengthening of small

and medium-sized urban centres. Strategies for improving sustainability, internal cohesion and stability of the regions concerned are to a large extent dependent upon the improvement of relations between urban and rural areas. Such strategies should have an integrated character and should comprise a wide diversity of complementary measures. Recommendations regarding structural urban-rural relations highlight for example transparency in regional co-operation, tender and competition in all the phases of the development processes, financial instruments that promote non-speculative development are much needed, better inclusion of rural aspects in urban-rural relations, (see pages 267-270 for thorough listing of policy recommendations).

#### **2.3.4 Recommended changes in polity and governance**

The issue of partnership is related to the idea of good governance, which has been spelled out by the European Commission. The principles of good governance include a set of general principles: openness, participation, accountability, effectiveness and coherence. The five principles are supposed to reinforce those of proportionality and subsidiarity, and EU initiatives should be checked systematically with regard to whether public action is really necessary, if the European level is the most appropriate one, and if the measures chosen are proportionate to the objectives. Partnership is obviously a form of participation and thereby a constitutive element of the EU's interpretation of good governance.

The idea of partnership should not, however, blur the fact that the essential rationale of good government is to promote public interests, which actually is a fundamental objective that should not be jeopardised by e.g. participation, providing that the risk is there. The positive connotation of partnership is related to the idea of pursuing a win-win situation, where all parties involved do gain. From the point of view of policy recommendations, the idea is primarily that the public should gain, that is, public interests should form the basis of any public policy. If private interests gain as well, that is very fine indeed. Consequently, policy recommendations should indicate the foreseeable allocation of gains among all partners involved. (See Part two, 1.4.4, page 92)

### **3 ESPON Project 1.1.3 Particular effects of enlargement of the EU and beyond on the polycentric spatial tissue with special attention on discontinuities and barriers**

#### **Third Interim Report**

TPG-Lead partner: The Royal Institute of Technology (KTH), Sweden

Partners: Nordregio, ÖIR, S&W, TNO Inro, Karelian Institute, CEDRU, NTUA, ITPS, University of Ljubljana, VATI, The Prague Institute for Global Urban Development, Polish Academy of Sciences

#### **3.1 Findings**

##### **3.1.1 Main territorial structures (polycentricity)**

The ESPON 1.1.3 project developed a methodology to measure polycentricity, consisting of the components size, location and connectivity, which measures different dimensions of polycentricity. If aggregated to the Polycentricity Index significant and plausible differences in polycentricity between countries become apparent. The results show that the new member states and candidate countries (=EU10+2) on average have more polycentric urban systems than the old EU member states, this mainly because of the location index. The connectivity index of the EU 10+2 is much lower than in the EU 15. The transport infrastructures necessary for the networking between urban nodes are weaker in the case of the new EU member states compared to EU 15. It must be emphasised that the polarisation of the urban system in the accession countries has increased since their transition from planned to market economies in the 1990s and is likely to increase further in the future.

Spatial entities were discerned which could "compete" with the Pentagon: One potential transnational region could be formed by the three small Baltic countries, another is the so called "Triangle of Central Europe"<sup>1</sup>, a potential transnational region of integration containing the Triangle including Austria, Czech Republic, Slovakia and Poland as well as Slovenia and the Interreg IIIB CADSES area.

##### **3.1.2 Spatial Disparities and territorial cohesion**

The spatial diagnosis of the enlargement was regarding discontinuities and divergence.

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<sup>1</sup> Warsaw (in the East), Poznan (ev. Berlin in the West), Krakow, Saxony (Dresden), Prague, Bratislava, Vienna and Budapest (in the South)

At the macro-level (EU27/ESPON space) the spatial trends in population and economic terms (years 1995-2000) indicate that the three Baltic States suffered significant population losses, but at the same time remarkable improved their contribution to the total ESPON GDP. Polands pattern of population gain is diversified but in terms of wealth contribution it is almost entirely on the rise. Czech Republic, Slovakia, Hungary and Slovenia largely have loss of population, but while Czech Republic faces dramatic losses in GDP contribution (except for Prague), this monocentric structure cannot be recognized in Slovakia and Hungary. Slovenia is gaining in wealth.

The national/region level (meso-level) shows that the new member states GDP per capita on average has been growing, but that the gap between poor and rich regions has been widened at the same time. Apart from economic convergence the social convergence is of high interest, because a high GDP does not automatically imply a low unemployment rate (e.g. Madrid and Rome)! But there are also regions with low GDP per capita together with low unemployment rates, particularly in Portugal, Central Europe, and parts of UK, Ireland, and Sweden. In EU10, large parts of Hungary, Romania and Cyprus have relatively low unemployment, while in Poland, the Czech Republic, Slovakia and the Baltic States have relatively high unemployment in 2000.

The micro-level diagnosis was focusing on banking sector and foreign direct investment (FDI) and shows that the move from a bank-based system to a more finance based system (stock markets) generally provoke the concentration of financial activities in the main financial centres that the national scale as well as at the international one. Peripheral regions and small and medium sized enterprises could therefore suffer from credit rationing. The financial systems in the new EU member states are still heavily bank-based, but liberalisation process could lead to a more finance based system. The FDI in 2001 shows that 80 % of the FDI inflows are concentrated in three countries (Poland, Czech Republic and Hungary).

Typologies were elaborated for the

- regional specialisation (which describes changes occurring within regions and how they relate to regional performance) and the
- geographic concentration (describing geographic concentration as changes occurring between regions and at the wider geographic scales in terms of trends towards concentration or dispersion).

The results of geographic concentrations show that not all regions will respond equally to policies that promote specialisation or differentiation of economic structure. The comparative analysis demonstrates that most transformations (growth of service sectors, decline of employment and

increase in concentration in the primary sectors, decline of employment and dispersion in the secondary sectors) are occurring in all over the EU, but within the EU10+2 the transition as growth of the service sectors, decline of employment and increase in concentration in the primary sectors have both a faster pace and a stronger manifestation

Draft typologies mapping regions with problems/needs were elaborated namely "Fringe", "Shrinking", "Rustic" and "Rust belt" communities:

"Fringe" Communities: Regions with peripheral location, low population density, low level of economic wealth and currently slow growth rate are expected to be less attractive for private investors and qualified mobile labour than other regions. 47 extreme 'Fringe' regions are identified mainly located in Romania, Bulgaria, Greece, Portugal, Scotland and in the coastal parts of East Germany.

"Shrinking" Communities: Regions with poor demographic structure, negative population trends and low population mass and density are involved in a negative spiral of cumulative causation, with declining regional markets for the private sector and increasing per capita costs for public services. The results show one Shrinking region in Denmark, Hungary, Lithuania and Poland, two in Italy and Portugal, three in Spain and Greece, and four in France, Bulgaria, Sweden, Estonia and Latvia.

"Rustic" Communities: Regions specializing in the primary sector, with low income levels and a slow rate of structural transformation in the recent past, but now moving towards secondary and tertiary sectors are more likely to experience poor economic growth rate in the near future than other agriculture-dominated regions. We assume that the slow rate of transformation from the agrarian economy in the past reflects the fact that the manufacturing and service sectors did not find these regions attractive as economic locations in the pre-accession situation, when international competitions was less fierce than after enlargement. There are six regions with all indicator values in the lowest quartile - these extreme 'Rustic' communities are all together located in Romania. The very rustic communities having four indicator values in the lowest quartile can be primarily found in Romania as well as in Bulgaria, Latvia, Lithuania, the Czech Republic, Slovenia and Slovakia but even in Portugal, Italy and Greece.

"Rustbelt" Communities: We assume that current low income and technology levels in the manufacturing industry will not attract new industrial investments as much as in other manufacturing regions.

### **3.1.3 Dynamics and flows**

A number of border regions will have the potential to merge to dynamic functional relationships with new neighbours. The analysis focused on 118 border regions (NUTS3 level) of the EU10+2. By analysing the geographic type of borders, ethnic-historical types of borders, density of border crossings, economic disparities and the membership in Euroregions and transnational Working Communities, first draft typologies for "border typology for integration potential" were elaborated, trying to identify forerunners, hardworkers, candidates and handicapped for integration on NUTS3 level.

In the 118 border regions 63 regional cross-border co-operation organisations (60 Euroregions and 3 transnational Working Committees) are existing. 90 % of the border regions are members of one or more of these organisations whereby 28 regions are members in two and four regions are members in three organisations.

### **3.1.4 Contradictions between levels**

One goal of polycentric development is to strengthen major urban centres outside the 'Pentagon', but this will increase spatial disparities between the already dominant capital cities in the accession countries, such as the Baltic states, Hungary or the Czech Republic. However, if the promotion of balanced urban systems in these countries is a common goal, more Structural Funds and transport infrastructure would have to go into the peripheral regions of the new member states, and this would go at the expense of their capitals.

### Goal Conflicts of polycentricity policies for accession countries:

Goal	Policy	Goal conflict
Competitiveness at global scale (Lisbon)	Strengthen highest-level global cities	Polarisation between the global cities and the rest of Europe will increase. The European urban system will be less balanced and polycentric.
Cohesion at European scale	Strengthen major cities outside of "Pentagon"	The competitiveness of the global cities in Europe may decrease. The urban systems of individual countries will be less balanced and polycentric.
Cohesion at national scale	Strengthen medium-level cities in accession countries	Competitiveness of major cities in the accession countries may decrease.
Sustainability	Strengthen lower-level cities in accession countries	Competitiveness of major cities in the accession countries may decrease.

#### 3.1.5 Findings at transnational level (Interreg III B areas)

#### 3.1.6 What is new?

Two scenario studies are conducted to forecast the effects of enlargement by using two different but complementary forecasting models of regional socio-economic development:

In scenario 1 (RESSET model) four scenarios have been tested so far with following findings:

- The largest accessibilities are in the areal core of the New Europe and the model picks this up, shifting population and employment towards this heartland in the absence of inertial factors which mitigate this redistribution. This is the essence of the trend projections.
- There are considerably less spill-overs from new activity in different countries into other countries than we expected.
- There is a tendency for the west to capture more activity than the east even when the east is favoured in terms of investment/subsidies in employment
- There is a general spreading of activity throughout the new Europe which is tantamount to a redistribution from large to small countries and from peripheral to core, with the exception of Scandinavia and the Baltic States

that appear somewhat of an exception, capturing activity from Poland and Germany.

- In the migration south scenario benefits the west rather than the east but the two non-EU countries Switzerland and Norway, appear to benefit most from any of the scenarios tested.

In Scenario 2 (SASI model) the results of three scenarios are summarised as follows:

- Transport infrastructure improvements in the accession countries and between the accession countries and the old EU member states contribute to bridging the economic gap between the old and new member states.
- Transport infrastructure projects that improve the transport corridors between the old and new member states are more important than transport infrastructure projects within the accession countries.
- Transport infrastructure improvements designed to reduce spatial disparities at the European level are likely to increase spatial disparities within the accession countries at large or within individual countries..
- Except the transport pricing scenarios, all transport policy scenarios examined so far in ESPON are likely to accelerate the decline in polycentricity in the accession countries.

## **3.2 Methods and data**

### **3.2.1 Spatial analysis methods**

A Polycentricity Index was elaborated measuring polycentricity with a size, location and connectivity index (see chapter 1.1.1). A spatial diagnosis was examined with the analysis of convergence, discontinuities and divergence in the enlargement process. The project is also elaborating two scenarios using for the Scenario Study 1 the RESSET model - a new model which is designed for ESPON 1.1.3. It is a sketch planning model which enables any casual user with a view about the future urban and regional development of the ESPON space to engage in information speculation: to explore the scenario space. For the Scenario Study 2 the SASI model (also used in ESPON 2.1.1) is a model of regional socio-economic development particularly designed to show the impacts of European transport policies.

### **3.2.2 Indicators**

The core indicators used within the project are GDP, employment according to the three main economic sectors, unemployment rate, population and accessibility.

### 3.3 Policy Recommendations

Project 1.1.3 based the making of policy recommendations on two very different rationales for making policy combination:

+ **Principle-base rationale** (basically a coordinated sector approach with a top-down perspective). As for concrete and combined policy actions, it's recommended:

- In a long term perspective, transport infrastructure investments in the new member states and particularly between new and old member states are of primary importance to increase competitiveness and cohesion in the EU as a whole.
- Infrastructure developments should also strengthen the potential Transnational Region formed by the three small Baltic countries. Deepened cooperation with the Russian enclave Kaliningrad is important for environmental concerns. Intensified networking with St. Petersburg and Kiev is of high priority.
- Polycentricity at the European level should increase by promotion of the network of major cities in the "Triangle of Central Europe", with its potentially high level of integration.
- GDP growth in major cities and city regions in the new member states does not necessarily reduce unemployment or prevent social exclusion. This calls for intensified and focused urban policy programmes for more and better jobs in both capital and second tier cities.
- Promotion of multiplier effects of R&D centers.
- Large scale infrastructure improvements alone are not sufficient for significantly reducing the economic disparities between the old and new member states; they have to be integrated with other policies of the European Union. Transport policy scenarios examined in this report are likely to accelerate the decline in polycentricity within in the new member states and accession countries, i.e. over-promoting capital regions. This points at the need for policies to improve the second rank cities' functions. Corridors concentrating both internal and international traffic should be a priority investment.

All new member state should be invited to draft national programmes for regional development with emphasis on the functional growth of second tier cities. EU funding should be provided to partnerships formed at the regional level - both to draft the plan and to secure its implementation. Small member states should profit from drafting plans in cooperation with neighbouring states. Plans should be based on analysis of the potential

function and contribution to positive spatial association of the second tier cities. Such plans should include policies aiming directly to generate employment in second and lower order cities and towns.

A second group of policies focuses new transport infrastructure in selected cities: Intensively develop regional highway networks focusing on major regional centres; Route new high speed rail lines to serve selected regions; Intensively develop local transport accessibility, including sustainable transport; options such as bicycle paths linking communities and regions.

A third group of policies builds on increasing importance of culture, leisure-based tourism and sporting activities to the economies of cities and regions: Attract major one-off events with longer term development potential; Deliberately develop a cultural or tourist role based on existing natural and cultural resources in regional centers or second-tier cities. Development of tourist networking possibilities (natural, cultural, historic) for cities and regions with similar experiences; Restore historic tourist quarters

+ **Capacity-based rationale** (territorially based and largely following a bottom-up logic)

Macro level policy combinations:

- Explore the use of the Open Method of Coordination (OMC) as a mode of governance to a greater extent in EU spatial strategies. Particularly in the Accession countries, regional and local conditions are necessary prerequisites for developing national plans to encourage polycentricity and cohesion.
- Fortified Rural Development Policy focusing on the enormous needs in EU's Rustic communities. EU's RDP should be broadened to focus more on sustainable rural development and suggest possibilities to support funding the often risk-filled attempts to switch to more environmentally-friendly methods of agricultural production. The RDR budget in old and new member states should be adjusted to the particular needs for rural development and environmental management.
- Extended Neighbourhood policy should be directed towards the border areas that are handicapped for integration, ie those with an already low intensity of transnational activities and low economic disparities, or those that have difficult or inaccessible borders.

Meso Level Policy combinations

- Capacity building of regional and local administrations may be necessary to empower these regions with the skills needed to recognize opportunities and suggest plans for EU-funded projects, manage

programmes and evaluate results. Development of communication mechanisms and methods to promote transparency and greater stakeholder participation are also key aspects of this capacity building.

- By means of national policies, extended social policy should be developed to secure key service provision in Europe's Shrinking regions to make them more attractive. The EU should provide guidelines for which services should be considered as minimum standard for service accessibility in small town Europe.
- •At the national level encourage programmes to increase cooperation within regions of the Enlargement countries, dependent or independent from EU-funding. Intra-regional cooperative forums need to be highlighted as opportunities for local exchange, benchmarking and mutual learning.

#### Micro-level policy combinations

- Regional/local institutional or administrative capacity may benefit by the introduction of horizontally placed "Development Councils" entrusted with the job of coordinating the expected effects of policy and planning on the normative objectives of competitiveness, cohesion and conservation (or the economic, social and environmental aspects of sustainability).
- Encourage Local Agenda 21 plans to adapt a spatial dimension to sustainable development, for instance the importance of accessible green corridors within and close to major urban areas, bicycle paths linking major transport hubs.

In regions/subregions facing severe problems ("fringe", "rustic" and "shrinking" communities) there is a need for an integrated development approach, in which the main axis/focus should be a settlement/urban oriented policy, applying the principle of polycentrism at local scale (ie. townships, villages, hamlets). This would include cooperating and networking in complementarities, generating some thresholds and synergies at the very local level.

## 4 ESPON Project 1.1.4 The Spatial Effect of Demographic Trends and Migration

**Third Interim Report**, March 2004

Lead partner institution is Institute for Growth Policy Studies (ITPS) in Stockholm and partner institutions are IGEAT in Brussels, Norwegian Institute for Urban and Regional Research (NIBR) in Oslo, Università G.d'Annunzio in Pescara, Centre for Geographical Studies (CEG) University of Lisbon Foundation (FUL), Institute for Geography and Regional Research – University of Vienna and VÁTI, Hungarian public non-profit company for regional development and town planning, Budapest.

### 4.1 Findings

This report investigates the demographic development in Europe, primarily from the 1990s onwards and the main findings related to territorial structures and trends are the statistical exercises and results as regards migration and natural population development on regional level. However, an important theme in the report is the explanation power of economic factors as regards migration. According to the analyses, the economic factors have lost in importance or more they have become embedded in more complex explanation factors related to life quality. (p.75-77)

A number of variables have been used in order to describe the demographic development in Europe, and its implications on spatial/regional development. They are *migration*, *age structure* and *gender structure and marital status* (i.e. fertility), *natural population change*, *total fertility rate (TFR)* etc. The project is mainly a statistical analysis on European/macro level and typologies have been used for describing the recent development and current situation.

As regards *TFR*, first results show that there is a positive correlation between the level of TFR and natural population change, even if the age structure of course also has impact on the natural population change. Estimations have been done on regional data for selected countries, showing similar a pattern. Denmark and Poland are exceptions since the correlation is very weak in those cases, and Spain, Italy and Germany show strong correlations, among those tested.

As regards the *ageing* of the European population, it is partly an effect of falling TFR and that cohorts in reproductive ages have diminished. As such, it is also a consequence of other developments than the “purely demographic”. Mapping the ageing in Europe shows that it is a phenomenon both in expansive in-migration areas and traditionally out-migration ones.

Regression analyses show no correlation between ageing and total population change or between ageing and net-migration. In the new EU countries and in Northern and Southern Europe the ageing process seems to have impact on total population change, but the impact on the components seems to differ between them. With regard to natural populations change the ageing process seems to be especially significant for the development in Southern Europe where ageing and low TFR seem to reinforce each other. The impact on net-migration is, however, not so pronounced. It is only in the Nordic countries that there may be a small connection between ageing and net-migration in the sense that ageing regions also are out-migration regions.

The results with regard to external migratory movements shows a very different pattern compared to the internal balance [...]. It indicates some important aspects:

- Europe has become globally attractive, even in spaces of traditional emigration, such as Spain, Southern Italy, Greece, ...;
- metropolises are the most attractive areas for external immigration;
- in eastern Europe there is a difference between the richest countries that become attractive, especially the Czech Republic, and countries such as Poland or Romania which remain countries of emigration, although in a much more moderate rhythm than in the beginning of the nineties;
- some tourist areas, such as southern France, the Algarve and the Mediterranean coast of Spain increasingly become regions of exterior immigration. Most of this immigration is coming from northern Europe, among others retired people with a high standard of living.

As regards *depopulation* the first typology has 5 categories, from "very strong", to "no depopulation". Here Spain, Italy, Bulgaria, Slovenia, Hungary and the Czech rep come out as countries with depopulation areas. In Scandinavia Sweden is the deviant, partly a result of the large size of the regions. No depopulation regions occur to a high degree in Greece, UK, France, Poland and northern Italy. The second typology shows indirect depopulation, through variables such as ageing population, ageing labour force, dependency ratio etc. The indicators show that demographic scores at any given time are highly influenced by former demographic occurrences - that is, national and regional changes in fertility, migration patterns and other external factors. The linkages between low fertility, natural population change and net out-migration result in eroding preconditions for development.

From the scenario exercises the most important result is the magnitude of the population-ageing problem in Europe. The evolution of the spatial pattern of the ageing processes shows that it will be intense not only in the more developed countries of Central Western Europe, but also in the Southern and Eastern parts. Only a handful of regions will be free from the pressures of strong population ageing processes. Although with variable patterns, depending on the characteristics of each country, the most critical period in most of the scenarios, in terms of the ratio of "elderly to working aged people" will be between 2015 and 2030.

#### **4.1.1 Main territorial structures (polycentricity)**

##### **Findings related to the spatial structure in terms of SIZE**

The report presents a typology of regions and age groups – what groups are attracted to what kind of regions, and it shows that migration flows are different for different age groups and that they are attracted to different types of regions. Naturally this is related to more than the size of the region, but size is one aspect. REF

Regarding GDP and its importance for demographic development it was more important before than it is looking at more recent development: "The evolution of the relation between the migratory balances and the GNP/inhabitant is the most significant given: inside the Western Europe regions, whereas there clearly was a relation in the 60s, it becomes negligible as from the 80s." (p.76)

Metropolises are the most attractive areas for external immigration, and there are in addition tourist areas that have become areas of immigration due to high life quality, attracting retired persons (south of Spain etc.) – followed by people from poorer countries. (p.64). (Is this micro or meso level?)

Regarding the external migration the project has shown that Europe has become globally attractive, even in spaces of traditional emigration, such as Greece and southern Italy. In Eastern Europe the countries are in different situations – richer countries are immigration countries, poorer countries outmigration countries. (p.64)

##### **Findings related to the spatial structure in terms of INFRASTRUCTURE NETWORKS**

Mobility is addressed, but this is more interpreted as migration, and not connected to infrastructure networks. The driving forces, or tools for mobility, are not brought up to a large extent. This concerns all levels – macro, meso and micro.

## **Finding related to the spatial structure in terms of SOCIO-ECONOMIC SPECIALISATION**

The problems connected to specialisation/diversification that old industrial regions might have as regards unemployment, low education levels and out-migration tendencies are mentioned, but this is not discussed in depth. More, the actual migration/mobility/ demographic development is discussed – as this summary shows. REFFORMATVERBINDEN

In the typology presented above (with 14 categories) the European regions are characterised after their attractiveness to, firstly, young people. The categories give some hints on the regional specialisation, although it is just hints. Regions attractive to young are urban metropolises or other urban regions. Repulsive for the young are those of suburban character, economically weak, or of "vacation character" (?? that is, western France, Portugal). "Idenfinite" regions are for example east European regions or regions combining "pleasant surroundings and economic dynamism" (positive among all age groups)

## **Findings related to the spatial structure in terms of CO-OPERATION**

Co-operation and networking is not addressed in any large extent in this report. This concerns all levels – macro, meso and micro.

### **Summary**

The implications of the demographic development contradict the polycentric development ambitions in ESDP/ESPON. The population redistribution that is going on will not automatically encourage polycentricity – more the contrary, an unbalanced and unsustainable European space. (p.183) "Signs of polycentric development are evident within Pentagon, but outside this area there are instead indications of monocentric development with regard to the demographic development. This phenomenon is especially strong in the Northern countries and in Eastern Europe." (p.20 in part 2, Results)

Reducing the disparities in living standard and income levels in Europe is considered of utmost importance for reaching a polycentric development in EU29. The gap between the new EU-members and the old ones is pronounced and temporary rules and regulations are perhaps in some cases necessary in order to hamper a short-term large drain from east to west. In the long run a policy that stimulates symmetrical migratory movements should be of great importance and prioritised on the political and social agenda. (p.182-184)

"From a functional urban areas' point of view there are, however, instead some signs of periurbanisation only indicated in this study but known from other studies – as well as signs of a more polycentric urban development in

differing parts of Europe, but on a lower regional level (...). This periurbanisation process can, however, also be seen as a monocentric development as it is dependent on the economic and social development in the centre." (p.20 in part 2, Results) The development differs between Scandinavian countries and the rest of Europe. In Scandinavian countries the urbanisation process is still ongoing, whereas in the rest of Europe there has mainly been suburbanisation since the 1980s.

Polycentricity on micro level is not addressed explicitly but it can be concluded that with the differing attractiveness of regions that the typologies indicate, it is almost possible to imagine "monoaged" regions, with young people in the urban centre and older age groups in the suburbs.

#### **4.1.2 Spatial Disparities and territorial cohesion**

Regarding spatial disparities the picture shows increased disparities between centre and periphery. This is here indicated by for example the strong mobility in and around metropolitan areas, and the weak mobility of old industrial regions. Mobility and migration on micro level indicate however somewhat different things in the northern periphery and the central European territory. In the northern periphery the urban areas are still immigration areas, in central Europe the suburbanisation is more visible.

The internal migratory flows illustrate the divisions inside national spaces. These correspond to differences in economic growth and in the environment.

One of the typologies groups the European regions according to popularity as immigration areas. (p. 16-17 summary) This reveals the regional pattern of migration – and consequently a (selective) picture of territorial disparities. The regions are classified according to their "popularity" among different age groups. Regions attractive only for the young/old do imply certain disparities, since the labour market becomes imbalanced with an imbalanced population structure. Combining this typology with information on the differing mobility of inhabitants across Europe makes the picture of disparities even more complex: Mobility and flows are weaker in the eastern parts of Europe, but also weaker in Spain and Italy and in old industrial regions. It is stronger in and around metropolitan areas.

The general picture that the report draws is one where the Nordic countries and the new EU-member states in Eastern Europe stand out from the rest. There the problems from a negative demographic development are more severe than in other parts of Europe.

### **4.1.3 Dynamics and flows**

It is mentioned that the fertility and its timing, pace and course have varied between different types of local communities and regions (urban-rural, centre-periphery), and also that the TFR have developed differently in different countries and regions since the 1960s and onward.

Studies in several countries have documented that the timing, pace and courses of development in fertility change varied substantially between different types of local communities and regions, for instance according to dimensions commonly associated with rural-urban, centre-periphery etc." (exec. summary, p.10)

When discussing demographic development it is crucial to have a long-stretched time perspective, to conclude over the development over decades, generations and "cohorts". The central time perspective is the 1990s and onwards. In some cases however, the development from 1960's and onwards is addressed. E.g. in the exec. summary: "It seems apparent that the national TFRs have been converging during the period after 1960. The patterns are however, more heterogeneous when we move to subnational territorial entities ..."

### **4.1.4 Contradictions between levels**

Looking at the demographic development in Europe on micro, meso and macro level, naturally there are contradictory tendencies. Development differs between regions, between east and west etc. The reasons for the perceived contradictions are the complex set of drivers and effects of demographic development.

### **4.1.5 Findings at transnational level (Interreg III B areas)**

Trans-national and cross-border co-operation is not addressed in the report.

### **4.1.6 What is new?**

This report presents a comprehensive picture of European scale demographic development. That is the main merit of the project.

They also categorize regions after type and profile of migration by age groups. This might be considered a new way of describing the European territory, where specific regions are mentioned as "attractive to young people", "repulsive for the young" etc. It is a somewhat more detailed analysis level than just saying that the young are attracted to the cities etc. (for more on this see under Findings). Intentions for scenarios on replacement migration related to regional economic performance is presented, but not yet performed. The concept of replacement migration,

i.e. whether regional economic development can improve with international migrants replacing the domestic population loss, is very much in the centre of discussion in the EU in relation to for example the enlargement.

## 4.2 Methods and data

### 4.2.1 Spatial analysis methods

The statistical analysis performed in this project is central to the results. The main result is a discussion on the demographic development in Europe, the outcome of a range of statistical analyses. Statistical indicators are tested against each other, for to see the degree of correlation. In addition, a scenario building exercise is performed, with four different alternatives (one without migration, three different migration scenarios), and with intentions for further scenarios on replacement migration. (For a brief summary of the results of the scenarios, see under Findings.)

### 4.2.2 Indicators

Table 2.1: Indicators, Scale and Temporal Scope

	Territorial level*	Temporal scope
<b>Basic indicators (depopulation process):</b>		
Total population	NUTS 3 (2)	1980/90-1999 (latest)
Area	NUTS 3 (2)	---
Population density	NUTS 3 (2)	1990-1999 (latest)
Total area of urban settlements	NUTS 3 (2)	1999 (latest)
Population in urban settlements	NUTS 3 (2)	1990-1999 (latest)
Indicators on degree of urbanisation	NUTS 3 (2)	1990-1999 (latest)
In-migration	NUTS 2	1990-1999 (latest)
Out-migration	NUTS 2	1990-1999 (latest)
Net migration	NUTS 2	1990-1999 (latest)
Number of births	NUTS 3	1990-1999 (latest)
Number of deaths	NUTS 3	1990-1999 (latest)
Natural population growth	NUTS 3	1990-1999 (latest)
Population in "functional"/"strategic" age groups	NUTS 3	1990-1999 (latest)
Total Fertility Rate	NUTS 3 or 2	1960, 1980, 1988, 1990-1999/2000
Indicators on relations to spatial structures and change, from activity 1.1.1 and 1.1.2 (polycentrism, FUA, urban/rural types, urban-rural relations; typologies)	Cf. Terms of Reference. General cross-activity indicators and typologies	
<b>Indicators of territorial characteristics/regional context (vulnerability):</b>		
Population density (cf. above)	NUTS 3	1980/1990-2001
Indicators on relative remoteness, central/peripheral location (natural geography, travelling distances)**	NUTS 3 (2)	2000 (latest)
Indicators on degree of rural-urban structure**	NUTS 3 (2)	2000 (latest)
<b>Indicators on causal and effect processes:</b>		
Demographic change rates, components of demographic change, recruitment (net migration-natural growth), population potential fertility (see above)	NUTS 3	1990-1999 (latest)
Socio-demographic performance ratios (ageing, dependency, sex composition, labour market pressure), educational level**	NUTS 3	1990-1999 (latest)
Indicators on economic and socioeconomic performance (participation rate/employment, unemployment, GDP, labour productivity, sector mix/restructuring)	NUTS 3	1980/1990-2001

\* EU27+2

\*\* To be assessed and elaborated further

The table above shows the indicators used in the project. There is however data gaps causing problems.

There is lack data on place of origin and place of destination of migrants. This makes it difficult to see if the migrant comes from within or outside the EU, and whether he/she is a refugee or a labour immigrant. "At present" they investigate the possibilities of making a number of case studies for finding out about this. The table below illustrate what indicators on migration are important, ideal, available and what has been used in the project.

Table 6.1 List of indicators on Migration at a Regional Level

Political important aspects related to migrations	ideal indicators	existing indicators at regional level (eurostat)*	Data used and own evaluation*
depopulation of rural-peripheral regions	1 Total migratory balance 2 population evolution 3 ageing	- Interior immigration and emigration is available at nuts 2 level for most of the countries - exterior immigration is available for some countries but is generally underestimated - external emigration is very incomplete and for most of the countries underestimated	our evaluation of migratory balance has been done with the natural movement method : it allows us to have a complete matrix at nuts 2 and nuts 3 level (see 3.1.1.).
depopulation of young and intellectual for old industrial regions	Migratory balance of young and active people	- Internal arrival and departures by ages are rather incomplete but less than external arrival and departure	We evaluate the migratory balance by age classes level by the "age structure method": it allows us to get a complete matrix at nuts 2 level (see 3.1.2.)
socio-professional insertion of foreigners immigrants	1 proportion of population originate from poor countries 2 external migratory balance	- external immigration is available for some countries but is generally underestimated - external emigration is very incomplete and for most of the countries underestimated	- external migratory balance has been evaluated at nuts 2 level (see 3.1.3.) - no data is available at regional level considering the origin of the migrants
depopulation and change of social structure of centre towns	metropolitan and intrametropolitan migratory balance segmented by ages and social classes	No data are available about this topic because nuts 2 and even nuts 3 level are inadequate to apprehend this problem	- the geographic level (nuts 2, nuts 3) used in this study is in most cases not relevant to measure systematically this issue even if in many cases suburbanisation processes can be observed in the maps. The scale should be the metropolitan areas and these areas would have to be divided into core cities and suburbs with homogeneous criterion.
suburbanisation and space "spending"	metropolitan and intrametropolitan migratory balance segmented by ages and social classes	No data are available about this topic because nuts 2 and even nuts 3 level are inadequate to apprehend this problem	- the geographic level (nuts 2, nuts 3) used in this study is in most cases not relevant to measure systematically this issue even if in many cases suburbanisation processes can be observed in the maps. The scale should be the metropolitan areas and these areas would have to be divided into core cities and suburbs with homogeneous criterion.
East west migration	Rate of immigration from eastern Europe	- exterior immigration at nuts 2 level is incomplete and not available by country of origin	no data is available at regional level considering the origin of the migrants
mobility (temporary) of qualified person	1. proportion of population originate from rich countries 2- migratory balance of qualified people	There is no data of migration segmented in function of the social status	- no data is available about migration segmented in function of social status
Touristical mobility retreat migration	1 migratory balance of aged people 2 part of second	- Interior arrival and departures by ages are rather incomplete but less than exterior arrival and departure	We evaluate the migratory balance by age classes level by the "age structure method" : it allows us to get a complete matrix at nuts 2 level

(Table from p.54-55 in part 2 of TIR)

### **4.3 Policy Recommendations**

It is stated in the report that making policy recommendations for demographic development is not an easy task, and it is easier to see policy implications.

#### **4.3.1 Uncomfortable trends**

As regards natural population development, aging and dependency rates it is written in the policy recommendations section that "demographic development with population redistribution as a consequence of natural population decrease and low TFRs, ageing and out-migration accentuates the polarisation process between various regions." Even though this is perhaps not a contradiction between development and the territorial goals, it is a sign of an ongoing development potentially worsening the situation as regards regional disparities in Europe.

It is finally important to consider that EU cohesion policy aims at reducing the regional disparities *and* at encouraging growth and competitiveness, and that sometimes these two aims are contradictory.

#### **4.3.2 Uncomfortable policy effects\***

#### **4.3.3 Recommended changes in policies**

It is stated in the report that EU regional development policies and national policies must prioritise economic and social (family) policy to stimulate TFR. Increased European integration of the national policies is also seen as necessary.

"By reducing the regional and national differences regarding income and education, more balanced migratory movements will take place, promoting a more symmetrical economic development in the EU29-area. Furthermore, reducing the regional and national differences in income and education will be an effective means to promote a polycentric development and even stimulate symmetrical migration flows (...) Regional enlargement with larger local labour markets and functional urban areas will also stimulate a polycentric development where perhaps the infrastructure and accessibility will be even more important and a precondition for, and a "driving force" in this development." (p.183)

"a policy that stimulates symmetrical migratory movements should be of great importance" (p.183-184)

"... governments should respond to demographic change and to potential labour shortage with a variety of policies and instruments ..."

- encouraging higher workforce participation
- postponing retirement ages
- improve labour productivity levels
- immigration policies
- encouraging increase in fertility

None of the policy recommendations in this report explicitly address the Structural Funds.

Migration in general is considered as an important potential for development in Europe, in the long-term perspective. It is written that due to the fear of in-migration, and the experience that immigrants often get low-skilled jobs in spite of high education, it is important to analyse the "employability features of immigrants (human capital + social capital) and also of the conditions that may lead to an upgrading process ..." (p.126-127)

#### **4.3.4 Recommended changes in polity and governance**

It is considered important that politicians and policy makers are aware of the demographic development cycles, of long and short term effects etc. and take this into consideration when deciding on policies. This can be interpreted both as stressing a multi-level approach and a better co-ordination between different sectors (the point below.)

The issue of sector co-ordination is not addressed in the report.

## **5 ESPON Project 1.2.1 Transport services and networks: territorial trends and basic supply of infrastructure for territorial cohesion**

**Final Report**, August 2004

This document is based on the Final report of the ESPON 121.

The trans-national project group is formed by:

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The final report of ESPON 1.2.1 study has a strategic and territorial approach. It is partly based on data and knowledge obtained from other studies in the transport field, but mostly based on the further development and application of approaches readily at hand of the TPG partners. More than deepening specialised transport questions, the aim is to integrate the information into a territorial dimension, which was missing before. So, the concept developed for ESPON 1.2.1 is a combination of state-of-the-art and newly developed methodologies with the objective to describe different aspects of transport infrastructure and services in Europe and its regions.

### **5.1 Findings**

#### **5.1.1 Main territorial structures (polycentricity)**

In terms of transport networks, the length of motorway and rail networks in the early EU countries is higher than those that joined the EU in the first enlargement, when motorways were built to improve the integration of the Mediterranean 'cohesion'. The same situation is now in progress in the new EU member states through the TINA projects. Nevertheless, it remains a large gap in transport provision between central and peripheral countries.

Three groups of countries can be distinguished in terms of the network repartition, which seems to be highly correlated with the size of population in each area: the first one contains the old countries of European Community (excepted Luxembourg which presents a particular morphology of its network because of its very small surface), plus United Kingdom and Switzerland: the network is distributed in a homogenous way on the territory. The Scandinavian countries are in the second one because the networks are not very developed owing to their low density of population. The last group contains most of Eastern countries (excepted Poland, Czech republic, and Romania), which present a hierarchical network.

The vulnerability of the network has been studied in terms of the relative role played by each node and each edge and the consequences in terms of transfer of flows in the network consequently to the specific hazards. The results points to the natural importance of the edges linked (directly or by the intermediary of another edge) to the main European metropolis as Paris, London, Madrid, Roma, and so on and to some edges that represent very important links because of their specific role in the local connectivity of the network. It concerns mainly roads around mountains (as at the east and at the west of the Pyrenees), bridges (as in Denmark) and tunnel (as Frejus and Saint Gothard in the Alps or under the English Channel). The jamming of major European capitals does not induce a high rerouting in the case of the suppression of a node around them due to the fact that other possibilities of routes are often available around these big metropolies, because of the density of the local network. Lastly, the case of Nuremberg, in Germany shows the importance of this node as a European crossroads, as a kind of door open on the Eastern European countries. With the suppression of certain important links in the cases of the destruction of a bridge or obstruction of a tunnel, it can be noted that for each case the rerouting begins far from the removed edge. It concerns mainly the international transport by heavy trucks, drivers preferring to reroute on the nearest corridor rather than to use local network.

### **5.1.2 Spatial Disparities and territorial cohesion**

The network density of cities estimates in a quantitative way the degree of isolation of territories, taking simultaneously into account various physical elements, as geographical constraints (mountains, rivers...) or anthropogenic as quality of transport network (because we deal with the travel time) and density of population. This indicator shows clearly the imbalance between territories.

- The phenomenon of centre-periphery clearly appears: the average travel times in Ireland, Greece, the Baltic States and Scandinavia are very high,

materializing the important degree of isolation of the major part of these countries.

- The littoral effect is really more contrasted. If in some areas the littoral lands are far from a city of more than 100 000 inhabitants, in others the localisation of many important cities is near or on the coast, as for example around the North Sea, the western Mediterranean Sea, the South-East of Italy, etc... and drive to a very low average time<sup>2</sup>.
- The third phenomenon concerns the important isolation of certain internal areas, mainly due to a particular geographical situation as for mountains in Spain, France, Italy and Austria or plain in Poland, Latvia and Estonia.

The analysis of the relative proximity of the whole territory to road network, using the algorithm of expansion or Minkowski's algorithm, permits to underline the unbalances between NUTS and to complete the fractal analysis at national level. This indicator reinforces the hierarchical network and the concentration of roads in the centre of Europe, even if the hierarchic aspect is not visible.

The European space is heterogeneous. The different regions are in unequal situation. Clear effects of NUTS size are Belgium, Holland, Germany and a part of Austria, England and roman Switzerland, very developed countries but with little Nuts are in the same group: an homogeneous zone. The Spain is a characteristic country with very important settlement on the littoral and in Madrid region. The Eastern Europe with the new adherents is also characteristic.

### 5.1.3 Dynamics and flows

The nodes and areas generate flows owing to their internal characteristics and their accessibility to other areas, leading to flows on the network. The capitals are important sources of flows, compared to medium-sized cities, with differences of generation between the West and the East. It must be underlined that the spatial distribution of European cities is not favourable with a homogeny distribution of flows. Indeed, the hierarchy of the road network according to the potential relations between major European cities (in terms of population) underlines this phenomenon.

But by showing potential relations between main production areas, a new structure of transport network takes shape, not only concentrated in the West of Europe. **Vienna and Bratislava become major crossroads** for the exchange with Hungary, Bulgaria, and Romania and more generally all

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<sup>2</sup> That is coherent with the fact that, on a worldwide scale the human density on littoral areas is about 200 inhabitants/km<sup>2</sup> in the South and 130 in the North, 60% of global population living at less than 60 km of coasts.

the European South-east, at least until the passage by the Balkans is not really open and safety. The apparition of **a triangle linking Warsaw, Berlin and Vienna** traduces the potential strong relations between these cities and, in corollary, the risk of the saturation of roads.

Nevertheless, the interactions between the transport and the urban network lead to the development of important corridors whose orientation is globally radial, and potential problems of vulnerability and capacity.

Main car traffic flows on roads are highlighted between most EU central countries capitals. It's not only the fact that they are bypasses to go from any point in the territory to another, but their highest generation and attraction index. For this geographical reason, road networks in peripheral regions haven't such a high traffic on their links, in some cases reaching values 100 times lower, which leads to less negative externalities, as will be developed after. Concerning freight traffic on road, main corridors are located in EU15 countries, mainly Benelux, Germany, Italia and France. By showing the road traffics involving new EU countries, some regions can see their traffic increase in a significant way, with the enlargement of the EU. These ones are in eastern Germany, Austria, and North-East of Italia.

The Freight traffic on rail is roughly similar in its general form to the freight traffic on road. However, in the case of the rail freight flows from CEE to CEE the corridors toward the East cannot be seen in Germany. The highest traffics are found in Benelux, Germany, North Italia and France and the high volumes of traffic in the eastern countries.

Regarding the relation between MEGAs, Benelux and the Rhine valley are at the crossroads of these flows but it is not possible to know if the traffic on these edges is due to relations inside this area or to exchanges between MEGAs located outside this area.

The potential freight corridors from European maritime gateways are mainly located in Benelux, Germany, France, Switzerland and Great Britain. It is accentuated the importance of the links located near the sea and this is why we can see the high values for the edges concerned. The more stringent case is for the links located near the Mediterranean Sea (from Valence to Gioia Tauro). Finally, the road corridors starting from Atlantic ports have lower traffic values than for North Sea and Mediterranean ones and there may be opportunities to develop their traffic.

The potential relations between MEGAs allow showing where the crossroads are located in Europe. It is clear that the area containing Benelux, the East of France, the West of Germany and Switzerland is the main of them. A prospective view showing in a better way the relations with and between new European Union countries MEGAs shows "narrow passages" for these

potential relationships: Channel Tunnel, the Pyrenees tunnels, the bridge "Nyborg-Stagelse".

#### **5.1.4 Contradictions between levels**

In this document, spatial transport approach has been done in three levels:

**At local level** such approach has been existed for a long time and in particular in urban planning although a clear understanding between land use pattern and mobility is still not obvious. Nevertheless, progresses are made in this direction.

**At national level**, infrastructure schemes take into consideration problems of accessibility of regions or accessibility of remote areas, included islands. Through national master plans the national spatial policies are somehow "internalised" but there is no guarantee at all of an overall European consistency, from this point of view. Some master plans privilege uniform principles of accessibility, but others stress the criteria of financial or socio economic return making a clear separation between transport and regional development. In France for example there is a history of "Aménagement du territoire" which is not shared by many other European countries.

**At European level** an initial concern was regional development in order to reduce the gap between regions and to help regions with lower income to catching up. The structural funds policy were refined including redeployment of old industrial places and stimulation of trans-border cooperation. In all these actions transport projects take often an important place. The initiative of a "European Spatial Development Perspective" which was an informal perspective, proposed a more global approach, which is in line with an objective of bringing more cohesion in Europe. Transport networks have been considered as a way to reinforce cohesion and several important transport projects of peripheral countries have been partly financed by cohesion funds.

#### **5.1.5 Findings at trans-national level (Interreg III B areas)**

Trans-European networks will help to integrated cross border zones not only in the centre of Europe, where network of cross border small and medium size cities will emerge, but also in more peripheral zones (i.e. between Galicia and northern regions of Portugal, Spanish and French Basc countries, Spanish and French Catalan regions, along the Rhine river across France and Germany, between Vienna and Bratislava, Malmöe-Copenhagen, etc.).

### **5.1.6 What is new?**

Typologies are proposed through the combination of at least two different indicators. We propose here three different typology approaches:

- A typology confronting the infrastructure endowment with the density of population: comparing, in an aggregated analysis, the infrastructural performances of the EU15, CC10, and CC12, we can find the whole good condition of the EU15 countries infrastructural endowments, with a high infrastructural density and good use level; on the contrary, the CC10 countries present a potential deficit whether in use level (above datum of the Espon countries), or in the infrastructural density (below average datum). The CC12 countries find an infrastructural density below average datum (Espon countries), but with a good use level, justified by the low population densities.
- A typology of regions according to two dimensions, accessibility and economic performance: in general the more accessible regions are the economically more successful ones. The most affluent and productive regions, such as Munich, Frankfurt, Paris and Düsseldorf are also most central, i.e. most accessible, and the most peripheral regions with poor accessibility are among the poorest regions.
- A typology of regions suffering from transport externalities produced by road traffic flows: areas where the intensity of traffic is high and the density of network high-ranking: Benelux, Rhine valley in Germany, Paris and London-Manchester axis. After these areas with very high values we can observe other zones with quite high results: North Italia, a large part of France and Germany and the East of Spain. More globally, there are 2 types of dichotomy: the first one is core of Europe-periphery and the second one West-East. To put it in a nutshell, the potential externalities are not distributed in a homogenous way on the European territory: the areas presenting a good accessibility<sup>3</sup> seem to be those, which suffer the more from transport externalities.

## **5.2 Methods and data**

### **5.2.1 Spatial analysis methods**

Transport time and costs for freight are basic indicators of European economic integration and regional accessibility. In many former studies either time or cost, or a combination of both, a “generalised” cost or time has been used to characterise differences in accessibility or to estimate a kind of “impedance” or “resistance” function between two zones.

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<sup>3</sup> See for example part 3 of this report

Quality of service is also a factor which plays a more and more important role in the satisfaction of users, in their strategy of location for production "unit" or logistics centres which in turn influence in depth the pattern of flows in Europe.

Furthermore the costs and time of transport also depend upon the operating system chosen which in turn will be determined by the volume of traffic or the frequency of service required: rail transport gives a good example of such differences, with improved performances in time and costs when shuttle trains can be operated in good conditions as compared to wagon load units which must go through several marshalling yards from origin to destination thus increasing considerably both time and cost per units and deteriorating considerably the quality of service.

At a time when policy objectives for sustainable development focus on development of alternative modes (modes alternative to road), it is not possible to limit the question of transport accessibility to the sole road services for freight: availability of alternative services have been considered making it much more complex to introduce relevant indicators. More elements have to be taken into account, characterised by a large number of operation variables in particular for rail, intermodal and short sea shipping transport.

In addition problems of congestion must also be taken into account for road as well as for alternative mode: For road this results in delays on certain routes although road freight transport has shown in the past a quite good aptitude to avoid peak hours in congested areas and to adapt accordingly the driving and resting hours; but such flexibility encounters limits which become more constraining with increase of traffic. For rail this has led to the question of "priority for freight" because of the time lost to leave the right of the way to passenger trains and to the identification in Europe of a "priority freight" network, as recalled earlier to the policy context.

### **5.2.2 Indicators**

The indicators are **grouped into themes** following a logic. First, indicators and maps on **infrastructure endowment** are presented. Then, it is presented what is the infrastructure supplying in terms of travel times and what are the costs to reach certain points. Following that, the opportunities supplied by the transport system are presented in form of more **complex accessibility indicators**. First, daily accessibility is presented in different indicators, demonstrating what opportunities can be reached within a day-trip. Then, **potential accessibility indicators** are presented which allow a further differentiation of space in terms of market or economic potential of areas enabled by transport networks and services.

After looking at potential, the real use of the infrastructure in terms of flows on the networks is modelled, i.e. it is analysed which parts of the European transport networks have to carry which traffic load. **Transport and mobility** has also a backside that is reflected in the following sections with indicators on **transport externalities**. Finally, certain risks related to our dependence on a functioning European transport system are reflected in a series of indicators and maps on **transport network vulnerability** and its consequences.

### 5.3 Policy Recommendations

The aim of the policy recommendations at the European level is first of all to draw principles that could guide these recommendations, then to explicate the nature of these ones, before applying them, partially or totally to macro-regions of Atlantic Arc area, Mediterranean Sea area, Nordic area, Central area, Eastern Europe.

The objective is to have a more balanced, polycentric and sustainable spatial development and to ensure the territorial cohesion of the European Union. First of all, it is important to have a development: economic, social, demographic, and cultural. The transport system must thus facilitate the economic activity, but without being too costly, and allow to everyone the freedom of displacement, to have access to fundamental goods and services. It must participate to the reduction of the spatial inequalities, so that everyone can have fair chances. Finally, it must be more sustainable, preserve resources for the future generations, together with ecological diversity.

With these objectives and according to the elements developed in the report, it is clear that territorial cohesion can be ensured only at certain levels and with a certain diversity, a compensatory equity, because the European space, as we have seen with the fractal perspective, is deeply heterogeneous and this at every scale.

The general objectives of ESPON give us some criteria for action: economic efficiency, accessibility, struggle against imbalances, sustainable development, cohesion together with a modal shift, polycentrism, but also regulations, directives... But, the coherence between economic efficiency and sustainability can be discussed and requires for us at least the introduction of the temporality in the previsions and thus of dynamic of choices, some prospective of which we have attempted to give some elements with the maps showing potential flows.

The transport system is an area where two dynamic conceptions are fighting. The first is the transport demand coming from individuals and firms and which is essentially at short term, and which has dramatically grown in

the precedent century and could saturate, block the functioning of the system.

To response to demand by a policy of infrastructures building is not sufficient so we purpose to develop short and medium-term policies:

- Regulation of traffics to increase the capacities, diminish the pollutants, the casualties... These means are the statutory and relating to pricing policies, the increase of intermodality to facilitate a modal shift and the degradation of speeds.
- To improve the capacities available on the railways to permit a modal shift: limit the speed and the improvement not on the edges, of the segments of roads or motorways, but of the intersection at all the scales.
- Short-sea shipping: maritime transfer of certain kind of goods, linked to heavy containers.
- Transformation of classical railways into freight-dedicated lines.
- To furnish to the private economic system modes of high speed.

A policy of infrastructure creation is also necessary to diminish the vulnerability of network by a minimum of modal redundancy when it is possible and a multimodal redundancy when it is not.

### **5.3.1 Uncomfortable trends**

The consequences of a profitable transport system for a great number of activities, taken individually, are collectively costly. The awareness of these environmental problems is historically recent and the tools to measure it even more. But these ones exist, as shown by the maps on pollutants emissions. So, inhabitants must be preserved from risks linked to these situations.

The transport system is an area where two dynamic conceptions are fighting. The first is the transport demand coming from individuals and firms and which is essentially at short term, and which has dramatically grown in the precedent century and could saturate, block the functioning of the system. This micro-economic demand leads to the transfer to the colectivity of some direct but mainly indirect costs of the transport. The demand of the private sphere is a short-tem demand (about 2 or 5 years for enterprises). If this demand is not satisfied, the risks of delocalisations are very important, because of the concurrence. And the risks are amplified by other present and structural factors, which are out of our study area.

The transport supply firstly consists in roads, railways, ports and airports infrastructures. These ones are characterised by the long term: a road

supposes at least two centuries of functioning. Some axis dates from several centuries, mainly because of geographical constraints, which have for a long time limited and still reduce the possibilities of choice.

The current creation of an infrastructure lasts roughly 15 years because of expropriations, studies on economic and environmental impact, which is globally 5 times more than for investments of industries. These two durations illustrate one of the difficulties of the problem. Let's add that the creation of an infrastructure is in a general way of public initiative even if the operator is private. As a consequence, it seems evident that **response to demand by a policy of infrastructures building is not sufficient** because firms, potentially facing difficulties linked to deficiencies of the transport system, would have about largely enough time to delocalise their activities before the projects would be achieved. And this even if the anticipations and prospective, which remain necessary, are well made.

This does not mean that a policy of infrastructures building is useless because this one is necessary to give a response in the long term to the demand but it implies **to develop short and medium-term policies** to adapt the system to such a demand, which is in fast growth.

On the road, concerning interregional and international travels, the problem at short or medium-term according to the corridors concerned is the saturation because of the fastest growth of the transport, compared to the economy.

### **5.3.2 Uncomfortable policy effects**

The enlargement will have results in the central countries with the traffic increase. If the infrastructure endowment is not sufficient the enterprises could relocate themselves, as long-term policies lead to delocalisations, saturations of infrastructures, modifications of the international repartition of work, etc. The temporality of transport supply and transport demand are very different, and that is the main problem.

The road network is almost sufficient in many countries and builds an expressway; a motorway or a railway take a long time. Furthermore, construction of new facilities will be more difficult tomorrow than yesterday because of the reactions of local populations and the increase consideration for environmental problems.

It is necessary to act in short terms and to adapt the network use to the traffic evolution, in the goal of promote modal transfer on maritime traffic and dedicated railway thanks to cost and speed voluntary policies.

### 5.3.3 Recommended changes in policies

Policies at European scale are:

- Encouraging the best territorial definition of large projects (Quick Start Projects) in the context of a much more complex process of implementing transport projects. Deeper territorial analysis is needed to facilitate realistic cost-sharing schemes, enhance profitability, clarify risks and therefore attract private partners. The projects should be defined according to territorial visions (especially the few of them included in explicit territorial and multimodal National Plans). The detailed territorialized analysis of this kind of projects is also needed to assess political decisions.
- Planning key Trans-European Multimodal Transport Questions as the networked character of the future Trans-European Transport System will produce a new geographical redistribution of the transportation costs and benefits. Therefore, the overall functioning of the networks depends upon multi-party agreements to define new schemes for cost and benefit shares. Some capacity problems at local scale must be solved to avoid blocking potential benefits of this future network, like cities with obsolete road and rail configurations, and relatively poor rail connections to airports.
- The future re-definition of the TERN should identify those axes with "TERN Eurocorridors" characteristics (axes where long-distance traffic tends to concentrate). Specific analysis of major road (and rail, in some cases) metropolitan bypasses and rings is required.
- Leading the Transport network implementation process by way of identifying areas of common European interest and facilitating the negotiation agreements between a growing number of decision-makers following corridor-like approaches.
- Monitoring Large Transport Infrastructure Projects promoting better transport infrastructure management and supporting spatial development and environment policies.

From the analysis of macro-regions developed in the report, some trans-national and regional policies affecting those regions from ESPON 121 perspective are:

- Atlantic: it is necessary to envisage policies facilitating a fast economic and sustainable transfer modal, to make this territories attractive, and, in the medium term, to propose a carriage of goods faster than the truck, less expensive and less pollutant. In long term, the continuation of construction of a high-speed railway network for travellers is necessary.

Specific policies for this area (apart from those general already explained above) are the modernization and setting with the B2 gauge to make possible the creation of a real multimodal corridor Lille-Hendaye-Bilbao-Oviedo- La Coruna-Vigo-Porto.

- Mediterranean area: a first recommendation is to delete the weak links which exists in the main corridors of the current transport network of the Mediterranean area (Trans-Pyrenees passages, Trans-Alpine passages, Greek connection to the rest of EU countries) which are not considered in the priority projects. This is the case of the French-Italian rail connection: to give continuity to the high-speed rail line from Marseille and the North of Italy along the coast. The connection of Greece to the rest of the EU countries could be improved not only by strengthening the motorways of the sea, but with a corridor along the Balkan coast as an alternative of the TINA corridors. The second recommendation is to strengthen the intermodal connections by way of defining a network between the coastal transport nodes and inland transport nodes which can act as intermodal centres. For example, Zaragoza in Spain is connected to Madrid with a high-speed line and will be connected to the seaport of Barcelona by the same mode and is also situated in a region where the network density is not high, with the possibility to improve the capacity of the existing one.
- Nordic area: in a polycentric perspective the only real weaknesses in terms of relations in the urban structure, assessed through the quality of passenger transport services, can be observed in the Baltic states capitals. To answer to this major stake, transport can play a major role, and the development of the corridor I with the Via Baltica and Rail Baltica projects, will contribute significantly to improve the terrestrial and maritime relations. Nevertheless, the accessibility to the rest of the Union cannot be based only on terrestrial networks, for Riga and Vilnius where long distances are needed to reach the closest MEGAs. So we propose to encourage the development of air service in Riga and Vilnius airports. Indeed, the remoteness of their location at the scale of the continent can be only corrected by the air mode. A development of the air services to the closest MEGAs would seek to develop relations to Poland, to Finland and to Sweden in the first place, and to more remote locations at a lower level of priority.
- Central area: The central area is suffering from road transport to a very high degree. Given the good road infrastructure endowment already in place, alternatives to road have to be further supported. For passenger transport this is basically rail, in particular high-speed rail. Given the history of recent rail development, particular attention has to be given to

trans-border corridors. For freight transport, there are two alternatives. Rail and inland waterways. For both, it seems to be less an issue of missing network links, but a question of missing intermodal terminals and improved logistics to allow the provision of competitive services. The second recommendation comes because of the economic dominance of the central area the new member states have to be linked by appropriate transport infrastructure.

- Eastern area: The eastern area must be organized with the others macro regions (Nordic, Central and Mediterranean area) and the new neighbours (Russia, Belarus, Ukraine and Turkish) to establish links between the European Union and the eastern neighbours. But this area must improve the relations between the countries on its space. Therefore, the pan European corridors appear relevant to serve these objectives.

#### **5.3.4 Recommended changes in polity and governance**

Recommended changes are to do territorial impact analysis of large transport infrastructure projects, to include multiple scale and modes in definition of large transport infrastructure projects and to include service management strategies and monitoring of impacts in large projects.

## **6 ESPON Project 1.2.2.: Telecommunication Services and Networks: Territorial Trends and Basic Supply of Infrastructure for Territorial Cohesion**

### **Final Report, August 2004**

- Lead Partner: Centre for Urban and Regional Development Studies (CURDS), based at the University of Newcastle upon Tyne in the UK. The project team comprised Randal Richardson (Project Coordinator), Jonathan Rutherford, Andrew Gillespie, Simon Raybould, Ann Rooke, Amanda Lane and Sue Robson.
- Centro de Estudos em Inovação e Dinâmicas Empresariais e Territoriais (CEIDET), University of Aveiro, Portugal. The project team comprised Gonçalo de Sousa Santinha, Eduardo Anselmo de Castro, Artur da Rosa Pires, Rui Fernandes Simão, Carla Cristina Santos, Marie José Marques, Raquel Sofia Santos, Degol Medes and João Marques.
- Karelian Institute, University of Joensuu, Finland. The project team comprised Heikki Eskelinen, Lauri Frank, Timo Hirvonen and Sarolta Nemeth.
- The School of Built Environment, Heriot Watt University, UK. The project team comprised Cliff Hague and Karryn Kirk.

### **6.1 Findings**

The overall message emerging from our report is that the shape of supply and demand for telecommunications in Europe is complex. This should not be surprising for a number of reasons. First, the number of countries we attempt to cover is bound to create complexity, notwithstanding attempts to create a single market for telecommunications, a common regulatory framework and a common basis for developing the information society across Europe (e.g., successive eEurope Action Plans). Second the wide range of socio-economic circumstances of these countries and of regions within these countries makes for complexity. Third, historical differences in patterns and trends in telecommunications development between different countries also lead to complexity. Examples of these different historical patterns include: different network ownership patterns, for example, prior to liberalisation the UK had a single national incumbent, whereas Finland had an additional set of small regional incumbents; different start points, rates of, and attitudes towards liberalisation, with some EU15+2 countries having begun the liberalisation process in the 1980s, whereas by contrast some N12 countries are only now instigating this process. Fourth, different technologies exhibit different geographical patterns and rates of rollout. Finally, individual

countries have their own particular attitudes to intervention in the market. These factors taken together with other 'cultural' factors account for one of our key analytical findings namely that, national specificities remain crucial in understanding territorial differences across the European space. Despite these differences, though, some clear general territorial patterns do emerge. (final report, ex. sum. page 4)

a) At the macro-level: There is a 'north-south' divide across the EU15+2. The main factor in this pattern is the strength of the Nordic countries which lead the way in the uptake of almost all technologies. A number of other northern countries join the Nordic countries in the top cohort, but which particular countries do varies from technology to technology. When we compare EU15+2 with N12 countries, we see that, on average, there is a 'west-east' divide across all technologies considered and in respect of the development of e-commerce. There is, however, evidence of progress in the N12 countries. For example, digitisation of networks has now reached 80 per cent in all but four countries, the growth of several technologies, notably mobile telephony, is more rapid than in the EU15, though growth rates are not, at present, rapid enough to facilitate 'catch up' in the short-term. Furthermore, when we look beyond the average we see that some N12 countries are ahead of some EU15+2 countries on particular technologies and applications. Just as there are significant differences between countries within EU15+2 there are differences between countries within the N12. There is no obvious group of countries within the N12 which consistently (over a number of years) is more advanced than other parts across all technologies and applications, as is the case for the Nordic countries in EU15+2, though the data does suggest that Malta, Slovenia and Estonia are ahead on the leading edge technologies and applications (broadband and e-commerce). Bulgaria and Romania can be identified as lagging across all technologies and applications. (final report, ex. sum. page 5f.)

b) At the meso-level: When we turn to explore regional differences within and across the European territory it becomes clear, that national specificities remain crucial in understanding such differences. For example, many Nordic regions can be regarded as highly advanced telecoms regions. (final report, ex. sum. page 6)

An overall typology of combined household and business telecommunications development is presented. Regions are classified into categories from 'highly advanced telecoms regions' to 'highly lagging telecoms regions'. Highly advanced telecoms regions are Dutch and Nordic (particularly Swedish) regions, plus core city regions (Bruxelles, Antwerpen, Hamburg, Inner and Outer London), whereas highly lagging telecoms regions are all Bulgarian

and Romanian regions, remaining Czech and Polish regions, Lietuva and Latvija, and Açores. (compare with final report, ex. sum. page 11)

c) At the micro-level: At the micro-level our study suggests that there are disparities between metropolitan, urban and rural areas. If we first consider roll-out, it is clear that metropolitan areas have denser and better quality services. This is partly a function of the activities undertaken in large cities. So, for example, large cities have disproportionately high levels of installed telephone lines, host the nodes of Internet backbone networks and are first in line for technology updates such as network digitisation. Most importantly in respect of current policy debates, our research shows that the currently most commercially developed forms of broadband technologies – ADSL and cable modem – are, as one would expect for technologies with nodal properties, following a hierarchical roll-out pattern, with areas of high density population being served first. (final report, ex. sum. page 12)

Our analysis of 'mature' technologies (in Chapter 3) suggests complex territorial patterns and that the technologies examined do not display the same territorial disparities – fixed line and mobile telephony on the one hand, and PC and Internet adoption on the other, display distinctively different territorial disparities. (final report, ex. sum. page 13)

### **6.1.1 Main territorial structures (polycentricity)**

Our regional 'category spread' tables demonstrate that interregional differences within each individual country are narrow compared with inter-country differences. This applies to all technologies save for broadband technologies which are in the early stages of roll-out (and Internet backbone networks, where such analysis is less appropriate). This leads us to posit the existence of distinctive 'national telecoms cultures', with some countries having, for example, high computing cultures, whilst others have high voice communications cultures. Examples of these include:

- Sweden and Finland – high communication, high computing cultures.
- Greece, Italy and the Czech Republic – high voice communication cultures.
- Netherlands and Denmark – high computing cultures.
- Germany and France – low telecommunications cultures (with respect to both voice and the Internet).

(final report, ex. sum. pages 6-7)

In order to deepen our understanding of regional differences, beyond those associated with national specificities, we consider the data for NUTS 2

regions (available for EU15 only) against a number of socio-economic-geographic categories to see how significant these categories are as discriminants of telecoms uptake. The results of the analysis again reflect the complexity of telecommunications territorialities and there is no consistent message across the technologies. For example:

- a) In the case of PCs and the Internet, high uptake is generally associated with developmental status, with non-Objective 1 regions and those with higher GDP (which are clearly linked) performing best.
- b) In the case of broadband, high uptake is usually associated with non-Objective 1 status, relatively high levels of GDP, density of population, and position relative to the core (i.e. Pentagon regions).
- c) In the case of mobile technology the core-periphery distinction (Pentagon / non- Pentagon), was the most useful discriminant, though interestingly, the most marked distinction was the high levels of mobile telephony adoption in non- Pentagon regions (reflecting the 'Nordic' and 'Mediterranean' effects noted above).

These general findings are again complicated by national factors and specificities. (final report, ex. sum. page 6f.)

Most importantly in respect of current policy debates, our research shows that the currently most commercially developed forms of broadband technologies – ADSL and cable modem – are, as one would expect for technologies with nodal properties, following a hierarchical roll-out pattern, with areas of high density population being served first. (final report, ex. sum. page 12) Our analysis of Internet backbone network provision also suggests a number of interesting findings. Some positive trends are emerging in relation to more polycentric development. For example, the increasing importance of a number of 'gateway cities' (Praha, Budapest, København) beyond the core, through which these networks both pass to reach more peripheral regions of Europe, and interconnect to permit communications exchange between different networks. Some pan-European providers have concentrated on connecting more peripheral cities in regionally-focused networks. This has led both to some of these cities becoming more connected than certain cities in the core, and therefore, to differing levels of peripherality in access to backbone networks. (final report, scien. sum. page 23)

### **6.1.2 Spatial Disparities and territorial cohesion**

The European 'core-periphery' distinction (which is apparent across many socio-economic indicators) does not hold for telecommunications. This is mainly due to the strength of the 'Nordic periphery', but in the case of

mobile telephony, the 'Mediterranean' periphery also outpaces the 'core' and for broadband uptake Spain and Portugal have so far outpaced some core countries, notably the UK and France. The one area in which the core clearly leads is in access to Internet backbone networks for large corporate users and Internet Service Providers. (final report, ex. sum. page 5)

When we come to uptake of telecommunications, our analysis suggests different patterns of metro-urban-rural penetration for different technologies. For fixed line and mobile telephony there is no systematic difference by type of locality, though the situation varies between countries. However, a gap does open up when we look at Internet related technologies. This gap becomes very significant when we consider uptake of broadband. This pattern is reflected across all countries for which we have data, though the scale of the metro-urban-rural differentials varies. The broadband uptake gap can at least partly be explained by the differentiated roll-out pattern. The disparity in Internet uptake cannot be explained in this way, and may be more worrying and appears to have been sustained over time. (final report, ex. sum. page 12)

There are disparities between metropolitan, urban and rural areas. If we first consider roll-out, it is clear that metropolitan areas have denser and better quality services. This is partly a function of the activities undertaken in large cities. So, for example, large cities have disproportionately high levels of installed telephone lines, host the nodes of Internet backbone networks and are first in line for technology updates such as network digitisation. (final report, ex. sum. page 14)

When we turn to analyse metro-urban-rural disparities in fixed line telephony penetration for households, however, we find no simple and consistent relationship. This finding relates to EU15 only, however, and the limited data we have for N12 countries suggests that a metro-urban-rural divide remains. (final report, ex. sum. page 15)

### **6.1.3 Dynamics and flows\***

### **6.1.4 Contradictions between levels**

The sections referring to fixed line telephony, mobile telephony, PC penetration, Internet uptake, broadband, e-commerce and pan-European fibre backbone access are related to different levels.

There is one contradiction concerning fixed telephony:

At the micro-level our study suggests that there are disparities between metropolitan, urban and rural areas. If we first consider roll-out, it is clear

that metropolitan areas have denser and better quality services. This is partly a function of the activities undertaken in large cities. So, for example, large cities have disproportionately high levels of installed telephone lines, host the nodes of Internet backbone networks and are first in line for technology updates such as network digitisation. (final report, ex. sum. page 14)

When we turn to analyse metro-urban-rural disparities in fixed line telephony penetration for households, however, we find no simple and consistent relationship. This finding relates to EU15 only, however, and the limited data we have for N12 countries suggests that a metro-urban-rural divide remains. (final report, ex. sum. page 15)

### **6.1.5 Findings at transnational level (Interreg III B areas)**

Member states in co-operation with the Commission should support, where necessary, deployment in less favoured areas, and where possible may use structural funds and/or financial incentives (without prejudice to competition rules). (final report, page 112)

### **6.1.6 What is new?**

In our Final Report we introduce the typology or concept of 'spread of regional difference' and we illustrate this for EU15 countries. The 'spread' typology is helpful in illustrating the degree to which regional disparities are occurring in a particular territory for individual technologies or for groups of technologies. We also provide typologies of NUTS 2 regions, including the regions of the N12 countries, as a method of producing comparisons of the degree of overall telecoms advancement of all regions across EU27+2. These typologies are based on composite indicators that we have constructed from the data, some of which (related to enterprise Internet use) are estimated values. We present four such regional typologies: A typology of levels of household telecommunications uptake, A typology of estimated levels of business telecommunications access and uptake, A typology comparing levels of household and business telecommunications uptake, An overall typology of combined household and business telecommunications development into a single index. (final report, scien. sum. page 27)

## **6.2 Methods and data**

### **6.2.1 Spatial analysis methods**

The general methodological approach during the course of Project 1.2.2 involved trying to uncover quantitative data which was or could be made comparable at various territorial levels (final report, scien. sum. page 25). In our Final Report we introduce the typology or concept of 'spread of regional difference' and we illustrate this for EU15 countries. The 'spread' typology is helpful in illustrating the degree to which regional disparities are occurring in a particular territory for individual technologies or for groups of technologies. (final report, scien. sum. page 26-27) We also provide typologies of NUTS 2 regions, including the regions of the N12 countries, as a method of producing comparisons of the degree of overall telecoms advancement of all regions across EU27+2. These typologies are based on composite indicators that we have constructed from the data, some of which (related to enterprise Internet use) are estimated values. (final report, scien. sum. page 27)

### **6.2.2 Indicators**

We developed a wide range of indicators in our first report (final report, ex. sum. page 28):

- Development of telecommunications–infrastructure: 17 indicators
- Prices of telecommunications services: 13 indicators
- Diffusion of ICT and usage of ICT–services: 21 indicators
- Expenditures for ICT and ICT–services: 7 indicators (compare with Table 4, first interim report, pages 37-38).

We subsequently reduced the number of indicators to produce a core set of indicators. These indicators were reproduced in the Third Interim Report, with the core set of indicators in bold (final report, ex. sum. page 28). 11 core indicators, for example 'Proportion of main lines connected to digital exchange', 'Proportion of households with broadband Internet access', 'Proportion of firms with access to the internet', are still remaining in the three following sets of indicators: Development of TN&S, Up-take and use of TN&S, Up-take and use by business (compare with third interim report, pages 19-20).

## **6.3 Policy Recommendations**

The Final Report explores ways in which European and national telecommunications regulation and institutions could be adjusted so that

regulation could be used as a tool for regional development (final report, ex. sum. Page 24-25). There are three policy areas: regulation aimed at stimulating competition and how relevant the measures adopted are to the problems of under-served areas; the Universal Service Directive (USD); and adjusting the role of the regulatory authority to enable/require it to take into account questions of territorial development (final report, page 237).

1. Policy area: There can be little doubt that the opening up of European telecommunications markets to competition, together with technological advances in the 1980s and 1990s, have led to rapid growth in the availability of telecommunications networks and services. Competition has clearly had a pronounced impact on some parts of the telecommunications market. Regulators have undertaken a number of measures to try to stimulate competition. The key question from a regional perspective is how competition can be developed where there is little appetite amongst the telecommunications providers to address those markets. (final report, page 237) The regulatory options are mainly a matter for national governments and the Commission (final report, ex. sum. page 25).
2. Policy area: From a territorial perspective the most important directive within the NRF is the updated Universal Service Directive (USD) (CEC, 2002b). Universal service obligations (USO) exist in most developed economies. In essence, USOs "constitute a requirement that telecommunications operators provide a basic voice telephone service to all who request it at a uniform affordable price even though there may be significant differences in the costs of supply" The USD is the Union's attempt to bring a degree of harmonisation to USOs in Europe. It recognises that in a liberalised market some individuals, groups and communities may miss out on the potential benefits which the market offers. The USD defines a minimum set of services and directs that Member States should ensure that these services.
3. Policy area: In addition to a review of the USD and of individual USOs there may also be a need to consider whether and how the policies of the regulator relate (or fail to relate) to the regional development policies of Member States. Indeed, this may be a more costeffective approach and also one which is in line with the current vogue for 'joined-up government'. Generally speaking, the main concern of telecommunications regulators in Europe appears to be competition and price control, with the territorial focus being the nation state. Given the importance of telecommunications to other policy areas it would seem appropriate for governments to widen their regulators' brief or to ensure mechanisms for cooperation/coordination between

them and ministries or regional authorities concerned with territorial development issues. (final report, page 252)

### **6.3.1 Uncomfortable trends\***

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### **6.3.2 Uncomfortable policy effects\***

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### **6.3.3 Recommended changes in policies**

One policy option is to issue license conditions which impose more even territorial coverage. Such a strategy may make sense when the market for licenses is buoyant, but would be less productive in other circumstances. Furthermore, conditions would have to be enforced (final report, page 238).

When considering whether the scope of universal service obligations is to be changed or redefined, the review process should also consider:

- Whether specific services are available to and used by a majority of consumers and whether the lack of availability or non-use by a minority of consumers results in social exclusion; and
- Whether the availability and use of specific services convey a general net benefit to all consumers such that public intervention is warranted in circumstances where the specific services are not provided to the public under normal commercial circumstances. (final report, page 246)

An approach to stimulating or 'pulling through' broadband technologies into a region or locality is creating a critical mass of users to provide the incentive to telecommunications companies to provide networks. Regional and local authorities can act as key players in this process (final report, page 253).

Direct subsidy to individual telecommunications providers remains an option to policymakers (final report, page 257).

A way of stimulating investment in infrastructure is through public-private partnerships. This may involve partnerships between public authorities and telcos and/or partnerships between public authorities and locally-based enterprises (endogenous or exogenous) (final report, page 258). In addition to telecommunications companies, public-private partnerships can also involve private companies based in a particular region, which has the advantage of creating a guaranteed market for the technology (final report, page 259).

There is also increasing evidence that national governments in Europe are prepared to intervene or permit intervention by regional or local authorities in the construction and/or ownership of networks in order to overcome a perceived failure to invest by the private sector. In France, for example, the previously restrictive conditions under which local authorities could intervene in the telecommunications sector have been eased to allow the public construction of broadband infrastructure networks where necessary (final report, page 261).

Finally, an improved and harmonised data collection system covering the ESPON space is required. Only through improved databases can truly evidence-based policymaking occur (final report, ex. sum. page 25).

#### **6.3.4 Recommended changes in polity and governance**

Gillet et al (2004) point out that one of the key roles of local government is as a 'rulemaker'. Local policies can therefore be adapted to encourage telecommunications providers, particularly those using alternative broadband technologies, to invest in a region or locality. One approach which involves a lighter touch and perhaps less public expenditure is to create a more permissive planning regime – for example, in respect of mast and antenna siting – to enable companies to pilot particular technologies. This approach, of course, potentially raises environmental questions and the opportunities and costs would have to be explained to the community in question. (final report, page 265)

A clear message which emerges from our recent research is the need for greater symmetry of knowledge between the public and private sector in the area of telecommunications. This is true at European, national, regional and local level. It is also true regardless of the particular policies adopted from the policy menu, unless a decision is made to leave everything to the market. Each state of EU27+2 will have its own government structures, including regional and local governance systems. The relationship between the telecommunications providers and government agencies will also differ between countries. In these circumstances it is perhaps unwise to be prescriptive about how expertise is to be garnered or utilised. One approach would be to create a multi-layered system, acting in a coordinated manner, with varying degrees of expertise resting in different layers. At the regional level a regional telecommunications plan, with a "regional telecommunications directorate" to act as a policy and implementation unit, might be established. (final report, pages 265-266)

## **7 ESPON Project 1.3.1 The spatial effects and management of natural and technological hazards in general and in relation to climate change**

**Third Interim Report**, March 2004

Prepared by the following consortium: Geological Survey of Finland (GTK), Finland; Swedish Meteorological and Hydrological institute (SMHI), Sweden; Comissão de Coordenação da Região Centro (CCRC) and Instituto Geológico e Minero (IGM), Portugal; Institute of Ecological and Regional Development (IOER), Germany; Institute of Spatial Planning (IRPUD), Germany; Center for Urban and Regional Studies/Helsinki University of Technology (CURS/HUT), Finland.

Associated partners: Itä-Uudenmaanliitto (Finland) and Swiss Federal Institute of Technology Lausanne (EPFL) / Laboratory of Engineering and environmental geology (GEOLEP)

Editors: Philipp Schmidt-Thomé and Jaana Jarva

### **7.1 Findings**

The main focus of the report is a further development of the methodology, a further map making process, an application and review of methodology for inner-regional weighting of risks in case study areas, dealing with possible future highly sensitive areas according to development trends, including climate change scenarios, formulation of planning responses, and policy recommendations.

(c) The additional or modified indicators and maps focused on droughts, as of high priority for Europe, oil spill hazard, slope steepness and a package of maps referring to economic vulnerability in Europe (Nuts 3) in relation to earthquakes, radioactive contamination risk, nuclear power plant accident risk and winter storm risk. Moreover the report included the application of the methodology into several case studies at a regional level (case study regions Dresden, Itä-Uusimaa and the Central region of Portugal).

The ESPON Hazards project suggests that every European region and municipality should be aware of possible risks due to natural and technological hazards to mitigate the risks. The Third Interim Report presents a framework of a risk mitigation planning guide that shows the main elements of a spatial risk mitigation or risk management, respectively, and can be applied on the regional or local level. In general, a spatial risk mitigation planning guide has the following purposes:

- • minimize the impacts of the effects of hazards on people and (built) environment,
- • review the hazards of the respective area (region, municipality),
- • establish goals and objectives,
- • review a range of possible approaches to reduce risk,
- • identify the highest priority mitigation strategies and policies,
- • identify potential future actions to implement those measures that appear to be effective and appropriate for the area,
- • provide a background document (on the regional level) for local action.

### **Genuine findings**

Possible future highly sensitive areas, including climate change scenarios

In the context of risk reducing policies – which often have long term effects –, the identification of those areas that will be highly sensitive in the future has been a research topic that focuses on future risk estimation and presents a methodological basis how such an identification of future highly sensitive areas could be done.

According to the project's definition of risk (= hazard potential x damage potential / coping capacity) three paths of how an area or region might come more sensitive in regard to a certain risk were stressed out in relation to the increase of hazard potential, increase of damage potential and decrease of coping capacity.

#### **7.1.1 What is new?**

The suggestions through the policy recommendations towards the incorporation into the planning levels (mainly the regional one) of the risk management dimension

The development of an application tool to individually change the weighting factors of risks

### **7.2 Methods and data**

#### **7.2.1 Spatial analysis methods /Part I, Summary, pages 5-10**

The basic outcome of the methodology is a **nine** risk class matrix (Figure1. Nine risk class matrix)

The problem of weighting the selected risks is still not solved because it depends on certain social values that differ from society to society. Further, the area of Europe is very large and heterogeneous which makes the setup

of universally valid weighting factors for all risks an almost unsolvable task. Despite all scientific objections, from a political point of view, the *development of an application tool* to individually change the weighting factors has been introduced by the research.

Vulnerability is discussed from three different aspects (economic, ecological and social) and for the purposes of the ESPON Hazards project the three dimensions of vulnerability should be further on connected to the European scale with the help of maps.

### **Economic dimension of vulnerability**

Sample maps that portray aspects are currently developed. Possible sample maps include:

- Oil spills: the threat to different sectors of economy, e.g. tourism,
- Floods vs. land use: in what kind of areas do floods mostly occur?
- Droughts vs. agriculture

### **Social dimension of vulnerability**

The social dimension of vulnerability acknowledges the vulnerability of people, and the emphasis is on the *coping capacity* of different social groups.

The following indicators were chosen:

- Population density
- National GDP/capita
- Dependency
- Education rate

The social vulnerability indicators, excluding population density, measure those characteristics of a region that make people less able to understand the risk or recover from a hazard event.

### **Ecological dimension of vulnerability**

The ESPON Hazards project does not attempt to measure ecological vulnerability the same way as economic and social vulnerability are measured, due to problems in finding suitable indicators for measuring the degree of ecological vulnerability in all NUTS 3 regions and for all hazards. The fact that different hazards affect different natural areas (e.g. forest fires and oil transport) and appear in different scales (e.g. landslides and nuclear power plants) makes it impossible to find common indicators.

## **Towards an integrated vulnerability map**

The core idea is the integration of the economic and social dimensions of vulnerability. This enables the inclusion of coping capacity into the project not only in a qualitative way (like suggested in the First Interim Report, p. 93), but also quantitatively. The ecological dimension will have to be excluded from the integration due to the unique way different hazards affect the environment.

Moreover a Delphi method was applied aiming at drawing an exemplary risk profile for each case study region (they were selected for the purposes of the project) and reviewing the weighting of risks. The application of the tool takes place in the following steps:

1. Choice of experts
2. Preparation of the tool (hazards and indicators)
3. Application of the tool with the experts
4. Summary and description of results
5. Transformation of results into regional maps

### **7.2.2 Indicators**

**Table 1:** Possible future hazard indicators and data sources (Part II, page 4)

**Table 4:** Possible future hazard indicators and data sources (Part II, page 22-23)

## **7.3 Policy Recommendations /Part I, Summary, page 16**

The section about policy recommendations is still open for further investigations and some aspects have to be discussed or deepened for the final report.

### **(c): EU-level**

1. Need for better inclusion of risks related to natural and technological hazards in EU policies. This calls for better integration of environmental and regional policy measures at all spatial scales. Risk management should be made an integral and explicit part of EU cohesion policy.
2. Stress *vulnerability reduction* as a key strategy in policy and planning. There should be more emphasis on prevention and vulnerability reduction through spatial planning, based on the "precautionary principle" and "redundancy", i.e. developing robust policies that cover multiple hazards. Such measures are more cost-effective than risk reduction of single risks based on exact scientific predictions.

3. Deliberate use of Structural Funds for risk management: a) Use criteria relevant to risk and vulnerability to identify a region as eligible to funding through the Structural Fund objectives 1, 2 or 3 (e.g. highly sensitive areas); b) Direct structural assistance to projects that reduce the hazard potential and the damage potential or that increase the coping capacity; c) Monitor the risk and safety impacts of structural assistance.
4. Establish a European Emergency Management Agency (EEMA) for coordinating European risk management efforts. The EEMA should, among other functions, coordinate emerging EU initiatives in the field of risk management and guarantee the coherence between EU policies.
5. Implement the recommendations of the 6th Environmental Action Programme in broadening the scope of the SEVESO II Directive.
6. Ensure fluent co-operation between different ongoing initiatives in the field of hazard and risk management, including legislative and financial instruments.

**(b) Meso-level (national, Interreg)**

7. The implementation of the Strategic Environmental Assessment directive (2001/42/EC) should be ensured by member states, preferably in a uniform fashion across Europe, broadening the scope of all plans and programmes with potential effects on risk and vulnerability. The dimension of *safety impact assessment* should be integrated with other impact assessment methods.
8. Create governance networks to address risk management in regions with special environmental characteristics and related challenges. Instruments such as the river basin management plans of the Water Framework Directive (2000/60/EC) for risk management purposes, should be used.
9. Improve integration and co-operation between spatial planning experts and civil protection authorities (this applies to other spatial levels as well). Support the process of drafting common civil protection guidelines in the EU, while strengthening the aspects related to spatial planning and risk prevention.
10. Transnational Interreg areas with common ecological denominators should be used as 'breeding and testing' grounds for meso-level risk management programmes.
11. Make financial aid in disaster events conditional upon the compliance to national guidelines of risk management.

### **(a) Regional level**

12. Adopt and implement regional mitigation plans, allowing for “subsidiarity” by taking into account both the extent of different hazards and the best information and expertise is situated. The mitigation plans should be based on solid scientific and geographical information and they should make use of the *space-type concept* as outlined in (chapter 4.2.).

13. In order to support regional mitigation plans, adopt measures in the new Thematic Strategy on the Urban Environment (COM (2004)60 final).

14. Enhance horizontal co-operation between regions and urban areas (e.g. through networks such as Interreg initiatives, EUROCITIES, URBACT etc.) in the fields risk management and civil protection.

15. Enhance public awareness of hazards and public participation in risk reduction efforts.

### **(a) Local/Community level**

16. Adopt local mitigation plans based on the best available knowledge on hazards. Criteria for the quality and funding of these plans should include the following:

- a. Multi-hazard approach, including “domino” effects
  - b. Integration of the relevant vulnerability components
  - c. Facing all elements from prevention oriented mitigation to preparedness, response, recovery (see DPSIR chain, 2nd Interim Report p. 150).
  - d. Public participation; integration of private stakeholders in risk assessment, decision making, choice of measures and implementation
17. Accept and enforce the mitigation plan as a guideline for all other municipal activities with a relation to hazard exposure and vulnerability (e.g. local land-use plans, investments in public infrastructure etc.).

### **7.3.1 Recommended changes in policies**

There should be more emphasis on prevention and vulnerability reduction through spatial planning, based on the “precautionary principle” and “redundancy”, i.e. developing robust policies that cover multiple hazards. Such measures are more cost-effective than risk reduction of single risks based on exact scientific predictions.

### **Policy recommendations explicitly addressing Structural Funds**

Deliberate use of Structural Funds for risk management: a) Use criteria relevant to risk and vulnerability to identify a region as eligible to funding

through the Structural Fund objectives 1, 2 or 3 (e.g. highly sensitive areas); b) Direct structural assistance to projects that reduce the hazard potential and the damage potential or that increase the coping capacity; c) Monitor the risk and safety impacts of structural assistance.

Transnational Interreg areas with common ecological denominators should be used as 'breeding and testing' grounds for meso-level risk management programmes.

### **7.3.2 Recommended changes in policy and governance**

Create governance networks to address risk management in regions with special environmental characteristics and related challenges. Instruments such as the river basin management plans of the Water Framework Directive (2000/60/EC) for risk management purposes should be used.

Improve integration and co-operation between spatial planning experts and civil protection authorities (this applies to other spatial levels as well). Support the process of drafting common civil protection guidelines in the EU, while strengthening the aspects related to spatial planning and risk prevention.

Enhance horizontal co-operation between regions and urban areas (e.g. through networks such as Interreg initiatives, EURO CITIES, URBACT etc.) in the fields risk management and civil protection.

## **8 ESPON Project 1.3.2 “Territorial Trends of the Management of the Natural Heritage”**

### **Third Interim Report**

Transnational project group: EuroNet – Royal Haskoning (lead partner); European Centre for Nature Conservation (ECNC); EuroNet – Enviplan; EuroNet – Land Use Consultants; EuroNet – Territoires, Sites & Cités. With contributions from: Accademia Italiana di Scienze Forestale (Italy); Eastern Norway Research Institute (Norway); EuroNet – Fundacion Metropoli (Spain); Peter Bassin (Slovenia); Inst. of Environmental and Landscape Management, Szent Istvan University (KTI) (Hungary); ACER (Slovenia).

### **8.1 Findings**

#### Physical structure

The European physical structure leads to geomorphologic, natural and cultural differences in the regions. The alpine ridge forms the permanent divide for climate, history and trade in the continent, while the plains are home to most economic and social activities. The close presence of the sea has strongly influenced the history, economy, landscapes and traditions.

Europe has also an extensive network of rivers and inland waterways. There is a coherent system transporting the water, nutrients and pollutants to the coastal deltas. Large concentrations of European natural heritage are connected through this system.

At the macro level there are distinct differences between the Pentagon region and the rest of Europe in terms of land cover. The Pentagon has clearly a relative low percentage of semi natural land cover, while the built up area is significantly higher. There is no clear difference between EU15 and new member states when average land cover figures are compared.

The largest natural areas can clearly be identified in Finland, the Alps, the Cantabrian Mountains, the Pyrenees, the Carpathians, Greece and Scotland. The dominance of mountainous regions is obvious, apart from Finland and Scandinavia with extensive forests. Apparently those areas provide biotopes in the different climate zones that are of high natural values (Executive Summary and Introduction, page 20).

The Atlantic region shows a strong contrast with for instance the Boreal region. In the Atlantic region the largest cities of Europe are located, the coastal zone is heavily urbanized and the pentagon area covers a large part of this bio geographic region. The most important airports as well as harbors

are located within this region, thus concentrating a large number of potential environmental threats.

The natural conditions in the Atlantic region are favorable for intensive forms of agriculture. Large production units for crops and dairy, profit from generally good soil and climatic conditions. Combined with the extremely good transport facilities in the Atlantic regions, this area is highly under pressure to intensify food production.

Urbanization in the Continental region is more widely spread. Most concentrations in larger cities are found along the rivers. Especially the highly accessible Rhine Valley shows a concentration of urbanized areas. Conditions for agriculture in the Continental region are generally good, but differ according to sub regions. Large plains and wide river valleys allow for intensive forms of crops.

The urbanisation in the Alpine regions is quite different. Especially where development pressure occurs in relation to good accessibility (in the pentagon part of the Alps) urbanisation pressure is extremely high. One of the main components of the development pressure focusing on the valleys is the lack of build able surface. Therefore the contrast between built and non-built area is an important attractive characteristic of Alpine areas.

Urbanization in the Pannonian region is spread out over the area in the lowland of the Danube valley. The urbanisation pressure is lesser than in the Atlantic region. Further economic development in the corridor along the Danube from Belgrado to Budapest may be expected. In the Pannonian region the agricultural land uses are concentrated that may intensify in the future.

Urbanization in the Macaronesian region is strongly related to the coastal zones where, near the beaches tourist facilities are concentrated.

In the Mediterranean region, urbanization is influenced by the attractive climate, attractive landscape and the quality of existing cities. This area, being world's most important tourist destination, offers attractive circumstances to settle for residential uses as well as for economic activities which are not strongly related to other local conditions. The actual process of urbanization takes place here at the coastal zone and around the large cities.

Territorial trends may cause a threat as well as a challenge to nature. Most important are the following trends:

- Agricultural intensification and intensification, and the abandonment of land.

- Agricultural production not only focused on feeding the local population, it also became subject to trading and transportation thereby stimulating further development of roads and increase of agricultural area. At the same time, land has been taken out of production in the more remote and marginal areas in large parts of the continent;
- Increase of the surface of urbanized land.
- Growing tourism inducing urbanization, large traffic flows and rural pressures (Executive summary, page 14)

Furthermore, the pressure between the potential growing MEGA's and natural heritage is expected to be highest in regions that have a high percentage of natural and forest areas, i.e. mainly Scottish, Spanish and Alpine regions. Special attention should be paid to the effect of this development on the surrounding semi-natural and forest areas.

### **8.1.1 Main territorial structures (polycentricity)**

In the Alpine and Mediterranean regions more than one fourth of the land cover is natural area. In the Pannonian and continental regions less than 3,5% is nature. In the Boreal and Alpine regions forest covers more than half of the land.

The overview of the built up areas in Europe (Figure 3.1: Percentage built-up areas for NUTS 3 /Part I, page 13) extends the polycentric scope beyond the MEGA's and FUA's concept to another main idea of a development axe from the European Pentagon, the Eastern European Pentagon (TPG 2.2.2) towards the SE direction until the Black Sea, along the European Corridors (IV, V, VII). The above area includes a large number of MEGA's and FUA's as well.

The major urban concentration area of Europe is covered from several natural environment sites that should be protected and controlled.

**The spatial structure findings in terms of INFRASTRUCTURE NETWORKS** have been slightly covered.

### **Findings in terms of SOCIO-ECONOMIC SPECIALISATION**

From the socio-economic point of view the northern central areas are the most favourite as far as the Euro-Creativity Index and the competitiveness ranking is concerned. Tourism activities relatively increase in the central and coastal areas of Europe. At the same time the relationship between tourism, agriculture and other sectors in the local rural economy is increasingly important.

## **Findings on polycentricity**

The physical structure (geo-morphological and hydrological structure) has contributed at most to the human settlements development in relation to the historical past of the countries as well. On the other hand the natural environment is in danger within the most valuable natural sites due to the urbanization process.

### **8.1.2 Spatial Disparities and territorial cohesion**

#### **8.1.3 Dynamics and flows**

It may be concluded that during the many centuries of Europe's spatial development trends show a continuous decrease in the area of natural heritage. In times of high prosperity and strong population growth this process has been most pronounced. Since the start of the industrial revolution the process of spatial development has been extremely strong, in terms of land take for agriculture, the intensification of agriculture, the development of towns, industries such as mining, tourism and infrastructure.

Many current and past human activities have polluting effects on the environment. These activities affect the ecological quality of natural areas, resulting in a loss of species and a decrease in biodiversity. For instance air and water pollution or the overexploitation of groundwater, may have an impact on nature by damaging woodland or reducing the area of wetland.

Increasing urbanization and associated infrastructure, changes in agriculture and the development of the tourism industry are affecting the quality of the environment in a number of ways:

- Small ecological network structures are decreasing;
- Natural qualities are disappearing;
- Wetlands and water bodies are decreasing as groundwater tables are lowered;
- Substitute landscapes are often more uniform in physical and biological character;
- Remaining habitats are smaller, more fragmented (see chapter 4).

Territorial trends may also create opportunities for nature, for example changes in land use such as the abandonment of agricultural land. Chapter 4 deals with trends of natural areas and biodiversity. In the chapter 6 and 7 the future threats and opportunities are described. /Part I, page 31

#### **8.1.4 Contradictions between levels**

In the framework of the policy recommendations as a major contradiction might be considered the priority at a macro level of preserving the urbanization trends around the European Corridors through a proper spatial planning in relation to the natural heritage damage at the micro level that will be a major impact. Such an impact could be slightly avoided through specific spatial plans at several levels and spatially oriented financial support by the Structural Funds.

#### **8.1.5 What is new?**

The interrelation of the human activities with the physical structure of the European territory (Figure 6.1 Bio geographical regions /Part III, page 4) could be considered as the most genuine finding of the research. Such an approach guides to the future spatial dynamics connection with the natural environment capacity and promotes the natural heritage importance in spatial planning as well.

Moreover the major land use classification that is provided by the project and mainly the built up areas (Figure 3.1 Percentage built-up areas for NUTS 3 /Part I, page 13) expresses in a clear way the broad urban concentrations structure at a macro – level which formulate the critical development axe of the European territory that includes the Pentagon as well as the rest urban distribution across the lowland area that is extended along the Danube until the Black Sea. At the same time the land use at a European and regional level, using the layers through GIS, stimulates the hot – spots of the natural sites (Figure 3.2 Percentage natural areas for NUTS 3 /Part I, page 14) that are in danger due to the urbanization pressures in correlation with the other Espon findings (Mega's, Fua's, transport corridors, etc).

### **8.2 Methods and data**

#### **8.2.1 Spatial analysis methods**

The following methods are used:

- Secondary sources, consisting of policy documents, scientific research, existing statistical information. A significant quantity of documents on social, demographic and economic trends, agriculture, infrastructure, nature and landscape provides a useful information source;
- GIS analyses and map overlays;
- Tentative explanations for correlations;
- Trend extrapolation. Predictions of the future circumstances can be achieved through extrapolation of past trends;

- Questionnaire on national policies relevant for the current study;
- Case studies illustrating the local processes and trends for different locations. / Part I, Executive summary, page 4

### **8.2.2 Indicators**

In order to analyze and monitor the above developments; a number of indicators have been developed in relation to agriculture, urbanization, economical structure and innovations, tourism, infrastructure and environmental aspects /see Part I, page 33, Table 3.6:data

Table 4.4 Data, Part I, page 45 as far as nature heritage is concerned (natural area, fragmentation of nature)

### **8.3 Policy Recommendations**

The management of the natural heritage, aiming at protection and enhancement of the natural heritage should be approached in close relation to existing environmental policies, addressing the quality of water, air and soil.

Since space is a scarce resource, the natural heritage should be managed also in close relation to the spatial policies in order to avoid unnecessary land take, fragmentation and developments interrupting ecological coherence.

Acknowledging forthcoming changes in the Common Agriculture Policy, and the fact that agriculture is the largest land cover, requires close co-operation in formulating rural development policies.

The importance for the natural heritage of the geohydrological system, consisting of main fresh water sources in mountainous areas connected by rivers to the seas, requires an integrated approach with actions within the Water Framework Directive. The approach promoted by the Integrative Coastal Zone Management seems an adequate tool to be applied more generally.

Apart from the management of protected natural areas, the management of the natural heritage should focus more on "protection - by - developing", rather than mere conservation.

#### **8.3.1 Uncomfortable trends**

The major urbanization trends at a European level approach are focusing on the N-W / SE development axe. In the framework of the polycentrism concept of the ESDP there is a necessity to promote sustainable and balanced development in the above area in order to avoid the further

expansion of urbanization and focus on new innovation and knowledge economy economic activities (Third Cohesion report). In the same area the natural environment protection and promotion is of top priority spatial objective.

### **8.3.2 Uncomfortable policy effects**

The objectives towards a balanced spatial development outside the Pentagon and towards the CEE will increase the urbanization procedure within the major urban concentration area (NW-SE of Europe). Specific economic activities should be of top priority for the eastern countries such as Knowledge economy, innovation, ITT, etc. that will not draw the urbanization process to large quantities that will damage the natural environment.

### **8.3.3 Recommended changes in policies**

#### **Recommendations, macro level**

Elaboration and enhanced implementation of Natura 2000 is strongly recommended. Stronger integration of Natura 2000 especially with water related policies like the Water Framework Directive, addressing not only water quality but also quantity requires consideration of the location of natural areas within the European hydrological structure. When implementing nature protection policies and considering the enhancement of territorial cohesion by adding new areas to the Natura 2000 ecological network, river related areas like river valley forests, and river bed marshlands should be included. The measures deriving from Natura 2000 should assure also qualitative possibilities for spatial developments of environment friendly economic activities in order to avoid side - effects caused by restrictions.

Since the impact of climate change differs in the various bio geographic regions, specific approaches should be developed for flooding caused by excessive water run-offs in the Alpine and Mediterranean regions, river flooding in the Continental and Atlantic regions and combined sea-river flooding near the delta's in the Atlantic and Boreal regions. Also the problems of desertification in the Mediterranean region and of increased temperatures on the Alpine areas require specific approaches. Protecting natural areas may play an important role.

Flooding should, in relation to the natural heritage not always be seen as a hazard. Wide riverbeds can be used to retain the larger quantities of water flowing incidentally through the rivers after extreme rainfall. Inundations that are a consequence can be regarded as part of quite normal natural

dynamic processes. These should be regarded as hazards if human life and investments are at risk. The selection and implementation of flood areas should be balanced with regional socio-economic interests.

Co-operation within rural development schemes should be differentiated according to the bio geographic regions. Not only the impact of climate change on the natural heritage differs per bio geographic region, also the agricultural problems resulting in increasing intensification, extensification as well as abandonment, are different.

Where the development axes, being concentrations of potential urbanization, cross concentrations of natural areas, special attention should be given to the balance of the two. This especially applies to the concentration of natural areas at the former Iron Curtain.

Spatial development policies should reach a substantially stronger trans-sectoral dimension. The spatial development approach involves co-operation of various sectors of activity, various levels of authorities, and various stakeholders. Therefore it is an important policy implementation tool, providing widely acceptable solutions. It allows for all public policies with territorial impacts to be scrutinized and assessed so as to strengthen and increase their synergies and the sustainability of their outcomes. But sectoral policies should fully integrate the dimension of sustainability themselves, particularly the central ones, e.g.: transport, energy, agricultural and other. *(From Ljubljana Declaration, 13th CEMAT conference)*

### **Recommendations, meso level**

Next to the general implementation of nature protection policies, each country should give high priority to the actions required for the implementation of the Natura 2000 / Emerald ecological network and balance those according to the requirements of sustainable spatial development.

Special attention as well as cross border co-operation is needed for the territorial cohesion of the ecological networks on both sides of national borders. Since many natural borderlines are related to geomorphologic features like mountain ranges, seas or rivers, these border areas are generally containing exceptional concentrations of natural values. Border crossing rivers, connecting natural areas and hydrological systems on both sides may be preferable parts of the cross border ecological network.

Within the countries, the ecological network should include the important protected natural areas of the country as well as other protected national landscapes, areas with natural land cover and agricultural areas that contain natural values. Strategic zones where new stepping stones or corridors can

be located in order to enhance the territorial cohesion of the national ecologic network are to be indicated.

Maps of the infrastructure, being part of the TEN or TINA international network of multimodal connections that form part of transnational development axes, should be superposed over the national ecological main structure as described before, in order to identify overlaps. At the one hand nature can become under threat of urbanization and fragmentation, on the other hand these areas may be especially attractive for settling of residential and economic activities in a healthy, natural environment. In such cases, a balanced sustainable development should be specified and implemented carefully in accordance with the regional authorities and other interests.

Agricultural developments, resulting in intensification, extensification or abandonment should be related to the national ecological policy and its main structure. Conflicts and opportunities to enhance the territorial cohesion of the ecological main structure must be identified and included in regional rural development policies.

### **Recommendations, micro level**

Identifying new areas for protection and inclusion in the ecological network should be based on the strategic location of the area for strengthening the coherence in the national network and on the socio-economic development of the region.

Sustainable development requires avoidance of unnecessary land take for urbanization and infrastructure. This includes concentrating urbanization at the existing urban nodes, located in development axes near the exits of highways and railway stations.

In order to balance the implementation of nature protection and of an ecologic network with the social economic developments of a region, an integrated future oriented approach is recommended. Such an approach, taking into account all relevant aspects and interests, should result in a spatial development vision for the region integrating a rural development policy, an urbanization policy with regard to residential and economic functions, and policies with regard to natural heritage, the environment and water.

Such regional development visions that preferably result in spatial plans or even plans should aim at identifying the specific opportunities for future economic developments of regions that are to be defined as multi municipal areas that are functionally connected. The FUAs of ESPON project 1.1.1 fit to that definition.

The process resulting in a common vision on the future spatial development must be organized by involving relevant stakeholders and interests. Scenario's and SWOT analyses are helpful tools to arrive at commonly accepted selection of objectives and spatial configurations. National government and the EU should under certain conditions support such integrated processes, leading to spatial plans on the regional level.

### **Policy recommendations explicitly addressing Structural Funds**

In the framework of the suggestion towards the Eastern countries in the central and SE Europe the Structural Funds policies should be adjusted in a more spatial policy oriented form, so as to stimulate new economies within the eastern part of the NW – SE development axe of major urban concentrations, such as High Technologies, R/D, Knowledge economy, industrial restructuring toward services of the tertiary sector of production, etc.

Moreover the Structural Funds policies should support the protection and promotion of the natural heritage through the concept "protection by development" by suggesting spatially oriented financial tools that will give special attention to the natural areas of high value aiming at the development of economic activities that could be properly adjusted to the sensitiveness of the environment.

## **9 ESPON Project 2.1.1 Territorial Impact of EU Transport and TEN Policies**

**Final Report**, August 2004

This document is based on the Final report of the ESPON 211.

The project was led the Institute of Regional Research at the University of Kiel and consisted of the following institutions:

- Institut für Regionalforschung, Christian-Albrechts-Universität Kiel, Germany,
- Spiekermann & Wegener (S&W), Urban and Regional Research, Dortmund, Germany,
- Politecnico di Milano, Milan, Italy
- Vrije Universiteit, Amsterdam, Netherlands,
- Department of Infrastructure, Kungl Techniska Högskolan, Stockholm, Sweden,
- Centre for European, Regional and Transport Economics, Kent, UK,
- Bundesamt für Bauwesen und Raumordnung, Bonn, Germany.

Furthermore the Institute of Transport Economics, Oslo, Norway and the Federal Office for Spatial Development, Bern, Switzerland, have contributed to the research.

The aim of the research TPG was to assess the territorial impact of EU transport and ICT policies. This has been achieved by defining policy scenarios, defined upon European policy documents and evaluating the impacts of the policies with three economic models. The model results are evaluated with respect to the European policy goals cohesion, polycentricity and sustainability by applying indicators that operationalise the spatial policy goals. Research has been performed, how national transport policies interact with European policy and how transport policy interacts with other policy areas. Finally, recommendations are given in this report based on the derived results of this research.

### **9.1 Findings**

#### **9.1.1 Main territorial structures (polycentricity)**

The results of the forecasts of polycentricity of the European and national urban systems can be summarised as follows:

- The polycentricity of the *European* urban system has increased in the past and is likely to continue to increase in the future as large cities in the accession countries catch up with cities in Western Europe.
- However, polycentricity of the European urban system will mainly grow in the accession countries, whereas it will decline in Western Europe because of the continued growth of the largest cities.
- Polycentricity of *national* urban systems in Europe has declined in the past and is like to continue to decline in the future.
- All transport infrastructure policies examined accelerate the decline in polycentricity of national urban systems because they tend to be directed at primarily connecting large urban centres.
- Transport pricing scenarios, which make transport less expensive, have the same effect as infrastructure improvements.
- Transport pricing scenarios, which make transport more expensive in general, strengthen the polycentricity of national urban systems.

The comparison of polycentricity of MEGAs at the European level and polycentricity of FUAs in individual countries shows that the spatial scale at which the analysis is conducted, matters. Transport policies, which reinforce polycentricity at the European level, may increase the dominance of capital cities within their national urban systems and so contradict the goal of the ESPDP to achieve a balanced polycentric urban system. It will be the task of further research to point towards rational trade-offs in this goal conflict.

### **9.1.2 Spatial Disparities and territorial cohesion**

According to SASI model results, the impacts transport policies on cohesion can be summarised as follows:

- If the whole ESPON Space is considered, all transport scenarios contribute to convergence in relative terms in both accessibility and GDP per capita, except pricing scenarios that make transport more expensive. However, in absolute terms the opposite holds: All scenarios increase the gap between in accessibility and GDP per capita between the rich regions in the European core and the poorer regions at the European periphery.
- If only the accession countries are considered, only infrastructure scenarios which strengthen the corridors between eastern and western Europe improve accessibility in all accession countries; all other projects widen the gap between capital cities and rural regions. For GDP per capita, the general pattern is absolute divergence as in the whole ESPON Space except for the pricing scenarios which make transport more expensive

- Scenarios, which reduce the disparities between the old and new member states, may do so at the expense of larger disparities within the accession countries.
- CGEurope model cohesion results point that rail policy has little effect on cohesion, road investments are pro-cohesion, higher prices for road transport are anti-cohesion. Different outcomes are only shown for absolute effects from the pricing scenarios.

The role of ICTs is important for the definition of GDP level, its growth and its distribution. Therefore, the EU policies in this sector are relevant, both for efficiency aims (GDP growth) and for cohesion purposes (GDP distribution); the different regional levels of ICTs endowment (*digital divide*), in fact, imply a relevant policy impact on cohesion.

Existing Regional Disparities in ICT infrastructure known as *digital divide*, appear very clearly when studying data extracted from the INRA Survey<sup>3</sup>. In particular, data concerning fixed telephony penetration and Internet connections. The percentage of households with a fixed telephone is quite high everywhere (most regions are above 75% penetration level), as expected due to the pervasive presence of the telephone in everyday life. The highest penetration rates are in Southern England, part of Germany and Southern Scandinavian Countries, but also Germany, the Netherlands, Greece and Northern Italy show very high penetration levels. In more peripheral regions the penetration is relatively less high. Home Internet access shows higher regional differences, resulting in a higher digital divide. In this case, the regional difference is shown between regions of Spain, Portugal and Greece in comparison to regions in Northern Countries, like Scandinavian Countries<sup>4</sup>, Great Britain, The Netherlands and Germany. These latter show a much lower penetration rate of Internet access at home than the former group of regions.

The ICTs accessibility indicator, based on population and Internet as e-commerce vehicle (percentage of connected using Internet for e-commerce purposes), highlights, as expected, the strong position of geographically central and highly populated regions, with some exceptions: Southern Spain and Italy show high virtual accessibility due to their higher than average Internet use.

### **9.1.3 Dynamics and flows**

Differences in GDP per capita compared with the respective reference transport scenarios for the present European Union (EU15), Norway and Switzerland (CH+NO), the twelve accession countries (AC12) and the whole ESPON Space (EU27+2), have been studied. The first thing to note is that

the relatively large differences in accessibility translate into only very small differences in GDP per capita. No region gains more than a few percent in GDP per capita. The huge investments for the trans-European transport networks in the past have not brought much overall economic growth to the member states of the present European Union (EU15) in the past, nor are they likely to do so in the future. The effects for Switzerland and Norway (CH+NO) and for the accession countries (AC12) are much larger and will be even larger in the future because of the implementation of the TINA projects. The overall effects for the whole ESPON Space (EU27+2) are, of course, the weighted average of the effects for the three groups of countries. The very small differences have to be seen in relation to the overall growth in GDP per capita, which between 1991 and 2021 is assumed to more than double.

The results of the accessibility forecasts are as to be expected. Unstandardised accessibility is improved in all retrospective and infrastructure prospective scenarios, as these assume infrastructure improvements compared with their respective reference scenarios. The effects are much stronger in the infrastructure prospective scenarios and, not surprisingly, they are the stronger the more infrastructure projects are assumed to be built. Now the accession countries gain significantly more in accessibility because of the increased emphasis of the most recent revisions of the TEN and TINA programs on projects in the new EU member states.

The analysis dealing with *overloaded transport corridors* shows that road transport flows for the year 2020 in comparison to the base year 2000 have grown by almost 43 percent. The transport flow volumes are increasing almost all over the study area. The rail transport flows are increasing disproportionately but will not be able to compensate the increase of road transportation flows within the ESPON space. The European core area holds a share of 39 percent of kilometres travelled in the ESPON space, until 2020 this share will decline to around 35 percent. Urban regions are more burdened by the load of traffic, but rural areas more and more take over the load. Accession countries have the highest relative gain in road transportation. Near to railway corridors that take over a large amount of the transportation volume, regions show disproportionately lower, relative transportation flow increases than other regions.

Forecasting impacts of ICT policies the growth rate of per capita GDP is supposed to decrease from 0.0037 to 0.023, while an efficiency scenario leads to a worsening of regional disparities. Also in this case, the inference is not to choose an indiscriminate policy option, since this would not only reduce the costs but also the advantages in terms of both efficiency and cohesion.

#### **9.1.4 Contradictions between levels**

Regarding polycentricity, scenario with TEN/TINA projects 2001-2021, can be said to favour polycentricity on all three scales, macro, meso and micro. On the macro scale, the fact that the Pentagon is favoured less than the average points towards a gain in polycentricity. The same conclusion can be drawn from looking at effects by regions classified according to macro scale accessibility: effects of this scenario are lowest in central regions, medium in medium regions highest in peripheral regions.

A tendency in favour of polycentricity on the meso scale can be inferred from the observation that the impact is smaller than average in agglomerated and urbanised areas and largest in rural regions. On the micro scale we infer a certain tendency towards strengthening of smaller centres from looking at effects by subtypes of the BBR settlement structure typology. Within the agglomeration class the effects are lower in the cores and very high density parts than in the rest of these areas, whereas in the rural class the order is reversed: the more densely populated subtype of regions within rural areas gains more than the average, and also the less densely populated subtype of regions within rural areas gain the most.

#### **9.1.5 Findings at transnational level (Interreg III B areas)**

The effect of the scenario of the transport projects within countries has a higher impact than the cross-border projects, because the majority of the European networks do not cross borders. The border projects between Bulgaria, Greece and Romania have very high positive impacts for the border regions in these countries. Furthermore, the biggest number of cross-border projects is located in the area of Poland, Czech Republic, Slovakia and Hungary, which account for most of the benefits in the scenario where only cross-border projects are considered.

Significant positive economic effects for the new EU member states can only be expected if the TINA projects linking the new member states to the major centres of economic activity in western Europe are implemented. The effect of pricing scenarios depends on their direction: scenarios which make transport less expensive have a positive, scenarios which make transport more expensive, a negative economic effect. However this result might need to be qualified if the subsidies or revenues associated with the policies were taken into account.

#### **9.1.6 What is new?**

For the evaluation of the results produced by modeling the impact of transport and ICT policies the forecasted output values of the models have

been evaluated all together according to typologies and additionally by country.

- Objective 1 and Objective 2 regions (for analytical purpose only): Based on COM "Second progress report on economic and social cohesion" (30 January 2003) NUTS3 level regions situated within objective 1 regions are listed as Objective 1 regions. The type Objective 2 region includes regions containing at least one Objective 2 region (partly).
- Relative Rurality: This is a typology of urban-rural settlement patterns, which based on population size and was analysed in the framework of NUTS3 regions by TPG 1.1.2. The original typology of 6 classes was simplified into 3 classes, denoting low, medium and high rurality.
- Pentagon: London, Paris, Munich, Milan and Hamburg shape the "Pentagon". About 41 percent of the population of EU 15 are living in this core area, which is only 18 percent of the EU 15 territory, and producing 49 percent of the EU 15 GDP.
- Settlement Structure: The settlement structure typology of the BBR consists of three basic types defined by population density and situation regarding centres: agglomerated regions, urbanised areas and rural regions.
- Lagging Regions: The typology of lagging regions is based on the combination of regional values of GDP per inhabitant (in EURO) and the unemployment rate. Both indicators are standardised and after reversing the scale for unemployment aggregated by their geometric mean. All regions are ranked by the resulting index and finally classified as follows: Regions with lowest index values up to the coverage of 30 percent of the ESPON space total population are classified as "lagging regions", up to 50 percent as "potentially lagging regions". All other regions fall into the category "non lagging regions".
- Multimodal Accessibility Potential: This typology is based on a time based, multimodal accessibility-indicator, which is already calculated by S&W within the framework of project 1.2.1. This indicator is standardised on the ESPON-average (100). The classification gives a five-class typology ranging from very central over central, intermediate, peripheral to very peripheral (The overseas are classified as very peripheral without calculation.).

The study is able to demonstrate that within the two typologies of regions (objective 1 regions vs. advanced regions), different reactions to a specific ICTs policy exist. Within non-lagging regions, some areas are able to take advantage from both indiscriminate and efficiency policies, while others

react exclusively to efficiency policies; similarly, there are lagging regions that react dynamically to cohesion policies, while others seem unable to react.

## **9.2 Methods and data**

### **9.2.1 Spatial analysis methods**

The transport infrastructure scenarios have been defined and implemented using the GIS-based pan-European road, rail, waterway and air network database developed by the Institute of Spatial Planning of the University of Dortmund (IRPUD, 2003). All transport policy scenarios are introduced into the two regional economic models as changes of transport costs between regions over time and between scenarios. For that the historical and possible future developments of the networks are required as input. The evolution of networks over time is established in the database in five-year intervals; the network database (for rail and road) contains information for the years 1981.

These scenarios have been studied with two forecasting models: the SASI model, the CGEurope model. The SASI model is a recursive simulation model of socio-economic development of regions in Europe subject to exogenous assumptions about the economic and demographic development of the ESPON Space as a whole and transport infrastructure investments and transport system improvements, in particular of the trans-European transport networks (TENT) and TINA networks. For each region the model forecasts the development of accessibility and GDP per capita. CGEurope is a spatial general equilibrium model, comparative-static, which means that for each scenario analysis two equilibrium are compared.

Differentiated policy scenarios are presented based on different hypotheses on future ICTs policies (indiscriminate, efficiency, cohesion policies) and for each of them the corresponding per capita GDP at year 2020 is forecasted. From the methodological point of view, the STIMA model (Spatial Telecommunications IMPact Assessment)<sup>2</sup>, is based on the estimate of a *production function*, and it allows to measure the impact that ICTs have on regional performance. Using data from Eurostat Regio, ITU, EOS Gallup and INRA 2003 surveys, per capita GDP is estimated through a model, based on accessibility, internet connections, fixed telephony penetration, cable and satellite TV, total and high tech employment. On the basis of the estimates obtained by the model and on hypotheses of ICTs investments distribution among regions and actions, it has been able to forecast the impacts on GDP growth of three scenarios: an indiscriminate, an efficiency and a cohesion scenario.

The welfare implications of transport policies have been analysed on the basis of a social welfare function. This welfare function assumes that the welfare of groups can be determined as the average value of the logarithms of the incomes of individuals in the groups.

Polycentricity effects of EU Transport and TEN Policies have been developed combining indicators for the dimensions *mass*, *competitiveness*, *connectivity* and *development trend* into a composite indicator of *development potential*.

### **9.2.2 Indicators**

Indicators Developed are:

Impact Indicators of the SASI Model:

- Impact of 13 transport policy scenarios on GDP
- Accessibility rail/road, travel, by policy scenario
- Accessibility rail/road/air, travel, by policy scenario
- Accessibility road, freight, by policy scenario
- Accessibility rail/road, freight, by policy scenario

Impact Indicators of the CGEurope Model:

- Impact of transport policy scenarios on equivalent variation of income (welfare change of regional households as measured by the household's utility function, which is transformed to the so-called Hick's measures of variation, which measures the welfare change as the monetary equivalent), all 13 scenarios

Impact Indicators of the STIMA Model

- Accessibility 1999 (weighted by population)
- Internet connections 1999 (% of households)
- Fixed telephony penetration 1999 (% of households)
- Cable and satellite TV 1999 (% of households)
- Total employment 1999 (% of population)
- Employment in High Technology Sectors - mean 1995-2000 (% of population)
- Per capita GDP 1999
- Accessibility absolute growth at 2020 in the three scenarios
- Internet absolute growth at 2020 in the three scenarios
- Pc GDP average growth rate at 2020 in the three scenarios

- Pc GDP average growth rate in the three scenarios - differences from
- The EU mean at 2020

### **9.2.3 Territorial Impact Assessment (TIA)**

Territorial impact is measured in terms of by defining policy scenarios, defined upon European policy documents and evaluating the impacts of the policies with three economic models. The model results are evaluated with respect to the European policy goals cohesion, polycentricity and sustainability by applying indicators that operationalize the spatial policy goals. Research has been performed, how national transport policies interact with European policy and how transport policy interacts with other policy areas.

## **9.3 Policy Recommendations**

### **9.3.1 Uncomfortable trends**

In EU15 countries little direct use is made of EU policy or TENs in formulating national policy priorities, some of them use of similar concepts across countries (e.g. with respect to environment, regional impacts and cohesion). Accession countries put a strong emphasis on TENs and EU priorities in formulation of National policies, and other countries, like Switzerland, put strong emphasis on links between European and national policy priorities given key location. In a little more detail, TENs policy plays a relatively small role in setting national policy priorities, although as the most visible EU transport policy it is highly likely to be used as support for national priorities.

Whereas national policies are clear on the usefulness of European networks as a means of underwriting national needs for both network development and structural support, there is less common interest in adopting any move towards unified charging rules on efficiency grounds. Charging is seen more as a means towards raising revenues necessary for future infrastructure investments.

In most cases infrastructure investments relate to the role of accessibility in meeting some clear regional needs, and do not relate directly to the more general issues raised by the ESDP. Thus reference is typically to peripheral regions rather than to the balanced development of regions within an overall polycentric development.

There is still a strong belief across national policies that technical solutions to the environmental problem will meet the needs rather than a

comprehensive policy which effectively prices the different environmental consequences and allows users to make informed decisions.

### **9.3.2 Uncomfortable policy effects**

- Infrastructure policies have larger effects than pricing policies, and the magnitude of the effect is related to the number and size of projects.
- Significant positive economic effects for the new EU member states can only be expected if the TINA projects linking the new member states to the major centres of economic activity in western Europe are implemented.
- The effect of pricing scenarios depends on their direction: scenarios which make transport less expensive have a positive, scenarios which make transport more expensive, a negative economic effect. However this result might need to be qualified if the subsidies or revenues associated with the policies were taken into account.
- Negative effects of pricing policies can be mitigated by their combination with network scenarios with positive economic effects, although the net effect depends on the magnitude of the two components.
- ICTs investments have different marginal efficiencies, depending on the infrastructure or services in which they are spent. The choice of infrastructures and services to be developed has a critical role on the territorial impact of ICTs policies.
- ICTs policies suggested by the eEurope Action plan can lead to very different scenarios, depending on the distribution of regional investments.

### **9.3.3 Recommended changes in policies**

As the goals of EU policies are partly in conflict with one another, it is quite clear that transportation policy initiatives cannot be designed such that all goals are favoured at the same time. One possibility is to revise those policy measures in the direction of a more balanced spatial development, if one is willing to give up a certain degree of economic efficiency. Instead of doing so, one can leave the transportation policy unchanged in favour of a higher degree of efficiency. Spatial imbalances should then be equalized by transfer payments to those regions suffering from losses.

Pricing scenarios should not be abandoned in favour of spatial equality objectives. Instead, a policy worsening regional income disparities should be accompanied by transfers in favour of those regions suffering from losses. Such an instrument mix of pricing and compensation is the right way both to protect the environment in an efficient way, and to avoid undesired spatial

imbalances. An attractive feature of an ICT policy scenario such as our cohesion scenario is that it runs little or no risk of generating undesired environmental side effects. Hence, support of ICT resources and use in lagging regions is strongly recommended as an instrument to foster balanced growth in Europe.

#### **9.3.4 Recommended changes in polity and governance**

The work of ESPON 2.1.1 has frequently pointed to potential conflicts between different EU policy areas. Lack of consistency in policy objectives and instruments between different sectors and levels of policy making leads to conflicts in the implementation of EU transport and ICT policies.

If it is assumed that there will be no changes in the institutional arrangements concerning the delivery of transport and ICT policy, i.e. that the Common Transport Policy and common ICT policy will be formulated at the EU level but its delivery will remain mainly through national and regional governments under the principle of subsidiarity, it becomes necessary not only to forecast but also evaluate the likely impacts of transport and ICT policies.

For this the development of unambiguous indicators becomes paramount. Such indicators need to be capable of assessing the extent to which national and regional policies conform to agreed EU policy goals and through which national and regional policies can be designed to ensure a greater degree of horizontal consistency between policy fields and between countries and regions across the EU territory.

## **10 ESPON Project 2.1.2 Territorial Impact of EU Research and Development Policy**

**Final Report**, August 2004

Lead Partner:

- ECOTEC Research and Consulting Ltd., Brussels, Belgium

Project Partners:

- ECOTEC Research and Consulting Ltd., Spain
- TAURUS Institut an der Universität Trier, Germany
- Cardiff University, Department of City and Regional Planning, UK
- MCRIT, Spain
- MERIT Maastricht University, The Netherlands
- Politecnico di Milano, Italy

### **10.1 Findings**

A widespread recognition of the long-term economic benefits that can accrue to both firms and territories from strong performance in Research and Development (R&D) has led to an increased focus on R&D policies among policy makers at all territorial levels. Within an EU context, this emphasis is manifested in the Lisbon Agenda goal of creating a European Research Area (ERA), and the subsequently agreed Barcelona Objective of increasing investment in R&D in the EU to 3 % of GDP by 2010, of which two thirds should come from the private sector. (final report, ex. sum. page 9)

The potential links between R&D, innovation and economic development have important implications for those concerned with the spatial development of the EU territory. If spatial disparities in R&D capacity and activity are related to disparities in economic well-being, then achieving the goal of sustainable polycentric development in the EU will require appropriate R&D policies. This study seeks to contribute on each of these issues. (final report, ex. sum. page 9)

This work confirmed a positive relationship between GDP, levels of tertiary education and employment in high tech manufacturing and R&D expenditure, but found that these variables were not unit elastic (a 1% increase in GDP or tertiary education does not lead to a 1% increase in R&D spending). In the case of FP participation, a negative relationship was found between participation rates and levels of high tech manufacturing employment. Despite a relatively high potential for error in the model used,

this result may reflect the reality that high tech manufacturing in a given territory does not necessarily require the presence of R&D capacity. (final report, ex. sum. page 10)

European regions have very different profiles in terms of their capacity to undertake R&D. This influences their ability to generate economic growth through innovation. Equally, this variation means that there is no common typology of regions that can be simply applied across Europe. (final report, ex. sum. page 10)

The work reinforces the common perspective that the pattern of R&D activity in the EU is one of concentration in a limited number of regions, with strong disparities between these and other regions. The evidence also suggests that it is the Less Favoured Regions that experience the greatest disparities in performance, particularly those located in the Mediterranean region. Nevertheless, pockets of poor performance can be identified across the EU. (final report, ex. sum. page 13)

### **10.1.1 Main territorial structures (polycentricity)**

The potential links between R&D, innovation and economic development have important implications for those concerned with the spatial development of the EU territory. If spatial disparities in R&D capacity and activity are related to disparities in economic well-being, then achieving the goal of sustainable polycentric development in the EU will require appropriate R&D policies. This, in turn, requires a good understanding of the "baseline" situation regarding R&D in Europe, in terms of strengths, weaknesses, disparities and trends, an understanding of the spatial impact of current R&D policies and effective tools to assess the potential impact of future public measures. (final report, ex. sum. page 9)

A regional typology of R&D and innovation, based upon cluster analysis, is developed. In the first analysis, cluster 5 (top R&D performers, strong HRSTC base, highest share of high-tech employment) regions are the regional innovation leaders. These leading regions are concentrated in Germany, Sweden, Finland and the Netherlands. These regions have highest per capita GDP, business R&D expenditures, patent applications, high-tech patent applications and lowest unemployment. In the second analysis, which again grouped regions into five clusters, the number of leading regions (with high R&D capacity and high innovative capacity) decreased from 13 in the first cluster model to 6. Leading regions are located in only two countries: Germany and France. These regions have highest per capita GDP, business R&D expenditures, patent applications, FP4 and FP5 participations and lowest unemployment. (final report, ex. sum. page 12)

The results of the typology work do reinforce the common perspective that the pattern of R&D activity in the EU is one of concentration in a limited number of regions, with strong disparities between these and other regions. The evidence also suggests that it is the Less Favoured Regions (as defined by those that are eligible for support under Objective 1 of the Structural Funds) that experience the greatest disparities in performance, particularly those located in the Mediterranean region. Nevertheless, pockets of poor performance can be identified across the EU. (final report, ex. sum. page 13)

Although the three approaches adopted, one z-score approach and two cluster approaches, produced different results, sufficient common features existed to allow regions to be assigned to one of five types

- Type 5 exceptionally strong system of R&D and innovation
- Type 4 strong system of R&D and innovation
- Type 3 mixed fortunes in undertaking R&D and innovation
- Type 2 average strengths in R&D and innovation
- Type 1 weak at undertaking R&D and innovation

This typology can be seen as a pragmatic attempt to capture variations in regional performance. With 13 regions each, Type 5 and 4 contain the least number of EU regions (just 8%). These are located in Germany, Finland, France, the Netherlands and the UK. The long 'tail' of poorly performing regions in the context of R&D and innovation activity is clearly evident in this analysis. Most regions are found in Type 1 (32%) closely followed by Type 3. Most member states have at least one region in each of these categories. The weak position of Greek and Portuguese regions is clearly evident, as is the position of Austrian regions. In this case it is the position of Vienna that is ambiguous as it is performing well on some counts, but less well on others. (final report, ex. sum. pages 13-14)

The effects of the Framework Programmes (FPs) are felt most strongly in the wealthy core regions of the EU, where R&D activity is concentrated. (final report, ex. sum. page 29)

Comparatively high participation levels per unit of GDP in less developed regions lend weight to the argument that the FPs make a contribution to overcome the R&D gap that exists between European regions. (final report, ex. sum. page 29)

A trend away from supply-side measures to develop infrastructure and towards demand-side activities such as technology transfer is apparent. (final report, ex. sum. page 29)

### **10.1.2 Spatial Disparities and territorial cohesion**

Disparities in the R&D and Innovation capacity of the EU-27 are examined on an indicator by indicator basis in Section 6 of the main report. In general, the picture that emerges from the study reinforces that set out in previous publications in this field, most recently in the Third Cohesion Report (European Commission 2004).

This may summarised as follows:

- Research, innovation and high technology “hotspots” tend to be concentrated in core areas of North West Europe (Germany, the Netherlands and parts of the UK and France), with other strong performers in Scandinavia
- There is a long tail of less R&D and innovation-intensive areas, concentrated in Southern, Central and Eastern Europe, although capital regions in these countries are often characterized by concentrations of R&D and innovation activity where indicator scores are in the same range as that seen in the EU. core. Moreover, many New Member and Accession states perform strongly in terms of Human capital<sup>4</sup>, an important component of innovation systems.
- There is some evidence of regional “catch-up”, in that growth rates in lower performing regions tend to be higher, although this clearly reflects the fact that growth is more likely to be faster when starting from a low base. (final report, ex. sum. pages 9-10)

This work confirmed a positive relationship between GDP, levels of tertiary education and employment in high tech manufacturing and R&D expenditure, but found that these variables were not unit elastic (a 1% increase in GDP or tertiary education does not lead to a 1% increase in R&D spending). In the case of FP participation, a negative relationship was found between participation rates and levels of high tech manufacturing employment. Despite a relatively high potential for error in the model used, this result may reflect the reality that high tech manufacturing in a given territory does not necessarily require the presence of R&D capacity. (final report, ex. sum. page 10)

While these results shed some light on which types of region are more likely to engage in R&D, fundamentally, they tell us little about the mechanisms that affect R&D activity. This reflects the explanatory limitations of the quantitative data available (particularly at regional level) and highlights the importance of the qualitative aspects of this study, the results of which are examined below. Taken together, however, the regional data available do provide a means to characterise regions into different “types”, according to

their R&D and innovation “profile”. This gives us a more complete picture of regional disparities (by combining indicators rather than viewing them in isolation) and provides a sound basis for further research into the policy implications. (final report, ex. sum. page 10)

### **10.1.3 Dynamics and flows**

### **10.1.4 Contradictions between levels**

The Framework Programmes and Structural Funds, with their differing objectives are potentially complementary. Better co-ordination would assist in achieving common goals, particularly aims relating to increasing levels of economic activity and the promotion of territorial cohesion. An example of this might be improved co-ordination between those running R&D aspects of Structural Funds and Framework Programme participants at the regional level. (final report, ex. sum. page 26)

### **10.1.5 Findings at transnational level (Interreg III B areas)**

Consideration of Framework Programme activities (Integrated Projects and Networks of Excellence) should form a central part in the development of new trans-national co-operation programmes. Structural Fund programmes should seek to add value to these by supporting knowledge transfer vehicles and facilitating networks of firms. (final report, ex. sum. page 26)

### **10.1.6 What is new?**

In the current study, we have tested two approaches to developing typologies of regions, based upon their capacity to undertake R&D and to innovate, as revealed by the aggregate statistics available:

- The use of Z-scores<sup>4</sup> to assign regions to predefined categories
- Cluster analysis<sup>5</sup> based upon a) a k-means cluster analysis using identified indicators and b) a k-means cluster analysis using two composite indicators

This approach allows conceptualisation of the strength of a region in terms of its capacity to undertake R&D and for innovation. However, it must be recognised from the outset that there are numerous intangible or unobserved factors that will also have an important influence, but which cannot be captured by the typologies developed. Moreover, it was only

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<sup>4</sup> A Z-score is a standardised measure of the distance each value in a series is from the average. It is calculated by subtracting the average of a series from each of its values, and then dividing by the standard deviation.

<sup>5</sup> Cluster analysis uses mathematical techniques to sort objects (in this case regions) with similar descriptions into the same cluster.

possible to apply the typology analysis the original EU-15 Member States, owing to insufficient coverage of innovation data at a regional level in the New Member States and Accession Countries. The two different approaches to development of a typology are described briefly below. (final report, ex. sum. pages 9-10)

## **10.2 Methods and data**

### **10.2.1 Spatial analysis methods**

Regression Analysis techniques were used to examine the relationships between key structural indicators and R&D activity, as measured by R&D expenditure as a percentage of GDP and Participation in EU Framework Programmes. In the case of R&D expenditure, the model was used to understand the effects of:

- Output (as measured by GDP in real terms at Purchasing Power Parity);
- Population with tertiary education;
- Dependency on the production sector (as measured by the proportion of total output in the production sector (NACE codes c to f); and
- High tech manufacturing employment.

In the case of Framework Programme participation, the same 4 variables were used along with R&D expenditure. (final report, ex. sum. page 29)

The regional data collected was used to develop a typology of regions as a tool for approaches were used, based upon regional capacity to undertake R&D and to innovate, as revealed by available aggregate statistics:

- The use of Z-scores to assign regions to predefined categories on the basis of three indicators of "R&D capacity" and three indicators of "innovation capacity";
- Cluster analysis based upon a) a k-means cluster analysis using identified indicators and b) a k-means cluster analysis using two composite indicators.

Analysis on these bases produced three different regional classifications, each allocation regions for which data was available to one of five types. These results were used to produce an aggregate typology. (final report, ex. sum. pages 29-30)

### **10.2.2 Indicators**

The 10 indicators used were as follows:

- R&D Indicators
  - R&D expenditures as a percentage of regional
  - R&D personnel as a percentage of the labour
  - Patent Applications and High Tech Patent Applications to the European Patent Office
  - Employees with Tertiary level education working in a Science and Technology Occupation (HRSTC).
- Indicators of "Innovative Capacity"
  - Employment in High Technology and Medium High Technology Manufacturing as a percentage of total employment;
  - Employment in High Technology Services as a percentage of total employment;
  - Percentage of the Working Age Population (aged 24-65) having successfully completed some form of tertiary education.
- Indicators of R&D Infrastructure
  - Science Parks that are members of the International Association of Science Parks (ISAP)
  - Locations of Business Innovation Centres
  - Most Actively Publishing Universities and Public Research Institutes in the EU 15

(final report, ex. sum. pages 28-29)

### **10.2.3 Territorial Impact Assessment (TIA)**

We understand the concept of TIA to mean a tool or procedure for assessing the impact of proposed spatial development activities against spatial policy objectives or prospects for an area. In practice it should be able to identify:

- the positive and negative territorial effects of a policy, plan or programme, and;
- the means to accentuate the positive effects, and reduce or avoid the negative ones.

This process should, however, be seen as an aid to decision-making, rather than a decision-taking mechanism in its own right. (final report, ex. sum. pages 21-22)

TIA can cover different scales and aspects of decision-making. In the case of the EU's R&D policies, it is useful to use a tiered approach, which seeks to identify effects at the EU (macro); the trans-regional (meso) and regional (micro) scales. (final report, ex. sum. pages 21-22)

The Framework Programmes represent policies and programmes that operate at a European scale, with trans-regional and regional effects occurring largely through the incidence of projects. In contrast, the Structural Fund instruments set the policy context at the European level, which are translated into regional (and sectoral) programmes – with their own priorities and policy mix set in the context of the instruments, which in turn provide the framework for projects. (final report, ex. sum. pages 21-22)

The TIA approach thus needs to differentiate between the assessment of both scale effects (e.g. EU-level effects) and other effects of policies, programmes and projects.

Key questions for assessment at the different scales are:

- on EU-scale: How will the balance of R&D activity across the EU be affected by EU R&D policies?
- Trans-regional: Do EU R&D policies contribute to the development of successful interregional co-operation arrangements?
- Do these arrangements contribute to the development of complementary economic zones?
- Regional: How will R&D activities be influenced within a region by the combination of EU R&D policies?

Although a quantitative assessment of the impact of EU R&D policy may be desirable, the practical and theoretical difficulties of this are considerable. As such, we would favour the use of qualitative techniques, to avoid the dangers of spurious accuracy. Example tables, to assist in this process are proposed in the main report. (final report, ex. sum. pages 21-23)

### **10.3 Policy Recommendations**

Policy Recommendations belong to the following themes: Co-ordination between EU policies, Future Research and Data Requirements, Focus of Activities, Resources. (final report, ex. sum. page 26f.)

Better co-ordination between EU policies would assist in achieving common goals, particularly aims relating to increasing levels of economic activity and the promotion of territorial cohesion. (final report, page 26)

Concerning a focus of Activities, knowledge centres with a critical mass and linked to European Centres of Excellence should be developed at an inter-regional level. (final report, ex. sum. page 26)

One resources-recommendation is that structural Funds should, however, be directed to ensure that capacity exists to absorb any planned increases in spending on R&D-related actions. (final report, ex. sum. pages 25-27)

Also the study has highlighted the need for improved, consistent regional data availability to facilitate continued monitoring of spatial trends to support policy development as a recommendation concerning Future Research and Data Requirements. (final report, ex. sum. page 27)

### **10.3.1 Uncomfortable trends**

As noted, the Framework Programmes and Structural Funds, with their differing objectives are potentially complementary and need better co-ordination. (final report, ex. sum. page 26)

### **10.3.2 Uncomfortable policy effects\***

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### **10.3.3 Recommended changes in policies**

- Focus of Activities
  - Attention should continue to be focused on developing the regional enterprise base (which is mostly likely to make use of R&D results and convert these into innovation and output growth) to promote innovation and develop human capital in all region types. The objective should be to improve the capacity of the private sector to make use of innovative knowledge, whether this be from R&D undertaken locally or from other sources;
  - Knowledge centres with a critical mass and linked to European Centres of Excellence should be developed at an inter-regional level. Knowledge centres should have a critical mass of research activities, with investment in physical, social and human capital as required.
  - Actions to promote the mobility of researchers and the re-integration of researchers into firms and educational institutes should be maintained, with an emphasis on promoting practical linkages between industry and science
  - Consideration of Framework Programme activities (Integrated Projects and Networks of Excellence) should form a central part in the development of new trans-national co-operation programmes.

Structural Fund programmes should seek to add value to these by supporting knowledge transfer vehicles and facilitating networks of firms.

- At a European level, a Territorial Impact Assessment should be undertaken of all proposals for the development of new pan-European research facilities to assess the likely territorial effects and potential responses to these effects.

(final report, ex. sum. page 26)

- Resources

- Although, as highlighted, the complex relationships involved make it hard to assess the impacts of EU R&D policies, the positive contribution of activities is clear. There is also a strong consensus on the positive future economic benefits of a sustained increase in R&D investment, in line with the Barcelona target. As such, the resources available to EU R&D policies should continue to be increased, in both the Framework Programmes and Structural Funds.
- We recommend a minimum level of funding at least 5% in Structural Fund Programme be targeted at R&D, to counter the current variations
- Structural Funds should, however, be directed to ensure that capacity exists to absorb any planned increases in spending on R&D-related actions.

(final report, ex. sum. pages 25-27)

- Future Research and Data Requirements

- We recommend that the dynamics of the European Innovation System receive similar attention as work on national and regional innovation systems. It is the complex interplay of these different territorial scales that will influence the sustainable development of the European territory in the future.
- Analyses of regional industry-science contexts should be undertaken to take account of existing networks and relative strengths and weaknesses in innovation and R&D capacity. This should inform decisions over whether policy should seek to address the indigenous R&D base or access knowledge developed elsewhere.
- The study has highlighted the need for improved, consistent regional data availability to facilitate continued monitoring of spatial trends to support policy development. The data sets for the indicators used in this study need to be completed and updated, new indicators, particularly using data from the Community Innovation Survey, need

to be collated and published and record keeping on the spatial distribution of EU R&D spending needs to be improved. Section 10 of main report contains specific recommendations for the five regional types identified through the regional typology.

(final report, ex. sum. page 27)

#### **10.3.4 Recommended changes in polity and governance**

- Co-ordination between EU policies
  - As noted, the Framework Programmes and Structural Funds, with their differing objectives are potentially complementary. Better co-ordination would assist in achieving common goals, particularly aims relating to increasing levels of economic activity and the promotion of territorial cohesion. An example of this might be improved co-ordination between those running R&D aspects of Structural Funds and Framework Programme participants at the regional level;
  - Full advantage should be taken of the opportunity to co-fund Framework Programme projects through the Structural Funds in Objective 1 areas and this mechanism retained in the period 2007-2013. Moreover, the design and coordination of policies at a regional and trans-regional level should engage the skills and knowledge of those actually engaged in Framework Programme activities. (final report, page 26)

## **11 ESPON Project 2.1.3 Territorial Impact of CAP and Rural Development Policy**

**Final Report**, August 2004

Transnational Project Group :

- Arkleton Institute for Rural Development Research, University of Aberdeen
- Federal Institute for Less Favoured and Mountain Areas, Wien
- Institute of Spatial Planning, University of Dortmund
- National Institute for Regional and Spatial Analysis, NUI, Maynooth
- Norwegian Agricultural Economics Research Institute, Oslo (joined April 2003)

### **11.1 Findings**

Higher levels of CAP expenditure per ha UAA are strongly associated with more prosperous regions (Pillar 1). The level of total Pillar 1 support was found to be generally higher in more accessible regions, and lower in more peripheral regions at all spatial scales (local, meso and EU-level).

In contrast, Pillar 2 support was found to be higher in more peripheral regions of the community.

The strong tendency for Pillar 1 support to go to richer regions of the EU15 may be attributed to their larger farms, their location in the core of Europe, and their farm type.

It appears that the CAP has uneven territorial effects across the EU15 mainly due to Pillar 1. The "rural development" Pillar 2 may in some cases be more consistent with cohesion within countries, but runs counter to Eurowide cohesion in the way it is currently structured.

#### **11.1.1 Main territorial structures (polycentricity)**

General background:

FAO-recorded agricultural land within the European countries covered by the ESPON project occupies about 400 million hectares. Of this farmland, about half is arable (i.e. cropped), and the rest is either permanent pasture or under permanent crops (fruit orchards, vineyards, olive groves, etc.).

Despite scale economies which have led to the geographical concentration of food-chain activities, the widespread nature of farming and of the consuming

population means that this economic activity is important in all but the most urbanised locations of Europe.

What is more the location of the leisure activities of millions are influenced by the availability or familiarity of agricultural land and buildings.

Environmentally, European agriculture is a land management activity carried out at varying latitudes and altitudes, and in both densely populated and more remote areas. It thus influences, in a huge variety of ways, the quality of natural resources such as land, water and air, the degree of biodiversity, and landscape characteristics.

Specific analysis developed by ESPON 2. 1. 3:

As part of this project a Cluster Analysis was undertaken. The emerging clusters are the basis of the following territorial typology which can be considered as a detailed analysis of the rural spatial structure in Europe:

In the UE15 :

- **'Macro-City'** 76 NUTS 3 regions, comprising the urban areas in and around the largest European cities, Employment in agriculture is low, as expected in areas of large conurbations, but a higher-than-average rate of change in employment in agriculture combined with fewer than average proportions of farmers over 65 years old suggests the existence of a vibrant peri-urban agriculture.
- **'Meso-Accessible'** 345 NUTS3 regions (Germany, France, Italy, Belgium). The main distinguishing feature is the high accessibility at macro and meso (EU region) levels. Moreover, recent rates of GDP/head are relatively high, and rates of unemployment are relatively low, i.e. partial evidence of regional prosperity. There is an influx of population, which may be a regional expression of counter-urbanization at the EU level. A higher than average change in employment in agriculture and hotel expansion are also reported. Thus the meso-accessibility of these NUTS3 regions is positively accompanied by the outcomes of other socio-economic forces.
- **'Northern Mixed Economy'** 164 NUTS 3 regions (UK, Ireland, Austria). Most are meso-accessible, medium-sized city regions in north-west Europe, but have more hotels than average. GDP/head and unemployment are average. Their agriculture rather accentuates the mixed character of their economic activities and their lack of dependency on a single sector. Their land use patterns are characterised by higher than average grass cover mainly used for grazing, which suggests pockets of intensive farming. Alternative sources of farm incomes are

important for this cluster and there may be a significant proportion of pluriactive farm households.

- **'Southern Lagging'** 43 NUTS 3 regions comprising a mixture of sparsely populated areas, medium-sized towns and large urban centres (Athens). Its particularity lies in a combination of lower than average GDP/head and low accessibility at macro level. Their southern geographical position emerges as a disadvantage and confirmed by their LFA status and Intermediate + Lagging OECD type, leading to higher than average unemployment. A blend of small-scale agriculture (higher than average employment in agriculture and percentage of farmers aged over 65 years old and lower than average farm size) with industry and services emerges. However, the catching-up process seems to be on the way, as suggested by the higher than average growth rate of GDP/h at EU region level. Their land use patterns are typically Mediterranean, with higher than average cover values for olives, vineyards, fruit trees, annual crops and natural vegetation.
- **'Agricultural Peripheral'** NUTS3 regions ,17 mostly southern peripheral areas (Spain, Greece, Italy, Portugal) with higher than average areas of permanently irrigated crops, complex cultivation patterns, and agriculture with natural vegetation alongside the typical Mediterranean olive and fruit trees. Their peripheral geographic position, LFA status, and predominantly rural character as defined by the OECD rural typology are the main features. The agricultural sector dominates their economy, with small farms, land fragmentation, and the great majority of farmers being over 65 years old. Higher than average rates of unemployment and lower than average rates of GDP/head and population density are also reported for this cluster. However, considerable dynamism is observable in the tourism sector.
- **'Agricultural Tourism (Coastal)'** 18 NUTS3 regions. This is the most clear-cut cluster, including almost all the Mediterranean islands and southern coastal regions, which are well-known places of tourist attraction. Nevertheless, these regions remain part of the Southern European Agricultural Periphery, and most are characterised as predominantly rural and lagging by the OECD typology. They thus exhibit: low levels of GDP/head, small farm size, high numbers of farmers over 65 years old, and high employment in agriculture, forestry and fishery. Most importantly, their economy is hampered by their low accessibility at meso level despite their high accessibility at macro level, due to recent improvements in air traffic. A higher than average growth rate of GDP per head is an indicator of their comparative advantage. Typical southern European land use patterns, representative of the

Mediterranean climate: olive trees, fruit, vineyards, annual crops and natural vegetation.

- **'Diversified Farming'** 41 NUTS3 regions (Netherlands, UK). This cluster represents the « success stories » of the European model of agriculture. The existence of intensive large-scale (possibly dairy) farming and tourism infrastructure can be detected in this cluster which is characterised by higher than average GDP per head, average farm size and number of hotels and lower than average unemployment rates. However, the categorisation of this cluster of NUTS3 regions as predominantly-urban + lagging by OECD, with most of them having no claim to an LFA status, suggests a pluriactivity scenario. Most importantly, these NUTS3 regions are also seen to compete effectively on the grounds of their meso and macro accessibility at the EU level. Their main land use appears to be pasture (used for grazing) which provides additional support to the hypothesis of prevalent dairy farming.
- **'Core Farming'** 253 NUTS3 regions (Germany). The much higher than average farm size is the distinguishing factor in this cluster and implies the existence of a productivist regime in these agricultural areas, with large scale farming being the prevalent type. Lower than average numbers of hotels and farmers over 65 years old, and higher than average change in age of farmers over 65 years old are consistent with this being the agricultural centres of Europe situated around small cities or medium-sized towns such as Bedfordshire (UK) or Bielefeld (DE). In terms of accessibility, these regions are not disadvantaged. Their land use patterns are dominated by rice cultivation, complex cultivation and agriculture with significant areas of natural vegetation. Most of them do not have LFA status.
- **'Viticulture'** 20 NUTS3 regions (France). These regions are mainly distinguished by their higher than average percentage of areas planted with vines. They are characterised by relatively low employment in agriculture, forestry and fishery, but with high levels of unemployment and population change. The land use patterns of this cluster are mostly responsible for distinguishing this group of regions from the « Meso-Accessible ».
- **'Sweden'** The most statistically problematic cluster, due to the unavailability of land use data for Sweden. In this cluster, the great majority of Swedish NUTS3 regions (19) alongside three Italian ones with a high percentage of land developed for rice cultivation are grouped together on the basis of their lower than average rates of change for population, unemployment, GDP/head and farmers over 65 years old. The

majority of these regions are sparsely populated, and have acquired LFA status, and have been categorised as predominantly rural + lagging in the OECD rural typology. To this extent, stagnation appears to be the sole driver of their clustering here, which may not reflect their actual situation. Lower than average numbers of hotels exist.

In the NMS:

- **'Polish Cities'** Contains only 6 NUTS3 regions, 23 comprising the areas in and around most of the large conurbations in that country (higher than average population density and population levels). Their main characteristic is the high accessibility indices at macro and meso (EU region) levels. Higher than average rates of GDP/head change and unemployment change express a dynamism which typifies the cluster. Complex cultivation patterns prevail such as peri-urban land use in Polish cities, which also appear to have a lower than average percentage of fruit trees and vineyards.
- **'Dynamic Remote'** 19 NUTS3 regions (Poland, Baltic States). Most are medium-sized city regions but have low accessibility indices at macro (EU) and meso (EU region) levels. However, rates of GDP/head change are high, whilst the actual level of GDP/h remains relatively low. Juxtaposition of remoteness (at EU region level) and dynamism mark these regions of great potential. An Eastern European land use pattern of higher than average complex cultivation patterns existing around medium and large conurbations is also detected here, as is the case with « Polish cities »
- **'Static Remote'** 29 NUTS3 regions (Romania, Bulgaria). These are all sparsely populated, and with low levels and growth rates of GDP per head. The cluster's location on the fringe of the EU27 map (low accessibility indices at macro and meso level) is mostly part of the troublesome and isolated Balkans, but it appears to have a stable labour market, i.e. average levels of unemployment accompanied by low rates of change. To this extent, the core economic indicators reflect what seems to be a particularly lengthy process of integration to the EU27. In other words, this cluster is concerned with regions in a precarious equilibrium.
- **'Lagging Remote'**, 48 NUTS3 regions (Bulgaria, Romania, Baltic States). Macro-remoteness is testified here by a very low accessibility index at macro level. These are the most peripheral regions in continental Europe (EU27), with capital cities also being included (Sofia). Higher than average level of unemployment rates and lower than average levels and growth rates of GDP per head show the « leggings » character of this cluster's economy. These regions are sparsely populated with most of the land

being under permanent irrigation, in sharp contrast to the norm for all other NUTS3 regions in the N12 zone. As a result, a hypothesis of intensive agricultural land use - comparatively speaking - can be formulated for this cluster.

- **'Dynamic Macro-Accessible'** 34 NUTS3 regions,<sup>27</sup> (Poland, Slovakia). Their main distinguishing feature is their central geographical position in Europe, which is reflected in a high accessibility index at macro level. However, their accessibility index at meso level remains particularly low due to largely national problems of road/rail infrastructure. These regions are sparsely populated, with low levels of GDP/head and high levels of unemployment. Most importantly, this cluster of macro-accessible regions exhibits higher than average rates of change in both unemployment and GDP/h - indicative of energising forces in action. A higher than average percentage of non-irrigated arable land is also observed.
- **'Meso-Accessible'** (Malta, Cyprus, plus the capital city of Bucharest). The defining characteristic is poor data availability. For Malta and Cyprus, no statistical information was found in terms of population, population density or land use patterns. As a result, the clustering exercise was based on only two indicators: accessibility and GDP/head. To this extent, the only reliable conclusion about this cluster can be made in relation to their low accessibility at macro (EU region) level and high accessibility at meso (EU region) level; this primarily reflects « regional idiosyncrasies ».
- **'Stable Accessible'** (Hungary, Czech Republic, Slovenia, and Romania). The capital cities of Prague and Budapest are also included in this cluster. High accessibility indices at meso and macro level go hand in hand with high levels of employment (the lowest level/change in unemployment) and average GDP/h. These are NUTS3 regions which have succeeded in generating a steady flow of jobs and money. The key factor in explaining their advantage is the long-term stability displayed by their core economic indicators, which avoid fluctuation and thus match what is the « standard » for the EU15.

### **Findings on polycentricity :**

From an agricultural point of view, it is somewhat difficult to promote polycentrism as an obviously more efficient and desirable objective for food production: modern methods of farm production and long-distance transport have rendered the nearby proximity of settlements to farms largely redundant.

The polycentric approach may not be a feasible option in low density rural areas and/or where the transport infrastructure is weak.

Additionally, the building up of institutional networks which are an essential component of the polycentric model may be a particularly difficult challenge for economically weak regions, especially in relatively more remote rural areas, which are often lagging behind precisely because of their lack of associational structures.

### **11.1.2 Spatial Disparities and territorial cohesion**

This point is addressed with the work on clusters categories (cf. Previous point).

The specific types of territories that stand out from the rest for different reasons are the territories related to the following clusters categories :

- agricultural tourism
- diversified farming
- Lagging remote
- Stable accessible

### **11.1.3 Dynamics and flows (cf. Clusters categories)**

### **11.1.4 Contradictions between levels (cf. Findings)**

### **11.1.5 Findings at transnational level (Interreg III B areas) – not addressed –**

### **11.1.6 What is new?**

The building of clusters categories which gives a very precise view on Europe agricultural structures.

## **11.2 Methods and data**

### **11.2.1 Spatial analysis methods**

The central aim of Project 2.1.3 is to assess whether the CAP and RDP contribute to the goals and concepts of European spatial development policies. Thus the key questions for the project are whether the CAP and RDP support the goals of :

- social and economic cohesion
- environmental sustainability
- more polycentric development in Europe

However, the CAP and RDP can also be assessed relative to their own policy objectives which include adequate farm income levels, agricultural productivity improvements, de-intensification, possibly higher or adequate diversity (e.g. mixed farming).

While this project primarily examines the territorial impact of the CAP and RDP for consistency with higher-level EU policy objectives, many of the findings are also relevant to a more narrow assessment of the CAP and RDP against its own goals and objectives, although this was not an objective of this study.

### **11.2.2 Indicators**

#### **- Core Indicators :**

Utilisable Agricultural Area (UUA) as a percentage of total land area, NUTS3, (2000)

Percentage of farm holders under the age of 35 years, NUTS2 (1997, 1995, 1993, 1990)

Percentage of farm holders over the age of 65 years, NUTS2 (1997, 1995, 1993, 1990)

Agricultural output per hectare, NUTS2 (Annual 1990-1997)

Agricultural output per AWU, NUTS2 (Annual 1990-1997)

Percentage value added by agriculture, forestry and fishing, NUTS3, (Annual, 1995-2000)

Value of fertiliser input per hectare of arable land, NUTS2 (Annual, 1990-2001)

#### **- Other Indicators :**

Arable as a percentage of Utilisable Agricultural Area, NUTS2, (Annual 1974-2001)

AWU per 1000 hectares, NUTS2, (Biennial 1990-1997)

AWU per holding, NUTS2, (Biennial 1990-1997)

Percentage change in the number of holders, NUTS2, (1990-1997)

Percentage change in the number of old farmers, NUTS2, (1990-1997)

Percentage change in the number of young farmers, NUTS2, (1990-1997)

Per cent employed in agriculture forestry and fishing, NUTS3, (Annual, 1988-1997)

Fallow as a percentage of Utilisable Agricultural Area, NUTS2, (Annual, 1995-2001)

FNVA per AWU, NUTS2, (Biennial 1990-1997)

FNVA per hectare of Utilisable Agricultural Area, NUTS2, (Annual, 1990-2001)

LFA land as a percentage of Utilisable Agricultural Area, NUTS2, (Biennial 1990-1997)

Livestock Units per holding, NUTS2, (Biennial 1990-1997)

Permanent crops as a percentage of Utilisable Agricultural Area, NUTS2, (Annual, 1974-2001)

Permanent grass as a percentage of Utilisable Agricultural Area, NUTS2, (Annual, 1974-2001)

Standard Gross Margin per Agricultural Work Unit, NUTS2, (Biennial, 1990-1997)

Total agricultural subsidies per hectare of Utilisable Agricultural Area, NUTS3, (1990, 1999)

Total agricultural subsidies per hectare of Agricultural Work Unit, NUTS3, (1990, 1999)

Utilisable Agricultural Area as a percentage of total area, NUTS2, (Annual, 1974-2001)

Hectares of Utilisable Agricultural Area per holding, NUTS2, (Annual, 1990-1997)

### **11.2.3 Territorial Impact Assessment (TIA)**

In the first stage (year 1 of the project), a number of key hypothesis were developed regarding the territorial impact of the CAP and RDP. A key issue arising from the development of hypotheses was the importance of differentiating between different types of policy instruments that comprise the CAP and RDP because:

- a) they have played a distinct role within the CAP reform process and
- b) they may have given rise to territorially distinct effects.

In particular, the decision was made to analyse separately the following:

### *Pillar 1*

- Market Price support
- Direct Income payments
- *Pillar 2*
- LFA scheme
- Agri-environmental schemes
- Rural development measures

Based on these hypotheses, statistical analysis has been carried out to assess the extent to which changes in the CAP are associated with observable changes in the economic, social and environmental conditions in areas at the NUTS3 level or equivalent. This has been complemented by a review of the findings from previous studies considering the spatial effects of the CAP and RDP.

In addition, the territorial impacts of the Mid Term Review proposals have been estimated at NUTS3 level based on output from the CAPRI model.

Building on this, the second stage (year 2 of the project) has attempted to:

- complete the statistical analysis of Project 2.1.3's NUTS3 database, and
- use case-study methods to explore in more depth the causal relationships between CAP and rural development policy and certain apparent outcomes of policy, focusing, in particular, on how these are differentiated across space.

### **11.3 Policy recommendations**

Pillar 2 budget should be increased progressively, as anticipated in the Agenda 2000 and MTR agreements and in the Commission's proposals for the RDR 2007-13. This might be achieved either through continuing increases in the rate of compulsory modulation or preferably through the more substantial realignment of EAGGF towards Pillar 2. This is desirable because the RDR incorporates cohesion objectives, in contrast to Pillar 1.

It is recommended that:

- the new Rural Development Regulation 2007-2013 should contain a broader range of permitted measures under the four proposed axes, building on the lessons from LEADER and Objective 5b by including more measures which address sustainable rural development beyond the agriculture sector and which have a territorial dimension.

- the Commission keep under review the rates of cofinancing in the convergence countries, as there is evidence that the difficulties of match funding may have led both to lower levels of RDR expenditure and to a distorted composition of RDR spending in the poorer countries and regions.

It is also point out that consistency with cohesion objectives would be improved through allocation of the RDR budget to Member States according to criteria of relative needs for rural development and environmental management.

In relation to direct Single Farm Payments, it is suggested that the Commission explore models through which these might be modulated more progressively in richer regions of the EU, for example through relating rates of modulation to farm business size. Voluntary modulation could previously be applied in this way with a positive territorial impact, and this would be worthy of further investigation.

#### **11.3.1 Uncomfortable trends (see Findings)**

#### **11.3.2 Uncomfortable policy effects**

The principal conclusion from this ESPON project is that in aggregate the CAP works against the ESDP objectives of balanced territorial development, and does not support the objectives of economic and social cohesion. Moreover, in terms of polycentricity at the EU level, Pillar 1 of the CAP appears to favour core areas more than it assists the periphery of Europe, and at a local level CAP favours the more accessible areas.

The Rural Development Regulation is a cohesion measure, however, and while our evidence on Pillar 2 is more mixed, expenditure under the RDR does not appear to support cohesion objectives either.

#### **11.3.3 Recommended changes in policies (see point 11.3)**

#### **11.3.4 Recommended changes in polity and governance**

It is important that territorial measures include supporting rural community development – understood as an approach to working with and to building the capacity of individuals and groups within their communities. To this end, in offering grants and other support, local development agencies should prioritise collective action which is both inclusive and reflexive, and should support new arenas for interaction and collective learning.

Both the Commission and Member States should start reviews of their institutional arrangements for rural development and agriculture, encompassing broad consultation and debate, and leading to firm proposals.

## **12 ESPON Project 2.1.4 Territorial trends of energy services and networks and territorial impact of EU energy policy**

**Third interim Report**, August 2004.

PROJECT LEADER: CEEETA – Centro de Estudos em Economia da Energia, dos Transportes e do Ambiente, PORTUGAL

MEMBERS OF CONSORTIUM: CENERGIA – Energy Consultants, DENMARK; SOFTECH - Energia Tecnologia Ambiente, ITALY; CIRIUS – Centro de Investigações Regionais e Urbanas, PORTUGAL; IGP – Instituto Geográfico Português, PORTUGAL and UMM - University of Mining and Metallurgy, POLAND.

### **12.1 Findings**

NB: This review is based on incomplete third interim report (27.9.2004)

#### **Findings related to territorial structures, trends and impacts**

There is little evidence and research of the effects of energy on development. Mainstream models assume an adaptation of energy supply to energy demand, which is determined by economic growth: energy is assumed, at most, as a limiting factor not as a leading location factor. In average, energy has not an important weight in production costs of industry: as there is access to energy, only very important differences in price and access conditions will have a significant impact on the spatial pattern of economic activities. However, energy achievements represent key phenomena in economic development. Industrial revolutions are closely linked with new energy sources and natural energy endowments can represent key issues in regional or national development patterns.

Regions that “export” energy may have in this activity an important source of income, although in most cases, mainly in cases of nuclear, oil, hydro-electricity or wind or solar energy, the revenue for producing regions may be extremely weak in as much as these facilities are owned by non-residents in the region. An exception must be emphasized for biomass renewable energy sources. In these cases strong impacts can be noted, in direct employment and specially in indirect agriculture and like employments.

There is no clear relation between energy self-sufficiency and development. European countries were able to answer their energy needs through energy imports: no statistical relation exists between energetic self-sufficiency and GDP per capita. This result seems to hold at regional level where it seems there to be a non-coincidence between energy production and energy consumption.

Most of the energy policy measures will impact territorial development through energy prices variation. Studies found a significant but small impact of energy prices on economic growth: the studies analysed point to an elasticity of GDP to energy prices of about 0.02 or 0.03. We found no conclusive evidence of the impact of energy prices disparities on location of industrial activities even in the case of energy-intensive industries.

The major trends observed in the country sample of the study were the following:

In the New Member States:

- Primary energy production and energy consumption declined;
- Final energy consumption decline, despite GDP growth;
- The share of transport sector in final energy consumption increased while industry declined;
- Increasing share of electricity in final energy consumption but below EU15 average;
- Significant contribution of solid fuels in electricity generation;
- Energy intensity improvement;
- GHG emissions reduction more significant than in EU15.

In the European Countries:

- Renewable energy production increased;
- Slow growth of overall energy consumption, with fuel mix changing in favour of gas;
- Gas prices rose significantly;
- Electricity prices decreased in industrial and domestic sectors as a result of increasing competition between producers and technological improvements;
- Energy intensity improved;
- GHG slightly reduced.

### **12.1.1 Main territorial structures (polycentricity)**

**Findings related to the spatial structure in terms of SIZE (population, GDP etc.)\***

## **Findings related to the spatial structure in terms of INFRASTRUCTURE NETWORKS\***

## **Findings related to the spatial structure in terms of SOCIO-ECONOMIC SPECIALISATION\***

## **Findings related to the spatial structure in terms of CO-OPERATION**

With the enlargement new advantages will emerge in terms of new markets and new opportunities for investment. The Energy Charter Treaty has opened an opportunity window for political commitment in East-West energy co-operation. The enlarged market will create additional needs for interconnection in order to solve some critical interconnection weaknesses in free energy transit which are identified in EURELECTRIC & UCTE (2002)<sup>8</sup> for the European grid. In fact the European Directive 96/920EC has contributed to important improvements in the transnational networks. However we are still far from a single market and even for EU15 the demand is much higher than the offer, which implies some congestion management. The situation will be much worse if we consider EU25.

### **12.1.2 Spatial Disparities and territorial cohesion**

Large disparities exist on energy consumption between European countries with a major contrast between EU 15 countries (0.13 toe per 1000 € of GDP) and New Member States (0.42 toe per 1000 € of GDP).

Comparing the European Union countries with the accession countries the main energy systems differences come as follows:

- EU countries rely less on solid fuels (4% against 18%) and more on natural gas;
- Coal is still very important in the accession countries because of the important endogenous proven reserves. Some capacity has been closed, because of the huge environmental problems (CO<sub>2</sub> emissions and acid rains) while the productivity has been improved in the coalmines of certain countries;
- There is a substitution movement from coal to natural gas for electricity production;
- Industry as an energy-consuming sector has lost importance because of the structural political and economic reforms experienced in these countries during the nineties;

- The nuclear power stations in some countries have severe security problems and negotiations are or have been done with EU in order to close some of the most sensitive reactors;
- Renewable energy sources other than hydro have some important barriers in the accession countries. Excess electricity generation capacity in some countries, still subsidized prices and lack of financial incentives are among some of the most relevant barriers.
- The energy market reforms are still being conducted and will approach the *acquis communautaire* in a near future. The public ownership of energy utilities is still very important in some countries.
- Huge investments in the energy sector are necessary to increase competitiveness and improve the energy services quality.

### **12.1.3 Dynamics and flows**

Economic development has associated a decrease in energy intensity: increasing energy efficiency is embedded in economic development and, if we exclude some extreme country situations, in Europe it seems to be an inverse relation between development levels and the intensity of economic uses of energy. Energy intensity shows a clear decreasing trend. Transport shows the most significant growth of energy consumption between 1995 and 2000.

### **12.1.4 Contradictions between levels\***

### **12.1.5 Findings at transnational level (Interreg III B areas)\***

### **12.1.6 What is new?\***

## **12.2 Methods and data**

Data gathering in order to develop a primary database, covering the country sample required allowing indicator production and mapping methods was the obvious starting point. Unfortunately it has proven to be a very difficult task. There is a severe lack of statistical data on energy sector: systematic energy data gathering at regional level (NUTS 2) is scarce and in many countries no recent regional data is available; in some cases only recently was established the need for sub-national data on energy consumption.

### **12.2.1 Spatial analysis methods**

In order to measure and compare the different aspects of the energy sector at country level the project has grouped indicators into 4 domains covering different aspects of the energy sector (Economy, society and energy,

Reliable supplies of energy, Competitive energy markets and Environmental objectives.)

### 12.2.2 Indicators

Energy indicators are estimated from basic data on the structure of economic and human activity, combined with measurements of the energy use for those activities. Indicators link energy use to economic and human activity.

#### *Core Indicators proposed*

- Electricity production by power source
- Final energy consumption by energy type and consumption sector
- Energy prices for industry (tax included)

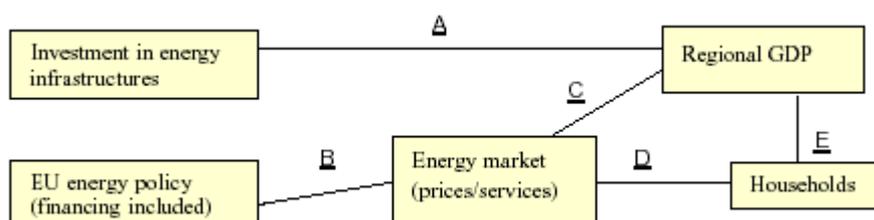
#### *Variables*

Besides the core indicators the following variables were proposed to be collected in order to construct the indicators proposed in the second interim report:

V1	Location of natural gas supply infrastructures
V2	Location of high voltage electricity networks
V3	Primary energy supply by energy product (oil, solids, nuclear, hydro, natural gas, other renewable)
V4	Location of Power Plants (hydro, thermal, nuclear)
V5	Refineries capacity
V6	Employment in the energy sector
V7	Energy prices for the residential sector (electricity, natural gas)
V8	Energy prices for the transport sector (unleaded gasoline, automotive diesel)
V9	Duration (minutes) of electricity supply disruption

### 12.2.3 Territorial Impact Assessment (TIA)

The aim is to clarify the differentiated territorial effects of energy policy and to quantify its effects on the economy and environment of the different European regions. The question is to find five sets of regional parameters A, B, C, D and E that permit the following transformations:



Besides investments in energy facilities, the impacts of energy policy will be mediated by energy prices. It is why we consider as our main concern to find a suitable operator C that can evaluate the effects of energy prices on regional GDP. Given the above-mentioned difficulties that impede the calculus of direct energy impact on a region, the procedure we used consists in the distribution of the impact calculated at a national level among the different regions of a specific country.

### **12.3 Policy Recommendations**

The absence of reliable and consistent statistical data under NUTS 0 level is a key issue in this research project. It is strongly recommended that the national and European authorities coordinate serious efforts in the development of data production for the energy sector (resources, production, consumption and prices) in order to render viable future research in this key area.

#### **12.3.1 Uncomfortable trends\***

#### **12.3.2 Uncomfortable policy effects**

The energy policy options of liberalisation and market opening as well as completing internal energy market may lead to higher concentration of economic power in major urban areas. In terms of lower differences in energy prices, it is not clear which regions/countries are winners or losers. Supply more responsive to the market may result more advantages for more developed regions. Regarding sustainability there is a risk that lower energy costs may reduce pressure to higher savings and efficient use of energy.

Fulfilling the Kyoto commitments and achieving lower dependence on traditional fossil fuels and reduction of emissions requires drastic measures in what concerns transport aiming to revitalise rail and inland water transport. It may lead towards more polarized development on major network nodes. Growing relevance of natural gas: disadvantages for activities in less developed and isolated regions, with possible relocation of energy intensive industries

#### **12.3.3 Recommended changes in policies**

No data available

#### **12.3.4 Recommended changes in polity and governance**

No data available

## **13 ESPON Project 2.2.1 The Territorial Effects of the Structural Funds**

**Third Interim Report**, August 2004

TPG: Nordregio (Stockholm; Sweden), EPRC (Glasgow, UK), Mcrit (Barcelona; Spain), INFYDE (Las Arenas – Vizcaya; Spain), ITPS (Stockholm; Sweden), University of Utrecht (The Netherlands), Peter Ache (Dortmund; Germany), SYSTEMA (Athens; Greece), Margaret Hall (Luxembourg)

### **13.1 Findings**

#### **13.1.1 Main territorial structures (polycentricity)**

- **At the micro-level**, on the 1994-99 period, Structural Funds seem not to have privileged the polycentric areas (p. 10).
- **At the meso-level**, on the 1994-99 period, regarding the assistance per inhabitant, Structural Funds seem to have privileged functional urban areas of regional importance, more than those of national or international importance, and more than sparsely populated areas (p. 12).
- **At the macro-level**, on the 1994-99 period, the indirect and qualitative impact is likely to be proven more interesting than the impact on changes in the economic performance. As regards the fields of intervention, direct contributions towards spatial development aims are mainly visible in the field of accessibility. However, considering both direct and indirect effects the field of socio-economic specialisation is of even higher importance than that of accessibility (p. 22).

#### **13.1.2 Spatial Disparities and territorial cohesion**

p. 10: "Referring to the Dissimilarity Index, the actual development trends differ regarding the level in question, e.g. there are trends towards increased territorial cohesion at the macro level (NUTS 0) while at the micro and meso levels the trends predominately point towards decreasing territorial cohesion (NUTS 2 & 3)."

- **At the micro-level**, on the 1994-99 period, Structural Funds seem more to have assisted the poor areas than to have counterbalanced spatial discontinuities.
- **At the meso-level**, it becomes clear that the strongest effects on territorial cohesion are indirect. In addition, structural actions, at least

coincide with, even if they do not necessarily enhance, cohesion on the interregional cross-border scale (p. 16).

p. 12: "Cross-border "anti-cohesion" within the EU15 could be said to stem more from the urban structure and the level of polycentricity than from real territorial imbalances. These "Islands of wealth and prosperity" are the source of the largest discontinuity with regard to GDP per capita, bringing about the fact that, in general, the larger the joint economy of the border region is, the higher is the inequality across the border."

p. 13: "Sparsely populated rural areas receive on average about three times as much assistance, per inhabitant, than do densely populated urban areas. The exception are areas of medium human intervention, where the urban areas show an absolute peak of 726 € per capita."

p. 15: "All in all, cross-border cohesion on the regional level thus seems to have increased during the programming period, in stark contrast to the simultaneous decrease in "general" interregional cohesion. Regions along borders where the difference has been fairly small have (on average) moved closer to each other, whereas the opposite holds true for borders where the economic gap was already large."

- **At the macro-level**, FUA beyond the Pentagon received substantially more assistance than those inside.

### **13.1.3 Dynamics and flows**

p. 15: "All in all, cross-border cohesion on the regional level thus seems to have increased during the programming period, in stark contrast to the simultaneous decrease in "general" interregional cohesion. Regions along borders where the difference has been fairly small have (on average) moved closer to each other, whereas the opposite holds true for borders where the economic gap was already large."

### **13.1.4 Contradictions between levels**

p. 10: "Referring to the Dissimilarity Index, the actual development trends differ regarding the level in question, e.g. there are trends towards increased territorial cohesion at the macro level (NUTS 0) while at the micro and meso levels the trends predominately point towards decreasing territorial cohesion (NUTS 2 & 3)."

### **13.1.5 Findings at transnational level (Interreg III B areas)**

"the analysis of Interreg IIC projects (...) illustrates that these contributed to learning and awareness rising regarding polycentricity at regional level,

especially when it comes to questions of morphology and transportation” (p. 11).

### **13.1.6 What is new?**

The project’s main advance may lie in the clarification of the relationship between scale, spatial inequalities and Structural funds assistance: it thus shows that Structural Funds policy does not sufficiently take into account contiguity and scale, et least regarding the spatial development.

## **13.2 Methods and data**

### **13.2.1 Spatial analysis methods**

Maps comparison, in particular by crossing Structural funds amount with GDP, evolution of population, accessibility or employment.

Some promising treatments on contiguity, by attributing a cohesion index to the borders between NUTS II regions.

### **13.2.2 Indicators**

Amount of Structural Funds spending during the 1994-99 period at the NUTS II and NUTS III levels.

GDP per capita and its evolution, population, employment, accessibility

### **13.2.3 Territorial Impact Assessment (TIA)**

Three directions (p. 39):

- territorial development (coincidences between Structural Fund spending and spatial developments in terms of GDP, the change of the relative economic position of a region, and transportation.);
- governance and policy development (the governance of the Structural Funds in the various countries as well as their conformity to national policies, influence of Interreg on the formation of trans-national macro-regions);
- causal links (Comparing actual spatial development to actual Structural Fund investment by region).

### 13.3 Policy Recommendations

- Direct Structural Funds contributions to polycentric development may be supported by:
  - The integration of polycentricity into Structural Funds programming (by introducing the concept of polycentrism at the individual programme level)
  - Area designation (by not fragmenting functional urban areas into different programme areas, by adapting programmes to the different types of functional urban areas, or by taking into account spatial discontinuities between neighbouring regions)
- Indirect Structural Funds contributions to polycentric development may be supported by:
  - Intensified policy discourse
  - Supporting new thinking (funding studies, evaluations and promoting new thinking)
  - Leverage of national practice
  - Promoting trans-national links

#### 13.3.1 Uncomfortable trends

p. 10: "Referring to the Dissimilarity Index, the actual development trends differ regarding the level in question, e.g. there are trends towards increased territorial cohesion at the macro level (NUTS 0) while at the micro and meso levels the trends predominately point towards decreasing territorial cohesion (NUTS 2 & 3)."

p. 12: ""Islands of wealth and prosperity" are the source of the largest discontinuity with regard to GDP per capita, bringing about the fact that, in general, the larger the joint economy of the border region is, the higher is the inequality across the border."

p. 15: "All in all, cross-border cohesion on the regional level thus seems to have increased during the programming period, in stark contrast to the simultaneous decrease in "general" interregional cohesion. Regions along borders where the difference has been fairly small have (on average) moved closer to each other, whereas the opposite holds true for borders where the economic gap was already large."

### **13.3.2 Uncomfortable policy effects**

About Structural Funds and cross-border inequalities, p. 13: “high levels of spending coincide with lower gaps across the border and vice versa. (...) One self-evident inference here is that structural spending in terms of relative volume is (especially within the framework of Objective 1) directed towards such regions that display a weak economic performance and hence normally also have smaller cross-border variations.”

### **13.3.3 Recommended changes in policies**

The most operational policy proposal is the integration of contiguity criteria in the selection of assisted areas (for not to divide functional areas, or take into account cross-border differentials of development). But every policy recommendation in this report is addressing Structural Funds.

### **13.3.4 Recommended changes in polity and governance**

The strong impact of the Structural Funds policy on local and regional governance is underlined by the report. The authors do not recommend changes but propose to use the Structural Funds as a lever on local governance, in particular to promote spatial development concepts.

## **14 ESPON Project 2.2.2 Pre-accession Aid Impact analysis**

### **Third Interim Report, August 2004**

TPG-Lead partner: Institute for Regional Development and Structural Planning

Partners: EPRC, RDI, CRT, EUROREG, CRS HAS

#### **14.1 Findings**

The ESPON 2.2.2 third interim report focuses on the contribution of pre-accession aid measures in the new member states and candidate countries to the attainment of spatial objectives in the ESDP. Three dominant priorities of pre-accession aid instruments were identified which account for about 80 % of total spending, namely geographical position, environmental quality and the institutional capacity. With exception of the three Baltic countries total pre-accession aid spending is relatively homogeneously distributed between regions of the candidate countries (vast majority of regions received funding up to 0,5 % of their regional GDP with border regions often ranking higher than inland regions). The common conclusions of the quantitative and qualitative analysis on spatial impacts of EU Pre-Accession Funds show that detailed assessment and measurement of territorial impacts of pre-accession aid are difficult to be achieved. A direct relation between pre-accession aid spending and regional development in terms of GDP and employment dynamics did not reveal, which does not mean that the policies under investigation are unnecessary or without impact. Although for some countries a positive relation between pre-accession aid spending levels and GDP growth per region could be observed no causality between these observations can be assumed. Correlation analysis showed a significant relation between the regional endowment with selected potentials and the regional performance in terms of GDP and employment dynamics. Pre-accession funds will likely contribute to the territorial objectives set, but due to the volume of resources, the scale of development disparities and institutional capacities, these impacts will not be very pronounced and hardly measurable in quantitative terms. The qualitative analysis confirmed that the impact of different instruments varies at different territorial scales and depends on the type of region affected.

Furthermore the project analysed the spatial impacts of the adoption of the acquis in the new member states in a country by country analysis which shows that many elements of the acquis are in line with territorial and spatial development themes e.g. accessibility and connectivity,

environmentally friendly and sustainable development. Therefore the adoption has the potential to influence territorial development issues by addressing regional potential and bottlenecks. But it is also emphasised that given the level of development disparities, changes of existing territorial development patterns can only be expected over the longer term and it is thus necessary to recognise the limitations of EU policy action. Furthermore explicit links to territorial development goals are not necessarily clear and the impact of the Community Policies on overall territorial balance and cohesion is unlikely to be perceptible in the near future. The analysis also demonstrates that particular chapters of the *acquis* are likely to have a more direct impact on spatial development than other.

#### **14.1.1 Main territorial structures (polycentricity)**

In the new member states potentials concentrate in the capital cities and few other major urban agglomerations. These regions have the most favourite socio-economic indicators within the regions of the new member states and candidate countries. They benefit, for instance, from relatively high investments, high levels of human capital, more developed infrastructure, higher shares of service employment etc. Furthermore, also potentials not measurable through secondary statistics on European scale for the regional level, such as the availability of training facilities or the access to decision making processes and responsible actors obviously also concentrate in these agglomeration regions. These potentials allow higher income and more modern economic structures than in other regions within these countries. In some cases, like those of Budapest, Prague or Bratislava, the capital's potential provision even dominates the respective national economic structures. This strongly affects the objectives of spatial cohesion and polycentric development. Furthermore this concentration is, apart from historical groundings, at least partly due to the spatial intensity of economic activities, in particular, in the early years of the catch up process after the beginning of the transformation process. Consequently, while these regions domination opposes the polycentrism at national scale, they are still regions with an integrative function for the surrounding regions, which only few if any other regions in these countries can provide.

In spatial terms centrally located in the new member states are the old industrialised regions. They are also somehow enveloped by the potential development axes of the Eastern European triangle. Under the socialist regime, these regions have been important drivers of economic activity. Despite the availability of some potentials, like comparatively high accessibility and population density, the old industrialised regions have

suffered from the privatisation process, comprehensive enterprise restructuring often leading to their closure, sudden loss of subsidies and the force to reorient activities to market structures. Regions were particularly hard hit the less diversified the regional industry had been structured. Furthermore, to set up modern highly competitive industries and other high-value added economic activities entrepreneurship and respective qualifications of the labour force are needed. Especially entrepreneurship qualities cannot be set up quickly but need special stimulus. Finally, for attracting modern economic sectors, these regions also need to overcome their environmental problems representing severe bottlenecks at least in parts of the old industrialised regions.

Growth potentials as well as the challenges of old industrial regions are particularly identified in the central transnational macro region of the candidate countries named Triangle of Central Europe enclosing the territory between Warsaw (in the East), Poznan (ev. Berlin in the West), Krakow, Saxony (Dresden), Prague, Bratislava, Vienna and Budapest (in the South).

#### **14.1.2 Spatial Disparities and territorial cohesion**

The Western border regions of the new member states and candidate countries are more heterogeneous than the major urban agglomerations. However, their most important common characteristic is related to their spatial closeness to the former external EU 15 border. Nevertheless, also this characteristic represents an important potential, as it encourages Western investments, trade, tourism and cross-border retail but also initiatives in educational and technological terms. In addition to the spatial closeness to the EU 15, though many of these regions are of rural characteristic, they tend to show more potentials and less bottlenecks than the peripheral Eastern and rural regions. Consequently, policies can more easily be translated into regional growth and development rather than in regions dominated by bottlenecks. This holds in particular with regard to these regions' role for trans-national networking. Yet, they can only comply with these tasks if the necessary prerequisites for successful business cooperation etc. are fulfilled, like the provision of appropriate infrastructures to overcome the limitations of potentials typical for rural and/or peripheral regions.

These regions' chances are somewhat opposed by the characteristics and developments of the peripheral Eastern and rural regions. Generally speaking, these are the regions most disadvantaged in economic terms in the new member states and candidate countries. The geographical unfavourable location there coincides with mostly poor infrastructure in all aspects, low investments and business activities, limited access to high level

education etc. Furthermore, these regions are also confronted with the economic results of such disadvantages as they face relatively low income and they tend to have high unemployment rates, especially as compared to the capital regions. Although these regions need political support in order to participate in national and European restructuring many of these regions are in a position where structural political interventions result in transfers rather than sustainable investments. Thus, the comparatively low level of development observable in the Eastern peripheral and rural regions claims for different political strategies other than those generally followed in the EU 15 in order to realise sustainable support rather than temporary transfers.

Lastly, the island economies are faced with largely different problems than the other new member states, which is due to their quite different structure. Although the island economies also differ strongly in their structures, they have some common features, which relate to specific problems as of their small nations located at the European periphery. While they benefit from environmental potentials, they are faced with bottlenecks related to their geographic position etc. Therefore, these island economies play a specific role in the context of international networking to overcome their solitary situation. Other spatial objectives, i.e. social and economic cohesion and competitiveness, are of lower importance for these regions on meso- and micro-levels, as of their small territory. Yet, they are relevant also for the island economies in terms of European spatial development. Due to their different levels of economic development and quite different economic structures, Malta and Cyprus still need different spatial policies in the catch up process on the macro-level.

Comparative analysis of national instruments for a territorial policy: National regional policy covers a wide variety of actions and is implemented for a range of reasons. National regional policy relates in a range of ways to territorial development goals whereby different policy instrument link to the goals of spatial cohesion, balanced spatial competition and spatial integration. Slovenia, Estonia, Hungary have adopted regional policies in line with the territorial development objectives. Bulgaria and Romania appear to reflect territorial development objectives in their objectives, but if this is translated into practice is a more open question. In the other new CEE member states regional policy takes a 'middle road' – supporting lagging regions as well as supporting regional competitiveness. In general regional equity appears to have a strong commitment but tend to be subservient to the needs of national economic growth.

The influence of the European Commission has been very visible on the design of regional policies in the new member states and candidate countries. At the same time important distinctions exist between EU and national policies which have a potential for conflict and tensions but also complementation.

### **14.1.3 Dynamics and flows**

Quantitative analysis of dynamic developments of policy interventions and impacts could only be partly achieved by comparison of spending levels and priorities for the two periods 1998-2000 and 2001-2002. Due to likely time-lags of impacts and missing up-to-date socio-economic data quantitative impact analysis was limited to the earlier period. Qualitative ex-ante analysis highlighted that EU Structural Funds in the future will have the capacity to contribute to the promotion of spatial cohesion, balanced spatial competition and spatial integration due to – in comparison to pre-accession aid - improved programming and implementation structures and substantial increases in funding levels for a wide range of policy actions.

### **14.1.4 Contradictions between levels**

Qualitative analysis based on case studies showed the relevance of the three level approach when discussing impacts of pre-accession aid with regard to territorial objectives. Several issues are highlighted. Firstly, case studies showed that objectives and impacts might be conflicting between different spatial levels. Infrastructure interventions e.g. which addressed objectives on macro and meso-level mainly also affected these levels, while the regional micro-level was not taken into account when formulating objectives and was also only partly positively affected. Although interventions thus contributed to spatial integration on macro and meso level, trends of disintegration on micro level were further fostered. Secondly, territorial scope of impacts obviously depends on the scale of projects. Due to limited budgets of pre-accession aid projects in some cases mainly affected the local level although objectives on national level had been stated. Thirdly the size of the country determines the relevance of spatial levels. In many small countries territorial developments on intra-national regional level seemed not to be of high priority. In those countries often only European interventions pushed national policies towards putting more emphasise on regional policies and thus on regarding territorial development objectives on meso and micro level.

#### **14.1.5 Findings at transnational level (Interreg III B areas)**

The territorial impacts of trans-national and cross-border co-operation programmes are analysed with regard to the spatial integration objective.

Cross-border co-operation: The analysis on case study regions focused on assessment of cross-border co-operation activities with regard to potentials and bottlenecks addressed and with regard to overall impacts on territorial development. All in all the programmes addressed the main regional bottlenecks resulting from the border situation, namely missing infrastructure links, weak economic structures due to limited market and commuting areas as well as institutional and mental barriers. Small Project Funds turned out to be an efficient instrument to foster socio-cultural integration. Furthermore, positive effects for regional institution building could be found, where funds have not been too limited. However, many measures focussed on regional development rather than spatial integration and the already existing level of spatial integration and cooperation activities tends to define the scope of cross-border cooperation programmes and not the other way round.

Transnational co-operation: Two macro regions (ARCHIMED and Alpine Space) have been studied in detail supported by additional research on other macro regions on more general level. Common foci of both programmes lie in the field of transport infrastructure improvement, preservation of natural and cultural heritage/environmental protection and tourism development. These priorities address main bottlenecks and potentials of the macro-regions, but budget seems to be too low to reveal significant impacts on transnational level and not only on smaller regional level. Spatial integration in economic terms was only addressed in the Alpine Space. Both programmes focussed on improving institutional conditions. The effects on spatial integration were in both cases limited because of unequal opportunities of participating countries (co-ordination with Phare or Tacis was not sufficient). In quite a number of cases, this led to a more regional rather than macro-regional character of the implemented projects. Corresponding to the cross-border cooperation activities, here the existing integration level strongly influences the common fields of action.

#### **14.1.6 What is new?**

The project's main new approach lies in the relation of policy priorities and spending levels to regional potentials and bottlenecks. Analysis indicates correlations between overall regional performance (GDP and employment level/dynamic) and regional endowment with several potentials. Analyses of

the extent to which policies are oriented towards main regional potentials and bottlenecks accordingly imply further insights into policy impacts. A regional typology based on potentials and bottlenecks enables to recommend policy packages per type of region with selected priorities oriented on the main potentials and bottlenecks.

## **14.2 Methods and data**

### **14.2.1 Spatial analysis methods**

The analysis on spatial impacts of the adoption of the *acquis* in the new member states and candidate countries is based mainly on country analysis.

Quantitative analysis of regional and spatial impacts of EU Pre-Accession Funds was examined with correlation and regression analyses. Qualitative Impact analysis was elaborated with six case studies according to the regional typology.

The analysis on spatial impacts of transnational and cross-border co-operation programmes were based on review of existing documents as well as case study findings.

### **14.2.2 Indicators**

Several indicators were developed by the ESPON 2.2.2 project which can be summarized as following: PHARE, ISPA and SAPARD spending (often expressed as % of regional GDP), total pre-accession aid spending, Location quotients for pre-accession aid.

### **14.2.3 Territorial Impact Assessment (TIA)**

Different methods are used to measure territorial impacts of different topics (adoption of *acquis*, EU Pre-Accession Funds and transnational and cross-border co-operation) – see chapter 1.2.1. In fact the project analyses the distribution of pre-accession aid funds and to which aim the funds were dedicated. So the result is information about the regional incidences of the funds and how funds coincide with regional structures in terms of development potentials and bottlenecks. In addition, quantitative analysis on how potentials and bottlenecks can influence territorial development forms the basis of further territorial impact assessment.

## **14.3 Policy Recommendations**

The European Commission is not responsible for all kinds of regional progress to be achieved through political intervention. The European

Commission should only intervene if inter-regional or possibly international effects through intervention can be expected and if the country or region cannot realise the intervention by own means.

Differences in development levels tend to be more pronounced between the group of the new member states and candidate countries and also within some of these countries than in most other parts of the former EU 15. Consequently, to achieve spatial cohesion in an enlarged EU, policy interventions have to take into account these differences in development levels as of the unlike needs in the differently developed regions.

For territorial development objectives to be more clearly addressed, pre-accession aid and Structural Funds regulations should define how programmes are expected to address territorial developments. Therefore, the territorial dimension and expected territorial impacts of different fields of action should be discussed and in particular, the spatial levels addressed need to be defined.

### **Macro level:**

Spatial cohesion and balanced spatial competition on European level: Policy recommendations need to differentiate between types of regions. Most important for macro-level cohesion is the utilisation of the Eastern European agglomerations' growth dynamic. They need to be strengthened for European competition. Yet, if snowball system shall work, transferring growth to the hinterland, then the respective local links should not be neglected also in reference to macro-level cohesion. Another crucial role for macro-level cohesion play the old industrialised regions. This the more, since they are enclosed by a triangle of weak and potential MEGAs, possibly forming a future Eastern European counterpart to the Western European Pentagon. Eastern peripheral and strongly agricultural dominated regions are particularly short of potentials, but here the national and regional scale is regarded as appropriate scale. In these regions it is important not to fall further behind.

Spatial integration on transnational scale: A strategic approach on programme level occurs to miss and the transnational character should be strengthened. A strategic approach should be supported and areas or sectors in need of action throughout the whole macro-region area should be taken into account. Actions addressing human and business resources should be stronger included in the programmes to foster participation of private sector actors in transnational activities. Because the analysis reveals a poor or not existing understanding of the ESDP objectives an improvement of communication between the different levels involved in transnational co-operation should be fostered through common communication strategies.

Finally, evaluation and monitoring on programme level should take the spatial dimension into account, thus also enhancing the territorial objective attainment.

### **Meso level:**

Although EU policies considerably strengthened institutional structures on the national level, there should be a continued emphasis on building up co-ordination and partnership in the new member states. Clear guidelines should be provided for the division of responsibilities among the national and regional levels of the spatial development institutions, with special regard to the establishment of the procedural rules and decision-making powers in programming regional development and utilising decentralised budgetary and international resources. Furthermore the country and types of regions specific characteristics should be taken into account. The analysis of territorial impacts of the acquis showed that several sector policies reveal a strong territorial dimension; therefore a co-ordination of sector policies with territorial approaches is regarded as necessary.

### **Micro level:**

So far, only few countries established extensive SWOT analysis on NUTS3 level. In order to lay a sound foundation for policy implementation an analytical base for interventions adapted to specific regional situation should be elaborated. Bottlenecks related to weaknesses of regional institutional structures provided a frequent constraint, therefore an increase of institutional capacity on regional level is recommended.

Furthermore policy packages and policy strategies are defined for different types of regions:

Capital cities and major urban agglomerations: infrastructure linkages on different levels, innovation, sector and business structure

Western border regions: human resources, innovation, cross-border integration

Old industrial regions: business restructuring, human resources, infrastructure modernisation, environment

Peripheral eastern and rural regions: economic diversification on basis of local SME's, institution building and human resources

Island economies: environmental protection, transnational integration measures, economic diversification

## **15 ESPON Project 2.2.3 Territorial Effects of the Structural Funds in Urban Areas**

**Final Report**, August 2004

Draft final report. The trans-national project group consisted of lead partner institution ECOTEC in Brussels (with partner offices in Birmingham and Madrid), Nordregio in Stockholm, ÖIR in Vienna, University of Thessaloniki, Institute for social research in Milan and Mcrit in Barcelona.

### **15.1 Findings**

Since this projects concerns the urban areas and the effects of the Structural fund the formal connection to polycentric development and spatial disparities is strong. Investigating the situation and point towards the future development of the European territory from a spatial planning approach is the very task given beforehand. A lot could be brought up under the following points, consequently. In the executive summary it is stated, "... gaining appreciation of the urban dimension of the Structural Funds is complicated by the simple fact that few programmes focus solely on urban areas, and equally, few measures take an explicit urban focus. The exception to this is the Urban Community initiative" This should be put forward as an important finding of the project, although perhaps not that a creative or constructive finding.

The project can be seen to have two central parts, or two central bases for argumentation: the first one being the more theoretical urban policy analysis, and the second one being the empirical case study analysis. The theoretical analysis results in a proposal for a TIA for Structural Funds in urban areas. The case study analysis discusses the focus and possible effects of Structural Funds in urban areas.

An important finding from the case study analysis is that the concept "urban issues" is a blurry one. What is an urban issue can be said to have become less and less clear during the course of the project. The most clear-cut definition is that it is urban if it takes place in an urban area. This makes the reasoning and drawing of conclusions somewhat unclear as well. Adding to this is that "urban" is not a common classification in the Structural Funds. It is only in the Community initiative URBAN that it is more relevant. URBAN is also more local in focus than the other Structural funds programmes.

Since urban areas are the territorial unit in focus, it is the micro-level that received the most attention. However, some of the more general conclusions made (e.g. on policies) concern the European macro-level, and there are

cases where conclusions are motivated by the impact on the national territorial structures, i.e. the meso-level.

### **15.1.1 Main territorial structures (polycentricity)**

In this section some of the findings related to polycentric development will be presented and discussed. They are primarily findings from the empirical case study analysis, and therefore they emanate from the local/regional level, but are sometimes considered as valid for the whole European territory, or other scales. It draws a somewhat contradictory picture concerning the attention paid or the funding distributed to urban areas in Europe. A finding that is clearer is the focus of the SF programmes in the case studies. In nearly all case studies economic development is considered as having the highest priority. This means that the measures, interventions and projects are classified and motivated by economic terms.

Some findings related to spatial structure in terms of size, in bullet points below:

#### **Micro-level**

- More than half of the Structural funds expenditures occur in what are categorized as functional urban areas of local or regional importance.
- The densely populated areas seem to receive less funding than sparsely populated ones, looking at per capita figures. Looking at total spending, a large share of the funding goes to densely populated areas.
- "... no consistent pattern in the targeting of urban areas by regional Structural Fund programmes."

#### **Meso-level**

- Less than 20% of the Structural funds expenditures went to FUAs of national importance.

#### **Macro-level**

- Only approx. 10 % of the Structural funds expenditure went to areas of transnational European importance.

### **Finding related to the spatial structure in terms of INFRASTRUCTURE NETWORKS**

Under the heading of "Connectivity" the transportation aspects of Structural funds in urban areas are addressed. The micro-level is the obvious focus in the SF supported infrastructure projects that are exemplified in the case studies. There are examples of local public transportation projects or larger infrastructure investments concerning motorway exits etc. having received SF support. Although the local focus is clear there are also several more

meso level examples, such as regional infrastructure projects, or projects with regional impact. "The shift towards more meso level activities in this respect can be considered an important spatial effect of the SF interventions potentially changing the prospects of the urban areas."

Infrastructure networks on macro level are not addressed in the report.

### **Finding related to the spatial structure in terms of SOCIO-ECONOMIC SPECIALISATION**

As regards socio-economic specialisation, the urban policies studied within the project reveal two major fields of issues, "socio-economic problems" of towns/metropolitan areas being one of them. Problems must be dealt with in order for cities to develop into motors for regional development. Solutions through specialisation/diversification of business structure are not explicitly discussed, but more "strengthening economic cohesion at local level" addressing employment issues or "economic revitalisation". Functional specialisation is then mentioned both in the local/regional context, as in the national. There are differing examples of how this is implemented through SF: re-utilisation of old industrial sites into business parks, as a general development strategy for a city region, or improved physical environment in order to create an attractive business environment. This kind of interventions are relevant both on micro and meso level.

The macro level as regards socio-economic specialisation is not addressed in the report, although a successful regional specialisation, it could be argued, should be one effective on both meso and macro level. In this report it is the micro level that is in focus.

### **Findings related to the spatial structure in terms of CO-OPERATION**

The co-operation within the Swedish Fyrstad region is an example of co-operation on micro level brought up in the report. Regarding governance the report brings up that new forms of networking and co-operation of actors have come as a result of the Structural funds programmes. The Interreg co-operation between Graz and Maribor is an example of co-operation on meso level. However, this is not a central theme in the report. The macro level in this regard is not addressed in the report.

### **Summary**

As regards polycentric development, the urban policies studied within the project reveal two major fields of issues, "balanced or polycentric development" being one of them. An important theme is "Tackling disparities within cities and incidences of poverty and deprivation". This can be interpreted as if polycentricity on the local level is more in focus than polycentricity on other levels. In the case studies two kinds of measures in

line with polycentric development has been traced by the analysers – support to clusters and reduce the negative effects of urban sprawl.

Supporting the urban regions in Europe for increased competitiveness etc. can directly be a tool for a polycentric Europe. This is the underlying aim of the project, but whether the findings of the report support this is perhaps a question of interpretation. It is written that overall SF has strong effects on economic and social urban development, it influences changes in the urban environment and in accessibility, and that it is important to remember the SF as a legitimising force on issues, helping to put issues on the agenda.

“Thinking more directly about the different aspects of polycentric development, we conclude that Structural Funds have influence on the aspects of morphology, economic profile and accessibility whereas the international co-operation aspect seems to be particularly weak.” (p.106)

### **15.1.2 Spatial Disparities and territorial cohesion**

Since this project focus on the development potential of urban areas and argues for more focus on this fact, both in policy and funding allocations, this is also the type of territory standing out. The argumentation is in line with the mainstream polycentricity argumentation, that growth and development in urban areas also benefit the surrounding rural areas. Consequently it can be interpreted as dealing with spatial discontinuities. A relevant comment in this context is that the urban areas studied in the project are of different population sizes (20 000 and more), something that should affect the analysis. The selection of case studies include both functional urban areas with serious structural problems of unemployment and high share of employment in manufacturing as well as cases without this kind of structural problems. But since the quantitative analysis was limited, it might be that the disparities and discontinuities are underestimated since all cases are “treated equally”.

“Overcoming spatial disparities” is a specific section in the analysis of the case studies in this project. This concerns mainly the local level, with focus on social segregation problems, something that SF in urban areas is often used for to reduce. As regards the meso level the Interreg co-operation in Graz-Maribor is an attempt to reduce the (cross-border) regional disparities, and create a more competitive region.

On macro level the relation between urban areas in old and new member states and possible disparities and discontinuities is not explicitly addressed in the project.

### **15.1.3 Dynamics and flows**

Findings related to flows and dynamics is not something explicitly addressed in the report. However, if the theme “structural change” can be interpreted as dealing with this, it is a theme that is inherent throughout the report. Structural funding largely goes to regions in transition, from industrial to service economy.

An underlying theme that perhaps can be seen as a meso-level application of flows and dynamics is the theme that can be called “the regional policy shift”. This implies the shift towards increased focus on growth, on urban regions as growth poles and on polycentric development on transnational or international level can be interpreted as a paradigm shift, from a more equality oriented regional development policy, to a more growth oriented. It is possible to discern this shift in the report.

### **15.1.4 Contradictions between levels**

It is not discussed a lot whether there are contradictions between macro, meso and micro level findings. However, it is relevant to mention that this could easily have been brought up. A polycentric, growth oriented urban network on European level implies leaving a lot of small and medium-sized (peripheral) urban regions behind. This is an important allocation policy discussion – who benefits from funding to an urban region and who does not.

Perhaps it is relevant here to again comment on the concept “urban”. Since the definition of “urban issues” through the SF is, that an urban issue is what happens in an urban area it might be the case that the level of issues discussed in the report is mistaken. Several of the issues brought up might not be solved easiest on the local/regional level, even though it is discussed as a local/regional issue. It might consequently *cause* conflicts between the three levels.

As regards the relation between policy and practice, it is written in the report: “Almost without exception the case studies illustrate that the EU Structural Funds strategies and the domestic policy objectives are closely related and ‘fit’ well together.”

### **15.1.5 Findings at transnational level (Interreg III B areas)**

Within the Interreg co-operation between Graz and Maribor the common aim was to strengthen the functional region as a whole. Perhaps this is a good example of a polycentric approach within cross-border co-operation. Otherwise the connection to trans-national and cross-border co-operation is weak in this project.

### **15.1.6 What is new?**

Perhaps it could be argued that focusing on the urban areas of Europe is a new approach and an attempt to use a new basic element for analysis. However, since the concept urban area on European level is a relative concept, and since the quantitative analysis proved very difficult, it could perhaps be argued that the concept is not well functioning, at least not for quantitative analysis. (In ESPON 1.1.1 the concept of FUAs is presented and used as a unit of analysis. It is a concept with a partly subjective definition, and perhaps therefore more usable?)

## **15.2 Methods and data**

### **15.2.1 Spatial analysis methods**

The main conclusion of the statistical spatial analysis within this project is the lack of consistent data on urban areas on European level. Due to the lack of data the quantitative analysis of Structural Funds in urban areas is practically absent, and the arguments of the project are largely based on the case studies of urban areas connected to qualitative analysis of European urban policies.

### **15.2.2 Indicators**

They have identified 8 parameters that indicate the strengths and weaknesses of urban areas:

- High level of unemployment
- Low level of economic activity
- High level of poverty and exclusion
- Specific need for conversion, due to sectoral mix
- High numbers of immigrants, ethnic minority groups or refugees
- Low level of education, significant skills deficiencies and high drop out rates from school
- Precarious demographic trends
- Rundown environment

Potential indicators for this is then:

- Unemployment – absolute numbers and rate
- Employment in sectors
- Economic activity rate
- Business start-ups and survival rates
- GDR per capita in PPP
- Income indicators (poverty, social/welfare benefits, household income
- Population data
- Non-nationals in population
- Residents of different ethnic groups

- Education level of population
- Environment indicators: quantity of derelict land, contaminated land, urban sprawl, congestion, NO<sub>2</sub>, CO<sub>2</sub>, smog, % recreation space, % parks, urban green space/inhabitant.

The idea was to collect some of these on European level, some for 800 urban areas, and finally more in depth for the case study areas.

Comparing the wish list of indicators to the ones used in the final report cannot be done for this project, since the quantitative analysis was practically abolished. It is written in the report that the "Urban Audit II" is due to report in summer 2004 and that their data will be very useful for urban focussed quantitative analysis.

### **15.2.3 Territorial Impact Assessment (TIA)**

Since this is a Strand 2 project, the concept TIA is brought up and discussed, and in the report a method for measuring territorial impacts of Structural Funds in urban areas is proposed. The use of the concept is presented in the following sentences: "For our current purposes we take the impact of proposed spatial development activities against spatial policy objectives for an area. Present references to TIA have largely been in the context of assessing the impact of plans and projects. It is less often used in the context of assessing the impact of policies. (...) It is also important to identify the parameters of the assessment, i.e. what we mean by territorial effects." Further on it is stated that TIA should be an aid in decision-making, and not an automatic decision-taker in itself. It should influence actions, and not rationalise proposed actions afterwards. It should function primarily for policies and programmes, and not on individual projects.

A possible method for TIA of Structural funds in urban areas is presented and here shortly summarized. It is functional on EU level and on programme level, and on regional programmes and sector-oriented programmes, and it is explicitly inspired by the SEA approach and by the ESDP and the UFA (Urban Framework for Action) for the specific developmental goals (metropolitan regions as gateways for development, polycentric structure of Europe strived for, support economic development of towns and cities, good urban governance etc.) Baseline analysis is considered important for TIA and a range of indicators are considered relevant for assessment, such as sectoral mix, no of business start-ups, employment, demographic structure, congestion and "governance capacity". Data for the baseline analysis is however lacking. Similar problems arise for the assessment of the effects of Structural funds. The policy analysis can be done with qualitative analysis, but the impact assessment could rely on either quantitative or qualitative. "Where there is limited information on Structural Fund inputs we feel that

qualitative techniques should be favoured ...” Finally the report present two alternative matrixes, or analysis schemes for assessing policies and/or programmes. They have also elaborated a “form of statement” where effects can be commented upon, and finally a “Summary of advantages and disadvantages of options”, also in form of a table.

### **15.3 Policy Recommendations**

The policy recommendations concern strengthening/paying attention to the importance of the urban areas in SF and in the EU – mainly through determining eligibility and evaluating effects.

#### **15.3.1 Uncomfortable trends**

It is difficult to see that contradictions between trends and current policy are brought up to a large extent in this report. The underlying condition is strengthened urban areas for a more polycentric territorial structure of Europe. When “urban development trends” are discussed it is stated that growth also implies urban problems such as sprawl and transport congestion. Widening socio-economic disparities could be added. However, sprawl, congestion and socio-economic disparities are also problems that economic growth in the cities, Structural Funds etc. could hamper. Consequently it is difficult to discern the cause and effect.

#### **15.3.2 Uncomfortable policy effects**

Since a polycentric territory and a strengthening of the nodes across Europe are central European territorial goals, the recommendations presented in this report on Structural funds in urban areas can hardly be interpreted as not in line with them. The report recommends stronger control and supervision over allocation of money (to urban/rural areas) and more consideration of the roles of urban areas. This has to be seen in the light of the ESDP and the Cohesion report, where a polycentric pattern is considered as the best precondition for territorial cohesion. However, depending on the interpretation and definition of territorial cohesion a focus on the urban nodes can either be seen as overlooking the weak rural areas of Europe, or as improving the support allocation since supporting the nodes might give effects also in the hinterland of the nodes. It should also be noted that the main impression from the policy recommendations is that more funding should be allocated to urban areas and more focus should be given to urban areas within the Structural funds. It could be argued that the Structural Funding is first and foremost needed in the peripheral regions of Europe, especially after enlargement. To then allocate more funding to urban areas could be seen as counteracting the idea of Structural funding.

### 15.3.3 Recommended changes in policies

The project draws the conclusion that since the EU is a largely urbanised territory, this territory is also benefited by the Structural Funds. However, the urban focus in the programmes could be stronger. One of the policy recommendations suggest this, for a stronger connection to the goals set out in the ESDP.

Since this project explicitly addresses the Structural Funds, so do several of the policy recommendations. These are:

- "A stronger urban focus to the Structural Funds"
- "An EU-level approach" in the eligibility assessment of urban areas for Structural Funds.
- "Determining eligibility of urban areas" concerning the eligibility of urban areas, and it is recommended that this be valued by the "contribution to the functioning of the EU urban system rather than solely on indicators of comparative economic, social or environmental performance".
- "Towards an EU TIA" where it is recommended "that data on the distribution of the Structural Funds is routinely collected that enables an assessment of the extent to which urban areas in the EU benefit."
- "Programme-level focus of Structural Funds" where it is stated that "an urban focus to the Structural Funds is most appropriately considered at the programme-level." Programmes should consider the role of urban areas.
- "Eligible actions" with the recommendation that "consideration is given to the manner in which Structural Funds can be used to support governance functions and practical linkages between urban areas."
- "Programme-level TIA (ex ante)" concerning that "all regional programmes should be subject to territorial impact assessment" and consider "the likely effects of Structural Fund actions on urban form; environmental emission and aspects such as transport and congestion effects."
- "Assessing the effects of Structural Funds in urban areas (ex post)" saying that serious consideration should be given "to the level of data availability on Structural Fund activities in urban areas in the final years of the current programming period. (...) all regional programmes are requested to provide estimates of the amount of Structural Fund activity occurring within identified urban areas."

One impression is that a main hypothesis underlying the argumentation in this report is the development potential of urban areas. This is not

something originally concluded in this report, but more an important precondition for initiating this project. Since the conclusions and policy recommendations practically all argue towards more focus on urban areas and more Structural funding to urban areas, it is their importance as gateways for development that is the underlying rationale.

#### **15.3.4 Recommended changes in polity and governance**

##### **Multi-level approach**

It is difficult to see anything clear in the policy recommendations in line with a multi-level approach involving European, national and regional actors in strengthening the territorial and regional development. The majority of the policy recommendations concern the Structural Funds at programme level and regarding eligibility. Consequently, the regional level and the EU level are addressed – but an obvious multi-level approach is difficult to discern. Perhaps one of the policy recommendations, which partly bring up the role of partnerships, could be interpreted as one. “Programme-level focus of Structural Funds” where it is stated that “an urban focus to the Structural Funds is most appropriately considered at the programme-level.” And recommended that “... regional partnerships, including urban authorities consider spatial goals for Structural Funds programmes (...) Programme partners should be encouraged to develop integrated strategies for the development of urban areas with weak social, economic and environmental performance.”

In the case studies actors representing different levels are exemplified. Since this project deal with the urban areas it is perhaps more clear that the multi-level approach concern the local – regional (– national) levels, and that the European level is implicit in the Structural funding administrative structure. The involved actors more often represent authorities than NGOs.

##### **Better co-ordination between different sectors**

*“An EU-level approach”* in the eligibility assessment of urban areas for Structural Funds.

*“Determining eligibility of urban areas”* concerning the eligibility of urban areas, and it is recommended that this be valued by the “contribution to the functioning of the EU urban system rather than solely on indicators of comparative economic, social or environmental performance”.

*“Eligible actions”* with the recommendation that “consideration is given to the manner in which Structural Funds can be used to support governance functions and practical linkages between urban areas.”

*"Assessing the effects of Structural Funds in urban areas (ex post)"* saying that serious consideration should be given "to the level of data availability on Structural Fund activities in urban areas in the final years of the current programming period. (...) all regional programmes are requested to provide estimates of the amount of Structural Fund activity occurring within identified urban areas."

## Annex 1 Overview on status quo of the ESPON transnational projects

### ESPON projects, nick names, interim reports<sup>6</sup> and lead partners of the ESPON Programme 2006

PROJECT NUMBER	TITLE	"NICKNAME"	REPORT No.	TPG Lead Partner
<b>1.1</b>	<b>Polycentric development and urban-rural relations</b>			
1.1.1	The role, specific situation and potentials of urban areas as nodes in a polycentric development	POLYCENTRISM	<i>Final Report</i>	NORDREGIO
1.1.2	Urban-rural relations in Europe	URBAN-RURAL	<i>Final Report</i>	Helsinki University of Technology Centre for Urban and Regional Studies
1.1.3	Particular Effects of enlargement of the EU and beyond on a polycentric spatial tissue with special attention on discontinuities and barriers	ENLARGEMENT	3 <sup>rd</sup> IR	The Royal Institute of Technology (KTH)
1.1.4	The spatial effects of demographic trends and migration	DEMOGRAPHY TRENDS	3 <sup>rd</sup> IR	ITPS (Swedish Institute for Growth Policy Studies)
<b>1.2</b>	<b>Access to infrastructure and knowledge</b>			
1.2.1	Transport services and networks: Territorial trends and basic supply of infrastructure for territorial cohesion	TRANSPORT TRENDS	<i>Final Report</i>	University of Tours
1.2.2	Telecommunication and energy services and networks: Territorial trends and basic supply of infrastructure for territorial cohesion	TELECOM TRENDS	<i>Final Report</i>	Centre for Urban & Regional Studies (CURDS), University of Newcastle
1.2.3	Identification of spatially relevant aspects of	INFORMATION	-----	----- ( <i>planned start: end 2004</i> )

<sup>6</sup> latest delivered reports  
IR = INTERIM REPORT

<b>PROJECT NUMBER</b>	<b>TITLE</b>	<b>"NICKNAME"</b>	<b>REPORT No.</b>	<b>TPG Lead Partner</b>
	information society.	SOCIETY		

**Continuation: ESPON projects, nick names, interim reports and lead partners of the ESPON Programme 2006**

<b>PROJECT NUMBER</b>	<b>TITLE</b>	<b>"NICKNAME"</b>	<b>REPORT No.</b>	<b>TPG Lead Partner</b>
<b>1.3</b>	<b>Natural and cultural heritage</b>			
1.3.1	Territorial effects and management of natural and technological hazards in general and in relation to climate change	NATURAL HAZARDS	3 <sup>rd</sup> IR	Geologian Survey of Finland
1.3.2	Territorial trends in the management of natural heritage	NATURAL HERITAGE	3 <sup>rd</sup> IR	Royal Haskoning
1.3.3	The role and spatial effects of cultural heritage and identity.	CULTURAL HERITAGE	-----	----- ( <i>planned start: mid of Oct. 2004</i> )
<b>2.1</b>	<b>The territorial effects of sector policies</b>			
2.1.1	Territorial impact of EU transport and TEN policies	TRANSPORT IMPACTS	<i>Final Report</i>	Christian-Albrechts- Universität zu Kiel, Institute of Regional Research
2.1.2	Territorial impact of EU research and development policy	R&D IMPACT	<i>Final Report</i>	ECOTEC Research and Consulting Ltd.
2.1.3	The territorial impact of CAP and rural development policy	CAP IMPACT	<i>Final Report</i>	University of Aberdeen, Arkleton Centre for Rural Development Research, Department of Land Economy
2.1.4	Territorial trends of energy services and networks and territorial impact of EU energy policy	ENERGY	3 <sup>rd</sup> IR	CEEETA
<b>2.2</b>	<b>Structural Funds and related funds</b>			
2.2.1	Territorial effects of EU Structural Funds	STRUCTURAL FUNDS IMPACTS	3 <sup>rd</sup> IR	NORDREGIO
2.2.2	Territorial effects of the "Aquis Communautaire", Pre-accession Aid and Phare/Tacis/Meda Programmes	ENLARGEMENT AID IMPACT	3 <sup>rd</sup> IR	Institute for Regional Development and Structural Planning
2.2.3	Territorial effects of structural funds in urban areas	STRUCTURAL FUNDS URBAN IMPACT	<i>Final Report</i>	ECOTEC Research and Consulting Ltd.

**Continuation: ESPON projects, nick names, interim reports and lead partners of the ESPON Programme 2006**

<b>PROJECT NUMBER</b>	<b>TITLE</b>	<b>"NICKNAME"</b>	<b>REPORT No.</b>	<b>TPG Lead Partner</b>
<b>2.3</b>	<b>Institutions and Instruments of spatial policies</b>			
2.3.1	The application and effects of the ESDP in Member States	ESDP IMPACTS	-----	----- (planned start: mid. Oct. 2004)
2.3.2	The governance of the territorial and urban oriented policies from the EU to the local level.	GOVERNANCE	-----	Universitat de València. Estudi General (through Department of Geography)
<b>2.4</b>	<b>Filling gaps and new policies</b>			
2.4.2	Integrated Analysis of Transnational and National Territories based on ESPON Results	ZOOMING IN	-----	----- (planned start: mid. Oct. 2004)
<b>3.</b>	<b>Co-ordinating and cross-thematic projects</b>			
3.1	Integrated tools for European spatial development territorial	SPATIAL TOOLS	<i>Final Report</i>	BBR, Federal Office for Building and Regional Planning
3.2	Spatial scenarios and orientations toward the ESDP and the Cohesion Policy.	SCENARIOS	1 <sup>st</sup> IR	Free University of Brussels -IGEAT , Center for Studies on Sustainable Development, Brüssel
3.3	Territorial dimension of the Lisbon/ Gothenburg process	LISABON/ GOTEHNBURG PROCESS	-----	Centre for International Studies on Economic Growth (CEIS), University of Rome "Tor Vergata"







Bundesamt  
für Bauwesen und  
Raumordnung

# **ESPON 3.1**

## **Integrated Tools for European Spatial Development**

***Final Report Part C***  
***New tools and instruments for  
European spatial analysis***

# C

Revised Version



# **ESPON 3.1**

## **Integrated Tools for European Spatial Development**

### **Final Report Part C**

#### ***New tools and instruments for European spatial analysis***

#### **REVISED VERSION**

The Final Report of the ESPON project 3.1 „Integrated Tools for European Spatial Development“ was delivered on 15 November 2004. This is the revised version.

The Final Report comprises three main parts (plus annexes):

Part A: Scientific and policy oriented conclusions of ESPON results until September 2004

Part B: Synthetic summary of ESPON projects (final and third interim reports)

Part C: New tools and instruments for European spatial analysis

The Final Report takes on board the results of the discussions during the ESPON seminar in Nijmegen, 10-11 October 2004, which was based on the “draft Final Report of the Project 3.1” and includes the final deliveries of TPGs as well as feedback given by ESPON members.

This report represents the final results of a research project conducted within the framework of the ESPON 2000-2006 programme, partly financed through the INTERREG programme.

The partnership behind the ESPON programme consists of the EU Commission and the Member States of the EU25, plus Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON programme and projects can be found on [www.espon.lu](http://www.espon.lu)

The web site provides the possibility to download and examine the most recent document produced by finalised and ongoing ESPON projects.

ISBN number **3-87994-021-5**

This basic report exists only in an electronic version.

**Editor:**  
**Bundesamt für Bauwesen und Raumordnung**  
**BBR**  
**Bonn, Germany, November 2004**

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## Foreword

This is the third part (C) of the Final Report of ESPON Project 3.1 "Integrated Tools for European Spatial Development". Project 3.1 is the cross-co-ordinating and one of the first round ESPON projects which commenced in July of 2002.

Reference points of the tasks of the project are listed by different partitions:

- thematic structures and reference points deriving from the input provided by other projects and by own additional efforts
- territorial structure reference points such as countries, spatial integration zones, etc.
- data base development and cartography
- policy impact methodologies
- policy development

This third part concentrates on the research activities of the project team. It shows the realised work in a well-founded comprehensive way. The annexes are written for the ambitious reader who would like to deepen his/her knowledge and the discussion on a special topic. By reading the report also the good, creative and constructive collaboration between the different ESPON projects as well as with the ESPON Co-ordination Unit and the DG Regio are obvious.

At this stage we would like to take the opportunity to thank all ESPON participants for their work and co-operation.

The project team was composed from eight institutions.

The institutes are listed below, followed by a list of staff involved in the project.



The present Final Report of the ESPON Project 3.1 is a team effort of all project partners under the leadership of the BBR.<sup>1</sup>

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The ESPON 3.1 Project team would like to express its thanks to all persons who are not listed, but contributed or supported the team. Special thanks to all the colleagues from the administration offices which worked hard, pragmatically and unconventionally to overcome formal requirements of the programme.

The ESPON Programme was launched after the preparation of the European Spatial Development Perspective (ESDP), adopted by the Ministers responsible for Spatial Planning of the EU in May 1999 in Potsdam (Germany) calling for a better balanced and polycentric development of the European territory. The programme is implemented in the framework of the Community Initiative INTERREG III. Under the overall control of Luxembourg, the EU Member States have elaborated a joint application with the title "The ESPON 2006 Programme – Research on the Spatial Development of an Enlarging European Union". The European Commission adopted the programme on 3 June 2002.

See <http://www.espon.lu> for more details.

The views expressed in this report do not necessarily reflect the opinion of the ESPON Monitoring Committee.

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## **Executive Summary**

- 1.1 Short summary and introduction by chapters**
- 1.2 Further research needed/ data gaps**
- 1.3 Networking undertaken**
- 1.4 Self-evaluation**
- 1.5 Abbreviations used by the project team**



# **Executive Summary**

(co-ordinated and compiled by Lars Porsche, BBR)

This is PART C of the draft Final Report which presents the results of the work of the ESPON Project 3.1 team. It describes our work on the ESPON Data Base; some new GIS instruments that we developed; an approach towards creating an ESPON Atlas; a proposal for building up a Regional Classification of Europe; various analysis and support tools for other TPGs; elements of co-ordination and guidance undertaken by our project; and the first version of an ESPON Policy Support System. It also explains the annexes, which include manuals and handbooks, and are intended for those who want to go deeper into the topics.

As requested, previous research results of the project team are integrated into this report. Therefore it contains important approaches and outcomes from our interim reports. This Final Report is comprehensive, covering the lifetime of the project and building on our earlier reports. The Final Report has taken account of all advice and guidance papers from the CU, for example "The guidelines for [the] Interim Report in March 2003"<sup>1</sup>

## **1.1 Short summary and introduction by chapters**

### **1<sup>st</sup> Chapter – Executive Summary** (compiled by Lars Porsche, BBR)

This first chapter is an abstract. It gives a concise but thorough overview of the content of the different chapters in this part of the Final Report. Therefore the structure of the Executive Summary follows the structure of the whole PART C report.

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<sup>1</sup> Developed by the CU after the 1<sup>st</sup> TPG lead partner meeting on 28<sup>th</sup> Feb. 2003

## **2<sup>nd</sup> chapter –the role of the ESPON Project 3.1** (by Volker Schmidt-Seiwert and Lars Porsche, BBR)

The ESPON Project 3.1 is the first co-ordinating cross-thematic project of the ESPON Programme 2006<sup>2</sup>. Its role was described in the terms of reference for the project:

This project *Integrated tools for European spatial development* belongs to the third strand and therefore holds a key position in the elaboration of the whole programme by the preparation of the common ground for the other projects and the integration of the results of the other projects towards co-ordinated conclusions. A further task is to secure the consideration of the enlargement issue in all thematic and policy impact studies. (ESPON Co-ordination Unit: *Terms of reference – ESPON project 3.1: Integrated tools for European Spatial development*, p. 2, 2002)

“Preparation of this project...comprises:

Support to the co-ordination on a technical and scientific level of the ESPON 2006 Programme and the projects under measure 1 and 2, including data collection, development of a GIS facility and map-making, thematic co-ordination preparing for the cross thematic exploitation of integrated results based on all projects prepared under the programme.

... offering scientific support for the achievement of the objective of the ESPON 2006 Programme. In this respect, the project will imply support to and a close co-operation with the Co-ordination Unit of the ESPON in Luxembourg...” (ESPON Co-ordination Unit: *Terms of reference – ESPON project 3.1: Integrated tools for European Spatial development*, p. 3, 2002)

Therefore work has taken place in six fields:

- technical and analytical support and co-ordination (database, GIS and map-making),
- concepts and typologies for spatial analysis, spatial concepts
- territorial and thematic co-ordination of the ongoing projects
- preparation for the exploitation of results of all projects
- compilation and structuring of recommendations to further policy development
- assistance in the promotion and networking of the ESPON programme

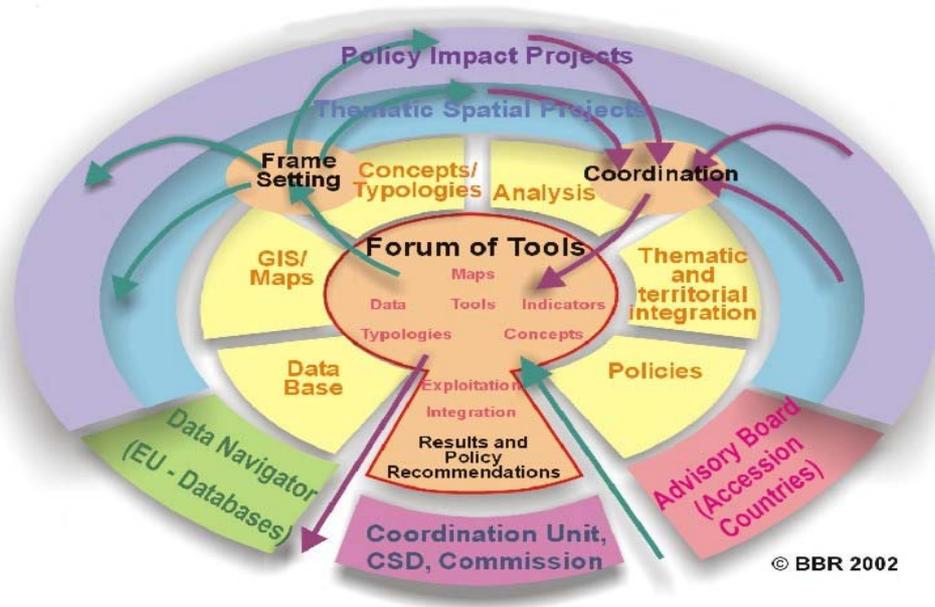
In the graphic below, one important task of project 3.1 is depicted as managing the interaction between project 3.1 and the project environment (other TPGs, European Agencies, experts from Accession Countries, etc.) to

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<sup>2</sup> From July 2002 to October 2004. A phase of smooth transition with ESPON Project 3.2 taking over the co-ordinating task started at the ESPON Seminar in Lillehammer.

produce outputs and deliverables. This task is described by the set of rings around the core of the output.

**Figure 1 Project scheme – integrated tools for the spatial dimension**



The figure above shows the inputs coming from the outer ring, namely:

- policy impact projects
- thematic spatial projects
- data navigator and databases
- accession countries and neighbouring countries advisory board.

The output is indicated by the "Forum of Tools" in the centre of the figure:

- spatial tools
- integrated data bases
- indicators
- typologies
- territorial concepts
- maps.

These core outputs are complemented by the deduction of policy recommendations, indicated by the flow from the core towards the users and applicants. These flows represent the main outputs and deliverables for external use that will be provided by the project.

Between these input and output layers the main tasks of the project are illustrated in the different sections:

- Analyses of spatial structures of key themes and variables, based on findings of other ESPON projects and additional research by the team on Project 3.1;
- Analyses of territorial structures such as countries, spatial integration zones etc.;
- data base development and cartography
- policy impact methodologies
- policy development

By this approach Project 3.1 has achieved added value for the ESPON programme by delivering products which support the programme on different levels, like the various guidance papers (please see 9.1 "Guidance Papers"). By working in a cross-project manner significant extra value was achieved.

### **3<sup>rd</sup> chapter- progress made** (by Volker Schmidt-Seiwert and Lars Porsche, BBR)

The chapter gives a short overview of the progress the project team made in its research and support activities over the whole lifetime of the project.

The TPG 3.1 developed very well. Its pro-active participation in the ESPON Seminars and the TPG lead partner meetings, and deliveries of the project interim reports were very influential. The 3.1 project made use of meetings to test various new products, as well as scientific approaches. These very fruitful interactions were used for improvements and further developments. Synergies generated a lot of win-win outcomes for all ESPON participants.

Work since the last interim report concentrated on the integration and use of TPGs' results to get a good, concise and applicable output. Throughout the life of the project, from the preliminary stage until the delivery of the Final and Interim Reports in March and August 2004, project 3.1 invested a lot of effort in co-ordination and support. The 3rd ESPON Seminar in Matera, Italy, in October 2003 and 4th ESPON Seminar in Lillehammer,

Norway, were the major events where a comprehensive background was established for the Final Reports.

With this report the project 3.1 fulfils the requirements of the terms of reference mentioned above.<sup>3</sup> Also the responses to the 3rd IR have been considered and included in the content of the various chapters of this report. As mentioned above, the outcome of the final and 3rd IRs of other TPGs have been important for the work on this report. The table no. 8 "ESPON projects, nick names, interim reports and lead partners of the ESPON Programme 2006" (see chapter 3) shows the state of play for reports of the TPGs.

The contractual requirements for the final report are presented below.

**Figure 2 : Addendum – Contract for ESPON 3.1 – October 2004 (Final Report)**

Addendum – Contract for ESPON 3.1 - October 2004 ( <i>final report</i> )	
l) Finalising the ESPON database, GIS and mapmaking facility as well as a co-ordinated, common approach to concepts and typologies for spatial analyses, including necessary technical specifications;	✓
m) Finalising the ESPON database, GIS and mapmaking facility as well as a co-ordinated, common approach to concepts and typologies for spatial analyses, including necessary technical specifications;	✓
n) A final comprehensive working report including the final findings of the above-mentioned working documents, including potential scientific and technical recommendations for the follow up project 3.2 on policy scenarios.	✓
Additional:	
An executive summary of the project's implementation, overview of the roles and inputs of participants to the ESPON information system network and recommendations for policy development	✓
Presentation of access points and concrete ideas for policy responses to the territorial trends facing different parts of the Union, at different geographical scales, with a view to improving territorial cohesion.	✓
Presentation of the developed territorial indicators, concepts and typologies linked to spatial planning, including maps.	✓
Presentation of the developed territorial indicators, concepts and typologies linked to spatial planning, including maps.	✓
Presentation and documentation of the GIS, databases and mapping facilities developed.	✓
Commentary on further data requirements and ideas for territorial indicators and measures of sustainable development, concepts and typologies, as well as on further developments linked to the GIS, database and mapping facilities.	✓
Annotation:	
✓ delivery:	in time
✓ task :	fulfilled

<sup>3</sup> see: [http://www.espon.lu/online/documentation/projects/cross\\_thematic/185/tor\\_3.1.pdf](http://www.espon.lu/online/documentation/projects/cross_thematic/185/tor_3.1.pdf), page no. 10 (Political challenges for the ESPON projects), 4<sup>th</sup> paragraph and following

**4<sup>th</sup> chapter – Goals and Concepts** (by Ph. De Boe and Th. Hanquet, PhD consultant)

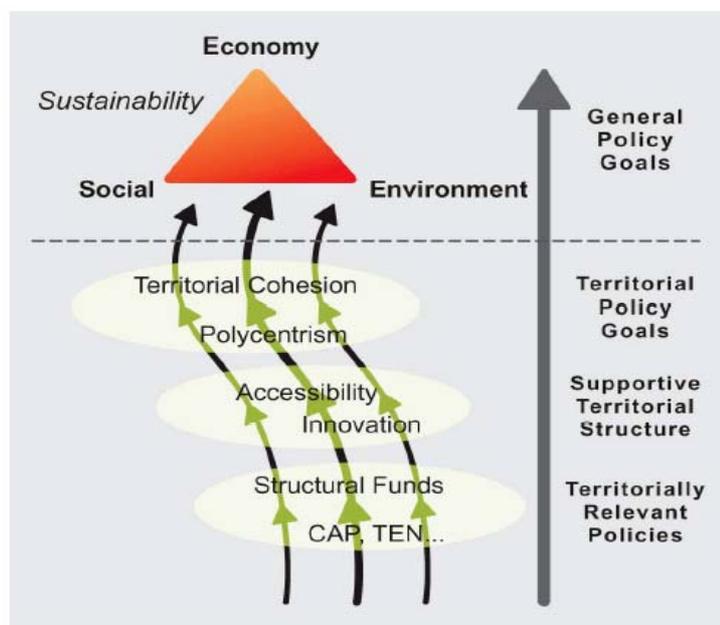
The fourth chapter introduces discussion on current goals and concepts in European spatial development and how it might be possible to interpret and implement these.

A common view of goals and concepts can be used as a basis to develop a specifically territorial approach to the wide range of issues in spatial development.

The topic of goals and concepts in a European context is obviously a huge one. Many things have been, and are still being, written about them, either directly or indirectly. The aim in this chapter is to build a more directly operational framework for ESPON research based on existing information. The aim is very ambitious, given the novelty of such an approach and the fact that things have to be put down in black and white at some point, which is a challenge when there are some sensitive matters.

The ESPON 3.1 project tries as a first step to establish the links between general goals of the EU and their translation into territorial goals and objectives, based on key policy documents such as the ESDP, the Cohesion reports and the recently adopted draft Constitution.

**Figure 3 Sectoral policies / instruments for a sustainable development**



Source: ESPON Project 3.1

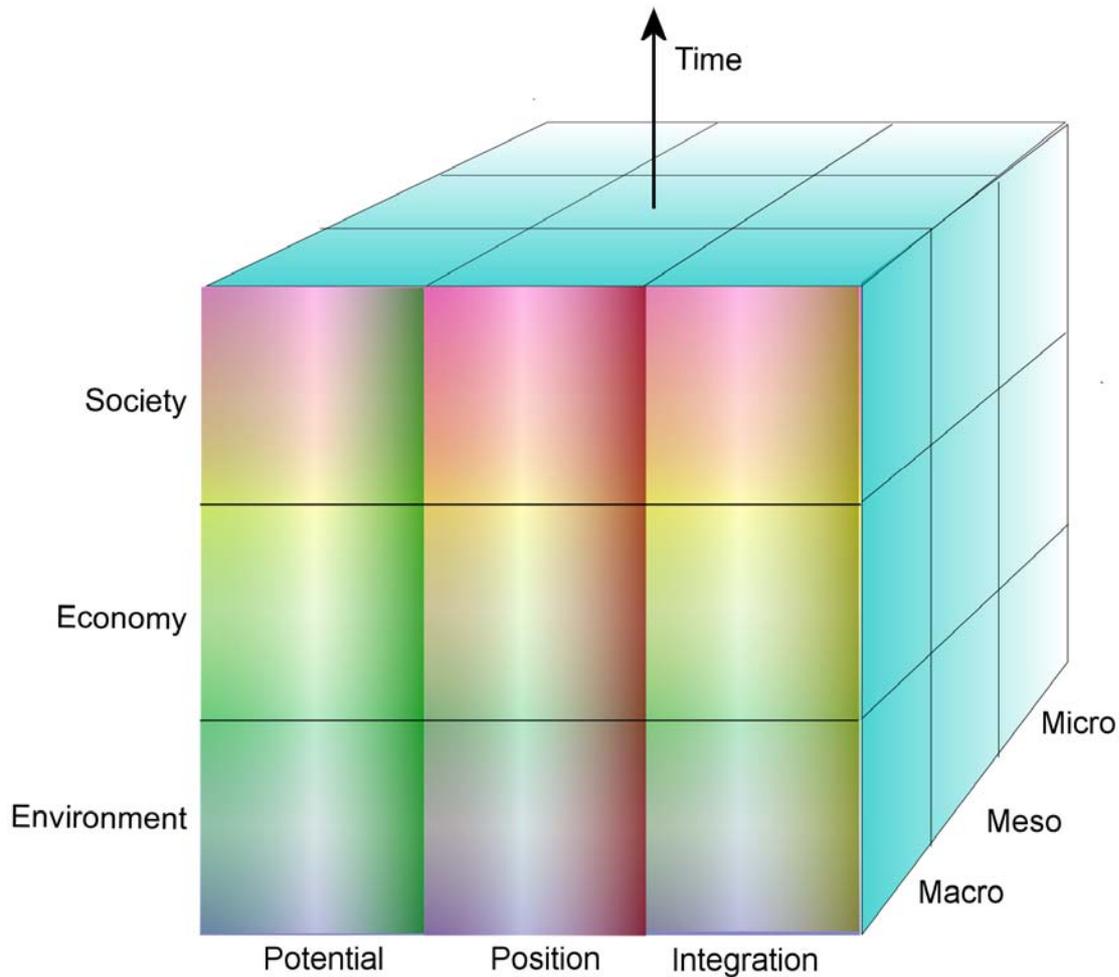
An ad hoc approach is then devised to handle the specificity of the territorial dimension, and use it to structure thinking about goals, concepts, and possibly spatial research in general.

This approach is based on three dimensions of territory:

- domains (grouped in "space" and "society" categories or according to the three summits of the "sustainability triangle": economy, environment, society);
- components of the territory
  - its own features (potential);
  - its features with regard to those of other territories (position) which enables potential interactions with them;
  - its effective interactions (exchanges, co-operation) with other territories (integration);
- scale(s) of the territory and its context; the reference set of scales adopted for the ESPON research comprises three levels:
  - macro (European level);
  
  - meso (transnational / national level);
  - micro (regional / local level).

These three dimensions of the territory are represented by a cube, which becomes a "hypercube" if the time, a fourth dimension, is added. Time acts directly or indirectly in most territorial issues, for example through scenarios or through notions such as "permanent geographical handicaps".

**Figure 4 The "hypercube" of territorial approach**



Source: Ph. De Boe and Th. Hanquet (PhDB consultant), 2004

The "hypercube" of the territorial approach helps to show the specificity of territorial cohesion with regard to economic and social cohesion. Territorial cohesion goes beyond geographical characteristics, because it emphasises the importance of links and interactions between entities, integrating the issue of scale and including the diversity of sectors and topics that could be influential.

The same approach can also demonstrate, along the same grid, the different dimensions of polycentrism, notably the requirements for the nodes and the importance of the relationships between them and with their territorial context.

A well-defined territorial approach involves viewing all territorially relevant concepts within a common structure. This not only helps to clarify their

contents but also gives a basis for defining coherent sets of indicators and typologies.

Concepts which the 3.1 TPG was expected to clarify are explored in this way. In a complementary approach, the different types of concepts and the links between them are made more explicit, and brought together with the territorial grid into a tentative common framework for spatial concepts.

## **5<sup>th</sup> chapter – ESPON Data Base (by Volker Schmidt-Seiwert, BBR)**

One important result of the ESPON programme is the establishment of the ESPON database. It was created through the combined efforts of the Transnational Project Groups and co-ordinated and maintained initially by project 3.1, and then after October 2004 by project 3.2.

The database contains fundamental regional background information necessary for the analysis of European regional structures and trends. It also integrates ESPON results. ESPON has covered EU25 + 2 +2. This makes the ESPON database a unique achievement and resource.

The ESPON database has developed by give and take. All TPGs contribute to this common base and all TPGs benefit by using its data and indicators for their own research.

The ESPON database has been developed and designed according the ESPON Data Navigator categories. In this way the data and indicators provided have been quality checked and adjusted. Updated EUROSTAT data have been included also.

All this was managed to allow transfer to the interactive version of the ESPON database which is now operational, and includes all TPG data delivered up to mid-September 2004.

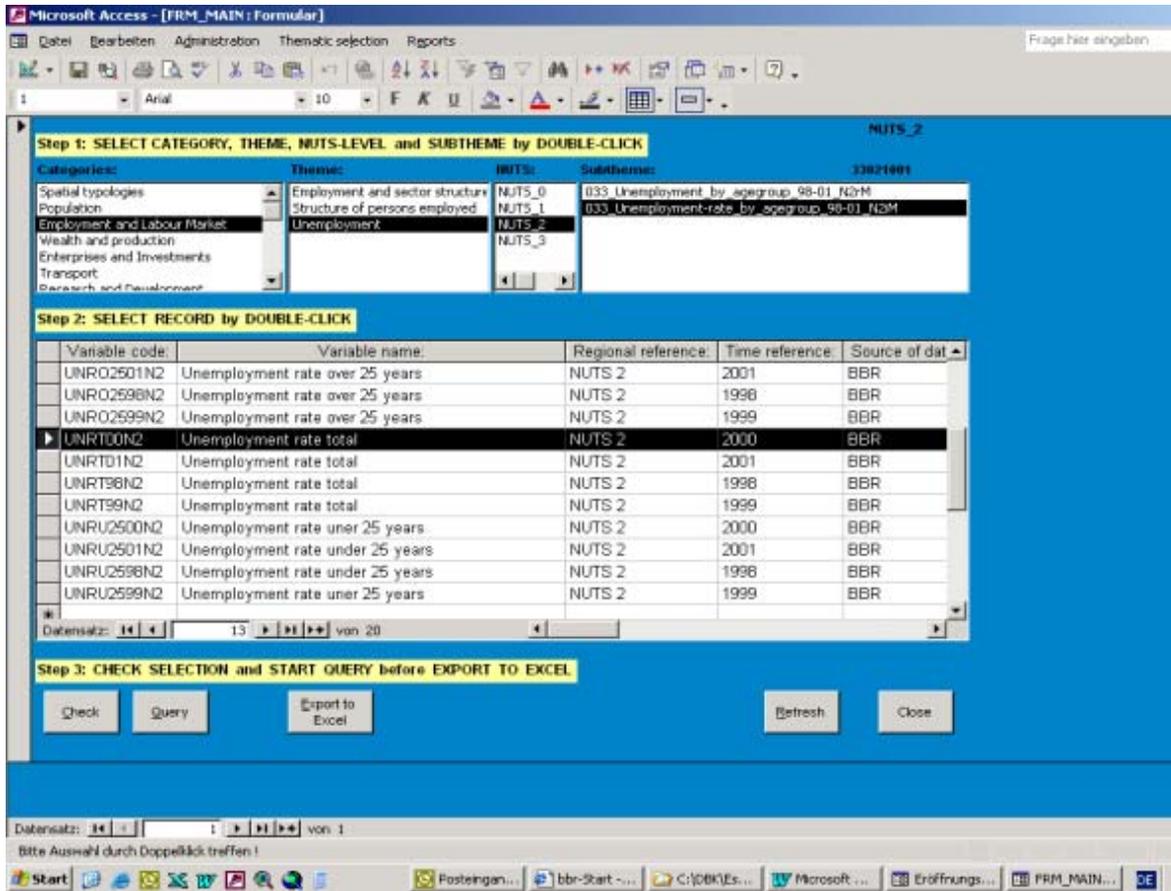
The ESPON database is divided into two areas. One of these is raw data (e.g. Eurostat data); the other is indicators (derived from original calculations by ESPON TPGs). This arrangement address some legal concerns while also making it possible to provide ESPON results in the form of regional indicators to interested persons outside the programme.

The selection of indicators is organised in a narrowing process, via the steps indicated below, leading to the appropriate meta-data file.

The first selection criterion is the main theme, e.g. population, employment and labour market. Further specification is done with the help of the sub-

theme, in the case of population e.g. population structure, structure of persons employed.

**Figure 5 Screenshot ESPON Data Base**



The next step is to choose the regional level by NUTS. After this the list of relevant tables appears fitting the selection. These are the associated meta-information tables.

In the central window the meta-information of the selected table now appears, giving all information included, like variable short name and description, NUTS level, Project responsible, contact and so on.

After the table of interest has been selected, all the indicators will be listed according to the regional and the time reference. The same indicator for a series of years will be listed for each year.

The choice of the indicator is done by double clicking on the appropriate variable. Up to a maximum of 25 variables or indicators can be selected out of a maximum of 3 tables.

After making this choice, the user has the opportunity to finalise the selection immediately, via 'run', or to verify the selected indicators first, via 'check'.

By returning to the indicator screen, an ACCESS table of the 'run' selected can be created, which can be exported into EXCEL.

## **6<sup>th</sup> chapter – GIS orientated instruments**

### **The ESPON Map KIT (by Volker Schmidt-Seiwert, BBR)**

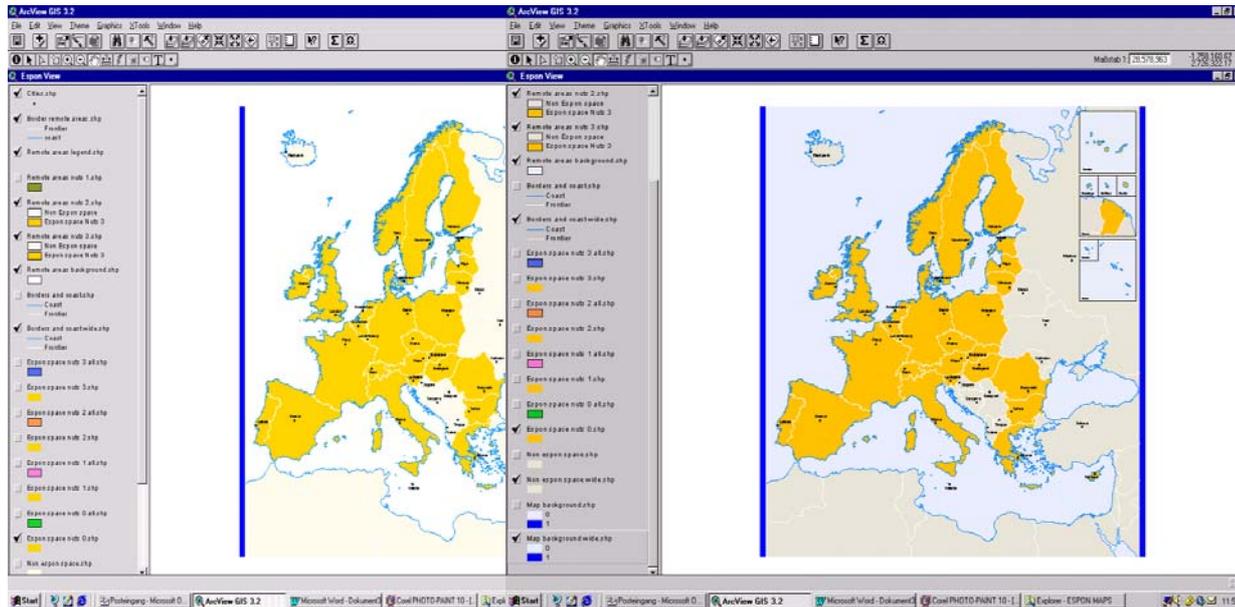
One of the tasks for the ESPON Project 3.1 was to develop new cartographic and spatial analysis tools that could be used by all other TPGs of the ESPON Programme, and at a later stage also by end-users. Therefore the project plays a very important role in the collection, unification, further development and elaboration of the results of all other TPGs, by incorporating these and using them to create easy to handle applications and tools for the scientific and policy communities.

Specific results from these tools have been provided in each of the ESPON 3.1 TPG interim reports (FIR, SIR and TIR). These were discussed during the ESPON seminars in order to gain feedback from the other scientists and policy-makers present. The completed work is of significant interest for further developments of common tools in the ESPON programme. Three main tools have been developed during the project's lifetime: the "ESPON Map Kit" (see chapter 6.1), the "ESPON Web based GIS" (chapter 6.2) and the "ESPON Hyperatlas" (chapter 6.3).

ESPON is not a single institution. Rather it consists of a network of research projects, each of which comprises a team of partners from different European countries. It was realised from the very beginning that ESPON needed some common base and means to steer the various TPGs so as to achieve coherence and identity in the ESPON results.

As ESPON is above all about spatial patterns and trends, it was clear that most of the results would be represented on maps, and therefore a common ESPON map layout, for use by all the separate TPGs, was essential. Project 3.1 designed a first draft map layout, which was discussed at the Mondorf ESPON Seminar. On the basis of the agreed map design, the ESPON map kit in the form of an ArcView3.2 project was developed. It gives coverage of all regional levels for the ESPON countries.

**Figure 6 Screenshot of ArcView version of the ESPON map design**



The cartographic elements and data provided (shape files) enable the construction of a map covering the EU 25+2+2 territory on different regional levels (NUTS 0, NUTS 1, NUTS 2, NUTS 3 and NUTS 2-3). For a complete cartographic presentation adjacent parts of the surrounding countries were added (the “non ESPON space”), including the map background, borders and coasts. The Remote Areas and islands are included as insets.

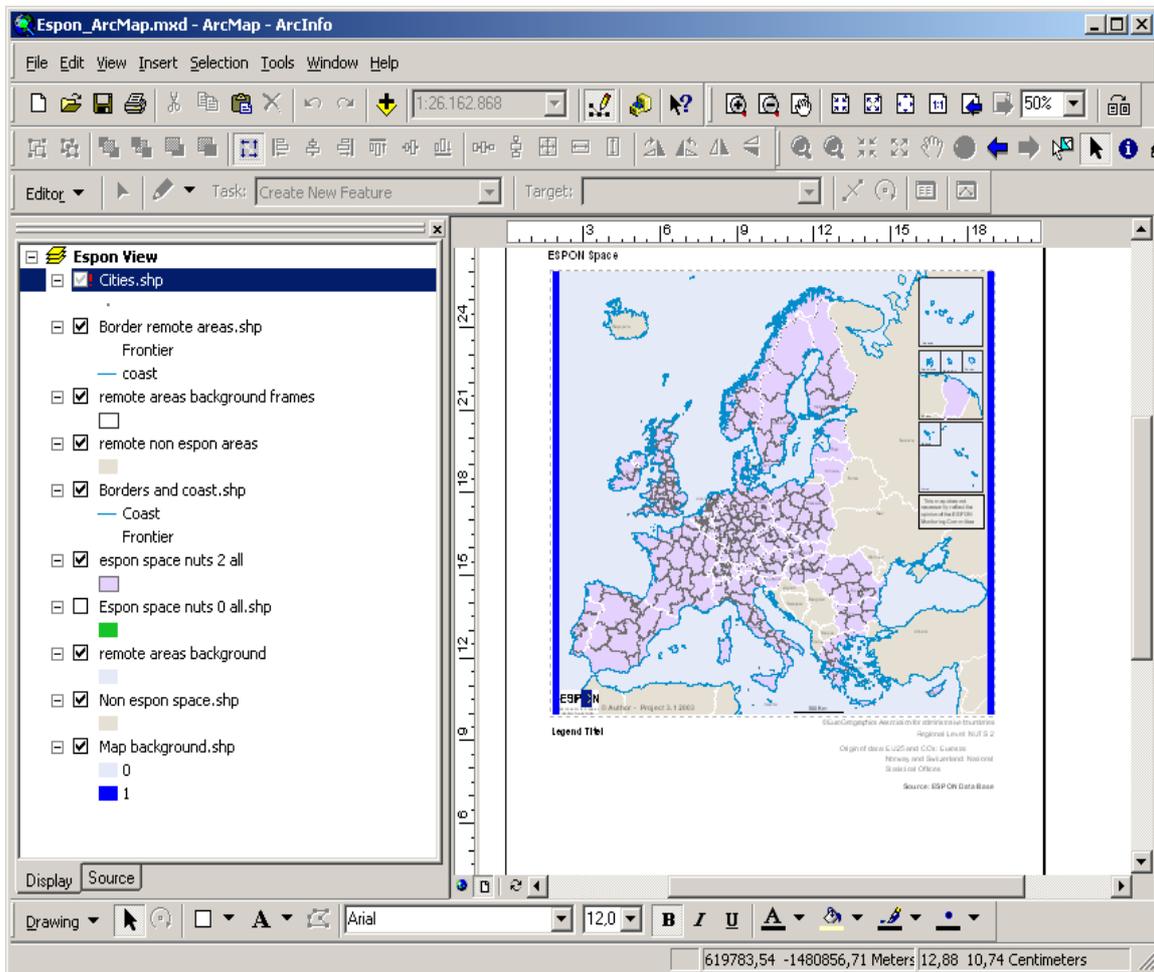
Thus, the ESPON TPGs’ obtained a unique tool to produce regionally based thematic maps. Intensive technical help and support by project 3.1 was given to assist the diffusion of the idea of a common map design among the projects. The standard ESPON map began to be used in the cartographic representations in the Second Interim Reports of the first round TPGs, and increased use followed thereafter.

In addition to the geographical data of the ESPON regions (NUTS 1 to NUTS 3) each TPG obtains a data set with vector data for the municipalities of the ESPON countries. This allows all regional and sub-regional territorial levels to be mapped and used for analytical purposes.

Technical progress continues to be made on GIS, and so the ESPON GIS has not come to an end. The ESPON map kit has been designed and distributed on the base of ESRI ArcView 3.2. To enable all TPG’s who might be interested in a transfer to the newer ESRI ArcMap, the project 3.1 will provide each interested TPG with the appropriate means for successful transition.

It is important to stress that this is not a change in the overall ESPON map world. Rather it is an alternative independent GIS approach. The advantage of the use of ArcGis is that it enables easier integration of the ESPON design elements into the layout, including scale and other cartographic standards.

**Figure 7 Screenshot of ArcMap version layout view of the ESPON map design**



The ESPON mapping kit provided by 3.1 has been revised according to the TPGs' suggestions for corrections and improvements. Considerable progress has been achieved. Use of the ESPON map kit by several TPGs provided examples for other TPGs'. The easy and ready to include ArcMap version in particular has helped some TPGs' to overcome cartographic challenges and even anxieties about entering the cartographic world.

It worked, as the final reports show, despite some required legal notes and disclaimers being missing, and some distorted maps!

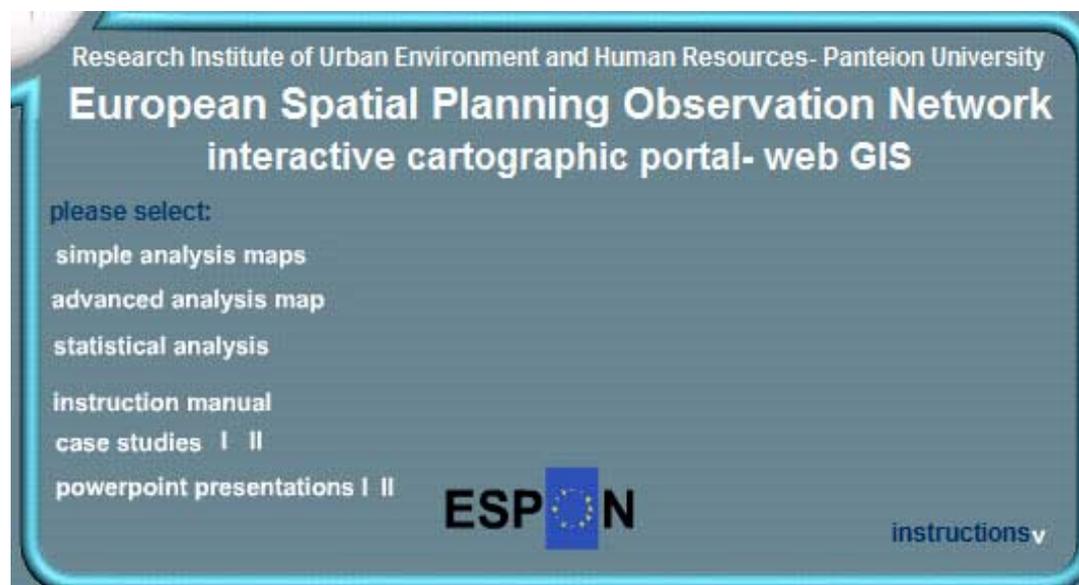
## **The ESPON WEB based GIS - interactive cartographical portal-web GIS** (by Panagiotis Getimis and Dionissios Kalivas, UEHR)

The "ESPO Web based GIS" or "ESPO Web GIS" is a tool that has been developed, as the title implies, for use via the internet. It is simultaneously a geographical database, a tool for spatial analysis and for harmonised cartographic presentations and dissemination of results. Maps (enhanced with spatial analysis tools), tabular data, metadata and monovariate statistical analysis are at the disposal of the user to explore the contents of the ESPON Data Base. The web based GIS uses the results (statistical data, spatial indicators) which are included in the ESPON Data Base. The data is organised following the "ESPO Programme Guidelines for the ESPON Data Navigator" in categories and subcategories.

The web site contains three main parts:

- Simple Analysis Maps
- Advanced Analysis Maps
- Statistical Analysis

**Figure 8 Web based GIS portal**



Source: (<http://www.uehr.panteion.gr/espon/>)

-

### **- SIMPLE ANALYSIS MAPS**

These include predefined maps, each giving to the users the following capabilities: Query and Spatial Selection, Buffer, Toggle and Zooming tools.

### **- ADVANCED ANALYSIS MAP**

To begin to work properly with the Advanced Analysis Map, a java plug-in is needed. This can be downloaded from the internet.

This part of the WEB GIS offers users the possibility to create active maps, corresponding to a Data Navigator category/subcategory, from the geodatabase that has been developed; to alter the geographical layer properties - changing the symbols and the labels for the selected attribute; to classify a layer-data table, and to utilise Advanced Query. There are built-in Statistics.

The user has the opportunity to Add Layers (which allows him/her to select and add data from the ESPON geodatabase). Users need to open the "ArcSDE – Add ArcSDE Connection" in the Catalogue window and complete the fields that are required.

In the geodatabase Connection section the user can, by activating the selected layer, view an analytical description of the capacities that the Layer Properties part provides.

The query builder tool (Advanced Query) allows the searching of records (e.g. polygons, points) of a selected layer, based on their attribute values. The user can search by numeric or string value. The user also can calculate statistics for a layer's numeric fields. Moreover, at the end of the Map site the user has a view of the metadata with some information about all the data contained in the database.

### **- STATISTICAL ANALYSIS**

This part of the application allows the user to search the database for statistical\indicator data. The results depend on the parameters that the user defines. After making a data compilation, the user can see the selected data as a chart, the corresponding metadata and some basic statistical information (Min, Max, Average, Coefficient Variation and Standard Deviation).

## Web based GIS technical outline

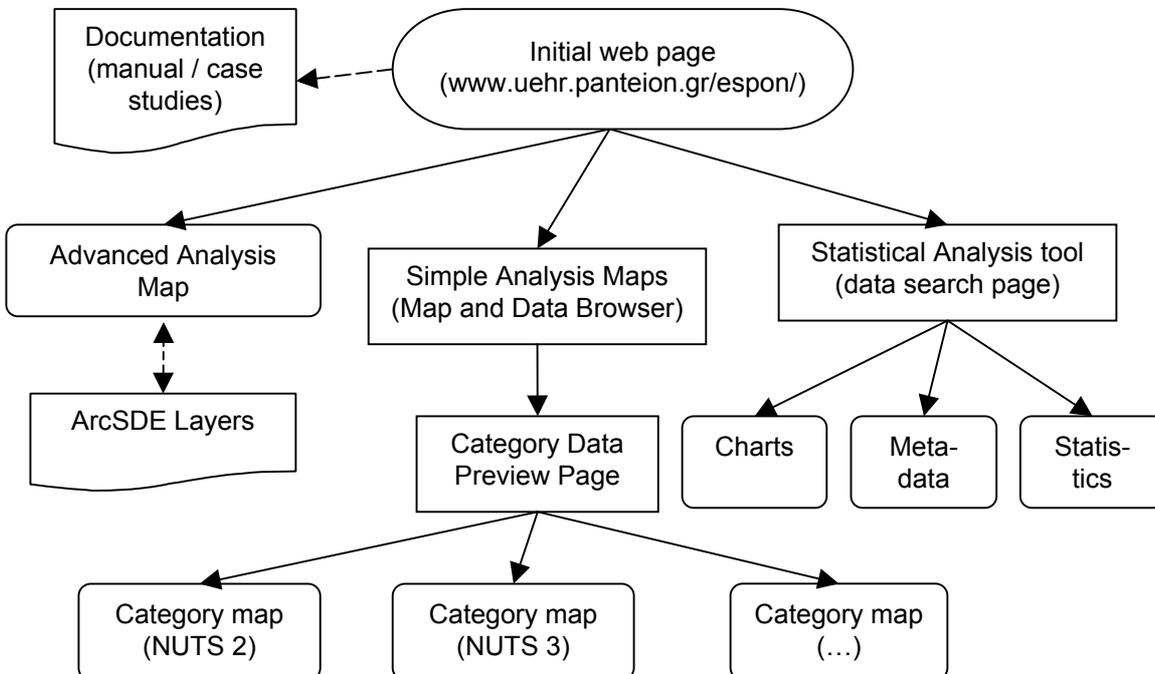
Due to the advanced demands of GIS capabilities and the range of needs within the ESPON programme, the WebGIS tool has combined many different platforms, elements and techniques into a common web interface.

## Web GIS Security

Since the data of the ESPON project are not intended for public access, security measures are necessary in order to restrict access only to the ESPON partners. Unfortunately, the variety of components used in order to offer maximum GIS and analysis capabilities does not allow the building of a single security platform, where the end-user could logon once in order to use all of the available functions. Thus, in order to secure all the data-providing areas of the site, each component has been locked separately. So:

All the pages produced from ArcIMS Advanced Analysis, ArcIMS Simple Analysis and Statistical Analysis tools have been unified in a common web interface. Thus all maps, tools and functions are accessible from a single web address ([www.uehr.panteion.gr/espon/](http://www.uehr.panteion.gr/espon/)), in other words a single web site. The structure of this site is show in the figure bellow:

**Figure 9 The Web based GIS final structure.**



**The ESPON HyperAtlas** (by Olivier Cuenot, Jérôme Gensel, Claude Grasland, Liliane Lizzi, Hervé Martin, Philippe Martin, Hélène Mathian, Saïd Oulahal, Jean-Marc Vincent, from the teams ID-Imag, LSR-Imag, UMR Géographie-Cités UMS-RIATE)

The ESPON Hyperatlas is a specific web application developed for ESPON 3.1 by a French research network called Hypercarte. It resulted from the "Hypercarte" project, which is financed by French public funds (CNRS, INRIA). The Hyperatlas covers a particular research question of Hypercarte.

The **Hyperatlas** proposes a package of modules for interactive cartography. The development focuses on a methodology that is easily understood and which allows the analysis and visualisation of a spatial phenomenon taking into account its multiple possible representations. Statistical observations of the territory are complex, and any one representation, directly linked to a specific objective, is the result of a combination of different choices relative to the territories and geographical scales, and the statistical indicators.

As there is a very big number of possible maps to describe a same phenomenon, HyperCarte proposes a computer environment for the conception, the analysis and the decision-making that integrates :

- ✓ a methodological expertise on the basis of spatial analysis methods that account for multiscale characteristics of the analysed processes,
- ✓ an optimal management of flows and numerical calculi,
- ✓ interfaces that are adapted to different profiles of users (researchers, decision makers, large public...), their needs and their knowledge.

Based on a client/server web architecture, the project is organised around the development of generic modules and their instantiations on specific thematics. Some illustrations of the first module's interfaces are presented here, implemented on a European database, constituted for the analysis of the economical, social and territorial cohesion of the European Union ( here the regional GDP per habitant).

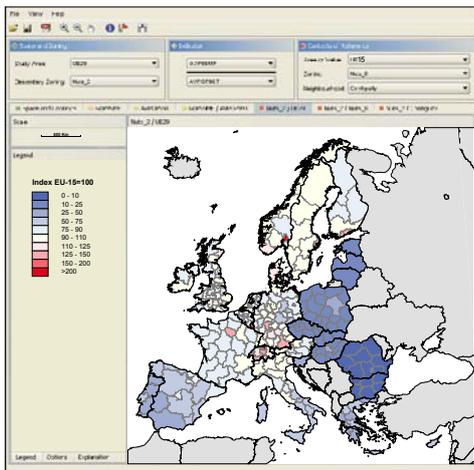
### **THE FIRST MODULE : MULTISCALE TERRITORIAL ANALYSIS (MTA)**

The module proposes a set of points of view for the description of one phenomenon. Each is associated to one of the different territorial zonings, that represent as much territorial and spatial contexts. The heterogeneity of the set of regions is viewed in terms of continuities and discontinuities according to three levels of reference.

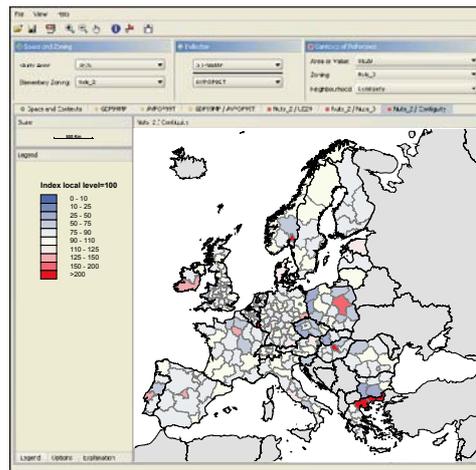
What is represented are the deviations between each region and one of the three following contexts :

- ✓ global (A), here the EU reduced to the 15th first countries
- ✓ intermediate (B), here the countries
- ✓ local (C), that are defined here with the contiguity relation.

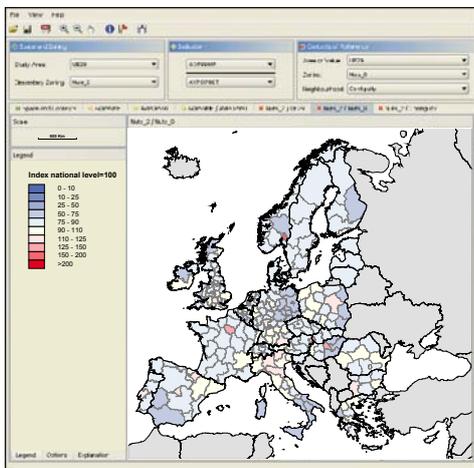
A map of synthesis (D) is also proposed in order to summarise the different relative position of the units according to each context.



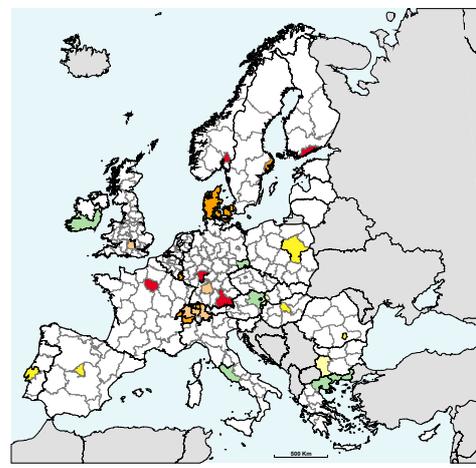
A- Disparities of wealth : global deviation



C- Disparities of wealth : local deviation



B- Disparities of wealth : medium deviation



D- Synthesis of relative positions of regions

## FUNCTIONAL ARCHITECTURE

The software uses three types of inputs :

- ✓ the description of the territorial units and their hierarchical organisation,
- ✓ the geometries of the elementary territorial units (geographical information),
- ✓ the attributes of the elementary units.

From this information, the software creates and visualises dynamic maps linked to several choices (area, zoning, attributes selected, level of zoom...). Generated maps may be stocked in a report (.html) as well as the calculated deviations.

## MANAGEMENT OF RELATIONS

A second module, Multiscalar Spatial Analysis (MSA) is at the present time in development.

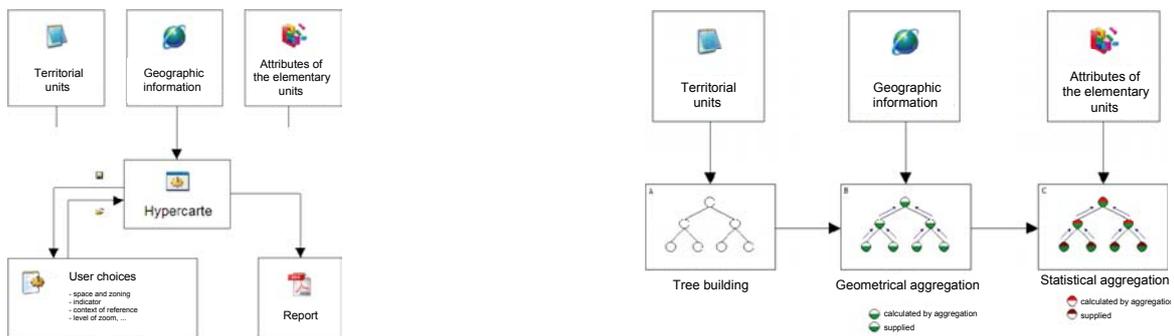
The distribution of social phenomena will be represented in a continuous space, free of any administrative delimitation. This is based on neighbourhood functions whose ranges will be user definable in order to propose several points of view.

## FROM TERRITORIAL ZONING TO SPATIAL PROXIMITY : CROSS VIEW

Hypercarte builds a tree [A] from a dictionary that describes the territorial units' hierarchy (UT).

The geographical information is an input in HyperCarte for the elementary units (UTE), that are the roots of the tree.

Then, the geographical information is built for the units of the upper level through geometrical aggregation [B]. In a same way, statistical description is known for elementary units and is built for the others through statistical aggregation [C].



## 7<sup>th</sup> chapter – Cross-sectoral analysis and breakdowns for territories

**Data for cross-sectoral analysis** (by Christian Muschwitz and Lutz Benson, TAURUS; Volker Schmidt-Seiwert and Ingo Heidbrink, BBR)

The data for the final analysis had to fulfil several requirements. First of all, it should have been available without gaps for the EU 27+2 on a level as up-to-date as possible (at least for the year 2000). Ideally the data should have been available for all regions for the same period and at the same point in time.

The ESPON database became the starting point for the analysis. In addition, the ESPON 3.1 project made extensive and time-consuming efforts to close the gaps and to generate a substantial area-wide data base for the EU 27+2. This included an analysis of all available sources, namely the core indicator list, ESPON database, ESPON map collection and all interim reports to identify indicators that might be appropriate to close the existing gaps. Some of the missing data has been obtained from Eurostat's Regio database and enquiries at several national statistical offices.

Depending on the particular indicators and based on plausibility considerations the following procedures were made use of:

- filling gaps by setting national mean, minimum or maximum
- approximation through NUTS 1 data or neighbouring regions data
- re-coding national data based on the allocation of related variables
- trend extrapolation of data available for previous time periods

One major outcome of this work is a unique database covering the whole EU 27+2 area. In itself this is already a very valuable output of the RCE-process.

**Table 1 Indicators used for RCE (examples)**

Theme and indicators	Description	Polarity
<b>Economy</b>		
GDP per capita	In PPS	+
Expenditure on R&D	Share of GDP	+
R&D Business Enterprise Sector	BES R&D personnel per 1.000 active person	+
GDP per capita growth	In Euro	+
Firms with own website	Proportion of all firms	+
Employment in tertiary sector	Share of total employment	+
Employment in primary sector	Share of total employment	-
<b>Demography</b>		
Population density	Number of persons per km <sup>2</sup>	+
Ageing	Share of population in the ages over 65 in percent	-
Reproduction potential	20-29 years in 2020 per 20-29 years in 2000	+
Population growth	Change 1995-2000 in %	+

**Regional Classification Analysis of Europe (RCE)** (by Christian Muschwitz and Lutz Benson, TAURUS)

For the **cross-sectoral analysis of Europe** the tool **RCE** (Regional Classification of Europe) has been developed.

The task of the Regional Classification of Europe (RCE) was to bring together sectoral strengths and weaknesses in a wider perspective and to evaluate the cross-sectoral situation of the EU 27+2 regions. The RCE enables researchers to identify which parts of Europe show high accumulations of strengths or weaknesses, and which parts show a more average level, with some sectoral strengths, but also some sectoral weaknesses.

The major aim of the ESPON programme is to provide an overview of the spatial situation in Europe, including the identification of trends and constraints, and to give evidence-based guidance to policy-makers. Such an ambitious aim is hard to achieve with a broad range of separate thematic projects, each working with a strong focus on its own field of research. Therefore there is a need for instruments or procedures to put the different parts of the thematic puzzle together in order to illustrate the total European spatial picture and to carry out a cross-sectoral analysis.

As noted in the tender, the SPESP study programme had already made a first attempt to conduct synthetic cross-sectoral analyses by combining selected indicators of different thematic projects. ESPON also needs such studies, improved and refined.

To meet this need ESPON 3.1 initiated a first attempt at a procedure that should lead eventually to an overall analysis of European spatial development. The starting point for the so-called Regional Classification of Europe is the recognition that the typologies and indicators developed by the TPGs define strong and weak regions with reference to their sectoral aspects. One major reference point for this analysis is the territorial structure, with particular focus on the ESPON core typologies for polycentrism (FAU classification), urban-rural relations and accessibility.

The cross-thematic SWOT analysis and the Regional Classification of Europe (RCE) were designed to bring out the findings for a cross-sectoral analysis and divisions for territories. Obviously the quality of such an analytical approach depends largely on the quality of the TPGs' input.

The approach was focused on a SWOT analysis that summarised the descriptive results of all TPGs, and that served as a pathfinder for the Regional Classification of Europe.

The main aims of this step were:

- a harmonised operationalisation of territorial concepts,
- identification of indicators,
- collection of data and integration into the ESPON database,
- statistical analysis of these data with reference to strengths, weaknesses, opportunities and threats of the development of European regions

Despite many attempts by ESPON 3.1 to explain the idea, and to guide the TPGs in order to enable them to fill out a questionnaire (which had been constructed by ESPON 3.1), the inputs of the TPGs often did not follow the default process and structure of the analytical steps.

At this stage it became evident that the original SWOT procedure had to be replaced by another analytical process. Thus a new approach was introduced by ESPON 3.1 to enable the completion at least of the Regional Classification of Europe as the ESPON core cross-sectoral analysis. This second approach aims at identifying indicators and applying simple quantitative methods, with the selection of indicators deliberately being done by ESPON 3.1 itself. The selection of indicators is based on the analysis of the available sources: core indicator list, core typologies, ESPON data base, ESPON map collection and interim reports. The outcomes of the attempted SWOT analyses were taken into account to identify indicators with a high thematic relevance, since the SWOT was an important source of sectoral information.

Following intensive internal discussion and taking into account data availability ESPON 3.1 chose (for analytical reasons) seven thematic fields of spatial development to be the core of further RCE analysis: economy, labour market, demography, environment, hazards, accessibility and spatial structure.

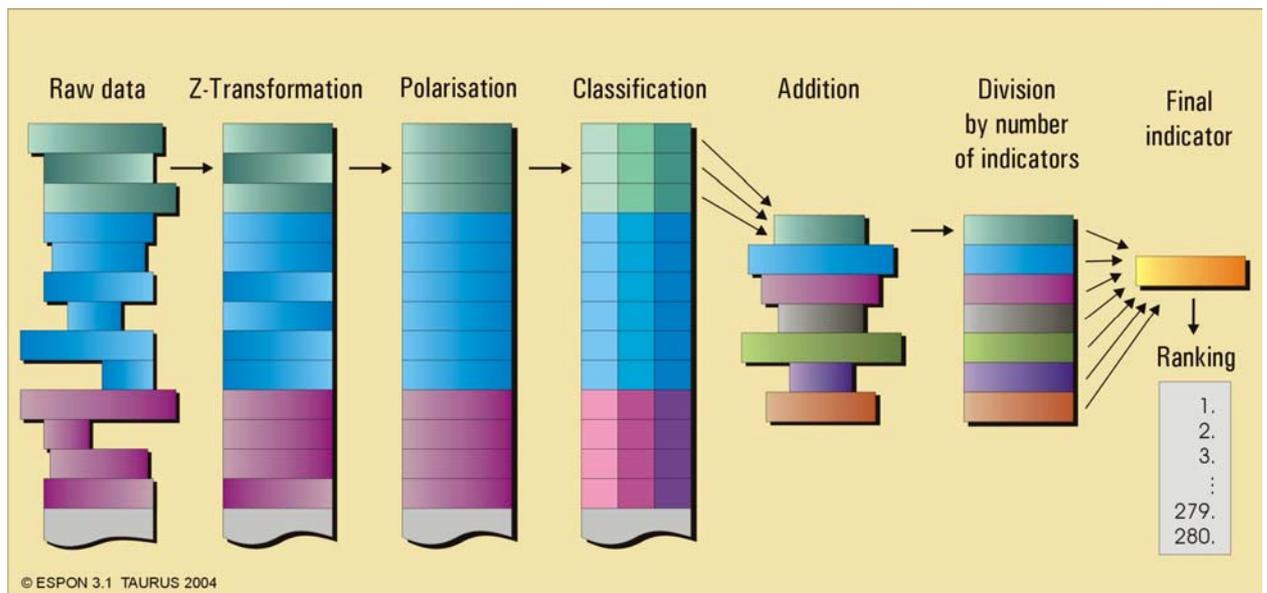
From these sources project 3.1 had a solid base for the ESPON ranking of European NUTS 2 regions, and was able to draw a broad picture of the spatial development in the EU 27+2. The aim was to back each of the seven fields with a broad spectrum of indicators characterising the status quo as well as the future perspective – an aim that ESPON 3.1 was able to achieve by and large.

It needs to be emphasised that there was a strong relationship between RCE and the ESDP core concepts. Two core concepts of the ESDP – accessibility and spatial structure (FUAs and polycentrism) – form a substantial component of the RCE. Sustainability, the third core concept, plays an

important role in the process of aggregation and weighting the indicators: this will be explained in due course.

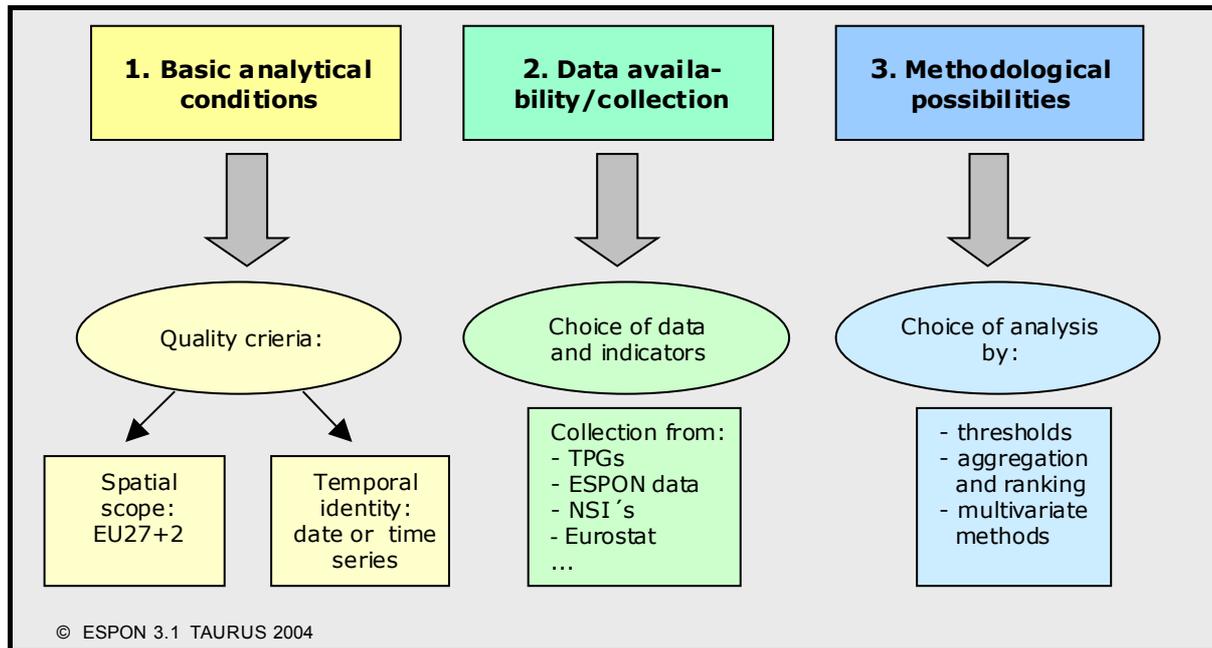
Some caveats have to be made. For example, due to the problems described above, the original grounding of the indicators (which should have been established in relevant TPGs) is missing. As a consequence some compromises had to be made in the analysis of the data, which had to be limited to some rather straight-forward statistical analyses.

**Figure 10 From raw data to ESPON ranking**



In essence, the approach adopted involved classifying the mean standardised individual indicators into three classes, and then aggregating them to seven thematic indices with equal weightings. These seven indices – again with equal weights – form the overall index, which is the basis for the final ESPON ranking. Figure 11 (above) shows the steps that lead from the raw data to the ESPON ranking. Figure 12 (below) summarises the whole methodological process.

**Figure 11 The way towards the ESPON RCE**



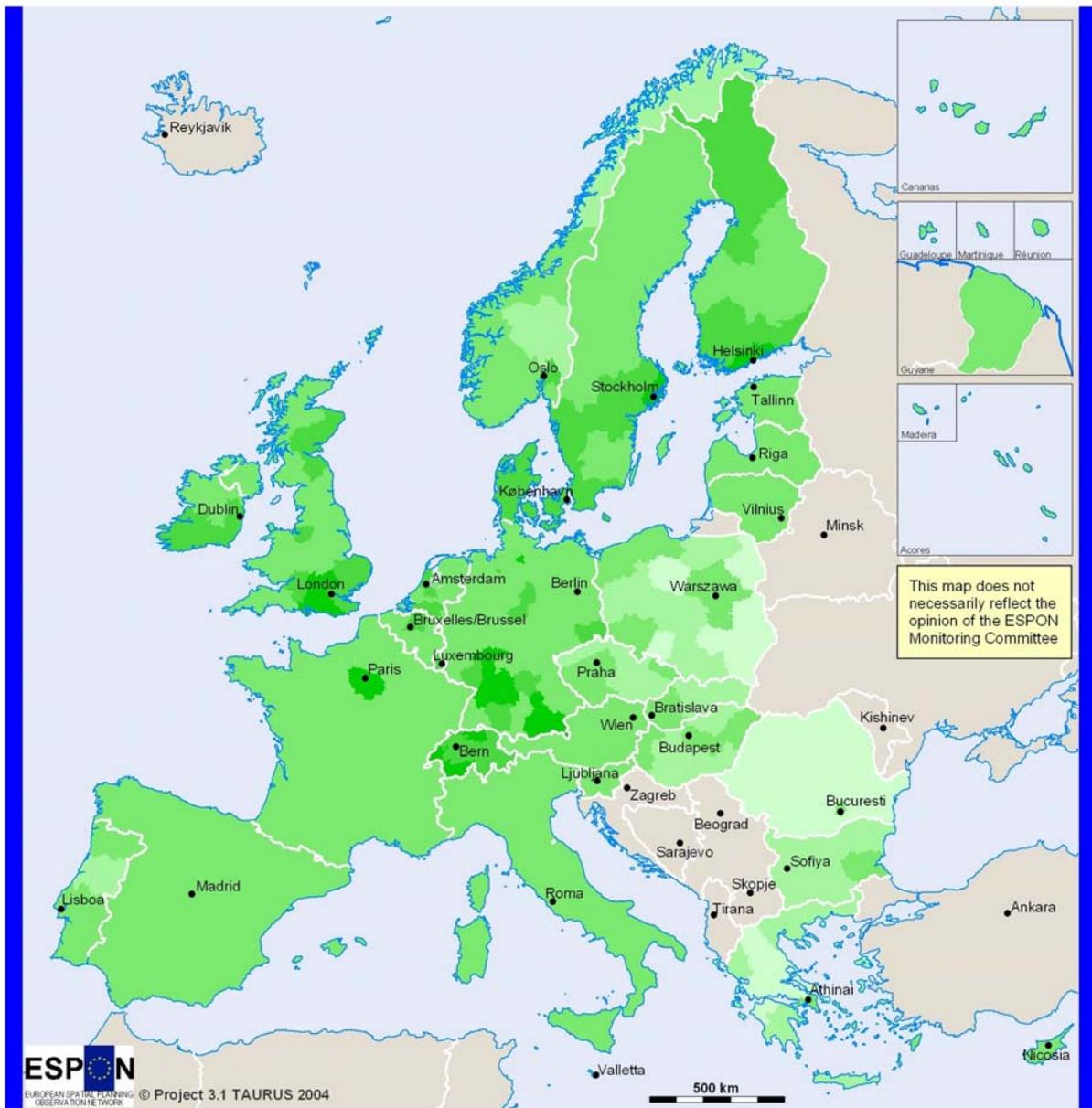
Seven thematic fields have been identified – economy, labour market, demography, environment, hazards, accessibility and spatial structure.

*Example 1 – Performance on economic indicators (the economic performance of the EU 27+2 regions).*

A set of seven indicators (GDP per capita, expenditure on R&D, R&D Business Enterprise Sector, GDP per capita growth, firms with their own website, employment in the tertiary sector, and employment in the primary sector) has been used. Map 1 identifies out-performers, the regions that are economically successful and wealthy, in contrast to under-performers.

# Map 1 Regional Classification of Europe - economy

## Regional classification of Europe - economy



**ESPON**  
 EUROPEAN SPATIAL PLANNING  
 OBSERVATION NETWORK © Project 3.1 TAURUS 2004

### Performance on economic indicators

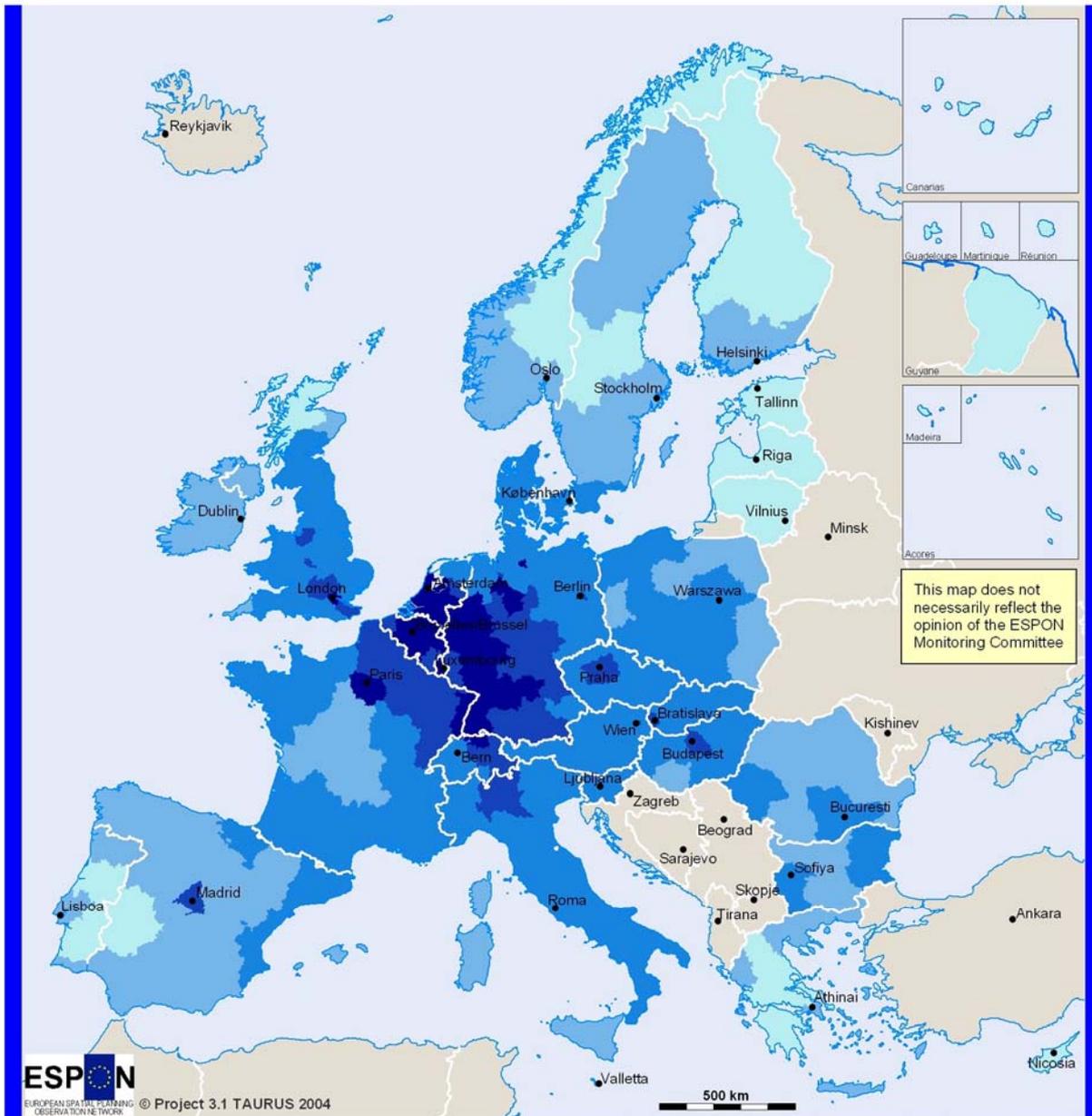
- underperforming
- below average
- average
- above average
- outperforming

© EuroGeographics Association for administrative boundaries  
 Regional Level: NUTS 2  
 Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
**Source: ESPON Data Base**

Example no 2 – Performance on accessibility indicators

**Map 2 Regional Classification of Europe – accessibility**

Regional classification of Europe - accessibility



**Performance on accessibility indicators**

- underperforming
- below average
- average
- above average
- outperforming

© EuroGeographics Association for administrative boundaries  
 Regional Level: NUTS 2  
 Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
**Source: ESPON Data Base**

The map is a visible representation of the regional characteristics of four accessibility indicators (By road, By rail, By air, and Multimodal). Out-performers are very accessible by air, rail and road in comparison with the under-performers,

After analysing performance on the different thematic fields (Economy, Labour Market, Demography, Environment, Hazards, Accessibility, Spatial Structure), the RCE brings together all the separate thematic results into one overall classification – a combination of all advantages and disadvantages through aggregation of information.

In a final step ESPON 3.1 developed a **ranking of the 280 European NUTS 2 regions** by simply replacing the numeral values of the RCE with ranks between 1 for the best performing and 280 for the worst performing region. The complete results of the ranking and additional information on the performance of the 280 NUTS 2 regions on the seven thematic indices have been provided in the annex without any further interpretation.

The RCE provides a very broad-brush approach to looking at different aspects of spatial development in an integrated manner. It is a transparent and extensive instrument that takes many dimensions of key ESDP concepts into account, as described earlier. It is much more valuable and sophisticated than a procedure based on a single indicator. To make such a comparison we used an adopted indicator for the measurement of regional welfare, the GDP (PPS) per inhabitant.

The RCE ranking seems to favour prosperous urbanised, but not so densely populated, areas in the centre of Europe, because they perform well on combinations of environment and/or accessibility and/or spatial structure, which represent intrinsic qualities of regions. Similarly, some agglomerations where the welfare measure is quite high come out worse when applying a wider focus like the RCE, since they have really serious problems in fields like environment, hazards or demography.

Some new spatial patterns like hazards or demography have been added for the first time, however, the broad spatial pattern, especially for the long-term high scoring regions, has not changed dramatically. Good and outperforming regions are located in the centre of Europe, except from some peripheral capital regions. This can be interpreted in different ways. On the one hand, it is exactly what might have been expected; on the other hand, it confirms the robustness of this method, because no real dramatic changes should occur at the upper end. Otherwise years of EU-spatial analysis would have been futile and wrong!

Nevertheless, compared with traditional spatial analyses the RCE produces a clear shift in favour of regions with good, but not excellent economic performance, compensated by excellent performance on other variables. Conversely, some agglomerations do not retain their traditional high rankings, because they have serious disadvantages in environmental or demographical aspects or may be threatened by various hazards.

What conclusion can be drawn for regional and spatial policy based on these main findings? EU regional policy obviously had positive effects on basic economic factors such as GDP and helped to initiate a catching-up process. However, the wider perspective reveals that hopes that this economic progress would automatically lead to substantial improvements in many other fields was too optimistic. For example demographic changes in certain regions will occur and these can outweigh improvements in GDP. Reliance only on economic parameters, especially in this field, is risky and can easily lead to a dangerous blindness, since a constant or even rising GDP per capita can co-exist with population decline.

There can be doubts whether a regional policy with a strong focus on economic factors - in analysis as well as instruments - and allowing only limited influence for other policies, really will be able to close these gaps. The consequence could be an incomplete identification of problem regions, and an inappropriate set of policy measures.

The ESPON 3.1 RCE findings could be a good base on which to build the argument for a widely focused spatial development policy, as a complement to traditional regional policy. Such a new policy should take a strong co-ordinating role and combine the sectoral policies, without losing the spatial goals, put forward by the ESDP, as a guideline.

## **National and transnational breakdown of ESPON results** (by Volker Schmidt-Seiwert and Ingo Heidbrink)

The indicators developed in the RCE, improving and complementing the TPG indicators of the ESPON database, can also be used to investigate further the spatial pattern and situation. A wide range of thematic typologies have been developed in the ESPON projects. Each typology is based on analysis of a particular topic and distinguishes between different groups of characteristics.

With the set of Core indicators, and especially with the selection of attributes within the RCE, it will be possible to investigate potential patterns of values of the typologies and to explore differences between them and groups created by values of the indicators of the RCE. This analysis will be done by using discriminant analysis, which identifies those indicators and variables (as independent or grouping variables) by which the given spatial scheme (as dependent variables) could be significantly differentiated. Differences between the groups can then be explained.

Furthermore, discriminant analysis has a second application. Of special interest and importance, discriminant analysis classifies regions whose group membership is not known, according to their characteristic values. This means that an existing regional classification will be examined according the indicator values, and regrouped if it is anomalous to the regional spectrum that they represent. Similarly, regions not already belonging to the group will be included if their indicator attribute fits.

As a first step this will be done in this phase for selected typologies like the Functional Urban Areas of project 1.1.1, the Urban-Rural Typology of 1.1.2 and the overall typology of telecommunication from project 1.2.2.

Furthermore differences between new and old member states of the European Union will be examined as well as border regions. Special attention will be given to transnational co-operation areas.

### ***Functional Urban Areas***

The Functional Urban Areas (FUA's) study has been used in this analysis related to polycentrism. For details please see chapter 7.3.2

### ***The new Member States***

What is the difference between the new Member States and the rest of the ESPON countries? The discriminant analysis reveals that the 10 new member states are significantly different from the EU15. The highest F-Ratios were GDP per capita (F-Ratio: 27.8), proportion of firms with own website (22.2), internet users (21.8), development of population (18.3) and the proportion

of the population over 65 years old (17.6). Next, with significant separation but slightly lower F-ratios, come the following indicators: changes in natural growth potential of the population; development of GDP; input-output ratio in agricultural production; R&D personnel and proportion of the population that is highly educated. In contrast, indicators like employment density, artificial and natural surface, youth unemployment or the risk of earthquakes show no significant difference from EU 15.

The telecom sector is important in explaining the differences between the new Member States and the other countries, underlining the need for improvement in this sector. The above average relative increase in the development of GDP in the new Member States, even allowing for the low starting base, might point to future improvement.

European comparisons have been prepared for each thematic field of the RCE. In addition fact sheets based on RCE-indicators have been prepared for each of the 29 ESPON countries (see chapter 7.2.2)

## **8<sup>th</sup> chapter – Dictionary of spatial analysis tools** (by Claude Grasland and Liliane Lizzi; UMR Géographie-Cités and UMS-RIATE)

One of the general objectives of TPG ESPON 3.1 has been the elaboration of new innovative cartographic and spatial analysis tools.

*A general methodology for the elaboration of spatial analysis tools* of common interest has therefore been developed (9.1) that can assist further development of common tools in the ESPON program. This general methodology has been fully applied in the case of a specific group of tools called *Multiscalar Territorial Analysis* (9.2) for which special computer software has been produced called ESPON Hyperatlas (cf. section 6.3). For a second group of tools called *Homogeneity and Discontinuity analysis* (9.3), the methodology has been fully validated from scientific and policy points of view, though it was not possible to complete the last step which would be the design of specific software. A third group of methodological problems has been revealed by previous analysis. This concerns the biases introduced by territorial divisions of NUTS 2 and NUTS 3 levels. This *Modifiable Area Unit Problem* was discussed at the ESPON meeting of Matera in the workshop on polycentrism, and it was suggested that there should be a more detailed exploration of the feasibility of a NUTS 2-3 division in the future of the ESPON Program. Therefore, we present preliminary findings on this question in order to provide guidelines for further research on the topic (9.4). Finally, we have explored innovative spatial analysis tools of borderless representation of spatial phenomena based on *Multiscalar*

*Smoothing Methods* (9.5) which are actually in the early stage of scientific and political validation in the framework of the ESPON programme. These methods could provide interesting solutions for the measurement and representation of polycentrism and for the elaboration of long time-series maps when territorial divisions are changing.

*General objective : bridging the gap between scientists and policymakers*

The aim of the research on spatial analysis tools developed by the ESPON 3.1 is to define coherent “packages” of indices and maps which could be easily computed and applied to a wide range of variables from the ESPON database. Those packages are not selected on a purely scientific basis (the most sophisticated and recent index of heterogeneity is derived from entropy), or purely on criteria of political acceptability or spatial planning tradition (like the Gini coefficient or the coefficient of variation, which are very poor measures of disparity). They are rather an attempt to transform into objective measures the rather fuzzy concepts in the ESDP. In the present report, we examine in more detail the contribution of spatial analysis tools to the clarification of four major problems of European policymakers working on spatial planning and regional development.

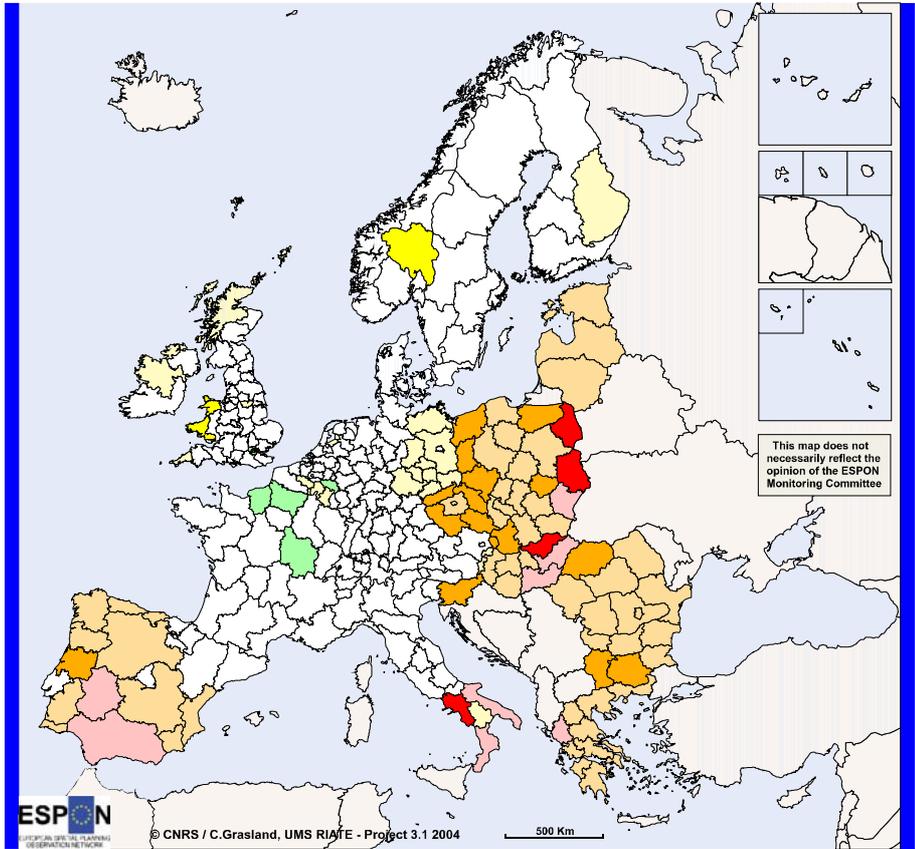
**Table 2 Political concepts and spatial analysis tools**

POLITICAL CONCEPT	SPATIAL ANALYSIS TOOL
<b><i>Subsidiarity &amp; Legitimacy of Regional Policy:</i></b> According to this principle <sup>4</sup> , the regional policy of EU should not duplicate the actions of member states and should avoid contradictions between levels of intervention.	<b><i>Multiscalar Territorial Analysis (MTA):</i></b> To compute the relative deviation of a region at European, national or local level helps to measure the potential contradiction between levels of action.
<b><i>Territorial Cohesion &amp; Integration of Sectoral Policies:</i></b> The originality of this new concept lies in taking into account the spatial dimension of the EU's sectoral policies.	<b><i>Homogeneity and Discontinuity Analysis (HAD):</i></b> Those tools are centrally concerned with the analysis and the measurement of spatial heterogeneity, which is not the case with classical econometric indices.
<b><i>Gerrymandering and manipulation of territorial divisions :</i></b> The allocation of structural funds is related to official NUTS divisions which can be manipulated by states in order to “maximise their benefit”.	<b><i>Modifiable Area Unit Problem (MAUP):</i></b> The effect of changing territorial divisions on statistical and cartographic results is well known. But the best division from a scientific point of view can be politically unwelcome (NUTS 2-3).
<b><i>Polycentrism &amp; Accessibility:</i></b> The connection of a territory to the rest of Europe or to the rest of the world should be organised around selected nodes or networks which can be defined at different scales.	<b><i>Multiscalar Smoothing Methods (MSM):</i></b> It is possible to derive multivariate maps of potential economic and demographic flows induced by the unequal distribution of population and wealth.

<sup>4</sup> “In areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community”.

Each of the four family of tools are illustrated by a map briefly commented.

**Map 3 Selected result from Multiscalar Territorial Analysis**



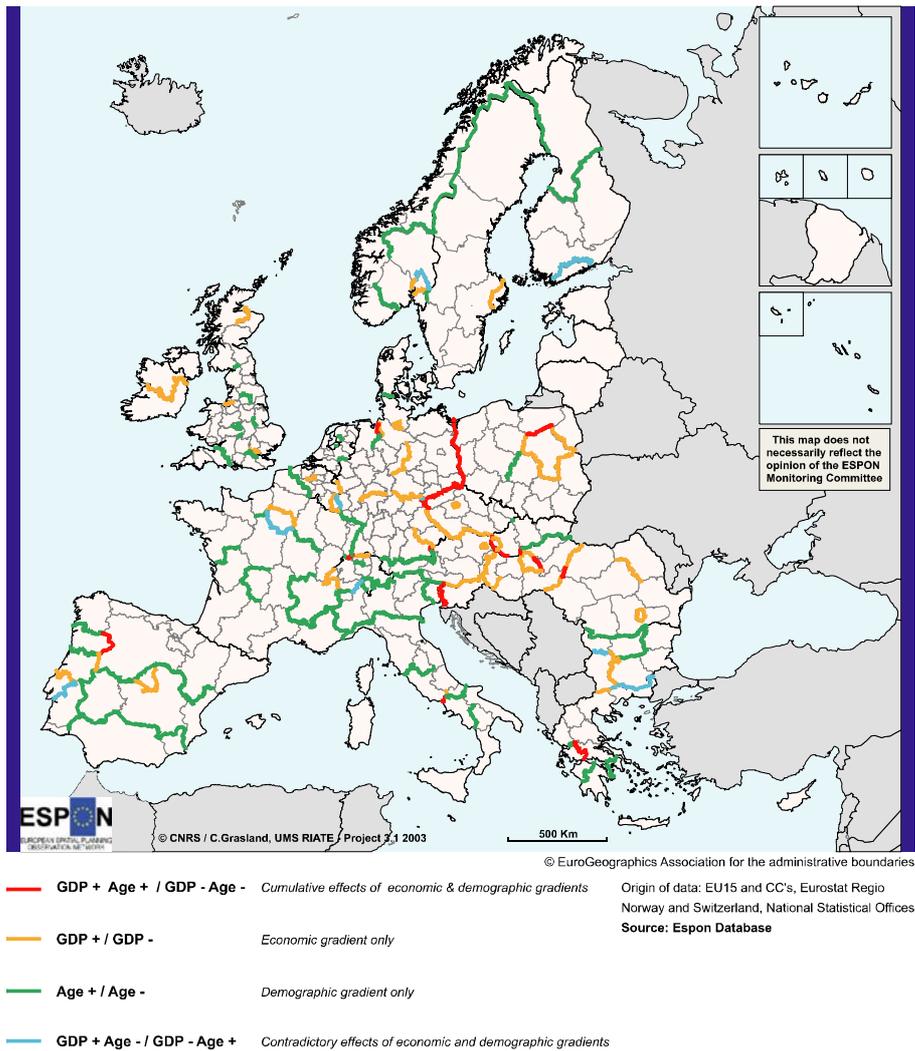
Under 75%

	European deviation	national deviation	local deviation
Lightest Green			X
Light Green		X	
Yellow		X	X
Light Orange	X		
Orange	X		X
Red-Orange	X	X	
Red	X	X	X

© EuroGeographics Association for the administrative boundaries  
 Origin of data : EU15 and CC's, Eurostat Regio  
 Norway and Switzerland: National  
 Statistical Offices  
**Source: Espon Database**

The map above proposes a synthesis of the situation of European most lagging regions according to the situation of GDP/inh. 1999 (in euros) at three levels of analysis. A region is considered as lagging, if its level of GDP/inh. is lower than 25% to the mean level of (a) European situation, (b) National situation, (c) Local situation (neighbouring regions). Only 4 regions appears to be "lagging for all criteria". Such a typology provides an interesting tool for the analysis of contradiction and complementarity between various levels (European Structural Funds, National planning policy, Local cooperation).

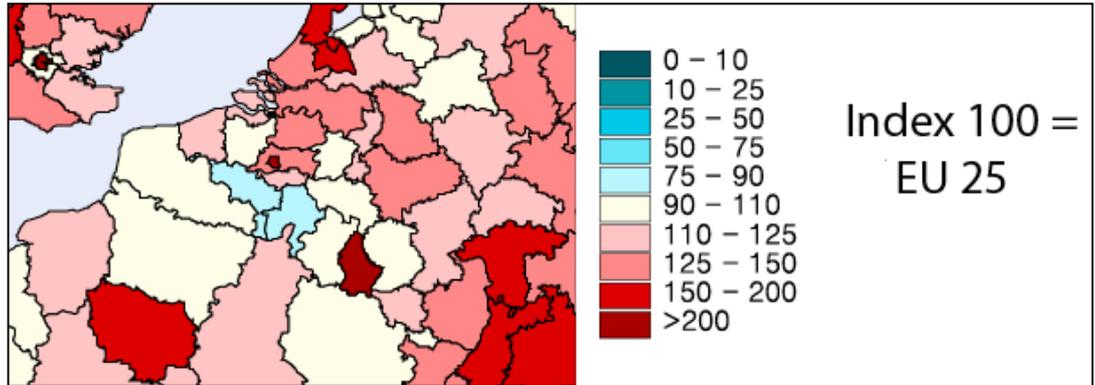
**Map 4 Selected result from Homogeneity and Discontinuity Analysis**



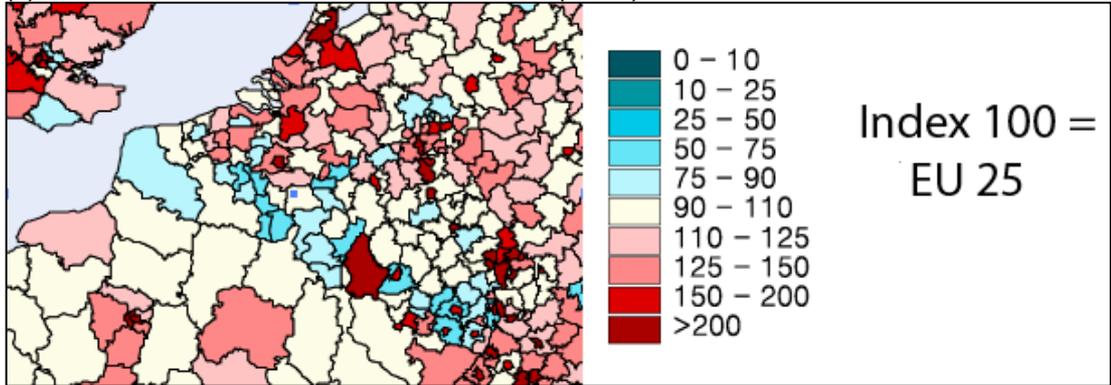
The map above illustrates how to combine several criteria for the analysis of cross-border situation. This example shows an approach to evaluate potential migrations induced by the joint of effect of economic differences (gradient of GDP/inh.) and demographic differences (gradient of median age of population). Sometimes, the factors can produce cumulative effects (a region with young population and low level of GDP/inh. is neighbour of a region with old population and high level of GDP/inh.) but sometimes they are contradictory or only one factor is active. This method should be generalised with more criteria, including accessibility factors (common language, permeability of borders, ...) and institutional rules (cooperation agreements).

**Map 5 Selected result from Modifiable Area Unit Problem**

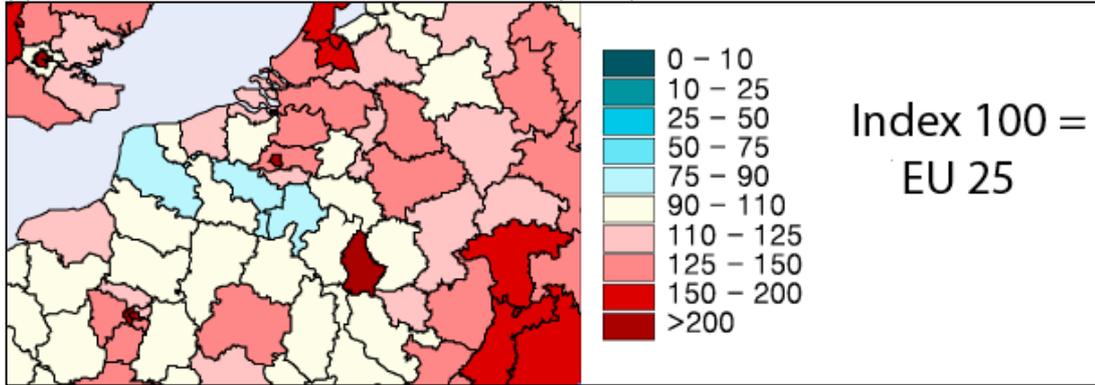
(a) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 2



(b) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 3

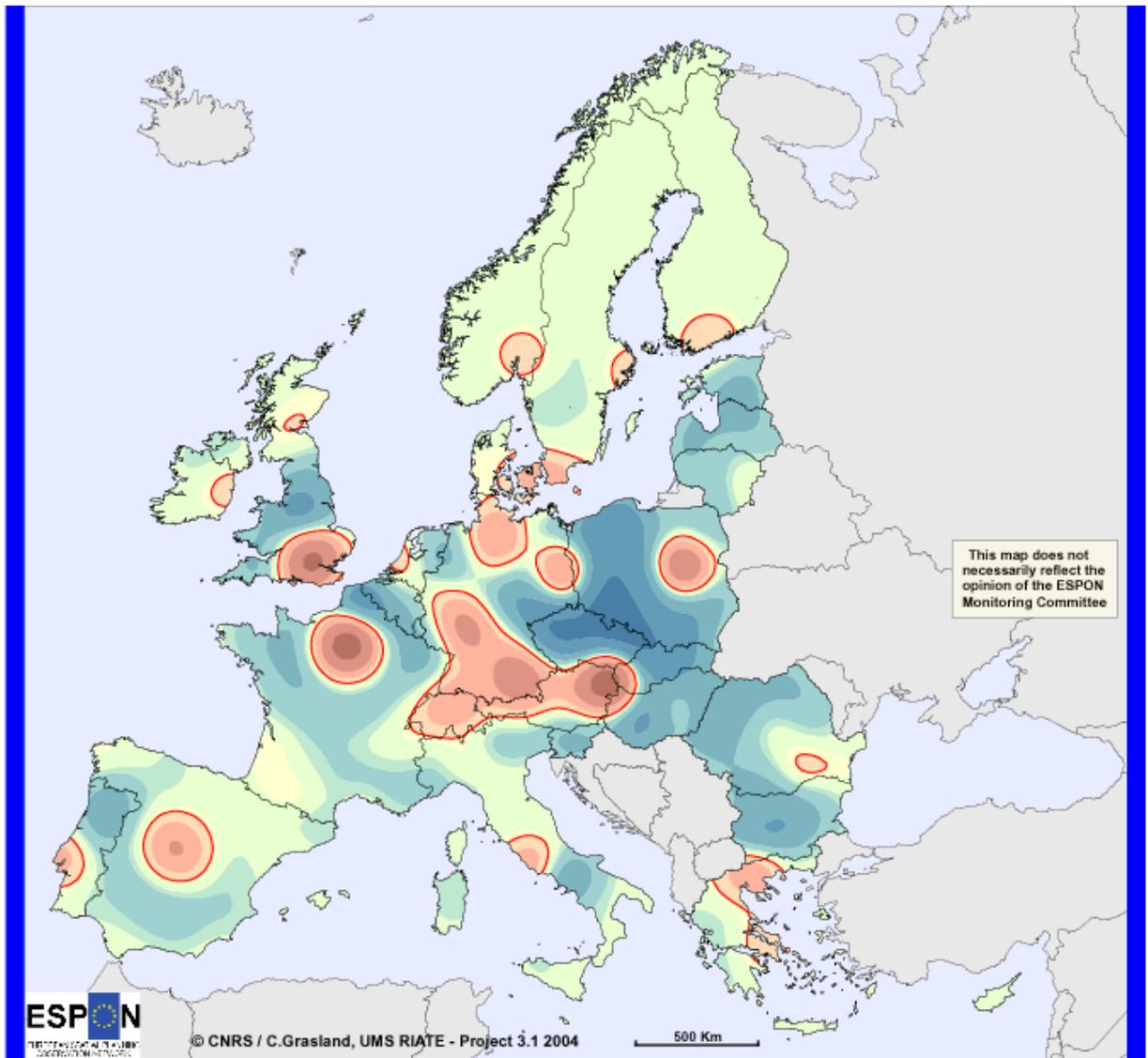


(c) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 2-3

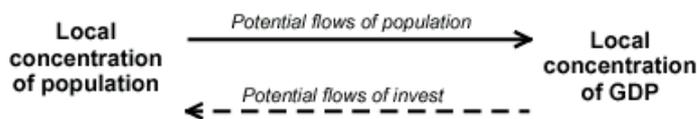


The maps above illustrate how the choice of territorial division can heavily influence the political decision on crucial topics like allocation of structural funds or the simple description of spatial structures. The regions located under a given threshold (ex. Index 75 of GDP/inh. 1999 in euros) are clearly not the same according to NUTS 2 or NUTS 3 levels, simply because added value is concentrated in urban areas where private companies and public administration declare their activity. From a scientific point of view, it is obvious that the territorial divisions should be as homogeneous as possible

in terms of mixture of urban and rural areas, which suppose a compromise between NUTS 2 and NUTS 3. The question is, if this is "politically correct"?

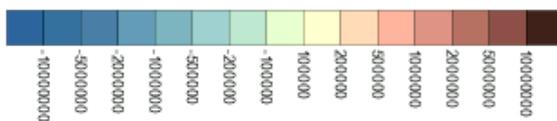


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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espon Database



**Map 6 Selected result from Multiscalar Smoothing Methods**

A new family of tools based on Gaussian smoothing methods could probably help to solve some of the difficulties which are related to the choice of NUTS division. This method introduces accessibility as a crucial parameter in the analysis of spatial distribution and propose to evaluate the potential flows which can be induced by unequal repartition of attributes in a given territory. The maps above presented shows the approach to evaluate the local flows (100-200 km) of labour force or invests which can be potentially induced by the unequal distribution of GDP/inh. in Europe. Alternative maps can be produced under more or less flexible assumptions on the effect of distance.

## **9<sup>th</sup> chapter – Elements of co-ordination and guidance**

### **Guidance Papers** (by Lars Porsche, BBR)

As mentioned in previous chapters, Project 3.1 has created added value for the ESPON programme by the delivery of products that support the programme on different levels, like the so-called guidance papers.

The first step to get good results was to create a basic common ground. The intention was to establish this common platform and to give the TPGs guidance with regard to their work and next reports. Also the intention was to secure integrated approaches and results for the whole ESPON programme.

Three guidance papers were developed and delivered since the start of the ESPON Programme 2006.

- Crete Guidance Paper
- Matera Guidance Paper
- Lillehammer Paper

The '**Crete guidance paper**'<sup>5</sup> was the first guidance paper developed and sent to the TPGs. The guidance paper together with the standard layout for ESPON maps and the "3-level-approach" has established a concerted approach and common platform of all TPGs.

In Crete all TPGs agreed that common elements were needed that could be used by different TPGs. These common elements were necessary

- to make things simple and efficient by facilitating the use of results from other TPGs; and
- to achieve coherent ESPON results.

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<sup>5</sup> Send out on 02.06.2003 by the 3.1 Project

The most important elements of the common platform are:

1. the ESPON data base (core indicators), including
2. a collection of ESPON maps (visualising the ESPON data base)
3. typologies of regions;
4. the analysis of trends and policy impacts related to different types of regions;
5. the operational definition and measurement of policy goals and concepts, as a base for
6. the assessment and evaluation of results (trends and policy impacts) with reference to these policy goals and concepts

For all ESPON Projects the '3-level-approach', which defines the levels for research and analysis, was and still is important. This approach was discussed and agreed during a TPG-lead partner meeting in Brussels, 26.02.2003, and then during the ESPON Seminar in Crete. The final agreement was for all on-going projects of that time as well as for all later projects to concentrate on the three-level-approach for the policy contexts:

- macro scale - European level
- meso scale - trans-national/ national level
- micro scale - regional/local level.

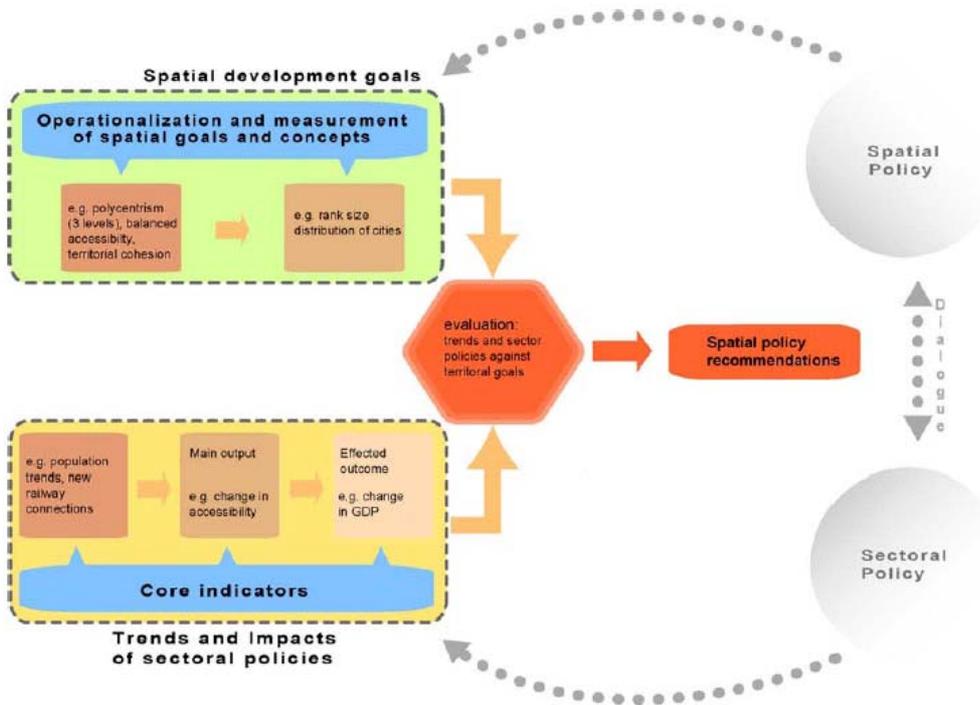
The '**Matera Guidance Paper**'<sup>6</sup> (MGP) started from the base provided by the 'Crete Guidance Paper'. The Matera paper mainly focused on the analysis of trends and policy impacts and the evaluation of trends and sector policies against territorial goals to reach spatial policy recommendations.

A central part of the paper, and of the "Matera Guidance Paper Figure", was the methodology used by the TPGs (cf the hexagon in the graph, see below and chapter 9.1). The main focus is on how to define operational models of policy goals and to confront statistical data about the real world with these models of spatial development goals.

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<sup>6</sup> the Matera Guidance Paper sent out on 20.02.2004

**Figure 12 Matra Guidance Paper Figure**



The guidance paper strengthened the common platform of the whole ESPON exercise. It has given all participants guidelines that helped them to work towards common programme results. The Matra Guidance Paper has been an especially important milestone for the work that went into the Final Reports.

In contrast to the two earlier guidance papers the '**Lillehammer Paper**' concentrated on orientations and a check-list for the writing of the final reports. The paper was based on important discussions which took place during the Lillehammer Seminar. These concerned a number of questions for orienting final results as well as policy recommendations. The influence of the Lillehammer paper on the structure of the reports can be seen by having a look at their lists of contents.

The '**Crete Guidance Paper**', '**Matra Guidance paper**' and the '**Lillehammer Paper**' strengthened cross-project links and created significant added value. The guidance papers made a very positive contribution. They assisted the first round projects on their way to successful project results and the final reports. The existing papers will also inform the work of later rounds of projects.

## **The European Meta-SWOT** (by Christian Muschwitz, Simone Reinhart, and Lutz Benson, TAURUS)

The major aim of the ESPON programme is to provide an overview of the actual spatial situation of Europe, including the identification of trends and constraints, and to give policy-relevant guidance. It is obvious that such an ambitious aim is hard to achieve with a broad range of thematic projects each working with a strong focus on their own field of research. Therefore an instrument or procedure is needed which fits the different parts of the thematic puzzle together in order to draw the pan-European spatial picture. This ambitious aim was addressed by a special procedure developed by ESPON project 3.1. An interactive approach was used in order to reach a synoptic perspective, by carrying out a cross-thematic SWOT Analysis<sup>7</sup>.

*SWOT analysis has been adapted to other fields and institutions. Prominent examples in the field of spatial and regional policy are SWOT analyses of structural funds programmes where the technique has been successfully used to summarise results of socio economic analysis and to build the link to the policy part. There have been global SWOT-analyses for whole regions as well as sectoral/thematic based SWOT analyses.*

*As highlighted by Karppi et al. (2001) and Bergs (2002) there are a number of qualitative criteria which a SWOT analysis should fulfill:*

- **consistency and coherence** in the sense that logical inconsistencies between S, W, O and T as well as with the underlying analysis should be avoided
- **balance** between SW and OT
- concentration on **factors that can be influenced**
- **measurability and operationality** of the factors
- clearing **interdependencies** when doing several thematic SWOT analyses
- The roots of SWOT-Analysis can be traced back to business management literature and business practice where it is widely used as an instrument for strategic planning. SWOT analysis basically consists of two elements, the first being an **internal**, more static analysis of the company's **strengths and weaknesses**. The second and more dynamic part of the analysis concentrates on the **external environment** of the company and **future opportunities and threats**. that might impact on the company's well being. In general a SWOT analysis prescribes (i) build on and stabilise strengths, (ii) eliminate weaknesses, (iii) exploit future opportunities and (iv) repel threats. Thus SWOT analysis is an instrument that stands at the interface of analysis on the one hand and strategic planning on the other hand.

<sup>7</sup> The SWOT description mainly relies on European Commission (1999), Bergs (2000), Schmid (2000) and Karppi et al. (2001).

The idea of project 3.1 was to base this SWOT analysis on descriptive results of all thematic TPGs, then as a second step the "Regional Classification of Europe (RCE)" would be done. The main aims were:

- a harmonised operationalisation of territorial concepts,
- the identification of indicators,
- collection of data and integration into the ESPON database,
- statistical analysis of these data with reference to strengths, weaknesses, opportunities and threats for the development of European regions and
- the evaluation of the overall goals of European spatial development.

Both instruments, the European Meta-SWOT and the RCE, were new and directly invented for the ESPON programme. This SWOT/RCE procedure should deliver a European cross -sectoral analysis. As a result of this analysis a picture of multi-dimensional spatial trends and impacts should be produced which was intended to be compared with existing EU spatial policies. The procedure required inputs from the TPGs on a very high and concrete level. The SWOT part was planned to underpin the next step, the RCE, so the whole exercise was a stepwise approach, moving from the broad spatial dimension (the whole of Europe) down to the regions (NUTS 2), while also expanding from a single theme to a multiple thematic view.

However, difficulties were encountered with the SWOT, and ESPON 3.1 was forced to search for a solution to carry out the RCE cross-sectoral analysis on its own.

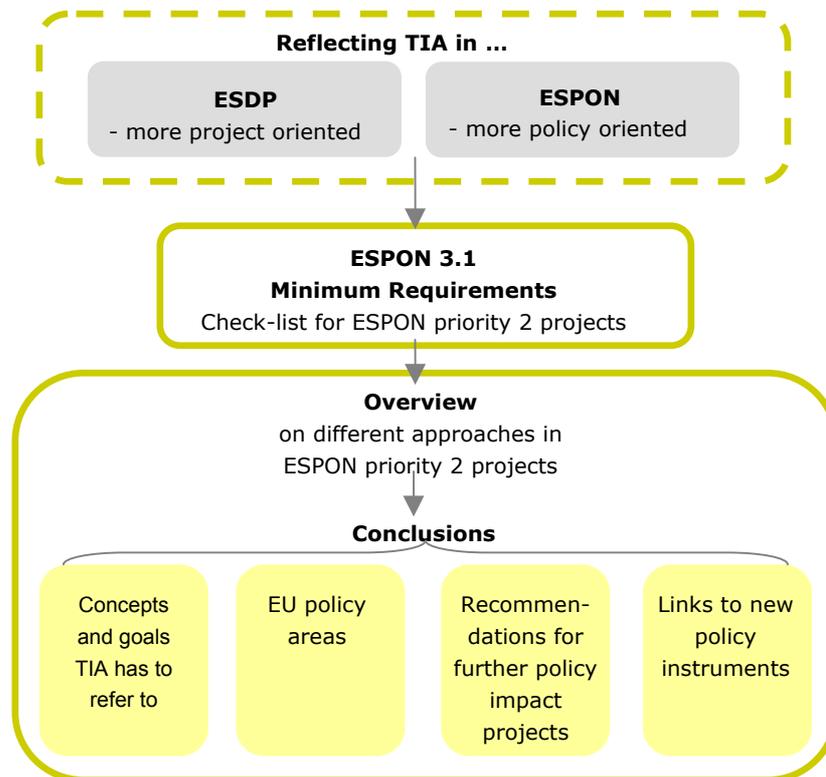
The modified procedure is described in the chapter 7.1 about the RCE and therefore is not repeated here.

Nevertheless the SWOT method, although new and never used in this broad context, can be considered an ambitious approach, which, when carried out with a good set of indicators, can produce good results. At least this is still the opinion of project 3.1.

## **Territorial Impact Analysis – TIA** (by Friedrich Schindegger and Gabriele Tatzberger, ÖIR)

This sub-chapter describes the application of a first approach towards a Territorial Impact Analysis. In the ESDP Territorial Impact Assessment was advocated for transnational projects and plans, and the method was regarded essentially as a tool for evaluating major projects. However, the ESPON programme sought to apply TIA to EU policies and programmes that while not having territorial development goals, nevertheless influence spatial development considerably. ESPON aimed to assess how and to what degree these policies and programmes are affecting territorial development. Because this is a rather dissimilar application, the term Territorial Impact Analysis is preferred here.

**Figure 13** ESPON 3.1 work steps concerning the TIA concept



### **The analysis is restricted to:**

- a compilation of the policy measures in certain regions (input side, e.g. financial interventions), recording what spatial development goals they follow and
- the structural status/changes in these regions (output side) evaluated against the chosen spatial development goals.

The ESPON 3.1 minimum requirements were elaborated as a check-list for the ESPON Priority Two projects. This revealed that very different approaches and methods had been used in these projects to analyse impacts of policies and programmes. This led to the conclusion that it hardly seems possible to cover the whole range of sectoral EU policy issues by one assessment methodology. The conditions for such a 'general model' are lacking for at least two reasons:

- the very different character of the spatial dimension and implications of the policy areas concerned (in particular their different affinity to spatial goals) and
- the rather different theoretical state of the art of applied research and planning in the different sectors

Finally four main conclusions were drawn from the ESPON experiences concerning TIA:

- Need for better definition of spatial development goals which any kind of TIA has to address – focusing on territorial cohesion and polycentric development
- Recommendations for monitoring and documentation of EU policy areas
- On the basis of the ESPON policy impact projects recommendations are made to the different EU policies for Transport and TEN policy, Research and Development, CAP and Rural Development Policy, and Regional Policy
- Finally, links to other new policy instruments like impact assessment or the open method of co-ordination are discussed.

Thus, the recommendations are primarily seeking to establish the conditions for elaborating TIA in the future on a more sound basis than is feasible now, by addressing:

- the particular orientation of the relevant EU policy programmes;
- the lack of territorial differentiation currently provided in data generated by policy implementation (due to the lack of the lack of a territorial dimension in the sectoral policies); and

- the fact that spatial development goals and concepts are still not operational in a way that allows them to be used to do impact assessments.

The future potential roles of Territorial Impact Analysis in the context of the new policy instruments '**Impact assessment**' and the '**Open method of co-ordination**'<sup>8</sup> are discussed.

The **Open Method of Co-ordination** (OMC) "is designed to help Member States to progressively develop their own policies by:

- fixing guidelines for the Union with specific timetables in the short, medium and long terms for achieving the goals which they set
- establishing, where appropriate, quantitative and qualitative indicators and benchmarks against the best in the world and tailored to the needs of different Member States and sectors as a means of comparing best practice
- translating these European guidelines into national and regional policies by setting specific targets and adopting measures, taking into account national and regional differences
- periodic monitoring, evaluation and peer review organised as a mutual learning processes. (par. 37, Lisbon European Council conclusions, 2000)."

As mentioned in earlier chapters, Project 3.1 has achieved added value for the ESPON programme by its delivery of products that support the programme on different levels, like the guidance papers.

## **10<sup>th</sup> chapter – From Integrated Tools towards a Policy Support System** (by Andreu Ulied, MCRIT)

This chapter presents the first version of the integration of ESPON's own and related information and knowledge tools into an ESPON Policy Support System (EPSS). The need for such a system was obvious from the beginning of the ESPON Programme 2006. The homepage of the ESPON Co-ordination Unit cannot fulfil such a requirement. In future a way should be found to combine or connect the Policy Support System and the CU web page.

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<sup>8</sup> CEC (2001) European Governance; White Paper, Brussels, 25-7-2001, COM(2001) 428 def. Luxembourg: Office for Official publications of the European Commission

Why is such a system needed? ESPON is a highly decentralised networking process, with many different networks of universities, research institutions, consultancies and independent experts working to provide sound scientific support to European policy makers for the construction of the European Union. The initial goal of ESPON 3.1 has been to deliver harmonised materials, maps and indicators to the Commission for consideration in the Third Cohesion Report. The consolidation of information and knowledge generated by ESPON in such a service-oriented approach is what is called a Policy Support System.

Technically the EPSS consists of four modules. These are: a user interface understood as an "Executive Information System" for top policy assessment and project appraisal; an information base to answer "What's up" questions and, together with the model base, "What if" questions (impacts of alternative policies into the policy indicators); a Forecast base to predict the behaviour of the system under different exogenous scenarios and alternative policy decisions; and an evaluation base integrated into the knowledge-base, where a directory with the main policy questions that the system must address can be included.

As a step in this direction an internet web page has been considered.

The need for and feasibility of a number of initiatives are worth considering:

- A portal website with links to other TPG webs with their own project material.
- In addition to policy indicators, TPG raw databases to be integrated into the system or become available somehow.
- Data storage and retrieval through the Internet and Internet mapping services.
- Availability after ESPON of computer models used by TPGs, and if so, for what type of analysis, and under what commercial conditions? Creation of a directory of models and modellers with the specific services they can provide.
- Interactive simulators available on the Internet focusing on key policy questions and scenarios, using the knowledge gathered.

In the current ESPON-PSS web-site visitors can find a variety of resources to support an improved understanding of the present situation of the EU and possible future scenarios of the Union: European policies, Spatial Policies, Data resources, Methods & Results, Research on ESDP, and Map resources containing a Map Catalogue for free downloading. It can be seen under:

[http://: www.mcrit.com/pss](http://www.mcrit.com/pss)

## **11<sup>th</sup> chapter –Exploratory and innovative research towards “Europe in the World” and “INTERREG III B”**

**Europe in the world** (by Patricia Cicille, Claude Grasland and Christian Grataloup, from the teams UMR Géographie-Cités, UMR Espace and UMS RIATE)

The ESPON Programme focuses mainly on the European territory, but Europe is not a self-contained system. It is important to have a look at external connections of the EU to get a complete picture of the status quo and possible future developments of the EU. Most studies developed in the framework of the ESPON Programme are based on databases limited to the EU and the candidate and neighbouring countries (EU27+CH+N) and do not take into account the relations between European territories and the rest of the world. However, many aspects of the internal differentiation of Europe are related to existing and potential flows between Europe and the rest of the world. This is especially true for the identification of gateway cities, polycentrism, spatial and social integration.

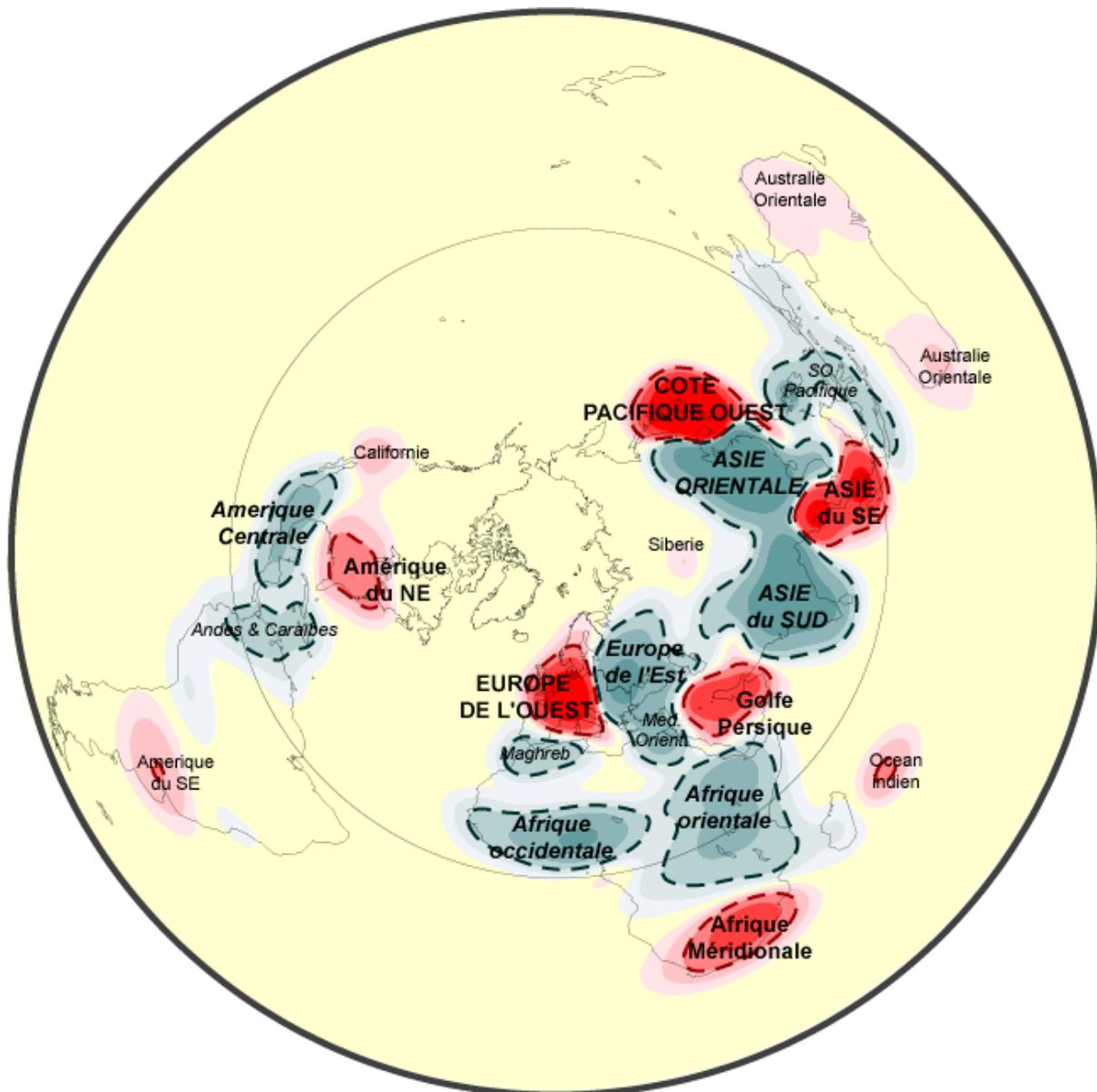
According to its terms of reference, the TPG ESPON 3.1 was not responsible for a complete study on “Europe in the world”. But it has established a small work package on this subject because part of its mission is to “fill the gaps” of the ESPON programme and to propose new directions for further research.

Three different strands were followed:

- first, the question of the representation of the world was addressed with its different connections: geographic projection, delimitation of “world regions”, joint analysis at different scales;
- second, smoothed representations of Europe in a world without boundaries have been provided, for different criteria (surface areas, density, GDP/inh. and CO<sup>2</sup> emissions);
- third, the functional influence of Europe has been drafted by two criteria, air flows and trade flows.

The work done in the 3.1 framework in the Working Package “Europe in the World” enhanced awareness and interest about this topic among the ESPON Community, and the MC decided to launch a specific ESPON project (TPG3.4.1) on this theme.

**Map 7 Preliminary definition of potential flows of labour force and invest at world scale in 2000**



Source : Grasland C., 2004, Draft version of a paper to be published in 2005

Comment: This map is a preliminary attempt to define potential flows of migration and investments at world scale, using the multiscale smoothing method discussed in the dictionary of tools of ESPON 3.1 and applied to European regions in part 9 of this report. This map presents in red (or green) the areas which are locally richer (or poorer) than their neighbourhood and has sufficient population or GDP to be subject to massive flows of migration (from green to red areas) or investments (from red to green areas).

**INTERREG III B** (by Kai Böhme, Nordregio, and Gregory Hamez, UMSRIATE)

At the beginning of ESPON 3.1, a specific work package was set up on "Networking with INTERREG III B". Then the new Interact programme was created with similar networking tasks, and the project 3.1 was asked not to go further in this direction.

The 3.1 work with INTERREG III B followed two strands: showing how the ESPON projects dealt with INTERREG (i.e. collecting from the TPG reports the different ways of treating INTERREG III B areas<sup>9</sup>); and using the results to propose new avenues of research.

A number of ESPON projects have addressed INTERREG co-operations. The territorial implications of INTERREG co-operation have been discussed in respect of three different aspects. A number of projects focused on the spatial dimension of programme foci, whereas others looked at spatial co-operation patterns and others on the effects in terms of learning.

At the transnational level, the building of a common identity and of trust is a good starting point for future developments towards greater polycentricity. The establishment of enduring co-operation patterns can actually then be regarded as the first step in the implementation of relational polycentricity.

Findings about INTERREG co-operation can be used to identify a number of possible foci for future ESPON activities in the field of INTERREG. The first is to support INTERREG projects in learning about and applying European spatial policy aims. At the same time, a systematic review of experience and results gained through INTERREG projects may also deepen some ESPON findings.

The question of flows represents another interesting track for further research in the INTERREG framework. Currently the INTERREG III B is organised on a morphologic basis, i.e. joining contiguous regions with similar characteristics. But recent research shows that flows are increasing between Europeans at a transnational level, so that the relational side should also be taken into account while thinking about the relevance of existing INTERREG III B zoning.

In the same way as INTERREG projects can benefit from utilising ESPON results, also ESPON may benefit from insights gathered in various INTERREG projects. This applies, in particular, to the questions of

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<sup>9</sup> see chapter 11.2 "INTERREG IIIB" for a map indicating the different areas

- main conclusions on issues such as morphology, transportation links, socio-economic functional specialisation or co-operation at cross-border or transnational level (possibly involving information on trends, i.e. time series, and flows).

## **12<sup>th</sup> chapter – Manuals and handbooks**

The chapter gives a short overview on the different manuals and handbooks that have been produced during the project's lifetime. These are mainly about technical developments like the "Web based GIS", the "ESPON Hyperatlas" and the interactive "ESPON Data Base".

## **13<sup>th</sup> chapter – ESPON Glossary**

The chapter is available as an electronic database, Access format, attached on a CD-ROM to this report<sup>10</sup>. The intention is to show the status quo regarding terms which are used inside the ESPON Programme and their different definitions by the TPGs. By giving some examples ongoing TPGs can make use of the existing definitions, which will facilitate their work. On the other hand, this chapter will stress the need for further work on common definitions. The diversity of thematic fields within ESPON means that there must be a process of moving towards common definitions.

## **14<sup>th</sup> chapter – Bibliography**

As mentioned above, for this chapter the report includes an electronic version of the bibliography used in the different ESPON Projects. The intention is to give both the interested reader and the ongoing ESPON projects an additional tool to facilitate their work.

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<sup>10</sup> If you are downloading this report, please contact the editor for an electronic version of the glossary or bibliography.

## **Annex – CD-ROM**

The CD-ROM attached to the paper version includes:

- Internet based Policy Support System (link)
- Web based GIS (link)  
(including manual)
- Hyperatlas  
(including manual)
- ESPON data base  
(including manual)
- ESPON Glossary
- ESPON Bibliography

## **1.2 Further research needed/ data gaps**

### **1.2.1 Further research needed**

#### **Goals and Concepts**

The next steps in the approach to goals and concepts would be:

- to extend the clarification by means of the "territorial grid" to other spatial concepts that are significant for ESPON (the set of concepts the project has explored is based on the ToR requirements, but other spatial concepts, notably some of those emphasised by TPGs, probably deserve similar exploration);
- to further refine and apply the classification of spatial concepts, notably to clarify the links between them;
- to translate the conceptual approach into appropriate indicators and typologies, with a focus on indicators which could give better account of interactions between territories (this aspect seems under-developed at present);
- to use the territorial approach to identify issues whose exploration would complement and enrich what has already been done in ESPON.

## **Regional Classification of Europe**

The RCE has been an important first step to utilise a unique database established for the regions of EU 27+2. But this database, and the RCE, offers many options for future research.

Interesting questions for further in-depth analysis could be:

- What kind of interrelations exist between the different topics? Are there complementarities, conflicts or even causal relations?
- A more differentiated analysis of the influence of settlement structure: i.e. what characterises rural areas that are performing excellently or poorly performing urban agglomerations? What other factors might be decisive?
- Evaluation by perspective (status quo, development, potential) exploring each of these three through a more tightly focussed analysis using the same or even more indicators. These should include time series and panel data to test more rigorously the efficiency of the spatial measures.
- Use of multivariate approaches, for example clustering regions on the basis of their performance in the thematic fields. This would help ESPON to understand how the different spatial themes are interrelated. Such an understanding could help to eliminate sectoral measures that produce contradictory outcomes, and might even help policy-makers to identify the optimal mix of sectoral policies and approaches.
- Other fields for further research involving in-depth analysis of the influence of the ESPON core typologies have already been mentioned under the methodological conclusions.

### **Additional:**

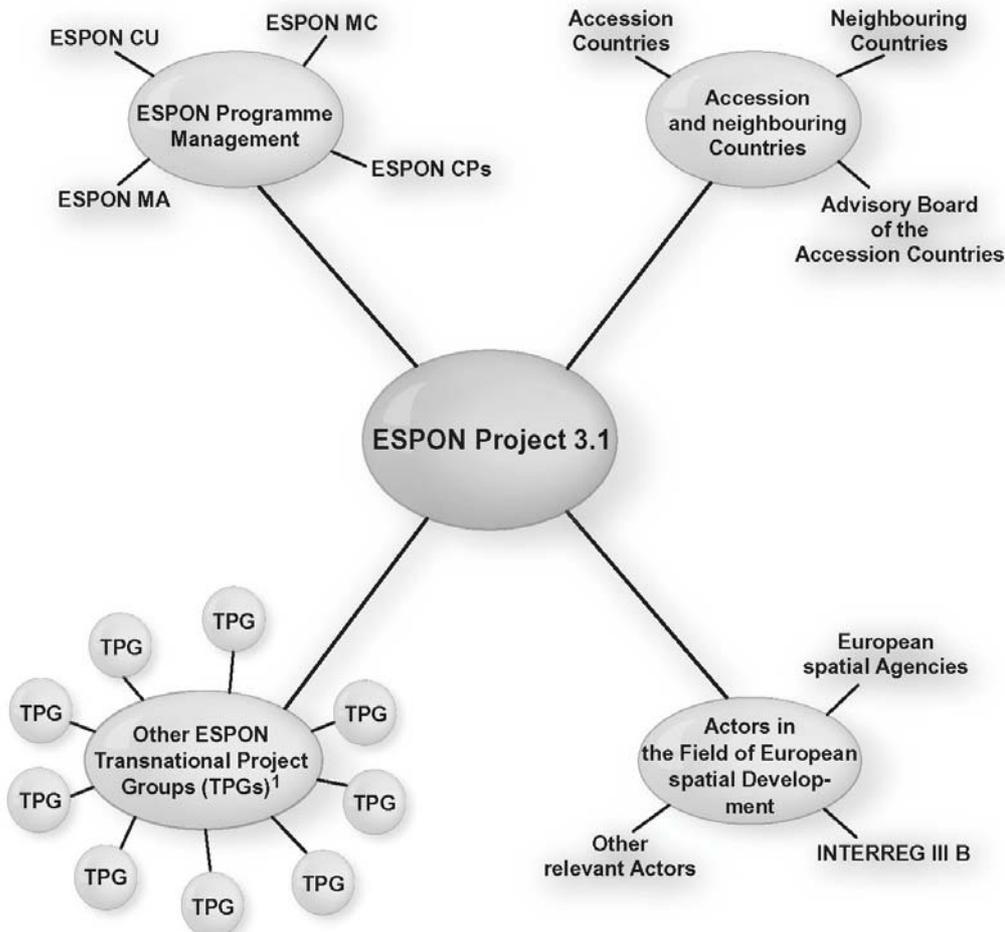
Networking between different TPGs has had beneficial results. The networking approach needs to be stressed and supported in future ESPON projects. Another important aspect which has to be re-emphasised is the need to use the ECPs if data or documents are required. One of the ECP roles is to help and support the TPGs.

### 1.3 Networking undertaken

The central aim of project 3.1 had been to strengthen the ESPON programme level and to support the ESPON Co-ordination Unit in its task to secure integrated approaches and results of the whole ESPON programme.

The first step to get good results is to create a foundation of common ground. For the ESPON Programme 2006 this meant establishing a common understanding about ESPON and shared "ESPON thinking". To do this it was necessary to establish good networking using effective tools. Meetings with different actors were organised and undertaken by the ESPON CU and the project 3.1 to bring all key persons together. The TPG 3.1 gave guidance to the other TPGs in various ways, e.g. through technical and analytical support or indirectly through the ESPON META SWOT, TIA or the different guidance papers (see Chapter 9).

**Figure 14 Networking activities of ESPON 3.1**



<sup>1</sup>total: 19 other TPGs

The philosophy or model of networking of the 3.1 project, considering all possible forms of communication, e.g. telecommunication or real face-to-face contact, was explained in the 1st IR and adjusted through the time. The networking activities of the project can be subdivided in four groups.

Networking with:

- the other ESPON Transnational Project Groups (TPGs)
- ESPON Programme management, i.e. ESPON Co-ordination Unit, ESPON Managing Authority, ESPON Monitoring Committee, ESPON Contact Points etc.
- European agencies and other actors in the field of European spatial development
- accession countries and neighbouring countries

### **Networking between the project 3.1 and the TPGs**

A lot of progress has been made in the field of networking in different ways via the ESPON Seminars, the 3.1 interim reports, the guidance papers or bilateral contact.

The networking between the TPGs and the project 3.1 developed through the life of the project. Since the beginning of 2003 all TPGs have been in contact with this co-ordinating, cross-thematic project. In particular the work on the ESPON META SWOT, the TIA, and the different 'Guidance Papers' supported the networking and communication.

If some TPGs began with doubts or suspicion about their relation with 3.1 these disappeared through good practice. Increasingly informal ways of communication have been used, which shows the good relationships that developed between the different actors. Most of the networking activities between 3.1 and other projects at the final stage of the first round projects related to data and GIS, layout questions and similar technical matters. This was the case until the end of the 1st round projects in September 2004. It has to be emphasised that some TPGs by networking also exchanged and improved their policy recommendations. The first round projects have now delivered final policy recommendations. All 2nd round projects' policy recommendations are still provisional and tentative.

In addition the networking has covered the full range of inquiries about practical aspects as well as theoretical aspects of the work. The participation of most of the 3.1 project partners in other TPGs has helped networking.

Nevertheless, networking has to be improved in the future and some ongoing TPGs should be more active. Networking is a mutual activity!

### **Networking between the project 3.1, the ESPON CU and the DG Regio**

The networking in particular with the ESPON CU and also with DG Regio was done in different co-ordinating meetings as well as through intensive and continuing contact via modern telecommunication media. The exchange has been crucial for the success of the ESPON Programme 2006 so far. It generated fruitful outcomes and facilitated the work of all parties.

### **Networking with the ESPON Contact Points**

The following team members are also ECPs:

- BBR                                ECP Germany
- TAURUS                            ECP Luxembourg
- UEHR                                ECP Greece
- UMS RIATE                        ECP France

Via these partners good and on-going networking, including exchange of information, has been guaranteed.

### **Networking with other actors in the field of European Spatial Development**

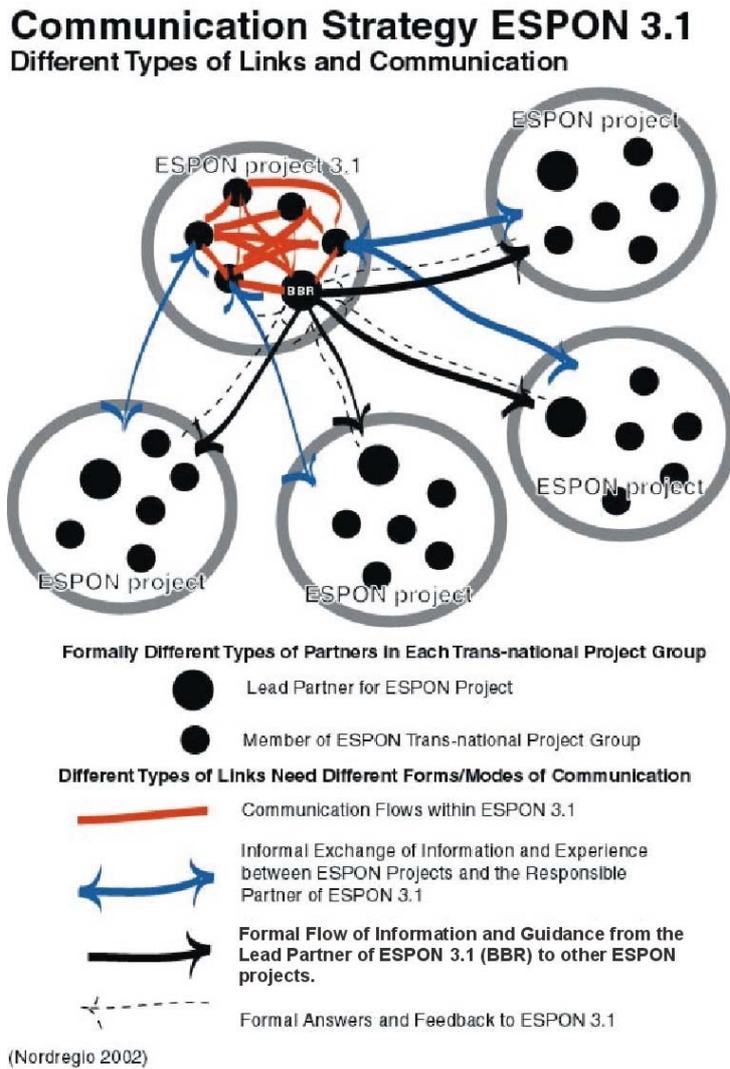
Networking with other related actors was not developed in a formal way during the project's lifetime. A lot of ESPON TPG participants are also working for other European programmes or initiatives. In this way an 'informal' and limited exchange has taken place. However, the intensive networking with the different INTERREG offices that was initially anticipated has not been started.

### **Networking within the 3.1 team**

Beside of the important external work of the project, internal co-operation and collaboration of the team has played an important role. The internal project networking has consisted of an internal network between the members of the 3.1 project.

Figure 17 shows that the partners inside project 3.1 have been responsible for informal exchange and information flows between 3.1 and the other TPGs.

**Figure 15 Communication strategy of ESPON 3.1**



## **1.4 Self-evaluation**

The EPON Project 3.1 started its work in July 2002 with seven other projects. At the beginning it was not only the TPGs that had to set themselves up, rather all the component parts of the ESPON programme were still feeling their way forward. The willingness of all participants – 3.1, other TPGs, ECPs etc. – to co-operate on a very informal and pragmatic basis has to be highlighted. A lot of unconventional solutions were found, enabling a good basis of mutual trust to be built up quickly.

As mentioned in chapter 3, the team fulfilled the contract. The co-operation with the CU was good and fruitful. At the beginning the cross-co-ordinating project was in a somewhat uneasy and uncertain relation with the other transnational project groups. This hindered the first steps towards the scientific work. The project was often seen as the “odd-job man” of the ESPON Co-ordination Unit and/or DG Regio. Such situations should be avoided in future cross-co-ordinating projects.

Sometimes higher level authorities made requests that were so demanding, restrictive and long lasting, that it was nearly impossible to urge the TPGs once more to comply with them on a voluntary basis.

Most of the other projects were expecting to be provided with developed methodologies and concepts or at least approaches when they began their work. Similarly, projects pressed project 3.1 from the beginning for data, indicators and typologies. Sometimes the 3.1 team was seen as the “free of charge supplier”. After a while this was clarified and mutual understanding developed. The team has done its best to fulfil the demands of the programme, but new projects must be clear that they themselves are the ones who have to produce the data, indicators, typologies etc.

At the beginning data problems made difficulties for everyone, not least the 3.1 team, but over the time and through co-operation with all TPGs a sound database has been established. Of course, there are data gaps. It would be surprising if there were no gaps. For instance, limitations of the ESPON data base, e.g. in terms of EUROSTAT updates, slow down research activities since analyses depend upon the availability of relevant data.

An important task for any other cross-co-ordinating projects, or perhaps for a special project, is to fill the gaps over the duration of the programme. Continuity of the ESPON database also has to be guaranteed.

The intense pressure on the Programme to come to first tentative results quickly so that they could be included in the 3rd Cohesion Report cost most of the project partners a lot of their budget resources. This left the partners

uncertain about the project schedule and their planned deployment of staff resources over the remaining period of a project.

### **Formal obstacles to overcome**

In the 3.1 project team a lot of unanticipated formal challenges cropped up. The team coped through mutual understanding, trust and joint efforts.

Crucially, the change in the arrangements for financial management of the ESPON Programme 2006 put project partners in very precarious situations. Delayed payments for work that had been done had serious impacts on their financial situation. This change also imposed additional resource costs on the partners because of the additional time involved in applying. Where such substantial changes are necessary consideration has to be given to their effects on projects and partners. Most of the projects shared these concerns.

In ESPON II the contracts should be different. A lot of requirements were demanding and it needed a lot of salesmanship to get the contracts signed.

### **Ideas for improvement**

The ECPs involved in ESPON Projects are asked to discuss problems and progress of their TPGs in the ECP forum. All in all, the ECP network could be better integrated and used. A clear division of responsibilities is needed. The ECPs should not act as a scientific board, rather they should try to help and support the TPGs.

An electronic newsletter communicating information within the ESPON network, and with scientific and political networks outside the "ESPON world" is needed. Such an e-letter would be especially valuable to disseminate reports of the ESPON Seminars including the seminar results.

ESPON Seminars are generally felt by the scientists to be an insufficient forum for a scientific exchange. Therefore additional meetings or fairs could help to foster more in-depth scientific discussions. The content of ESPON meetings tends to be very broad and can start with special topics like polycentrism and accessibility or give information about the strands of the programme.

## 1.5 Abbreviations used by the project team

**Table 3 Abbreviations**

<b>Abbreviation</b>	<b>Term</b>
AC	Accession Country
CAP	Common Agricultural Policy
CDCR	Committee for Development and Conversion of Regions
CIP	Community Initiative Programme
CSD	Committee for Spatial Development
CU	Co-ordination Unit
DPSIR	Driving force, Pressure, State Impact Response
ECP	ESPON Contact Point
EEA	European Environmental Agency
E-ESDI	Environment – European Spatial Data Infrastructure now called INSPIRE
ERDF	European Regional Development Fund
ESDP	European Spatial Development Perspective
ESPON	European Spatial Planning Observation Network
FUA	Functional Urban Area
GMES	Global Monitoring of Environment and Security
ICT	Information and Communication Technology
IR	Interim Report
LP	Lead Partner
MA	Management Authority
MC	Monitoring Committee
MTR	Mid-Term Review
NC	Neighbouring Country
NFP	National Focal Point (former ECPs)
PA	Paying Authority
RCE	Regional Classification of Europe

<b>Abbreviation</b>	<b>Term</b>
CADSES	Central European, Adriatic, Danubian and South-East Space
CIP	Community Initiative Programme
CSF	Community support Framework
FR	Final Report
GDP	Growth Domestic Product
GIZ	Global Integration Zone
HDA	Homogeneity and Discontinuity Analysis
MAUP	Modifiable Area Unit Problem
MEGA	Metropolitan European Growth Area
MSM	Multiscalar Smoothing Method
MTA	Multiscalar Territorial Analysis
MUS	Major Urban System
NUTS	Nomenclature of Territorial Units for Statistics
OMC	Open Method of Co-ordination
PIA	Polycentric Integration Areas
PSS	Policy Support System
PUSH	Potential Urban Strategic Horizon
R & D	Research and development
RCE	Regional Classification of Europe
RDR	Rural Development Plan
SDS	Sustainable Development Strategy
SEA	Strategic Environmental Assessment
SIA	Sustainability Impact Analysis
SPESP	Study Programme on European Spatial Planing
SUD	Subcommittee on Spatial and Urban Development (working group of the CDCR)
SWOT	Strengths, Weaknesses, Opportunities and Threats
TEN	Transeuropean Networks

<b>Abbreviation</b>	<b>Term</b>
TINA	Transport infrastructure needs assessment
TIR	Third Interim Report
TA	Technical Assistance
TEN	Trans-European Networks
TERM	Transport and Environment Reporting Mechanism
TIA	Territorial Impact Analysis
TPG	Transnational Project Group



## The role of the ESPON Project 3.1



## **2 The role of the ESPON 3.1 Project – Integrated Tools for European Spatial Development**

(by BBR)

The ESPON Project 3.1 is the co-ordinating cross-thematic project of the ESPON Programme 2006<sup>1</sup>. The role is described in the terms of reference for the project 3.1:

This project *Integrated tools for European spatial development* belongs to the third strand and therefore holds a key position in the elaboration of the whole programme by the preparation of the common ground for the other projects and the integration of the results of the other projects towards co-ordinated conclusions. Further task is to secure the consideration of the enlargement issue in all thematic and policy impact study." (ESPON Co-ordination Unit: *Terms of reference – ESPON project 3.1: Integrated tools for European Spatial development*, p. 2, 2002)

Preparation of this project...comprises:

Support to the co-ordination on technical and scientific level of the ESPON 2006 Programme and the projects under measure 1 and 2, including data collection, development of a GIS facility and map-making, thematic co-ordination preparing for the cross thematic exploitation of integrated results based on all projects prepared under the programme.

... offering scientific support for the achievement of the objective of the ESPON 2006 Programme. In this respect, the project will imply support to and a close co-operation with the Co-ordination Unit of the ESPON in Luxembourg,..." (ESPON Co-ordination Unit: *Terms of reference – ESPON project 3.1: Integrated tools for European Spatial development*, p. 3, 2002)

Therefore work has taken place on five levels:

- technical and analytical support and co-ordination (data-base, GIS and map-making),
- concepts and typologies for spatial analysis, spatial concepts
- territorial and thematic co-ordination of the ongoing projects
- preparation for the exploitation of results of all projects
- compilation and structuring of recommendations to further policy development

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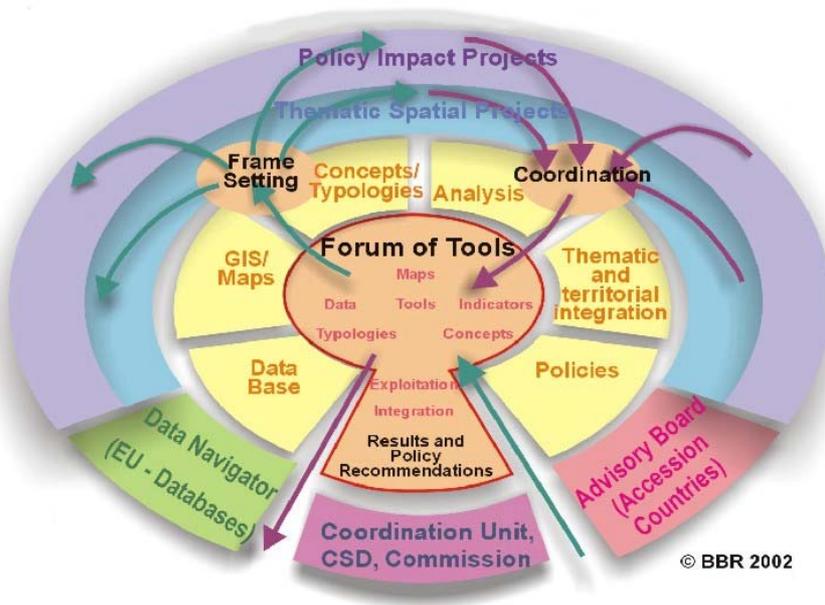
<sup>1</sup> From July 2002 to October 2004. A phase of smooth transition with the ESPON Project 3.2 concerning the co-ordinating task started with the ESPON Seminar in Lillehammer.

- assistance in the promotion and networking of the ESPON programme

**Philosophy and approach of the project**

In the graphic below, one important task of project 3.1 is formalised as transforming the interaction between project 3.1 and the project environment (other TPGs, European Agencies, Experts from Accession Countries, etc.) into outputs and deliverables. This task is described by the set of rings around the core of the output.

**Figure 16 Project scheme – integrated tools for the spatial dimension**



The figure above indicates the input by the outer ring, namely:

- policy impact projects
- thematic spatial projects
- data navigator and data bases
- accession countries and neighbouring countries advisory.

The output is indicated by the "Forum of Tools" in the centre of the figure:

- spatial tools
- integrated data bases
- indicators
- typologies
- territorial concepts

- maps.

These core outputs are complemented by the deduction of policy recommendations, indicated by the flow from the core towards the users and applicants. These flows are representing the main outputs and deliverables for external use which will be provided by the project.

Between these input and output layers the reference points of the tasks of the project are listed by different partitions:

- thematic structures and reference points deriving from the input provided by other projects and by own additional efforts
- territorial structure reference points such as countries, spatial integration zones, etc.
- data base development and cartography
- policy impact methodologies
- policy development

Project 3.1 gains concerning this approach added values for the ESPON programme by deliver products which support the programme on different levels, like the various guidance (please see chapter 10.1 "Guidance Papers"). By working in a cross-project manner a significant surplus value arises.

- Added values (1): final products for the European Policy-Makers

The main products are delivered for the use by the Co-ordination Unit (and via the Co-ordination Unit by the European Commission, the Monitoring Committee and Sub-Committee on Spatial and Urban Development (SUD)). These are, e.g. common database and indicator system, papers on concepts and policy recommendations, contributions for European documents (3rd Cohesion Report etc.) as well as spatial planning related seminars and conferences (e.g. the 29 and 30 November the Ministerial Conference on European Spatial Development and Urban Policy in Rotterdam, Netherlands).

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- Added values (2): frame-setting for other ESPON projects

Another type of product is used internally, i.e. within the ESPON programme. These internal products are addressed to other TPGs and include, for instance, the setting up and delivery of standards and guidelines (referring to data collection, cartography, concepts etc.) which are used by other TPGs for their work and help the Co-ordination Unit in its co-ordination task.

- Added values (3): exploiting results gained by other ESPON projects

In the other direction, TPG 3.1 makes use of results and recommendations of the other TPGs (see chapter 3.3.1 "Networking undertaken"), e.g. by creating links between the different TPGs, synergetic effects could fructify the work in a reciprocative way. For the purpose of integration, results will be cross-checked and evaluated for contributions to synthetic reports.

Added values (4): genuine contributions by project 3.1

Besides the networking aspect, an important part of added value of project 3.1 is based on genuine contributions that are not covered by the single projects of the themes 1 and 2, i.e. building a common data set and a joint system of indicators and tools, and defining and operationalizing concepts and tools. The activities and outcomes of the project 3.1 should be balanced with respect to giving room for "innovative" methods and thinking without losing sight of meeting the demand of policy decisions based on EU-wide data and analysis that is currently available.

- Added values (5): promotion strategy / publications / networking

Finally, TPG 3.1 supports the CU, until the end of the smooth transition phase<sup>2</sup>, in its task for internal and external networking and co-operation and it will contribute to the promotion and publication of ESPON results.

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<sup>2</sup> The so called "smooth transition" phase should ensure a constant support of the CU by the cross-co-ordinating projects during the final project phase of the ESPON Project 3.1 and the initial phase of the ESPON Project 3.2. Therefore the TPG 3.1, 3.2 and the CU decided to use the overlapping time for above mentioned transition phase.

The outcome of ESPON can be seen as a Policy Support System. The need for a Policy Support System (see also chapter 11 for a first approach) comes from two contradictory demands by policy makers: more advanced and yet more user-friendly and just-in-time decision-making support from experts and scientists. One possible strategy for resolving the conflict between more advanced and more friendly and just-in-time support is developing corporate intelligence inside governmental institutions by introducing efficient management of information and knowledge. The first strategy to move in this direction is to continuously consolidate and formalise disperse information and knowledge generated in the institution. This can be done by simply creating virtual libraries with synthesis of studies, storing databases in compatible formats, creating intelligent search-engines, etc., and linking it all together into open systems, driven by user-friendly and customised interfaces and accessible to any interested policy-advisor or policy-maker from his/her computer desk. The open system should integrate interactive explanatory tools of use for communication and educational purposes, but also provides access to multiple remote advanced information and knowledge systems developed and maintained by universities, research institutions and consulting firms that can answer a number of legitimate policy-questions.

The key to close the gap between policy makers and state-of-the-art scientific models is establishing an encouraging and co-operative environment where scientists, experts and policy makers interact personally and can understand each other. The SPESP experience is an example of a successful experience since most of the information and knowledge generated along the process was actually gathered, harmonised and distributed.

A step forward in this direction is the idea of a European policy support system (see chapter 11 and [http://www.mcrit.com/espon\\_pss/](http://www.mcrit.com/espon_pss/)).

Since the starting of the ESPON 3.1 Project and the three Interim Reports delivered various action and progress has taken place. This progress is based on different activities and expressed in various fields of work covered by the ESPON Programme and therewith by the co-ordination activities of the TPG 3.1.



## Progress made by the TPG



### **3 Progress made by the TPG**

(by Lars Porsche, Volker Schmidt-Seiwert, BBR)

#### **3.1 General introduction**

This is the last and final report of the ESPON 3.1 project. Supporting and guiding activities will be undertaken now by the succeeding co-ordinating cross thematic project.

The TPG 3.1 developed in a very good way. The pro-active participation in the ESPON Seminars as well as the TPG lead partner meetings and delivery of the project interim reports were of great influence. The 3.1 project made use of meetings to test various developed products as well as scientific approaches. This very fruitful interactions were used for improvements and further developments. Synergetic effects generated a lot of win-win effects for all ESPON participants.

The work since the last interim report concentrated on the integration and use of TPGs' results to get a good, compact and applicable output. Therefore from the preliminary stage until the delivery of Final and Interim Reports in March and August 2004 a profound co-ordination and support by the ESPON Project 3.1 was necessary. The 3rd ESPON Seminar in Matera in October 2003, Italy, and 4th ESPON Seminar in May 2004 in Lillehammer, Norway, were the big events where comprehensive background for the Final Reports were given.

In comparison to the former reports of the ESPON Project 3.1 this Part C, which is one of three parts, bases mainly on the own research activities of the TPG. Nevertheless outcomes and results of the other 16 reports were of great importance for the own work and writing.

As mentioned in the former report not all projects started their work at the same time. Table no. 2 "Actual ESPON projects, nick names, interim reports and lead partners of the ESPON Programme 2006" (see below) shows the state of the art concerning the projects report deliveries. This differs between 2nd, 3rd and final reports. Thus we concentrate mainly on the first seven final reports, five 3rd interim reports and their results. We also have taken in mind by writing this report the impulses, ideas and tentative results of other TPGs.

The TPG developed for a 'visible' coherence by providing a map-design for ESPON Maps and a structure as well as a layout by providing templates.

The transnational project group realised its work and fulfilled the contract as well as requested tasks from the addendum. On account of the given situation that this is the final report all requested tasks by the contract are listed below.

## List of requested task from the addendum:

**Figure 17 Addendum – Contract for ESPON 3.1 - November 2002 (draft first interim report) followed by December 2002 (first interim report):**

3 Addendum – Contract for ESPON 3.1 - November 2002 (draft first interim report) followed by December 2002 (first interim report):	
a) Definition of common standards for the collection of data in the programme and a structure of the ESPON database and GIS suitable to deal with the variety of data to be collected and processed during the ESPON Programme;	✓
b) Consensus with ongoing TGP on indicators and necessary data following a precise analysis of the availability and comparability of data at Community level. In this analysis, the results of the SPESP study programme and the ESPON projects in course should be taken into account. The task comprises as well a definition of an appropriate geographical level and the technological requirements for data collection, taking into account the availability of the data. A first detailed and comprehensive list of statistical and geographical data the TPG's intend to use, and eventually request from Eurostat, the EEA and National Statistical Institutes and National Mapping Agencies	✓
c) Support of networking and communication on scientific and technical matters between the research groups by the provision of inventories and the support of mutual exchange among the projects under all priorities on data, typologies and intermediate results as well as mapping.	✓
Additional:	
<i>GIS, databases and map-making facilities</i>	
A detailed description on the concept of implementation of the ESPON GIS; An inventory of available hardware, software, main datasets, tasks and network responsibilities.	
Statement on the integration of the "European" data pack. Demonstration of operational status using EUROSTAT statistical series on commune-level population, topographic reference data and one other thematic coverage	✓
<i>Co-ordination with Data Navigators, the European Environment Agency, Eurostat and DG JRC</i>	
Results of a preliminary round of contacts with the main actors at European level, reporting on ESPON methodologies, data issues, degree of commonality of applications and synergies, scope of on-going co-operation.	✓
<i>Co-ordination of results of ongoing ESPON projects</i>	
Elaboration of a common reporting format and mapping templates to be used by all parties.	
Cross-analysis of topics and issues of data suitability and availability by research theme.	
Identification of main gaps to be filled. First compilation of proposed territorial indicators.	✓
Annotation:	
- delivery: in time	
- task : fulfilled	

**Figure 18 Addendum – Contract for ESPON 3.1 – April 2003 (2<sup>nd</sup> Interim Report)**

<b>3 Addendum – Contract for ESPON 3.1 – April 2003 (2<sup>nd</sup> IR)</b>	
d) A first overview on concepts and methodology and possible results should be provided.	✓
e) Establishment of the ESPON GIS/database, including territorial indicators and maps developed so far.	✓
f) A well co-ordinated, second revised and extended request for further indicators to be addressed to Eurostat and the EEA by mid 2003 (the latest).	✓
k) Working document being a scientific report on the intermediate results in creating tools for the identification of potentials, weaknesses, opportunities and threats for a sustainable and more balanced territorial development. This report should cover all themes and make use of the intermediate results in a comprehensive and integrated way, and in doing so be able to guide other projects for the elaboration of the third interim reports for September 2003.	✓
Additional:	
<i>GIS, databases and map-making facilities</i>	
Documented examples of working maps from each research field.	
Review of cartographic techniques for the schematic representation of the spatial phenomena under investigation realised mainly by the TPG's.	
<i>Data integration:</i>	
All relevant provisional datasets, with the available data, collected by the research contracts, will be available as functional components of the ESPON information system.	✓
<i>Spatial concepts, concepts and typologies for spatial analyses</i>	
Draft report on relevant spatial concepts elaborated in collaboration with each of the TPG making reference to the discourse raised in the ESDP Study Programme (SPESP1).	
Computational issues and presentation of hypotheses, GIS-based algorithms, models and tools.	✓
<i>Recommendations to further policy development in support of territorial cohesion</i>	
Compilation of a brief comparative analysis of the policy context and framework for each domain – concepts, rationale, decision-making processes, instruments.	
Overview, on the basis of research inputs, of territorial impacts of territorial and sectoral policies as well as how to measure them.	
Outline methodology for the formulation and synthesis of policy strands.	
Inventory of actions undertaken for the promotion and networking of the ESPON programme.	✓
Annotation:	
- delivery:	in time
- task :	fulfilled

**Figure 19 Addendum – Contract for ESPON 3.1 – September 2003 (3rd Interim Report)**

<b>3 Addendum – Contract for ESPON 3.1 - September 2003 (third interim report)</b>	
h) Identification of orientations on an implementation of territorial objectives into EU policies – from analytical tools to feasible policy measures based on TPG results;	✓
i) Compilation of intermediate results on the territorial trends and impact of policies based on the variety of studies and themes covered by the ongoing projects;	✓
j) Working document on tentative recommendations to policy development towards the ESDP and the Structural Funds after 2006, including possible European priorities in different part of the enlarged EU territory and the necessities to coordinate the impacts of spatially relevant sector policies, taking into account recommendations of TPG's;	✓
k) Working document to prove first steps towards the preparation of methodologies for prospective scenarios.	✓
<b>Additional:</b>	
<i>Data integration</i>	
All relevant datasets, scripts/programmes, eventual models and algorithms produced under the research contracts will, as far as they are made available, be included as elements in the ESPON information system.	✓
<i>Outputs/deliverables</i>	
Working maps and thematic datasets: The direct findings and deliverables of the respective research themes will be presented via ESPON GIS by means of the standardised templates – a common style.	
Schematic policy material - illustrations: Progress towards a consensus on the legends and symbology to be adopted across the full range of themes under study. A comprehensive set of examples will be presented, with alternatives.	✓
First diagnosis of territorial trends and disparities.	
<i>Policy development</i>	
Principal findings, conclusions and proposals for an integrated policy framework, particularly in response to the priority theme of polycentrism and accessibility.	✓
<b>Annotation:</b>	
- delivery:	in time
- task :	fulfilled

**Figure 20 Addendum – Contract for ESPON 3.1 – October 2004 (Final Report)**

<b>3 Addendum – Contract for ESPON 3.1 - October 2004 (final report)</b>	
l) Finalising the ESPON database, GIS and mapmaking facility as well as a co-ordinated, common approach to concepts and typologies for spatial analyses, including necessary technical specifications;	✓
m) Finalising the ESPON database, GIS and mapmaking facility as well as a co-ordinated, common approach to concepts and typologies for spatial analyses, including necessary technical specifications;	✓
n) A final comprehensive working report including the final findings of the above-mentioned working documents, including potential scientific and technical recommendations for the follow up project 3.2 on policy scenarios.	✓
<b>Additional:</b>	
An executive summary of the project's implementation, overview of the roles and inputs of participants to the ESPON information system network and recommendations for policy development	✓
Presentation of access points and concrete ideas for policy responses to the territorial trends facing different parts of the Union, at different geographical scales, with a view to improving territorial cohesion.	✓
Presentation of the developed territorial indicators, concepts and typologies linked to spatial planning, including maps.	✓
Presentation of the developed territorial indicators, concepts and typologies linked to spatial planning, including maps.	✓
Presentation and documentation of the GIS, databases and mapping facilities developed.	✓
Commentary on further data requirements and ideas for territorial indicators and measures of sustainable development, concepts and typologies, as well as on further developments linked to the GIS, database and mapping facilities.	✓
<b>Annotation:</b>	
- delivery: in time	
- task : fulfilled	

The different topics mentioned in the various guidelines are, as it is visible, considered and implemented in the previous and the current report.

## Further progress envisaged

**Table 4** The activity plan October 2004 until the end of the project

Time	3 Activity
October 2004	
11./12. October	5th ESPON Seminar, Nijmegen, Netherlands
13. October	ECP Meeting, Nijmegen, Netherlands
November 2004	
02/03. Nov.	ESPON 3.1 – Robustness Test - Seminar
04/05. Nov	ESPON 3.1 - Final Meeting
15. Nov	Delivery of the final version of the Final Report of the ESPON Project 3.1

With this report the project 3.1 goes straight forward to fulfil requirements of the terms of reference mentioned-above.<sup>1</sup> Also the responses towards the 3rd IR has been taken in mind and has been included in the content of the different chapters of this report. As mentioned above the outcome of the final and 3rd IRs of other TPGs have been important for the work on this report. The list below shows the state of affairs concerning reports of the TPGs.

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<sup>1</sup> see:

[http://www.espon.lu/online/documentation/projects/cross\\_thematic/185/tor\\_3.1.pdf](http://www.espon.lu/online/documentation/projects/cross_thematic/185/tor_3.1.pdf)  
page no. 10 (Political challenges for the ESPON projects), 4<sup>th</sup> paragraph and following

**Table 5 ESPON projects, nick names, interim reports<sup>2</sup> and lead partners of the ESPON Programme 2006**

<b>PROJECT NUMBER</b>	<b>TITLE</b>	<b>"NICKNAME"</b>	<b>REPORT No.</b>	<b>TPG Lead Partner</b>
<b>1.1</b>	<b>Polycentric development and urban-rural relations</b>			
1.1.1	The role, specific situation and potentials of urban areas as nodes in a polycentric development	POLYCENTRISM	<i>Final Report</i>	NORDREGIO
1.1.2	Urban-rural relations in Europe	URBAN-RURAL	<i>Final Report</i>	Helsinki University of Technology Centre for Urban and Regional Studies
1.1.3	Particular Effects of enlargement of the EU and beyond on a polycentric spatial tissue with special attention on discontinuities and barriers	ENLARGEMENT	3 <sup>rd</sup> IR	The Royal Institute of Technology (KTH)
1.1.4	The spatial effects of demographic trends and migration	DEMOGRAPHY TRENDS	3 <sup>rd</sup> IR	ITPS (Swedish Institute for Growth Policy Studies)
<b>1.2</b>	<b>Access to infrastructure and knowledge</b>			
1.2.1	Transport services and networks: Territorial trends and basic supply of infrastructure for territorial cohesion	TRANSPORT TRENDS	<i>Final Report</i>	University of Tours
1.2.2	Telecommunication and energy services and networks: Territorial trends and basic supply of infrastructure for territorial cohesion	TELECOM TRENDS	<i>Final Report</i>	Centre for Urban & Regional Studies (CURDS), University of Newcastle
1.2.3	Identification of spatially relevant aspects of information society.	INFORMATION SOCIETY	-----	----- ( <i>planned start: end 2004</i> )

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<sup>2</sup> latest delivered reports  
IR = INTERIM REPORT

**Continuation: ESPON projects, nick names, interim reports and lead partners of the ESPON Programme 2006**

<b>PROJECT NUMBER</b>	<b>TITLE</b>	<b>"NICKNAME"</b>	<b>REPORT No.</b>	<b>TPG Lead Partner</b>
<b>1.3</b>	<b>Natural and cultural heritage</b>			
1.3.1	Territorial effects and management of natural and technological hazards in general and in relation to climate change	NATURAL HAZARDS	3 <sup>rd</sup> IR	Geologian Survey of Finland
1.3.2	Territorial trends in the management of natural heritage	NATURAL HERITAGE	3 <sup>rd</sup> IR	Royal Haskoning
1.3.3	The role and spatial effects of cultural heritage and identity.	CULTURAL HERITAGE	-----	----- ( <i>planned start: mid of Oct. 2004</i> )
<b>2.1</b>	<b>The territorial effects of sector policies</b>			
2.1.1	Territorial impact of EU transport and TEN policies	TRANSPORT IMPACTS	<i>Final Report</i>	Christian-Albrechts- Universität zu Kiel, Institute of Regional Research
2.1.2	Territorial impact of EU research and development policy	R&D IMPACT	<i>Final Report</i>	ECOTEC Research and Consulting Ltd.
2.1.3	The territorial impact of CAP and rural development policy	CAP IMPACT	<i>Final Report</i>	University of Aberdeen, Arkleton Centre for Rural Development Research, Department of Land Economy
2.1.4	Territorial trends of energy services and networks and territorial impact of EU energy policy	ENERGY	3 <sup>rd</sup> IR	CEEETA
<b>2.2</b>	<b>Structural Funds and related funds</b>			
2.2.1	Territorial effects of EU Structural Funds	STRUCTURAL FUNDS IMPACTS	3 <sup>rd</sup> IR	NORDREGIO
2.2.2	Territorial effects of the "Aquis Communautaire", Pre-accession Aid and Phare/Tacis/Meda Programmes	ENLARGEMENT AID IMPACT	3 <sup>rd</sup> IR	Institute for Regional Development and Structural Planning
2.2.3	Territorial effects of structural funds in urban areas	STRUCTURAL FUNDS URBAN IMPACT	<i>Final Report</i>	ECOTEC Research and Consulting Ltd.

**Continuation: ESPON projects, nick names, interim reports and lead partners of the ESPON Programme 2006**

<b>PROJECT NUMBER</b>	<b>TITLE</b>	<b>"NICKNAME"</b>	<b>REPORT No.</b>	<b>TPG Lead Partner</b>
<b>2.3</b>	<b>Institutions and Instruments of spatial policies</b>			
2.3.1	The application and effects of the ESDP in Member States	ESDP IMPACTS	-----	----- ( <i>planned start: mid. Oct. 2004</i> )
2.3.2	The governance of the territorial and urban oriented policies from the EU to the local level.	GOVERNANCE	-----	Universitat de València. Estudi General (through Department of Geography)
<b>2.4</b>	<b>Filling gaps and new policies</b>			
2.4.2	Integrated Analysis of Transnational and National Territories based on ESPON Results	ZOOMING IN	-----	----- ( <i>planned start: mid. Oct. 2004</i> )
<b>3.</b>	<b>Co-ordinating and cross-thematic projects</b>			
3.1	Integrated tools for European spatial development territorial	SPATIAL TOOLS	<i>Final Report</i>	BBR, Federal Office for Building and Regional Planning
3.2	Spatial scenarios and orientations toward the ESDP and the Cohesion Policy.	SCENARIOS	1 <sup>st</sup> IR	Free University of Brussels -IGEAT , Center for Studies on Sustainable Development, Brüssel
3.3	Territorial dimension of the Lisbon/ Gothenburg process	LISABON/ GOTEHNBURG PROCESS	-----	Centre for International Studies on Economic Growth (CEIS), University of Rome "Tor Vergata"

Since the start of the ESPON Project 3.1 and the delivery of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Interim Report various meetings of the TPGs, the TPG lead partners and the ESPON Contact Point meetings took place.

Ideas, suggestions, and proposals were discussed and further developed.

The results echoed in the former 3.1 reports as well as in this set of final reports .

**Table 6 List of meetings in which the project team or a member of it participated in or was present**

<b>Date</b>	<b>Type of meeting</b>
<b>2002</b>	
July	
16/17 Jul.	Contracting first round projects
September	
09 Sept.	ESPON CU & TPG 3.1 meeting, Esch-sur-Alzette, Luxembourg
October	
04 Oct.	GIS-Meeting with DG-Regio and Eurostat, Paris, France
07/08 Oct.	ESPON 3.1 – Kick-off Meeting, Bonn, Germany
24 Oct.	ESPON CU & TPG 3.1 Meeting, Bonn, Germany
November	
12 Nov.	ESPON CU & TPG 3.1 meeting, Esch-sur-Alzette, Luxembourg
21/22 Nov.	1 <sup>st</sup> ESPON Seminar, Mondorf-les-Bains, Luxembourg
23 Nov.	EPON 3.1 Meeting, Mondorf-les-Bains, Luxembourg
<b>2003</b>	
January	
20/21 Jan.	ESPON 3.1 Meeting, Paris, France
30 Jan.	ESPON CU & TPG 3.1 meeting, Esch-sur-Alzette, Luxembourg
February	
26. Feb.	ESPON TPG Leadpartner Meeting, Brussels, Belgium
March	
11 Mar.	ESPON CU & TPG 3.1 meeting, Esch-sur-Alzette, Luxembourg
25 Mar.	ESPON CU & TPG 3.1 meeting, Esch-sur-Alzette, Luxembourg
May	
04 May	ESPON 3.1 – Meeting, Panormo, Crete, Greece
05/06 May	2 <sup>nd</sup> ESPON Seminar, Panormo, Crete, Greece
07 May	ECP Meeting, Panormo, Crete, Greece
07 May	ESPON 3.1 – Meeting, Panormo, Crete, Greece
June	
16/17 Jun.	ESPON TPG Leadpartner Meeting, Brussels, Belgium
18 Jun.	ESPON 3.1 Meeting, Brussels, Belgium

<b>Date</b>	<b>Type of meeting</b>
August	
07 Aug.	ESPON CU & TPG 3.1 meeting, Bonn, Germany
September	
15 Sep.	ESPON 3.1 Meeting, Bonn, Germany
23 Sep.	SUD-Meeting, Brussels, Belgium
October	
05 Oct.	ESPON 3.1 Meeting, Matera, Italy
06/07 Oct.	3 <sup>rd</sup> ESPON Seminar, Matera, Italy
08 Oct.	ESPON 3.1 Meeting, Matera, Italy
27/29 Oct.	JRC - 1 <sup>st</sup> Workshop on European reference Grid, Ispra, Italy
<b>2004</b>	
January	
22. Jan.	ESPO 3.1 Meeting – Core meeting on SWOT/RCE, Bonn, Germany
February	
02. Feb.	Meeting ESPON CU & TPG 3.1, Bonn, Germany
05. Feb.	ESPON 3.1 Meeting, Bonn, Germany
16. Feb.	ECP Meeting, Brussels, Belgium
March	
03./04. Mar.	ESPON TPG Leadpartner Meeting, Brussels, Belgium
05. Mar.	ESPON TPG Leadpartner Meeting on financial matters (change of the financial control system for ESPON 2006), Brussels, Belgium
25. Mar.	Meeting ESPON CU & TPG 3.1, TPG 3.2 , Esch-sur-Alzette, Luxembourg
May	
11/12 May	4th ESPON Seminar, Lillehammer, Norway
13 May	ECP Meeting, Lillehammer, Norway
24/25 May	ESPON 3.1 Meeting, Barcelona, Spain
June	
08 Jun.	ESPON 3.1 Meeting –core meeting, Trier, Germany
21 Jun.	ESPON CU & TPG 3.1, TPG 3.2 meeting, Brussels, Belgium
24/25 Jun.	ESPON 3.2 meeting – 3.1 participation concerning smooth transition of the support function and the ESPON data base, Brussels, Belgium
September	
06 Sept.	ECP Meeting, Brussels, Belgium
07/08 Sept.	ESPON 3.1 Meeting – core meeting, Bonn, Germany
10 Sept.	ESPON CU & TPG 3.1, TPG 3.2 meeting, Esch-sur-Alzette, Luxembourg
13 Sept.	ESPON 3.1 Meeting – core meeting, Trier, Germany
October	
11/12 Oct.	5 <sup>th</sup> ESPON Seminar, Nijmegen, Netherlands
13 Oct.	ECP Meeting, Nijmegen, Netherlands
November	
02/03 Nov.	ESPON 3.1 Seminar on ESPON Wild Cards

## **3.2 Progress made by topics**

### **The ESPON data base**

The ESPON Project 3.1 developed, established and maintained the ESPON data base. With the completion of the project the data base will be handed over to the succeeding project 3.2, which has started its work in December 2003.

Through the ESPON Seminars and the interim reports of the TPG 3.1 great efforts and good progress were made in the field of the ESPON data base, which is one of the headstones of the further work by the ESPON 3.2 Project.

With the end of this project the interactive ESPON data base will be designed and ready for use including the TPG's data and indicators declared as contributions to the ESPON in the final and interim reports of August 2004 as far as delivered.

Especially related to the work on the final report of 3.1 and in respect of the RCE the indicator base has been improved for the selected RCE indicators. The project filled gaps and missing values. It calculated and provided new indicators on the basis of the existing ones by July 2004. By doing so a unique set of 38 indicators has been created on NTUS 2 level that covers all the EU 25 +2+2 space.

### **GIS Orientated Instruments and the Dictionary of spatial analysis tools**

The 3.1 project team developed two main tools with regard to the GIS. One of these new innovative cartographic and spatial analysis tools is the 'ESPON WEB based GIS' and the other one is the 'HyperCarte'. These two products are developed for the further use by the ESPON Programme, the scientific and political community. Perhaps at a later stage these will be also free accessible for the public.

The project laid in the field of GIS orientated instruments sound ground with this work for the ESPON Programme.

For this tools the TPG developed manuals and handbooks which are available as annexes for the ESPON 3.1 Project Final Report.

In this context also the development of the "Dictionary of Spatial Analysis Tools" has to be highlighted. It's a proposal to examine in more details the contribution of spatial analysis tools to the clarification of four major problems of European policymakers working on spatial planning and regional de-

velopment. Four solutions of spatial analysis tools for the work on different political concepts are explained.

## **SWOT & RCE**

The by the contract requested realisation of a SWOT analysis was from the beginning not given a warm welcome. Also an unsteadiness by a higher authority retarded the work in this field. As a compromise and concession the TPG searched for a solution. TPG 3.1 started to develop a method to get the required results on its own. The result is the RCE, Regional Classification of Europe. By using this approach the TPG also managed a very late request by the ESPON Programme on national and transnational breakdowns by using ESPON results, mainly the ESPON database. The latter was also developed, established and attended by the 3.1 team. For the work with on the regional classification of Europe the further development and adjustment of data of the data base as well as indicators were necessary.

## **Implementation of the guidance**

### *The Guidance Papers*

During the life time of the project, the TPG 3.1 developed various guidance papers in sequences. These were elaborated directly after the ESPON seminars. The intention, by developing these papers, was to create a common platform and to give the TPGs guidance with regard to their coming reports. Also the TPG 3.1 used mentioned guidance papers for the writing of its reports. In general a very positive conclusion about the implementation and application of the guidance paper and thus the creation of a common platform can be given at this stage. During the seminars and with the backing of the guidance paper important milestones were established as well as fulfilled. Please see also chapter 9.1.

Depending on the start of the projects, most of them started trying to define or have defined finally the concepts as well as typologies they are using. The project 3.1 noted that especially in this field the given guidance was needed to come to a common ESPON understanding. Here 3.1 as well as the ESPON Programme has continued its way to come to excellent results by developing the "Matera Guidance Paper" and at this stage for the 1st round TPGs the "Lillehammer Guidance".

Mayor effort has been made since the last report on central issues, like polycentrism and/or accessibility. The central role of the first round of final

ESPON reports play obviously the policy recommendations. The focus of other TPGs depends on their state of affairs. Seven projects delivered their final reports at the end of August 2004. Four projects delivered their 3rd interim reports (IR) in March 2004. Further, five final reports are expected for March 2005.

The latest of the above mentioned papers, called "Lillehammer Paper". It was also the final one developed by the 3.1 team. It laid the ground for the structure and writing of the final reports. As for the former reports, the 3.1 team has used also this one for orientation on writing its own final report.

### ***The Territorial Impact Analysis***

Another point under guidance given is the approach towards a Territorial Impact Analysis. The original idea of reviewing the Interim reports of the policy impact projects as regards their statements concerning TIA has been

- to develop the concept of the tool by applying it at the same time and
- to give addressees the possibility to take part in the development of the methodology

The ESPON 3.1 minimum requirements were elaborated as check-lists for the ESPON priority two projects which showed very different approaches and methods to analyse impacts of policies and programmes.

It turned out that there are considerable constraints against a quick progress (within this ESPON project) due to

- the actual orientation of EU policy programmes analysed that is still far away from actually taking into account spatial development goals and concepts (including Regional Policy, so far).
- Hence, as a direct consequence of that orientation, there is a dramatic lack of territorial differentiation of policy implementation data.
- Finally, the elaboration of spatial development goals and concepts in the wake of the ESDP has hardly achieved operational results appropriate for assessment, so far.

The examination within the ESPON project 3.1 proved that the diversity of features and manners of effects do not admit to cover the whole range of EU policy issues by one common assessment methodology. However, what turned out feasible is a common methodological approach to be applied to the different areas of concern in specific ways. This is considered the objective a manual (see chapter 9.3) to be applied as kind of check-list.

## **Integrating ESPON information and knowledge tools into an ESPON Policy Support System**

The initial goal of ESPON 3.1 was to propose and divulge basic common data sets and keys for harmonisation and standardisation within the ESPON Community and to deliver the harmonised material, maps and indicators to the Commission for consideration in the Third Cohesion Report. The next phase of ESPON 3.1 after September 2003 was to move towards consolidating all existing material and facilitating means for this information to be accessible to the whole ESPON Community and the Commission services. The consolidation of information and knowledge generated by ESPON in such a service-oriented approach is what is known as a Policy Support System.

In the current ESPON-PSS web-site visitors find a variety of resources to support the better understanding of the present of the EU and the possible future scenarios of the Union.

- European Policies: key dates, documents, sectoral processes and background information on the European construction, informing spatial policy in the EU.
- Spatial Policies: basic documents, political processes and critical debates directly affecting European spatial planning.
- Data resources: inventory of national data availability and statistics institutes and ESPON data base.
- Methods & Results: integrated methods and results developed by ESPON.
- Research on ESDP: interesting research papers dealing with different topics related to the ESDP.
- Map resources: basic information on ESPON map design, catalogue of key maps produced by ESPON projects, simplified cartography and interactive GIS tools offering the possibility to produce tailor-made maps, as well as links to interesting GIS portals.

## **Support to the CU and other TPGs**

Regarding to its contract, one task of the project 3.1 has been to support the CU and the other ongoing TPGs. This work was realised in various ways.

The project supported the CU by organising different meetings and seminars, like the TPG LP meetings or ESPON Seminars. Main results of the ESPON seminars were the guidance papers (see above and 9.1). Mentioned guidance papers were important for the further work of the TPGs. But the

TPG 3.1 supported the other TPGs not only by providing the guidance papers. The project team has been contacted regarding methodological, conceptual and technical questions. Latter were mostly related to problems with data, indicators, typologies and layouts. Beside of these, the project helped also to solve not directly ESPON related problems, like explaining was is a ".zip-format", how to create PDF-files, how to create ".jpg-files" and bring these to the right position in the report.

All in all these supporting work were success- and fruitful for all those involved.

One good example for the fruitful work is the draft version on "Europe in the world". The ESPON Project 3.1 laid the ground for the implementation of the project which will start soon.

### **Policy Recommendations**

Final policy recommendations, concerning to the contracts, are only asked from TPGs of the first round, which delivered in August 2004 their final reports. The expectation for TPGs, which have delivered their 3rd interim reports, has been to receive first tentative policy recommendations. The purpose of these policy recommendations depends on the different TPGs and its fields of work.

The ESPON Project 3.1 has been developed on the basis of own research and the final as well as tentative results of the other TPGs policy recommendation in a comprehensive, compact and synthesised form. Because of the very heterogeneous fields of work this task was very challenging. Please see PART A of the 3.1 Final Report.

### **Transition of work from the ESPON Project 3.1 to 3.2**

The 3.1 project was divided in a support function for the CU and the other TPGs as well as in a part for own research activities. First mentioned has to be continued by the succeeding project 3.2. Therefore the two projects started in spring a so called "smooth transition phase". This could be seen as a "phasing-in" of the 3.2 project until the definitive handing-over of tasks and responsibilities and a "phasing-out" of the 3.1 project. This approach can be assessed as very successful and as a model for possible further handing over activities.

### **3.3 Resume/ Evaluation**

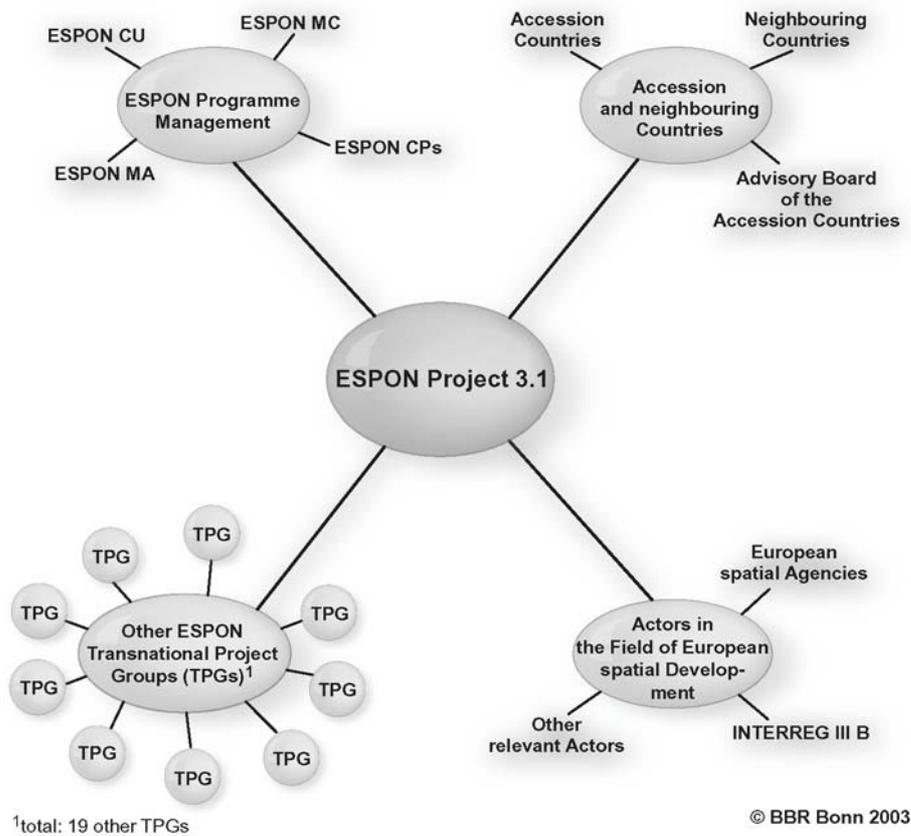
In general the work of the 3.1 team can be seen as very successful. The ESPON Programme started its work with eight projects, including the 3.1 project. Needless to say that "teething troubles" (Kinderkrankheiten) were inevitable. New rounds of projects followed. Also the diversity of subjects with varying fields of work as well as the stage of work increased. With the beginning of the new year (2004) former accession countries, which had partly the status as observer countries, have been included in the ESPON Programme 2006 as full members. This deeper involvement has a very positive effect. Most of the countries participate via one or more TPG partners in the ESPON projects. This contributes in a substantial way to the outcomes.

#### **3.3.1 Evaluation of Networking undertaken**

As networking is a fundamental aspect of the work by 3.1 it is presented and reviewed here. The philosophy or model of networking of the 3.1 project was explained already in the 1st IR and adjusted through the time. The networking activities are described and reviewed:

- Networking activities of the TPG 3.1
- Networking of the TPGs
- Networking between the project 3.1 and the TPGs
- Networking between the project 3.1, the ESPON CU and the DG Regio
- Networking with the accession and neighbouring countries
- Networking with the ESPON Contact Points
- Networking with other actors in the field of European Spatial Development
- Networking with other actors in the field of European Spatial Development

**Figure 21 Networking activities of ESPON 3.1**

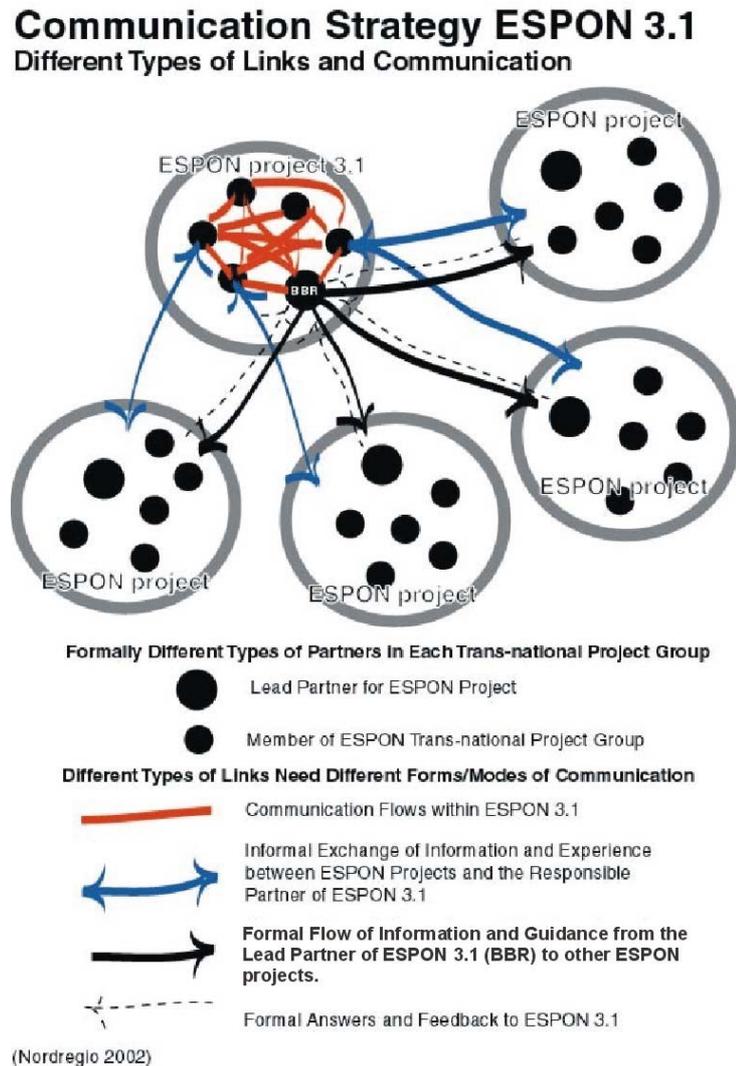


Source: ESPON Project 3.1

In the project 3.1 the team has reflected the European range of different perspectives. The main goal has been to come to joint results and conclusions and policy recommendations that are consensual in the working team wherever possible. In this sense, the working method is based on good internal communication and networking and the search for common results rather than a strict division of labour. Therefore the project has been in close contact with the ESPON Programme management, other actors in the field of European spatial development (i.e. European Spatial Agencies), the accession countries as well as some neighbouring countries of the EU.

Beside of the important external work of the project, the internal co-operation and collaboration has played an important role. The internal project networking consists of an internal network between the members of the 3.1 project.

**Figure 22 Communication Strategy ESPON 3.1**



The graphic shows that the partners inside the 3.1 project have been responsible for the informal exchange and information flows between 3.1 and the other TPGs.

### Networking of the TPGs

The biggest success is that a lot of TPGs started the networking between themselves, especially since first useful outcomes brought to light. Most TPGs searched corresponding partner-TPGs by themselves and came to a "win-win-situation". But it also has to be mentioned that some TPGs needed the help of the project 3.1.

After closing the first seven ESPON projects it can be said that the TPGs have made use of the network. But it is also true that more use and there-

with more benefit could be possible sometimes possible. A good result is that TPGs of the first round of ESPON projects are not only seen as providers or distributors, but rather as networking and interchange partners. The projects of the further rounds do fundamental research and scientific work to support the programme. All participants made use of the common data base and first tentative results which were published during August 2003 and March 2004.

An important aspect which has to be highlighted once again is also to call on the ECPs, if data or documents are needed. It is one of the ECP roles to help and support the TPGs.

### **Networking between the project 3.1 and the TPGs**

A lot of progress has been made in the field of networking in different ways via the ESPON Seminars, the corresponding 3.1 interim reports, the guidance papers or bilateral contact.

The networking between the TPGs and the project 3.1 extended. Since the beginning of the year 2003 all TPGs have been in contact with the coordinating, cross thematic project. Especially the work on the ESPON META SWOT, the TIA, and the different 'Guidance Papers' supported the networking and communication.

Former existing prejudices and doubts of the TPGs disappeared through good practise. More and more also informal ways of communication have been used, which shows good relationship between the different actors. Most of the networking activities between 3.1 and other projects at the final stage of the first round projects related to the data and GIS, layout questions as well as other technical matters. This was the case until the end of the 1st round projects in September 2004. It has to be emphasised that some TPGs by networking also exchanged and improved their policy recommendations. At this stage the first round projects delivered final policy recommendations. All 2nd round projects' policy recommendations are provisional and tentative.

Beside of this the networking has covered the full range of inquiries concerning practical aspects as well as theoretical aspects of the work. The participation of most of the 3.1 project partners in other TPGs has helped networking.

At the end of 2003 and the beginning of the year 2004 the networking concentrated mainly on methodological questions as well as those concerning

concepts. The focus of the 1<sup>st</sup> round TPGs swiftened until and during the writing of the final reports to a technical support concerning data, indicators, typologies, the use of statistical and mapping software.

Nevertheless, networking has to be further improved and some ongoing TPGs should be more active in the future. Networking is a mutual activity!

### **Networking between the project 3.1, the ESPON CU and the DG Regio**

The networking in particular with the ESPON CU and also with the DG Regio was implemented through different co-ordinating meetings as well as in an intensive and stable contact via modern telecommunication media. The exchange has been of utmost importance for the success of the ESPON Programme 2006 until now. It generated fruitful outcomes and facilitated the work of the parties.

### **Networking with the accession and neighbouring countries**

ESPON project 3.1 has tried to integrate the former 10 Accession Countries (ACs), the current two ACs as well as Neighbouring Countries (NCs) to facilitate common views on the spatial development trends and policy issues in an enlarging European Union. It has been one aim to bring in the knowledge and specific views of ACs into the ESPON results and allow exchange of experience between the 3.1 TPG and experts of the ACs and NCs.

The networking of the 3.1 project with the ACs and NCs has focused mainly on the field of database and GIS. Especially inquiries towards the accession and neighbouring countries have been realised. The data of mentioned countries is very important for the creation of a well founded and comprehensive data base.

Some ACs and NCs acceded the ESPON Programme formally and participate in an active way. At present, these countries are Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Norway and Switzerland. Other countries still are observer countries, like Bulgaria and Rumania. The acceded countries joined or still join different TPGs.

## **Networking with the ESPON Contact Points**

The following team members are also ECPs:

- BBR ECP Germany
- TAURUS ECP Luxembourg
- UEHR ECP Greece
- UMS RIATE ECP France

Via these partners a constant and good networking, including exchange of information, has been guaranteed.

## **Networking with other actors in the field of European Spatial Development**

During the project life time the networking with other related actors was not developed in a formal way. A lot of ESPON TPG participants are working also for other European programmes or initiatives. In this way an 'informal' and limited ex-change has taken place. The foreseen intensive networking with the different INTERREG offices has not been started

### **3.3.2 Self-evaluation**

This subchapter includes critical reflections and ideas for improvement.

The EPON Project 3.1 started its work in July 2002 with seven other projects. At the beginning not only the TPGs were in the situation to find itself. For the project team of 3.1 as well as for the co-operation with the ESPON Programme level, ESPON Contact Points and other TPGs during mentioned time the high willingness of all participants to co-operate on a very informal and pragmatic basis has to be highlighted. A lot of unconventional solutions were find. Vía these a good and trusting basis was established.

As mentioned above the team fulfilled the contract. The co-operation with the CU was good and fruitful. Challenging was at the beginning the little bit unsettled position of the cross-co-ordinating project in relation to the other transnational project groups. That hindered the first approaches towards scientific work. The project was often seen as the "odd-job man" of the ESPON Co-ordination Unit and/ or the DG Regio. Such situations have to be prevented for further cross-co-ordinating projects from the beginning.

Some interventions by higher level authorities concerning requested tasks were so intensive, restrictive and long lasting, that it was nearly impossible to urge the TPGs once again to contribute on a voluntary basis.

Most of the other projects were expecting at the beginning developed methodologies and concepts or at least approaches. Also data, indicators and typologies were requested directly at the beginning. Sometimes the 3.1 team was seen as the "free of charge supplier". After a while this was also clarified and mutual exchange was possible. The team has done its best to fulfil the demands of the projects, but for new projects it must be clear that above mentioned work has also to be realised by themselves.

The situation on data was not only for the 3.1 team at the beginning very difficult, but over the time and in co-operation with all TPGs a sound data base has been established. Of course, there are data gaps. It would be exceptional if there would not be gaps. For instance limitations of the ESPON data base, e.g. in terms of EUROSTAT updates, has to be mentioned, as these slow down research activities in the project, as far as analyses depend upon the respective data availability.

It is one important task for the further cross-co-ordinating projects or a special project to fill above mentioned gaps over the programme time. In addition continuity of the data base has to be guaranteed.

The high pressure of the Programme in order to come to first tentative results and include these in the 3<sup>rd</sup> Cohesion Report cost most of the project partners a lot of their budget resources. Subsequently the partners were unsure concerning the project schedule as well as their planned use of staff over the project time.

### ***Formal obstacles to overcome***

In the 3.1 project team a lot of unsettled formal challenges cropped up. The mutual understanding, trust and efforts helped the team.

Especially the change of the financial management of the ESPON Programme 2006 has brought project partners in very precarious situations, mostly concerning their financial situation by not getting the claimed money in time. Also this change faced the partners with the use of additional time resources for applying. Further deep changes, like the mentioned one, have to take the situation of the projects and its partners in mind. This topic was mentioned by most of the projects.

For a possible ESPON II also the contracts should be revised. A lot of entities had hard problems and needed a lot of salesmanship to get the contracts signed.

### ***Ideas for improvement***

The ECPs which are involved in ESPON Projects are asked to discuss problems and progress of the TPGs in the ECP forum. All in all the ECP network could be better integrated and used. But a clear division of tasks is requested. The ECPs should not act as a scientific board, they should try to help and support the TPGs.

An electronic news letter for the information of the ESPON network as well as scientific and political networks outside the "ESPON world" is needed. Especially after the ESPON Seminars such an e-letter including the seminar results would be very helpful.

ESPON Seminar are mostly seen by scientist as not sufficient for a scientific exchange. Therefore additional meetings or fairs could help to foster the scientific exchange. The organisation of such meetings for interchange are very wide and can start with special topics like polycentrism and accessibility or orientate the organisation along the strands of the programme.





## **Goals and Concepts**

- 4.1 Introduction**
- 4.2 EU Goals**
- 4.3 The territorial Standpoint**
- 4.4 From general to territorial goals**
- 4.5 Common framework for spatial concepts**
- 4.6 Clarification of Spatial concepts**



## **4 Goals and Concepts**

(by Ph. De Boe and Th. Hanquet, PhDB consultant)

### **4.1 Introduction**

As a chapter of part 4 of the 3.1 Final report, devoted to the Integrated Tools, this report on Goals and Concepts presents the operational outcomes of work done in the frame of Work Package C.10 (Concepts and Typologies) of the tender.

The contents of the chapter are based on the one hand on a compilation and synthesis of various sources (inputs from the TPG's reports, but also reference documents - such as the ESDP, the Cohesion Reports, or the Constitution for Europe – and contributions prepared by other 3.1 partners), and on the other hand on own research, more particularly on the role of concepts in the ESPON perspective, and on the topics of territorial cohesion and territorial integration.

In order to process the available material as objectively and systematically as possible, all inputs have been integrated in a database relating each piece of text (and its references) with the concerned concept(s). The total number of quotes processed amounts to some 3000 records, and the links between quotes and concepts to some 6000 records. In a second pass, all records have been browsed again in order to identify which ones could provide elements of definitions and/or links with indicators and typologies for one or several concepts. The result served as basis for the text, particularly the part on clarification of concepts.

Even if they are not often explicitly referred to in the text, inputs from the TPG's reports provided an abundant material which was largely used in writing this chapter. Available time did not allow to browse reports of August 2004 as thoroughly as those of the previous deliveries, but it appeared that inputs on concepts had generally not been further developed in the later deliveries. Still it is always possible that the chapter does not do justice to some of the conceptual inputs they might contain.

Although the Terms of Reference (ToR) for ESPON project 3.1 do not explicitly require that the final report should contain a section on goals and concepts, they indirectly indicate that such topic is of special interest with regard to the elaboration of a common ESPON framework:

- one of the tasks assigned is the "clarification of spatial concepts and territory as a common framework for all ESPON projects" (point A4);

- another task concerns the "interpretation" of the ESDP objectives, and the potential usefulness of a territorial approach to ensure their coherence:

*"According to some critics, cohesion, co-operation, preservation and competitiveness are highly exclusive with respect to one another, and that opposite political claims do not represent a pertinent context of sincere research. The question is whether, or to what extent, with the territorial reference it is possible that these elements can be reconciled simultaneously towards common objectives.*

*Furthermore it should be investigated, whether there are visible limits of the spatial approach, and how it could be further improved. The territorial approach was put on the agenda in order to bring added value to policies through better co-ordination of their overall impact. How far can the territorial approach support economic and social cohesion and sustainable development of the EU, and how?" (point B.1.2)*

In accordance with the ToR, one of the sections of the 3.1 TIR was devoted to the identification of orientations on an implementation of territorial objectives into EU policies. While reflecting on this topic, it appeared that trying to express more clearly and openly territorial objectives (or goals) could indeed constitute a significant part of the common framework for ESPON research:

- by contributing to a common reference for the assessment of the territorial impact of EU policies;
- by providing clearer orientations for policy recommendations;
- by fostering a common reflection that can gradually be integrated in the practice of decisions makers in territorially significant domains.

Obviously the topic of goals and concepts in a European context is a huge one, notably in the sense that so many things have been and are still written about and around them, be it directly or indirectly. It is not at all an intention here to synthesise all that material nor to render all its subtleness and nuances, even less to come on top of it.

The aim here is to build on existing material in order to develop a more directly operational framework for the ESPON research. That aim is nonetheless very ambitious, given the novelty of such an approach and the fact that things have to be put down in black and white at some point, which is a challenge in sensitive matters.

Hence the results presented should rather be considered as a contribution on the way toward a conceptual "integrated tool".

## 4.2 EU goals

The recently signed Constitution for Europe contains in its articles I-2 and I-3 a synthesis of respectively the Union's values and objectives (see box).

For the first time ever, the "territorial" qualifier appears in the enumeration of the fundamental objectives of the Union, applied to cohesion. This can be viewed as the sign of an increased awareness of the territorial dimension of issues and as a significant promotion for a territorial approach of realities.

While all objectives stated in the Constitution may have - to one degree or another - territorial implications, some of them have a more obvious territorial dimension, such as sustainable development, improvement of the quality of the environment, safeguard and enhancement of cultural heritage. None of those was present in the original Union Treaty (Maastricht). This evolution also illustrates how territorial issues have lately come to the foreground.

Result of a long process, explicit reference to the territorial dimension is mostly to be seen as a starting point for the development of an enriched approach. A sectoral culture has indeed developed for many years, notably in the scientific sphere, and it will certainly take some time to reach an equivalent know-how level in a territorial approach. It is acknowledged that "territorialisation" means increased complexity.

Making the link between high order objectives and territorial goals remains a challenge, both because the added value of a territorial approach is not always clearly perceived, and because the wide potential field of investigation makes it necessary to rely on a dedicated way to approach issues, and hence to work out some kind of structure providing a coherence.

The ESDP, which was adopted by the Commission and the Member States (EU15) in 1999, five years before the Constitution, had already done the effort of reflecting on the territorial significance of the Union's objectives. Starting from an integrated view of three fundamental goals of European policy, it illustrates them by the "triangle of objectives for sustainable spatial development", with as summits its three dimensions: economy, society, environment. The triangle suggests the balance and complementarity between the goals, among which the ESDP emphasises three that encompass a significant territorial dimension:

- economic and social cohesion;
- conservation and management of natural resources and the cultural heritage;
- more balanced competitiveness of the European territory.

## Figure 23 Article 2 of the Constitution for Europe

### Article I-2: The Union's values

*The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities.*

*These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men prevail.*

### Article I-3: The Union's objectives

*1. The Union's aim is to promote peace, its values and the well-being of its peoples.*

*2. The Union shall offer its citizens an area of freedom, security and justice without internal frontiers, and an internal market where competition is free and undistorted.*

*3. The Union shall work for sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance.*

*It shall combat social exclusion and discrimination, and shall promote social justice and protection, equality between women and men, solidarity between generations and protection of the rights of the child.*

*It shall promote economic, social and territorial cohesion, and solidarity among Member States.*

*The Union shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced.*

*4. In its relations with the wider world, the Union shall uphold and promote its values and interests. It shall contribute to peace, security, the sustainable development of the Earth, solidarity and mutual respect among peoples, free and fair trade, eradication of poverty and the protection of human rights, in particular the rights of the child, as well as to the strict observance and the development of international law, including respect for the principles of the United Nations Charter.*

*5. The Union shall pursue its objectives by appropriate means commensurate with the competences which are conferred upon it in the Constitution.*

Source: Treaty establishing a Constitution for Europe, Conference of the Representatives of the Governments of the Member States, Brussels, 13 October 2004 (CIG 87/04 Rev 1)

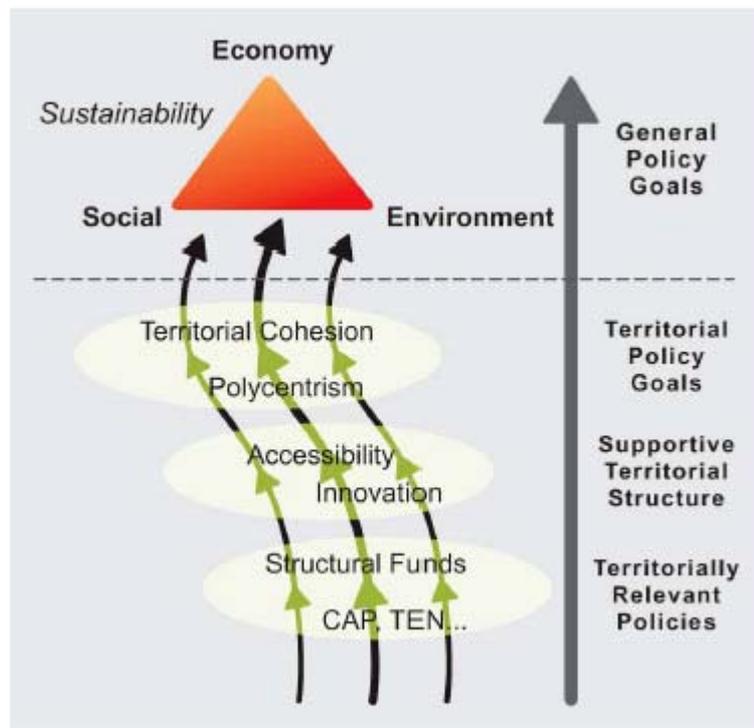
The ESDP insists that these three fundamental goals must be considered together, pursued simultaneously in all regions, and their interactions taken into account. They are translated into three territorial guiding principles, or territorial objectives:

- development of a balanced and polycentric urban system and a new urban-rural relationship;
- securing parity of access to infrastructure and knowledge; and
- sustainable development, prudent management and protection of nature

Although the relevance of the ESDP territorial objectives to achieve the fundamental objectives is sometimes questioned, they have been officially adopted (Potsdam 1999) and hence are taken as a starting point for the ESPON approach (ESPON CIP, Terms of Reference of the projects).

The relationships between general goals, territorial objectives / goals and territorially relevant policies, as viewed in the ESPON approach, are illustrated in the following figure taken from the 3.1 TIR.

**Figure 24 Sectoral policies / instruments for a sustainable development**



Source: ESPON Project 3.1, Third Interim Report, 2003

The ESPON is expected to take on board the recent developments (rise of the concept of territorial cohesion, Lisbon / Gothenburg strategy, enlargement,...) and to operationalise the ESDP. Both requirements imply

that the reflection on "territorial goals" should be pushed somewhat further – in terms of consistency and in terms of operational implications.

This raises the following question: what can be the specificity and added value of the territorial approach of European goals? And, first and more fundamentally, how can we identify and interpret "territory" and "territorial"?

### 4.3 The territorial standpoint

Several ESPON TPGs have more or less explicitly reflected on the notion of territory in their reports. Their contributions provide a vision on the concept and its relationships with other ones such as "space". *"The territory has been defined as an "appropriate space" (R. Brunet). Whatever be the scale taken into consideration, Europe, State, Region, Village, it has been built either by History or by institutions or else by collective logics, or by all of these elements together. It implies a notion of identity, authority and, increasingly, a notion of planning (Country charter, European plan). Therefore it is not a space a priori bordered with intangible limits."*<sup>1</sup>

*"The novelty dwells in the discovery of the "territory" by the economists who formerly considered the space as a neutral category. The territory is not interchangeable and neutral, it has a history, particular inhabitants and spatial relationships that are not reproducible and constitute an immobile resource"*<sup>2</sup>. It is also *"a space which is not only economic but also bearing a project and solidarity for the community living in it"*<sup>3</sup>.

A number of implications may be deduced from this approaches:

- territory is composed of many aspects which are superimposed on one another in a same place (like thematic layers), ranging from relatively fixed and stable aspects (location, climate, natural resources,...) to more immaterial and evolutionary aspects (history, language, religion, culture,...) which interact with each other;
- territory is not only made of "features" but also of (notably spatial) relationships;
- territory is affected by time (reminded through the notions of "history" and "immobile resources").

One may add one more dimension of territory, that the ESPON has particularly emphasised through its 3-level approach (see hereafter):

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<sup>1</sup> 1.1.1 FR, Annex report A (Critical dictionary of polycentrism), page 12

<sup>2</sup> 1.1.1 FR, Annex report A (Critical dictionary of polycentrism), page 39

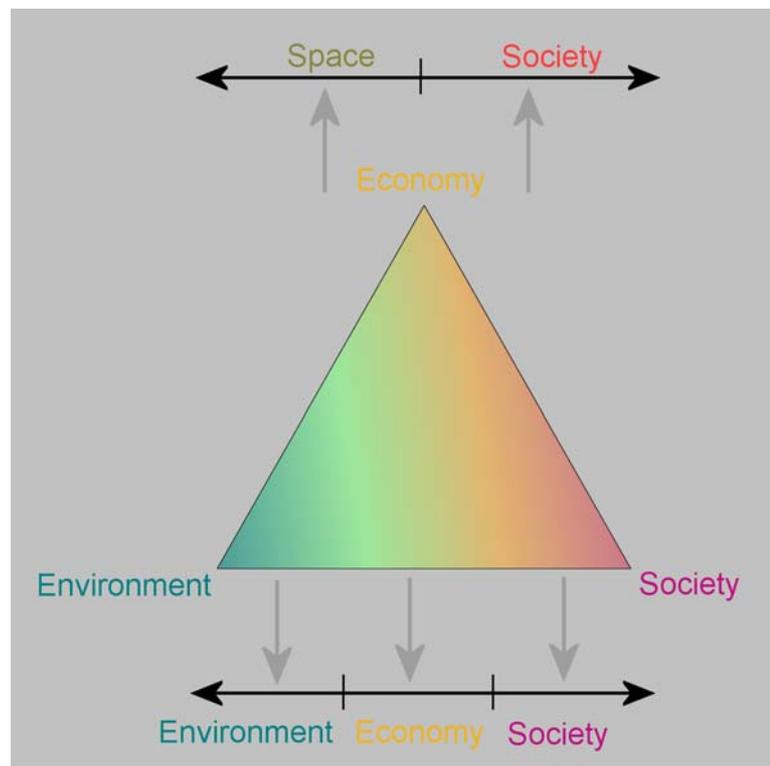
<sup>3</sup> 1.1.1 FR, Annex report A (Critical dictionary of polycentrism), page 28

- scale, which applies to the territory itself as well as to the context in which it is viewed, notably when considering spatial relationships; scale of the territory and scale of the context may be but are not necessarily interdependent (according to the issues the scope of the context may vary).

Making a synthesis out of this in order to operationalise the notion, three dimensions are identified for the territory:

- domains ("thematic layers"): there may be such a number of different domains that we need to summarise them in a meaningful way, e.g. space / society, or – probably more significant for the ESPON - the three dimensions of sustainable development, referred to in the ESDP as the "triangle of sustainability": economy, environment, and society; both standpoints can be linked, as shown in the figure;

**Figure 25 Two standpoints over the "thematic layers" of territory**



Source: Ph. De Boe and Th. Hanquet (PhDB consultant), 2004

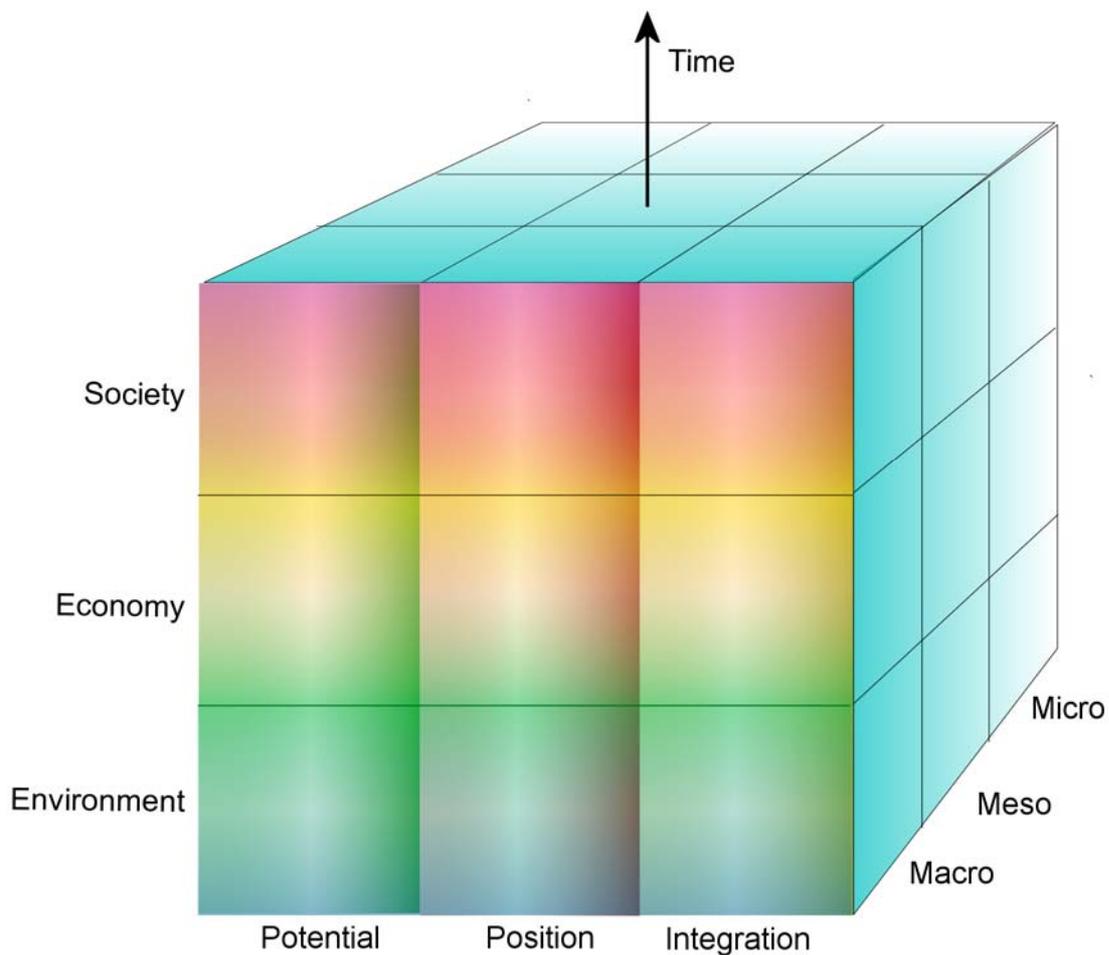
- components of territory, i.e. its own features (potential), its features with regard to those of other territories (position) which enables potential interactions with them, and its effective interactions (exchanges, co-operation) with other territories (integration);
- scale(s): while many different sets of scale may be considered, particularly when distinguishing scale of the territory and scale of the

context, it helps to define a reference set. For the ESPON research a three-level set of scales has been adopted according to the First Guidance paper: macro (European level), meso (transnational / national level), and micro (regional / local level).

Time enters in most territorial issues, either directly (when considering past evolutions, or scenarios and policies for the future), either indirectly (through the notion of "fixed assets", "permanent geographical handicaps", etc.). Time may be considered on long / medium / short ranges, and with different starting points (in the past, in the present).

These three dimensions of territory can be represented with a cube, which becomes a "hypercube" if the time dimension, as a fourth one, is added.

**Figure 26 The "hypercube" of territorial approach**



Source: Ph. De Boe and Th. Hanquet (PhDB consultant), 2004

#### **4.4 From general to territorial goals**

The ESPON programme is expected to help complement and implement the ESDP:

- complement it by studying more in depth trends and impacts of policies,
- implement it by showing efficient ways to achieve its aims and options.

Linked with a broader agenda, ESPON is focused on aspects more relevant for the actual issues at stake, such as enlargement and its implications for EU policies, coming in a context of growing globalisation, of threats for sustainable development, and of concerns about improving governance<sup>4</sup>.

Focusing implies prioritising the approach without limiting it. Two key territorial objectives have been considered as central by both the ESPON CIP and by most ToR, and explored in some detail by the intermediate 3.1 reports:

- territorial cohesion;
- polycentric development.

These key territorial objectives appear as conditions for making the European policies benefit all parts of the enlarged EU and strengthen its position in the global context. Of course they must be viewed in the larger framework of the ESDP objective of balanced and sustainable development, i.e. take into account other aspects / objectives such as fostering competitiveness, caring for social issues, managing natural and cultural resources, etc.

The TPG's reports show that there is a wide variety of standpoints on both territorial objectives. Hence the interest to take as a reference the four dimensions of the territory represented with the "hypercube" of territorial approach (figure 2). This allows the different views to fit in a common framework.

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<sup>4</sup> White Paper on European Governance of the European Commission (2001).

## 4.4.1 Territorial cohesion

### 4.4.1.1 Conceptual bases

Although territorial cohesion is a leitmotiv of the ESPON 2006 Community Initiative Programme (CIP), few TPGs have explicitly elaborated on its meaning. Together with the attempts to define indicators of territorial cohesion, some thoughts on that topic however show that there is a wide variety of approaches, from the now traditional measurement of some socio-economic disparities to more complex approaches.

It may also be observed that until now, none of the "reference" documents that present territorial cohesion as an important concept has provided a real definition for it. This difficulty (sometimes reluctance) to enclose territorial cohesion inside a definition probably results both from the complexity of the concept and from its potential implications for policies.

Of course territorial cohesion could for example be described as cohesion between / inside territories, but this would not solve the problem, as there is no European official definition of cohesion<sup>5</sup>.

What is the closest to a definition can be found in two different sources which provide a globally similar description. The first one is the Third Cohesion Report:

*"The concept of territorial cohesion extends beyond the notion of economic and social cohesion by both adding to this and reinforcing it. In policy terms, the objective is to help achieve a more balanced development by reducing existing disparities, avoiding territorial imbalances and by making both sectoral policies which have a spatial impact and regional policy more coherent. The concern is also to improve territorial integration and encourage cooperation between regions."* (page 27)

The second one is the discussion paper presented to the Galway Conference on territorial cohesion (25-27 May 2004):

*"As a policy objective, territorial cohesion aims to contribute to the harmonious and balanced development of the Union by reducing economic and social disparities, by preventing territorial imbalances from emerging and by making sectoral policies that have a spatial impact more coherent"*

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<sup>5</sup> The ScadPlus glossary (<http://europa.eu.int/scadplus/leg/fr/cig/g4000.htm>) does not contain a "cohesion" entry, but an "economic and social cohesion" entry, which gives some insight:

*"[...] Economic and social cohesion is an expression of solidarity between the Member States and regions of the European Union. The aim is balanced development throughout the EU, reducing structural disparities between regions and promoting equal opportunities for all individuals. [...]"*

*with regional policy. Territorial cohesion also aims to improve territorial integration and encourage cooperation between regions."*

In both cases, territorial cohesion is not presented as a concept summarising or describing an actual or wished situation or process, but rather as a "bundle" of policy actions in various domains. A few points deserve to be underlined:

- reduction of disparities appear as one of the ways to "implement" territorial cohesion but not the only one;
- integration and co-operation between territories are emphasised;
- a link is made with "territorial coherence" of the policies, a theme often associated with territorial cohesion, but whose scope is different (territorial coherence can be seen as a way to pursue a number of other goals as well, such as efficiency, territorial competitiveness, etc.).

Definitions such as the quoted ones raise the question of distinguishing what is the aim and what are the means, particularly when it comes to operationalise a concept. But given the sensitiveness of the issue, it seems more sensible in the ESPON context to focus on what is (seen) inside the concept (bottom – up) rather than to try to delineate it abstractly in a normative way (top –down) which would hardly fit with the current standpoints.

The approach should be sufficiently broad in order to encompass the different visions (there is no a priori reason to eliminate some and keep others), while giving as much coherence as possible to the whole. It should also fit in a process, as it can be expected that the reflection on territorial cohesion will be an ongoing one, built step by step along with the progress of "territorial awareness".

#### **4.4.2 References**

Territorial cohesion is only mentioned a couple of times in the ESDP, but emphasised by the Second and Third Cohesion Reports, and now introduced (but not defined) as an objective in the Constitution (article I-3, where "territorial" has been added to "economic and social cohesion"<sup>6</sup>). This addition is also reflected in article III-220 (ex Article 158 EC Treaty), where considerations have also been introduced about the need to pay particular attention to specific types of areas.

#### **Figure 27 Article III-220 of the Constitution for Europe**

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<sup>6</sup> Nowhere in the Constitution is "territorial cohesion" treated as a concept of its own. It is always coupled either with social cohesion or with economic and social cohesion.

#### ARTICLE III-220

*In order to promote its overall harmonious development, the Union shall develop and pursue its action leading to the strengthening of its economic, social and territorial cohesion.*

*In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions.*

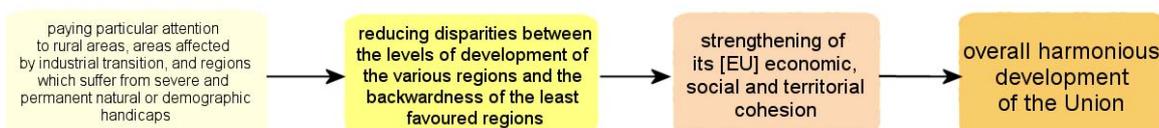
*Among the regions concerned, particular attention shall be paid to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, cross-border and mountain regions.*

Source: Treaty establishing a Constitution for Europe, Conference of the Representatives of the Governments of the Member States, Brussels, 13 October 2004 (CIG 87/04 Rev 1)

This echoes to the chapter of the Third Cohesion Report about territorial cohesion, which focuses on territorial imbalances and on regions with geographical handicaps.

The formulation of article III-220 gives a good illustration of the cascade of objectives in which (territorial) cohesion fits, which can be grossly represented as follows (from the means on the left to the highest level objective on the right):

**Figure 28 Cascade of objectives in article III-220 of the Constitution**



Source: Ph. De Boe and Th. Hanquet (PhDB consultant), 2004

Through the wordings "*in particular*" or "*particular attention shall be paid*", the formulation also expresses that the links inside the chain of objectives are not exclusive. A given objective in the cascade is one way, but not the only possible way, to reach the higher order objective.

#### 4.4.3 Territorial approach toward the concept

Doubts are sometimes expressed about the added value of territorial cohesion compared to economic and social cohesion. Indeed, if a territorial approach is assimilated to a sectoral approach whose specificity is the type of reference unit<sup>7</sup>, the question makes sense. The article of the EC Treaty

<sup>7</sup> For example: "*Territorial cohesion: the expression, existence or appearance of economic and/or social cohesion when analysed by territory (q.v.) - as opposed to, say, its expression in terms of different types of enterprise, or season, or some other variable*". (contribution kindly sent by K. Thomson (TPG 2.1.3) on 04/06/2003 at the request of TPG 3.1 for the elaboration of an ESPON glossary).

relative to economic and social cohesion already refers to regions, thus to a certain type of territory. In the same logic, analyses in terms of regional features were already present in the First Report on Economic and Social Cohesion (1996), before any official reference to territorial cohesion.

But if "territorial" is understood in a broader way, i.e. with the four above mentioned dimensions of the territory, the "territorial" qualifier applied to cohesion opens much wider perspectives.

On the background of the above given information, the concept of territorial cohesion and its elements could be approached as described hereunder.

### Time dimension

Referring to "*severe and permanent natural or demographic handicaps*", article III-220 of the Constitution conveys the idea of the relative inertness of territorial features. This suggests that the aim is not so much to reduce territorial disparities presented as permanent, hardly reducible, than to compensate them in order to progress toward a similar level of sustainable development.

### Domains

Considering the ultimate goal of article III-220 ("overall harmonious development of the Union"), territorial cohesion appears as a complement to economic and social cohesion which should help to reach balanced and sustainable development, through considering all axes of development, beyond some specific economic and social aspects, and their interdependencies. This reminds of the aim of the Lisbon / Gothenburg strategy, which also incorporates a multi-dimensional vision of development. In that multi-sectoral view, territory is a unique combination of different features, which give it specific assets and handicaps. Together with the aim of harmonious development, this recalls the Union's devise: "*united in its diversity*".

### Components

There is clearly a tension between the inertness and uniqueness of territorial features (whether they are considered as handicaps or as assets) and the wish to progress toward harmonious and balanced development. But there is also a solution when considering the three components of territory (potential, position, integration): it is not only the fixed potential of the areas that counts, but also the potential / actual interactions with other areas<sup>8</sup>. Those may also be used to "correct" the disparities and, beyond, to

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<sup>8</sup> The basic meaning of cohesion refers to interactions rather than to similarities: "*The act or state of sticking together; close union*" (Webster's 1913 Dictionary).

enhance potentials through complementariness and synergies. The "integration" component is indeed emphasised in the "Galway definition" of territorial cohesion.

This way to envisage territorial cohesion is obviously quite different from the current static and fragmented perception. It is far from being accepted right now, what could explain that its implications have not yet been explored in the ESPON research. It should probably be considered as a longer term perspective.

### Scale

Scale becomes particularly important if one takes into account the "interactions" dimension of cohesion. According to the scale of the considered units / context, cohesion is viewed differently. For example, strong cohesion at a scale does not mean that cohesion at an upper scale will also be strong. In some cases it can even be the reverse, internal cohesion being achieved at the expense of cohesion at a higher scale.

The dimensions of territorial cohesion may thus be represented in the same way as territory, through a hypercube where all components are identifiable and interlinked.

## **4.4.4 Polycentric development**

### **4.4.4.1 Conceptual bases**

Unlike territorial cohesion, polycentrism has inspired many considerations to ESPON TPGs, particularly on its dimensions and conditions. The visions are also quite diverse, some emphasising the physical / morphological, others the functional / relational aspects. Some insist on governance, others on the relationships between scales of polycentrism. The concept may also be viewed from a descriptive or normative standpoint. Different visions may even be expressed inside a same report.

The definition of polycentrism (as a feature of an urban system) proposed in a report of August 2003:

*"A polycentric urban system is a spatial organisation of cities characterised by a functional division of labour, economic and institutional integration, and political co-operation."*<sup>9</sup>

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<sup>9</sup> 1.1.1 TIR, page 3

was not maintained in the final report, which rather focuses on the different facets of polycentrism (e.g. morphological and relational polycentricity) and on the meanings of the concept according to the context and scale ("*continental or national perspective*" vs "*regional or local scale*"<sup>10</sup>). This may illustrate the difficulty to encompass all aspects of polycentric development in a single vision.

In that same report, polycentric development is instead delineated through opposition to other types of spatial structures:

*"Polycentricity is opposed to monocentricity, in which service provision and territorial management competence is increasingly concentrated to a single centre. Polycentricity is also opposed to urban sprawl, in which the structure of secondary centres is diluted in a spatially unstructured continuum. Rather, polycentricity is about promoting the balanced and multiscale types of urban networks that are most beneficial from a social and economic point of view, both for the core areas and for the peripheries."*<sup>11</sup>

#### **4.4.4.2 References**

Polycentrism is a genuine spatial concept introduced in the European context by the ESDP. It is not mentioned in more general texts such as the Treaties or the Constitution and is referred to only in the Second of the three Cohesion reports.

The ESDP introduces polycentrism as a part of a "*territorial guiding principle*", derived from the three fundamental goals. That suggests that polycentrism is not viewed as an aim by itself, but rather as a way to act on the spatial dimension of realities in order to achieve or progress toward the "higher order" goals. Some TPGs express such vision in their reports: "*Polycentricity is supposed to contribute to balanced regional development, European competitiveness and sustainable development, and to facilitate new urban-rural partnerships*"<sup>12</sup> or "*The concept of polycentric development is understood as an operationalisation of territorial cohesion.*"<sup>13</sup>

Although polycentrism is here linked to cohesion, the ESDP does not privilege the relationship of polycentrism with one of the three "fundamental objectives" in particular. Polycentrism appears rather as a way to progress toward sustainability, and thus concerns all three summits of the "triangle of sustainable spatial development".

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<sup>10</sup> 1.1.1 FR, Part 1 (Executive summary), page 3

<sup>11</sup> 1.1.1 FR, Part 1 (Executive summary), page 3

<sup>12</sup> 1.1.1 FR, Part 2, page 37

<sup>13</sup> 2.2.1 TIR, page 34

In this view, "*Polycentric development is used as a bridging concept merging the policy aims of economic growth and balanced development*"<sup>14</sup> and is a multi-sectoral approach of spatial structures. Polycentrism appears clearly here as a way to overcome the conflict between competitiveness and equity referred to in the Introduction, through the mediation of the territory.

#### **4.4.4.3 Territorial approach toward the concept**

Like visions of territorial cohesion, the visions of polycentrism given by the TPGs differ significantly in their scope. Some focus on urban systems, others also consider the links with the rest of the territory, in particular the countryside: "*Stronger relations between cities and their surrounding hinterlands is another aim of polycentrism. The objective is to achieve complementarity between the cities and the rural area to lupt against urban centripete processes and the idea that growth can afterwards be spread in all directions.*"<sup>15</sup>. This last view seems more in line with the ESDP, for which the "*development of a balanced and polycentric urban system*" is coupled with "*a new urban-rural relationship*".

All this shows that polycentric development, like territorial cohesion, exhibits the three dimensions of territory:

- multi-sectoral aspect: polycentrism relies on and affects natural features, economic structures and social structures;
- important role of all components (potential, position and integration): especially because of the importance of relationships between the poles and between each pole and its surroundings;
- issue of scale: particularly emphasised by the TPGs, which underline that the issues differ according to the scale, and that there is a question as to how polycentrism at one scale links with polycentrism at upper or lower scales;

The time dimension is obvious, notably because of the prospective dimension, as the European territory is acknowledged as actually not polycentric.

Polycentric development may thus also fit in a "hypercube" formalisation.

This allows to view both territorial goals with a "common grid". This is useful not only to analyse issues, but also to develop political recommendations.

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<sup>14</sup> 2.2.1 TIR, page 3

<sup>15</sup> 1.1.1 FR, Annex report A (Critical dictionary of polycentrism), page 18

For example, it can help to ensure that all dimensions are taken into account, and to identify links between them.

## **4.5 Common framework for spatial concepts**

### **4.5.1 Underlying principles**

Discussion of the two key territorial objectives – territorial cohesion and polycentric development - emphasises the interest to structure the reflection about spatial concepts in order to make them usable in the ESPON framework.

This does not only apply to high order and relatively complex notions such as those two. The ToR of project 3.1 require clarification of other spatial concepts<sup>16</sup> "as a common framework for all ESPON projects". For other projects also there is a similar requirement toward specific concepts more directly related with their research topic. In addition, there is a number of spatial concepts that are referred to in the CIP, in the ToR or in reference documents (ESDP, Cohesion reports), whose apprehension plays a role in the common ESPON approach.

Of course the aims of such "framing" approach differ according to the nature of the concept. For the two key territorial objectives, the main aim is to clarify the perspective in which the whole ESPON research is expected to fit. For other more "concrete" concepts, it is to show how those are or may be linked with the two key territorial objectives and with each other, in particular the role each may play with regard to a territorial approach with policy implications. Besides the need to structure the contents of each concept, there is also a need to structure the links between them.

Once the links between concepts and their specific role in the approach are defined, it becomes more relevant and useful to apply a similar framework (formalized with the "territorial hypercube") to the contents of each of them. Of course, in some cases only a part of the framework will be concerned (e.g. "social integration" will occupy a specific place in the cube). But it will be possible to view how each standpoint can contribute to the global approach (e.g. "social integration" as a particular facet of "territorial cohesion").

Direct links could be established between "associated" concepts belonging to different categories of operational notions (aspects, objects, tools) when they clearly belong to a same sector or domain. This is not often the case

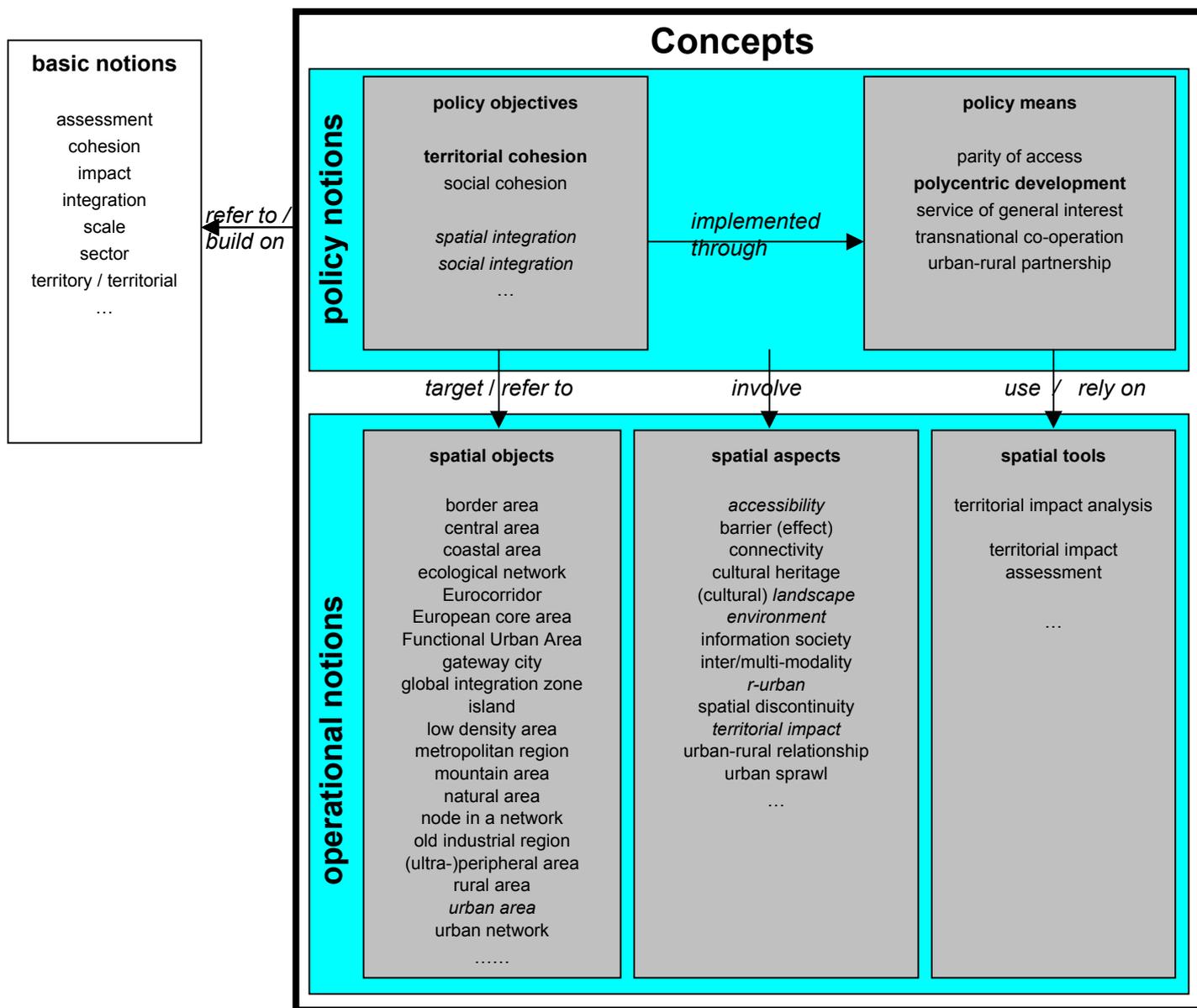
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<sup>16</sup> Accessibility, environment, landscape, r-urban, social integration, spatial integration, territorial impact (assessment), urban area.

though, and such a sectoral subdivision of the categories has not yet been systematically attempted.

The attempt to classify the spatial concepts and to identify the links between the categories represented on Figure 4 is commented in point 5.2

**Figure 29 Classification of spatial concepts and links between the categories**



Source: Ph. De Boe and Th. Hanquet (PhDB consultant), 2004

## **4.5.2 Categories of spatial concepts**

A distinction must be made between “spatial concepts” and “basic notions”. Basic notions are the bricks used to build concepts. In themselves they are not directly usable, but it is important for sense and consistency that their meaning be clarified and apprehended in a same way whatever concept they are integrated in. Among significant examples of basic notions are “territorial”, “cohesion”, “integration”, “impact”,...

Inside the ESPON study field, two main categories of spatial concepts are distinguished: policy notions and operational notions. Although both are not always easy to tell apart, policy notions are defined as those which include a dimension of goal, intention or action, while operational notions have a more pronounced technical dimension as they qualify either observed realities or tools designed to handle these realities.

It may happen that a concept belongs to one or another category according to the standpoint adopted. A same notion such as accessibility may be viewed as something which describes an observable reality or as something that should be enhanced in order to progress toward some territorial objectives, and has even sometimes been presented as an objective in itself. This is not a genuine problem as long as the context clearly shows in which meaning the concept is used.

### **4.5.2.1 Policy notions**

#### **4.5.2.1.1 Policy objectives**

Policy objectives are of two different orders:

- some have received a status through their inscription in fundamental texts such as the Treaties and the Constitution; they are considered of higher order: sustainable development, economic, social and territorial cohesion;
- others represent a facet of a higher order objective: social integration as a facet of (social) cohesion, spatial integration as a facet of (territorial) cohesion.

Requirements:

- to agree on a common definition / delimitation of the policy objective;
- to identify its links with other objectives and with policy means;
- to identify indicators / combination of indicators that allow to measure progress toward the objective.

#### **4.5.2.2 Policy means**

Policy means encompass different types of means which belong to different standpoints on policies. Those may be fields where decisions may be taken, decision processes and structures, binding or non-binding documents, but also ways to organise decisions in order to direct them toward one or several policy objectives, such as transnational co-operation or polycentric development.

Requirements:

- to agree on a common definition / delimitation of the policy means;
- to assess the potential of the policy means to contribute to progress toward one / several policy objectives;
- to identify indicators that allow to measure implementation of the policy means.

#### **4.5.2.3 Operational notions**

Operational notions are serving policy notions. The aim is not to define them per se but to give them relevance and usefulness in a given context. For example, a concept of "backward area", not useful in itself, becomes relevant in the context of regional policy.

In the ESPON context, all the operational notions have a spatial character. This does not mean that they are intrinsically spatial, but that they are considered under a spatial angle.

##### **4.5.2.3.1 Spatial aspects**

Aspects on which policies may act and domains where policies may be carried out. Some aspects have a more direct spatial character (accessibility, landscape,...) than others (information society,...).

According to the standpoint (more descriptive or more political), there is a possibility of overlap with the category "policy means" (at least for some items).

Requirements:

- to identify the spatial standpoint for the given aspect, in particular for the more "general" ones;
- to identify relevant indicators to measure and assess the variations of this aspect with regard to spatial issues / objectives.

#### **4.5.2.3.2 Spatial objects**

Identifiable objects to which policies are applied or which are used as references to apply policies ; these might be individuals, groups, political structures, regions,... In ESPON context, spatial objects are of special interest ; examples : urban areas, rural areas, islands, mountains, low density areas, border areas, backward regions; spatial objects may constitute elements of typologies (this fits with the way concepts and typologies are presented together in the ToR).

Requirements:

- to agree on a common definition / delimitation of the given spatial object;
- to link it with spatial issues;
- to find relevant indicators that allow to spatially identify specimens of the spatial object;
- to find indicators and methods to assess the evolution of (specimens of) the spatial object with regard to the policy objectives;
- when relevant, to build (a) typolog(y)ies of the spatial object or on basis of several spatial objects.

#### **4.5.2.3.3 Spatial tools**

Tools that may be used in order to apply policies to objects. It has links with policy means and may also group different types such as general tools, sectoral tools, conceptual tools, but with a more concrete and operational character than what has been defined as policy means. In ESPON context, spatial tools are of special interest; example: plans, guidelines, spatially integrated programs, territorial impact assessment (TIA).

Requirements:

- to agree on the contents of the spatial tool;
- to agree on the scope of its action with regard to policy objectives;
- to identify methods to implement the spatial tool in a relevant and efficient way.

## **4.6 Clarification of spatial concepts**

Needless to say, the enumerated challenges cannot be met within a few months or even years of ESPON work. Not only do they imply in-depth research, they also require an iterative and interactive process of debate and adjustments in order to reach the needed consistency.

A first exercise of application of the framework to spatial concepts is made here for the set of concepts to be clarified by TPG 3.1, except for the two key policy concepts previously discussed, and except for the concept of territorial impact (assessment) which is not exposed here as it is the main topic of another strand of research inside the 3.1 TPG. A couple of related concepts (global integration zone, metropolis / metropolitan area, rural area) have been added to the list.

The contents are based on several sources:

- reference documents (ESDP, Cohesion reports, SPESP results,...)
- specific inputs from 3.1 partners
- inputs from the reports of ESPON TPGs.

The presentation comprises two parts:

- an examination - concept by concept - of the conceptual bases, including "facets" of the concept and links with other concepts (not exhaustive); policy concepts are presented first, followed by operational concepts;
- a table summarising the specificities of each concept regarding the common territorial approach, with its three dimensions: domains, components and scale.

### **4.6.1 Conceptual bases**

#### **4.6.1.1 Social cohesion / integration**

Social issues as such are not among the main ESPON topics, thus no TPG has especially deepened the notion(s) of social cohesion / integration. However references are given by the Constitution, the Cohesion reports and the SPESP works, and the theme was explored by UEHR as 3.1 partner.

Associated with economic and territorial cohesion in the fundamental objectives of the European Union (in the Constitution), social cohesion is also presented as an aim of Lisbon strategy. Despite this central place in EU aims, it has no official definition. In reference documents, it is rarely isolated from economic cohesion. When analysed separately (e.g. in the Third

Cohesion Report), it focuses more particularly on unemployment disparities and on the risk of poverty.

ESPON contributions do not propose any definition of social cohesion either, although some considerations imply that social cohesion is assimilated with "*similar living conditions*" (2.2.2 TIR, page 17) or "*spatial equity*" (UEHR contribution).

As for social integration, one of the "spatial criteria" explored by the SPESP, the first official draft ESDP<sup>17</sup> has proposed a basic definition:

*Social integration expresses the level of interaction between different social groups in society, distinguished either by age, income, education, habitat, language, culture or nationality.*

The SPESP identified 7 groups of indicators of social integration: demographic structure, economic structure, labour market, income, education, housing and living conditions, social cohesion and political resources. UEHR derives 3 major goals from the objective of social integration:

- satisfying individual needs
- minimizing social discriminations and disparities
- safeguarding social stability

Linked concepts:

- services of general interest: mentioned by the Constitution as means for strengthening social (and territorial) cohesion
- social exclusion / segregation: the "problem" facet of social integration issues
- territorial / spatial cohesion: includes social cohesion as one of its facets
- territorial / spatial integration: includes social integration as one of its facets

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<sup>17</sup> Noordwijk, 1997

#### 4.6.1.2 Territorial / spatial integration

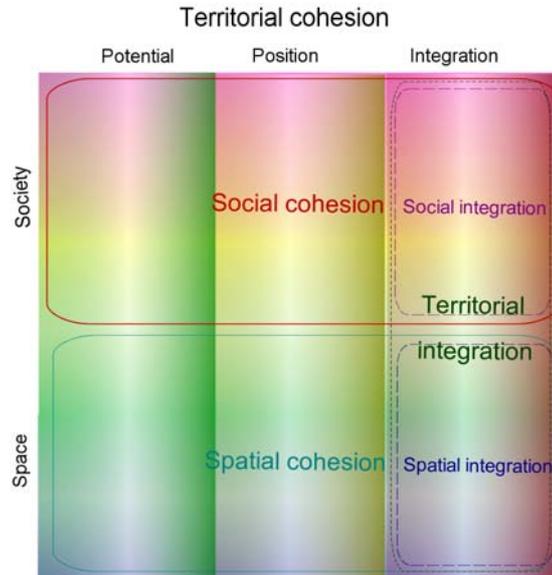
Like social cohesion / integration, territorial / spatial integration is among the seven "spatial criteria" explored by the SPESP. In the ESPON framework, it was mainly analysed by TPG 1.1.1 and TPG 3.1 (PhDB consultant).

The proposed definition for territorial integration is based on the one elaborated within the SPESP for spatial integration:

*Territorial integration is a system of economic, social, political, cultural and personal relationships between territories, which relies on links, complementarities and co-operation opportunities between them, and which may express itself in concrete patterns such as flows, mixes, similarities and cooperative initiatives.*

If we consider that territory may be viewed as a combination of space and society (see «3. The territorial standpoint»), territorial integration may be viewed as the combination of social integration (see «Social cohesion / integration») and spatial integration, where spatial integration designates the links between spatial entities, focusing on more physical and economical features.

**Figure 30 Link between "integration" and "cohesion" concepts**



Source: Ph. De Boe and Th. Hanquet (PhDB consultant), 2004

Territorial / spatial integration can be seen under different standpoints: as a pattern of links or as a pattern of processes, fostered by spontaneous mechanisms and/or by projects of voluntary cooperation.

Relationships may be observed at a moment of time (static) but – more interestingly - viewed as an evolving process (dynamic).

Linked concepts:

- accessibility: focuses on potential whereas spatial integration focuses on effective relationships and processes
- barrier: obstacle to spatial integration or result of deficient spatial integration
- r-urban: rural-urban relationships may be seen as a concretisation of spatial integration
- territorial cohesion: includes territorial integration as one of its dimension
- urban network / cluster: relies notably on territorial integration

#### **4.6.1.3 Global Integration Zone**

TPGs 1.1.1 and 1.1.3, as well as Taurus as 3.1 partner, have reflected on this notion. Their work provides the material for a tentative definition:

*Zones of global economic integration offer high-quality global economic functions and services, which enable a high-income level and relies on a well-developed knowledge base and good global communications infrastructures.*

The ESDP presents the "Pentagon" (with London, Paris, Milan, Munich and Hamburg as corners) as the only actual GIZ in Europe. A polycentric development perspective implies to research whether other areas in Europe may have the potential to play a similar role. Some TPGs (namely 1.1.1, 2.2.2) have identified smaller areas that could be potential GIZs.

Facets:

- assets, by type (production base, global services, transport and telecommunications infrastructure, research and information centres, integration in global markets,...)
- assets by field (size, competitiveness, knowledge base, connectivity,...)
- spatial structure (mono- or polycentric)
- spatial extension (possibly trans-national) and distribution
- organisational aspects.

Linked concepts:

- polycentric development at macro scale: encouragement to develop several GIZs outside the "Pentagon" - see ESDP § 70
- metropolitan regions: internationally accessible metropolitan regions are viewed as important components of a GIZ.

#### **4.6.1.4 Metropolis / metropolitan area**

This notion is not among the ones to explore according to the ToR, but it is retained because of its implications for polycentric development at European scale. TPGs 1.1.1 and 1.2.1 have devoted particular thinking to this concept. The 3<sup>rd</sup> cohesion report also refers to it.

The following definition has been proposed in the ESPON context:

*The term "metropolis" generally defines the greatest centre of a whole group of towns. In practice, only large towns enjoying easy accessibility, large size and a varied economic and human environment are defined as "metropolises". [...] The space directly and tightly polarized by one or several metropolis is defined as a "metropolised space".<sup>18</sup>*

Facets:

- size (mass), competitiveness, connectivity, knowledge (used by TPG 1.1.1 as criteria to build a hierarchy of metropolitan areas)
- spatial structure (polycentric or not)

Linked concepts:

- functional urban area (FUA): broader notion that also encompasses smaller urban centres
- major urban system (MUS): notion developed by TPG 1.1.3, apparently close but not identical to the notion of MEGA (see hereunder);
- Metropolitan European Growth Area (MEGA): notion developed in the ESPON context, a special category of metropolitan area, based on different criteria according to the source (TPG 1.1.1, 1.2.1, also 3<sup>rd</sup> cohesion report)

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<sup>18</sup> 1.1.1 FR, Annex report A, page 11 (in Critical dictionary of polycentrism)

#### 4.6.1.5 Rural area / region

TPGs 1.1.2 and 2.1.3. as well as Nordregio as 3.1 partner have worked on the concept of rural areas. However none has proposed a definition that stands "on its own", i.e. without reference to urban areas. The only autonomous "definition" comes from the ESDP:

*Rural areas in the EU are characterised by diversity and indigenous development. They are complex economic, natural and cultural locations which cannot be characterised by one-dimensional criteria such as population density, agriculture or natural resources. (§ 89)*

In the ESPON context, rural areas are generally defined by opposition to urban areas, even though it is underlined that this dualism becomes more and more obsolete. "The rural and urban as lived networks are not mirror images of one another, but components of a system"<sup>19</sup>.

Among the criteria are population size / settlement size, population density, land-use, economic activity criteria, administrative status, legal decisions.

Rural areas are considered as featuring particular attributes such as: tracts to open countryside, low population density, a scattering of small to medium sized settlements, less developed transport infrastructure and lack to access to services and amenities, especially of the type provided in larger urban centres.

It is noted that national definitions of rural and urban areas vary largely from country to country. Besides rural areas differ one from another in terms of economic structure and activity, natural and human resources, peripherality, demographic and social conditions, culture, integration with urban areas, political organisation and aspirations and capacities of the communities.

Linked concepts: urban area

- for defining the notion itself, either trying to delineate the border between urban and rural areas, or to point them out as extreme positions in a range that also includes "r-urban" or "rurban" areas;
- for analysing the relationships between both types of areas (cf. rural - urban relationships / partnership).

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<sup>19</sup> 1.1.2 FR, page 71.

#### 4.6.1.6 Urban area / region

Several TPGs (notably 1.1.1, 1.1.2, 2.2.3) have worked on the concept of urban area, as well as Nordregio as 3.1 partner. One of the results of this research is that it is more difficult today to identify what is a city or town than it was in the past: "*Currently, it is not so easy to argue in favour of the traditional split between the spatially, functionally, politically and administratively divided two spheres of urban and rural Europe*"<sup>20</sup>.

No ESPON definition was given yet for urban areas other than by opposition to rural areas. Among the criteria mentioned for identifying urban areas are population size/settlement size, population density, land-use, economic activity criteria, accessibility, central place function, commuting, administrative status, legal decisions.

Three main standpoints for defining urban areas are mentioned by Nordregio: based on the extent of built up areas (land use type), on classifying level of population, employment density, etc. or on plotting the functional areas of the town

It is also underlined that the concept of functional urban area (FUA) could be more practicable than that of "administrative" or physical urban area. In the ESPON approach, FUAs are identified and classified according to population criteria and to functions in transport, knowledge or decision-making, administration, tourism, industry.

Different types of urban areas are also mentioned e.g. metropolises, industrial clusters, intermediate cities,...

Urban areas are also distinguished according to their spatial structure (e.g. organised around one or several nuclei).

Linked concepts:

- FUA, which generally involves an urban node with its linked hinterland
- metropolis: a particular category of urban area
- polycentric development: structured by urban areas
- rural area: other end of the rural – urban range
- urban cluster / network: relationships among sets of urban areas

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<sup>20</sup> 1.1.2 FR, page 39.

#### **4.6.1.7 Accessibility**

Several TPGs have reflected on a general definition of accessibility, and Mcrit has explored it as a 3.1 partner. Together they come to a definition more or less similar to the following: *Accessibility determines the locational profile of an area relative to other areas (including itself).*

Facets:

- types of area for which accessibility is measured: region, city (punctual), corridor (linear),...
- resources to be reached (population, activities, natural resources, facilities,...)
- modes of transport / communication (person / freight, road / rail / water / air / ICT,...)
- units and context (scale) of measurement (local, regional, continental, intercontinental,...)
- ways of measurement (type of network, constraints, terms of the impedance function,...)

Linked concepts

- connectivity: may designate "topological" accessibility or focus on relational aspects
- central vs. peripheral area: accessibility is generally used as the primary criterion to define those, even though there might be other factors such as density or functional level.

#### **4.6.1.8 Environment**

This concept has hardly been discussed as such in the TPG reports, but Taurus (3.1 partner) has reflected on it and proposed a range of definitions, one of which taken from the Commission's green paper on the impact of transport on the Environment (1992):

*For the purpose of this paper, environment includes the quality of life, living conditions of human beings and the natural environment with suitable habitats for animals and plants. The quality of life is determined by the long-term availability in sufficient quantity and of adequate quality of resources*

*such as water, air, land and space in general as well as raw materials. It also includes the natural and cultural heritage.*<sup>21</sup>

This definition expresses clearly various spatial components of the environment, to which can be added more recently emphasised ones such as soil and climate.

The EEA has conceived the DPSIR (driving forces, pressures, states, impacts, responses) framework in order to reflect on the environment. This gives reference methodological bases in order to work with this concept.

Environment can be seen as one aspect of the broader notion of sustainability, which also encompasses social and economical aspects.

As mentioned higher, environment can be seen as encompassing notions such as landscape, natural and cultural heritage. + hazards?

#### **4.6.1.9 Landscape**

The 1.3.2 TPG, as well as Taurus as 3.1 partner, have more particularly explored this notion. They provide the basis for a tentative definition:

*Visually recognisable entities that reflect the historic processes of human activities in relation to the geomorphologic conditions and include natural as well as cultural values.*

Facets:

- bio-geographical features
- activities and developments influencing landscape (agriculture, forestry, industry, urban and infrastructure developments,...)
- UNESCO categories of cultural landscapes (landscape designed and created intentionally by man, organically evolved landscape, associative cultural landscape)

Linked concepts:

- cultural heritage: landscape contributes to the formation of identity and is part of cultural heritage as being long term expressions of human activities
- cultural landscape: characterises most European landscapes as they have been influenced by cultural practices or choices; urban landscapes may also be considered

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<sup>21</sup> [http://aei.pitt.edu/archive/00001235/01/transport\\_environment\\_gp\\_cOM\\_92\\_46.pdf](http://aei.pitt.edu/archive/00001235/01/transport_environment_gp_cOM_92_46.pdf)  
*For whatever reason, the last sentence of this definition is often omitted in quotations.*

- environment: landscape is an important part of the quality of life, hence of environment
- natural heritage: landscape is a basic component of European natural heritage

#### **4.6.1.10 R-urban / urban-rural**

The 1.1.2 TPG has especially analysed the concept of urban - rural relationship, in accordance with their ToR. Other TPGs have also reflected on it, more particularly the 2.1.3 TPG. As a 3.1 TPG partner, Nordregio has also worked on the concepts of urban and rural areas and urban – rural relationships.

The following definition of urban – rural relationships was proposed<sup>22</sup>:

*Relationships between something we define as urban and rural – the definition changes according to relation under scrutiny (structural, functional), according to geographical scale and according to various national contexts (administrational definitions)*

Besides rural – urban relationships, the "r-urban" notion can be used to designate a mix between rural and urban characters in settlements or lifestyles (cf. French philosopher Lefebvre in the 60's).

Facets:

- various issues: housing, employment, education, transport, tourism and resource use
- forms of relations: flows and / or structures

Linked concepts:

- functional urban area (FUA): integrates the urban-rural aspect in the reflection on urban areas
- urban-rural partnership: particular mode of urban-rural relations (co-operative, generally focused on governance)
- urban sprawl: particular mode of relationships between urban and rural where a core city expands into the surrounding countryside

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<sup>22</sup> Contribution kindly sent by K. Schmidt-Thome & C. Bengs (TPG 1.1.2) on 19/03/2004 at the request of TPG 3.1 for the elaboration of an ESPON glossary.

#### 4.6.2 Application of the territorial approach

	<b>concept</b>	<b>domains</b>	<b>components</b>	<b>scale</b>
policy objectives	social cohesion/ integration	many concerned but focus on the "Society" summit of the triangle	focus on the "Integration" component	all may be concerned but more often considered at meso / micro levels
	territorial / spatial integration	all are concerned	focus on the "Integration" component	all are concerned issues depend on scale
spatial objects	global integration zone	many concerned but focus on the "Economy" summit of the triangle	all are concerned (high values are required for all)	focus on macro scale
	metropolitan area / region	all are concerned according to the standpoint	all are concerned	focus on macro / meso scales for "external" issues, on micro scale for "internal" issues
	rural area / region	all are concerned according to the standpoint	all are concerned	all are concerned according to the context and issue
	urban area / region	all are concerned according to the standpoint	all are concerned	all are concerned according to the context and issue
spatial aspects	accessibility	focus on the "Economy" and "Society" summits of the triangle	focus on the "Position" and "Integration" components	all are concerned
	environment	focus on the "Environment" summit of the triangle	all are concerned	all are concerned
	landscape	all are concerned, but main focus on the "Environment" summit of the triangle	focus on the "Potential" component	focus on the meso / micro scales
	r-urban	all are concerned	focus on the "Integration" component	focus on the meso / micro scales

## **ESPON Data Base**

**5.1 ESPON data base**

**5.2 Core indicators and typologies**



## **5 ESPON Data Base**

(by Volker Schmidt-Seiwert, Ingo Heidbrink, BBR)

### **5.1 The data base**

One important result of the ESPON programme is the establishment of the ESPON database created in a concerted action of the Transnational Project Groups and co-ordinated and maintained up to now by project 3.1. as of October 2004 by project 3.2.

In the database, unique ESPON results are integrated as well as fundamental regional background information necessary for the analysis of European regional structures and trends. It should be noted, that the ESPON programme with the spatial coverage of EU25 + 2 +2 makes the ESPON database unique regarding the provided information as well as the challenges of collecting the data.

The ESPON data base is a matter of give and take. All TPGs will contribute to this common base, and in turn and all TPGs will benefit by using data and indicators in their own contexts.

#### **5.1.1 Regional statistical data - Principle of data integration – common standards**

The ESPON data base includes core data, indicators and typologies that provide the common backbone of the ESPON projects. The success of ESPON depends largely on the possibility of a joint use of the analytical results of the single ESPON projects. Especially the integrated use of ESPON indicators and empirical data requires a coherent data structure both related to indicators and GIS.

The ESPON data base must be seen as a spatial indicator base taking into account and using the official statistics of the statistical offices of the European Community, the Member States and other European countries as well as of other sources. It will not and cannot be part of the system of official statistics within the Community.

To make the ESPON data base manageable and to ensure comparability and the integration of data, it base on an agreed structure of the basic data and on a unique documentation of the data files. The provision of indicator definitions implies the need for a one to one relation between geo-references and data. The use of a unique data format and software base will guarantee data transfer and the integration of the data and will also ensure independent research at the same time.

Any data used in ESPON have a documentation concerning the origin of data, time reference, regional reference, author, source of data and variable description. Furthermore, related to indicators there exists a description of

the calculation algorithm, the statistical computation. Concerning geo-data, the kind of geo-processing and a description of data used is indicated.

Each contribution to the ESPON regional statistical data base includes two types of information:

- The data or indicator file with the set of actual regional indicators and data
- The meta data file with the set of meta information and documentation of the indicators and data.

In the context of general use within ESPON the key elements for data files and indicator files include the following elements:

- the related geo-reference
- the regional ID based on EU and international nomenclature (NUTS)
- the name of the region in international notation.
- A short indicator or variable name with no blanks or dashes within the name to prevent transfer problems between different systems or programs.

**Figure 31 Example for data set NUTS level 3**

<b>NUTS_ID</b>	<b>REG-NAM</b>	<b>POP_99_N3</b>	<b>DENS_99_N3</b>
BE232	DENDERMONDE	186,3	543,9

The meta data file includes all the information necessary for the identification of indicators and data.

**Figure 32 Example of meta data set and documentation**

		<b>POP_99_N3</b>	<b>DENS_99_N3</b>
S	ESPO Project	X.X.X	X.X.X
S	Source of data	Institute, Partner	Institute, Partner
S	Author	Name	Name
S	Regional reference	NUTS X	NUTS X
S	Time reference	year	year
S	Frequency of data	Yearly 1.January	Yearly 1.January
S	Origin of data	Eurostat - Regio	Eurostat - Regio
S	Variable name	Population year	Population Density year
S	Variable description	Annual average Population in 1000 (year)	Inhabitants per km <sup>2</sup> (year)
S	In case: indication/ Source of use	Document	Document
P	Theoretical Postulate	Indicator – Representation - Correspondence	Indicator – Representation - Correspondence
Q	Calculation algorithm	(Population 1.1.year + Population 1.1.year) / 2 / 1000	Annual average population year/ Area year
R	Characterisation According DPSIR of the EEA		
R	Policy Relevance	Policy option relevant (i.e. ESDP)	Policy option relevant (i.e. ESDP)
	Data Navigator	021	021
	NUTS Version	1999	1999
	Type of data	Raw data	Indicator

(SPQR: S: sample data description; P: theoretical postulate; Q: quantifiers used; R: policy relevance. DPSIR: D: driving forces, adapt their behaviour to these more or less restrictive conditions; P: pressures which may be positive or negative, S: state of the environmental components affected by pressures, I: impact on the environment as a whole in overall improvements or deterioration; S: society's response which is expressed by means of signals and reflected in political measures)

### **5.1.2 A short history of the ESPON data base**

At the end of January 2003, the ESPON data base starts with the first delivery of general socio-economic data and indicators based on the Eurostat data provided at the Mondorf Seminar.

Version 1 of the ESPON data base provided mid-March 2003 tries to fill the first data gaps of the most fundamental statistical data. As the results of the Second Interim Reports show, this is also the case within all TPGs, especially of this first round.

Version 2.0 was disseminated at the Crete Seminar in May 2003 followed by the Versions 2.1 and 2.2 in June and July including TPG's provisions and the results of the EUROSTAT special processing of the Labour Force Survey for ESPON concerning educational levels and professional orientations

The version 2.3 was provided at the Matera Seminar being the last version in the ESPON TPG structure. A first data base in the new thematic orientation in the phase of the final transition was version 2.4.

### **5.1.3 The final ESPON data base to be continued**

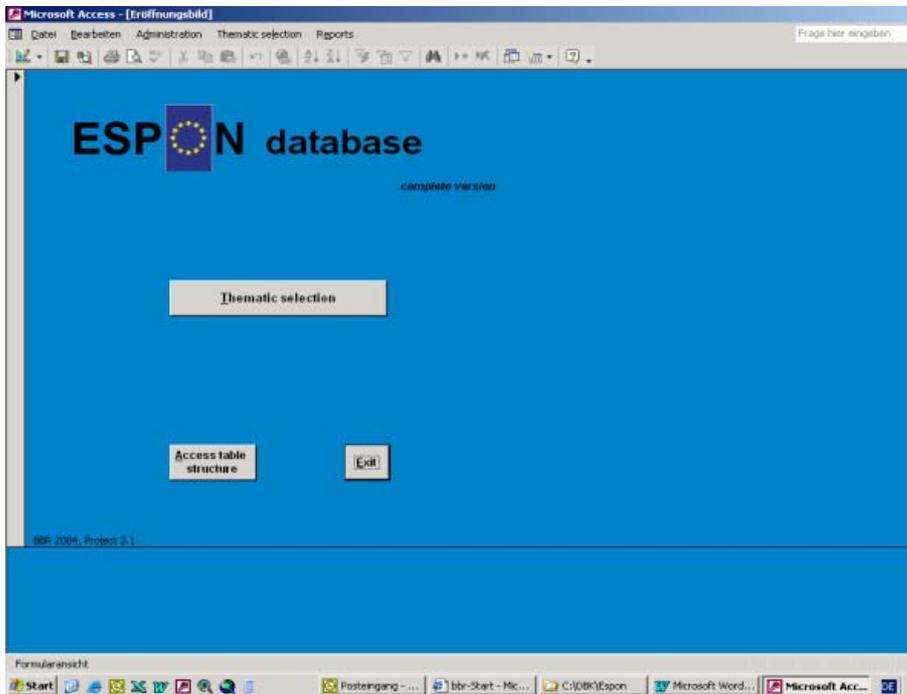
Being common and easy to handle, the ACCESS data base format turns out to be the most sufficient tool to provide regional statistical data and indicators of ESPON. When using this format, data of any TPG can be easily integrated. The extraction of information and combination of results of other TPGs in queries or reporting as well as the export into other data formats can be done in appropriate ways.

By now the ESPON data basis is a thematic orientated database according the final version of the ESPON Data Navigator. In the final version of establishment it will combine general features of an ACCESS database with an included user friendly front end solution for easy investigation and selection of data and indicators in thematic and spatial dimension.

According to the potential provision of ESPON results in form of regional indicators to persons outside interested and due to legal questions the ESPON data base is divided into the area of raw data (e.g. Eurostat data) and the area of indicators (assumed original calculations of ESPON TPGs).

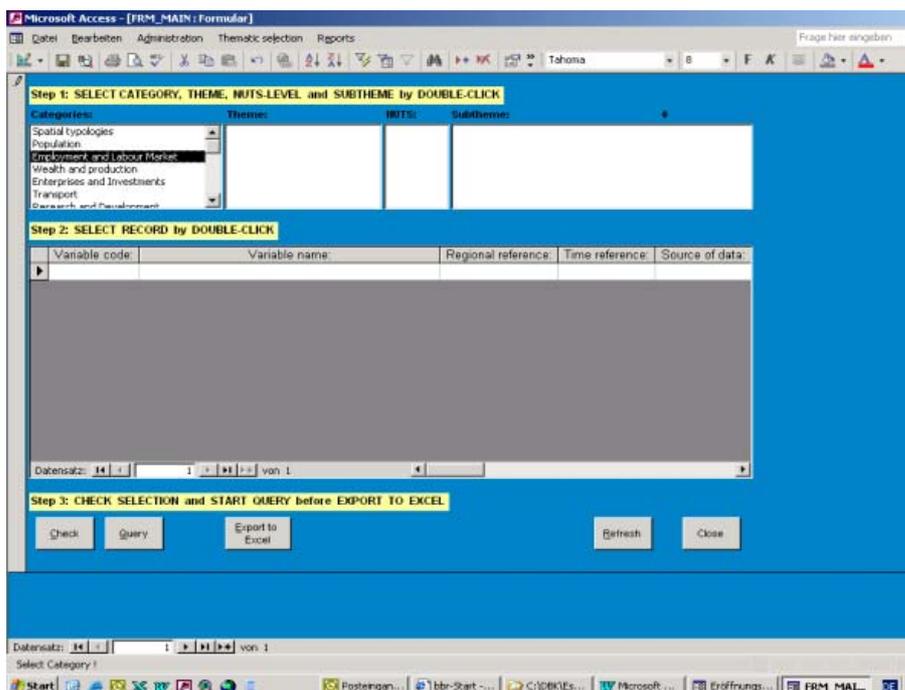
The selection of indicators is organised in a narrowing process via the steps indicated below leading to the appropriate meta data file. The first selection criteria is the main theme, e.g. population, employment and labour market.

The further specification is done with the help of the sub-theme in the case of population e.g. population structure, structure of persons employed.



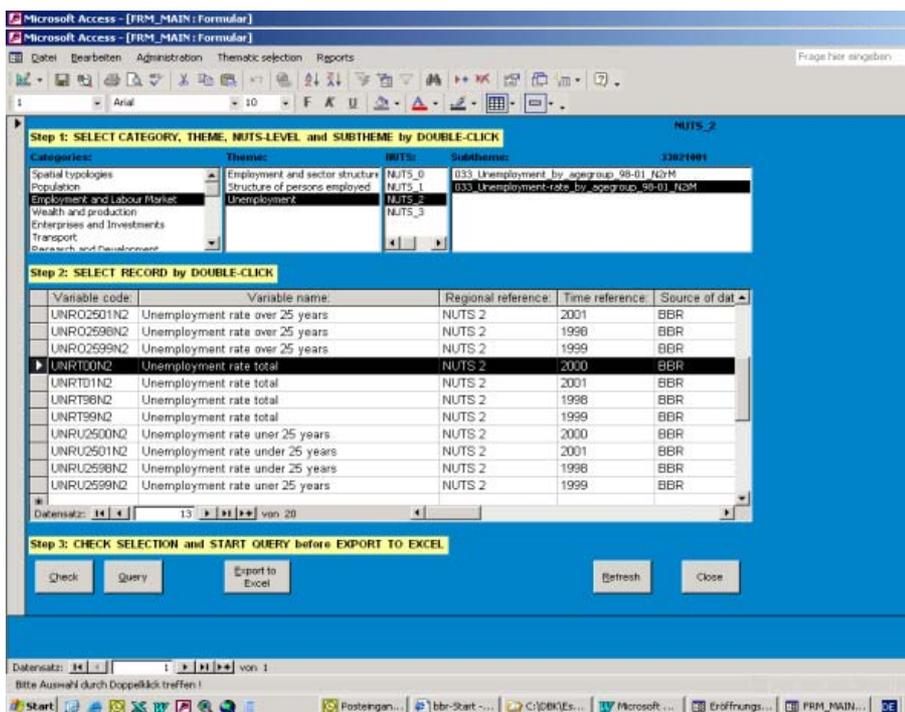
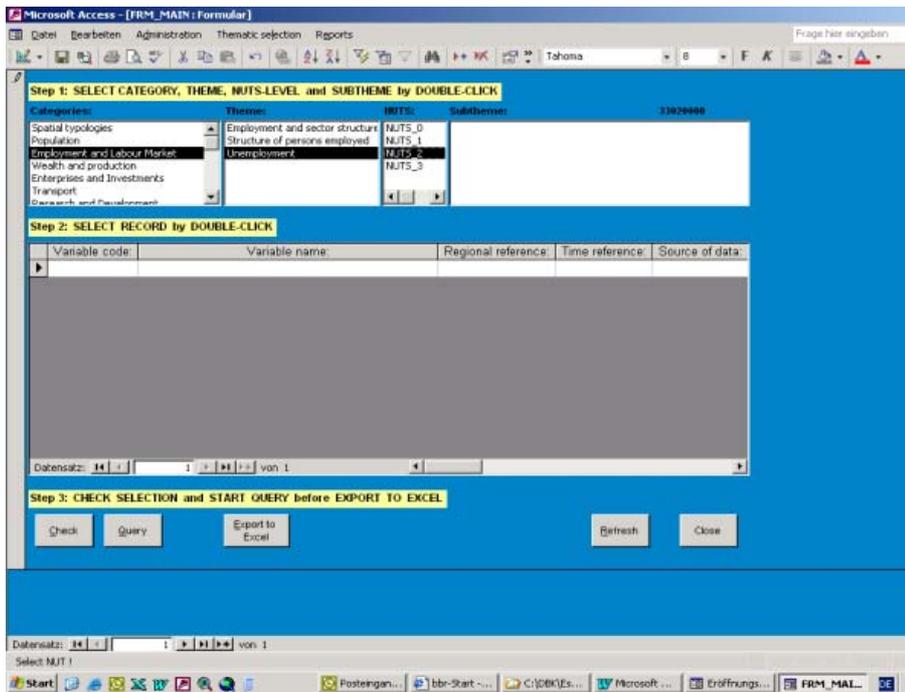
The sub-themes in a few thematic fields had to be modified and complemented compared to the Data Navigator in respect to the special ESPON TPG questions and results.

The next selection shows the regional level by NUTS. In the following the list of relevant tables appears fitting the selection. These are in fact the associated meta information tables.



In the central window now appears the meta information of the selected table including all information like variable short name and description, NUTS level, project responsible, contact and so on.

After having selected the table of interest, all the indicators will be listed according to the regional and the time reference. The same indicator for a series of years will be listed for each year.

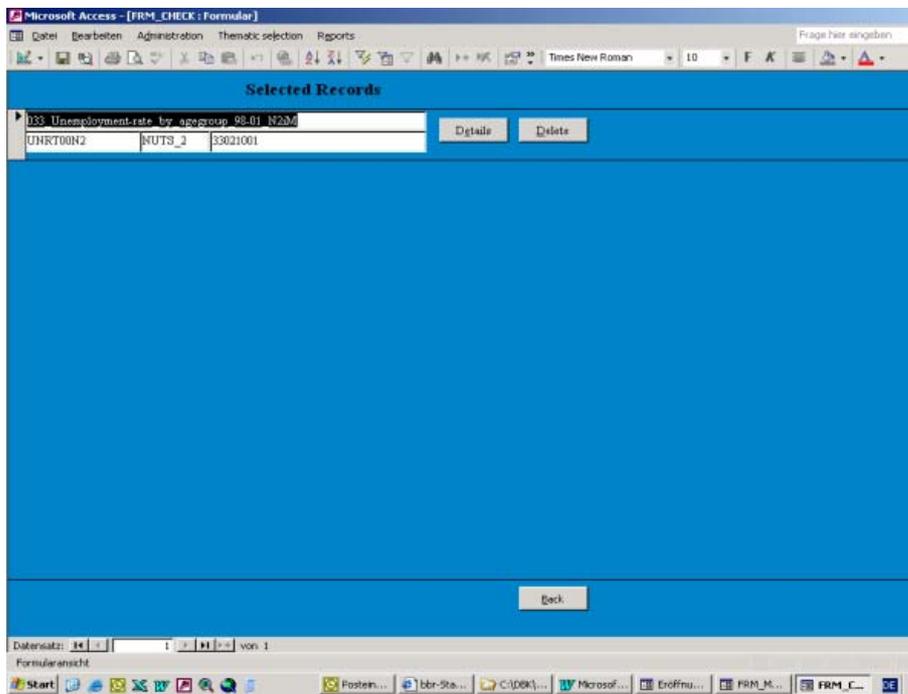


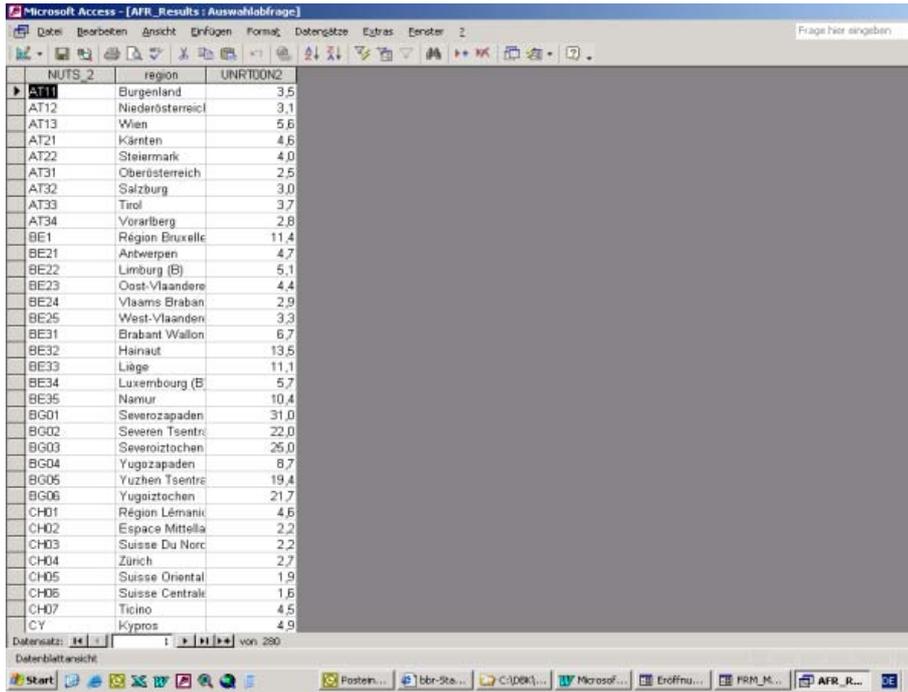
The choice of the indicator is done by double click on the appropriate variable. Up to maximal 25 variables or indicators can be selected out of maximal 3 tables.

After the choice the user has the opportunity to finalise the selection via 'run' immediately or to verify the selected indicators first via 'check'.

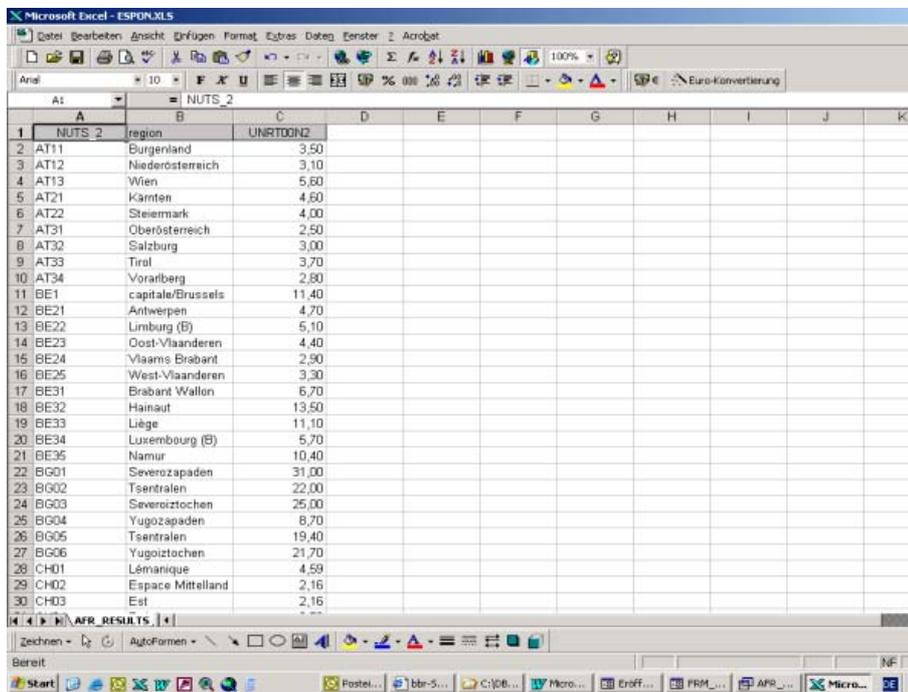
The check of the indicators leads to a view of the selected records. The selection is transferred into a temporary ACCESS file for verification and adjustment in case.

There detailed information can be visualised again in case of reassuring or indicators not needed or wrong selected indicators can be deleted





Back to the indicator view the 'run' of the choice creates the corresponding ACCESS table which could be exported into EXCEL.



**Table 7 Overview on the ESPON database table content**

(Extensions in table name indicate regional level - (e.g. N3 for NUTS 3) and status of data being indicator (i) or raw data (r )

<p><b>01 Spatial typologies</b></p>	<p><b>012 Spatial classification</b></p> <p>012_NUTS0_Reference_1999_M  012_Settlement_Structure_N2iM  012_NUTS2_Reference_1999_M  012_Urban_Rural_Population_N3iM  012_NUTS3_Reference_1999_M</p> <p><b>013 City System</b></p> <p>013_Functional_Urban_Areas_3classes_N5iM  013_Functional_Urban_Areas_N5iM</p> <p><b>014 Eligible Areas</b></p> <p>014_Objective_Regions_N2iM  014_Objective_Regions_N3iM</p>
<p><b>02 Population</b></p>	<p><b>021 Population Structure</b></p> <p>021_Population_with_tertiary_education_N0iM  021_Population-density_N0iM  021_Population_with_tertiary_education_N1iM  021_Population-density_N1iM  021_Population_age65+_Index_N2iM  021_Population_age65+_N2iM  021_Population_by_age-groups_1995_N2rM  021_Population_by_age-groups_1996_N2rM  021_Population_by_age-groups_1997_N2rM  021_Population_by_age-groups_1998_N2rM  021_Population_by_age-groups_1999_N2rM  021_Population_by_age-groups_2000_N2rM  021_Population_by_education_&amp;_agegroups_1999_N2rM  021_Population_by_education_&amp;_agegroups_2000_N2rM  021_Population_by_education_&amp;_agegroups_2001_N2rM  021_Population_by_education_&amp;_agegroups_2002_N2rM  021_Population_Dependency-rate_N2iM  021_Population_Natural_Growth_Potential_N2iM  021_Population_Relation_Aged-Youth_N2iM  021_Population_with_tertiary_education_N2iM  021_Population-density_EU-average100_N2iM  021_Population-density_N2iM  021_Post-Active_Dependency_N2iM</p>

	<p><b>022 Population Movement</b></p> <p>022_Indirect-Ageing_Depopulation_N2iM  022_Population_change_95-99_N2iM  022_Population_change_96-99_Typo_N2iM  022_Population_change_high65+_96-99_Typo_N2iM  022_Population_change_Natural-Migrat_96-99_N2iM</p>
<p><b>03 Employment and Labour Market</b></p>	<p><b>031 Employment and sector structure</b></p> <p>031_High-tech_manufacturing_N0iM  031_Average_Workhours_per_week_01_N2rM  031_Average_Workhours_per_week_02_N2rM  031_Employment_by_economic_activity_00_N2rM  031_Employment_by_economic_activity_01_N2rM  031_Employment_by_economic_activity_02_N2rM  031_Employment_by_economic_activity_99_N2rM  031_High-tech_manufacturing_N2iM</p> <p><b>032 Structure of persons employed</b></p> <p>032_Employed_Persons_by_Sectors_95-01_N2rM  032_Employment_by_agegroup_&amp;_nationality_00_N2rM  032_Employment_by_agegroup_&amp;_nationality_01_N2rM  032_Employment_by_agegroup_&amp;_nationality_02_N2rM  032_Employment_by_agegroup_&amp;_nationality_99_N2rM  032_Employment_by_occupation_00_N2rM  032_Employment_by_occupation_01_N2rM  032_Employment_by_occupation_02_N2rM  032_Employment_by_occupation_99_N2rM  032_Employment_by_professional_status_00_N2rM  032_Employment_by_professional_status_01_N2rM  032_Employment_by_professional_status_02_N2rM  032_Employment_by_professional_status_99_N2rM  032_Labour_status_by_agegroup_00_N2rM  032_Labour_status_by_agegroup_01_N2rM  032_Labour_status_by_agegroup_02_N2rM  032_Labour_status_by_agegroup_99_N2rM</p> <p><b>033 Unemployment</b></p> <p>033_Unemployment-rate_N0iM  033_Unemployment-rate_by_agegroup_98-01_N2iM</p>

<p><b>04 Wealth and production</b></p>	<p><b>042 Income and consumption</b></p> <p>042_GDP_Deviation_in_Euro_per_Inhabitant_N2iM  042_GDP_Deviation_in_PPS_per_Inhabitant_N2iM  042_GDP_Discontinuities_in_Euro_per_Inhabitant_N2iM  042_GDP_Discontinuities_in_PPS_per_Inhabitant_N2  042_GDP_in_Euro_and_PPS_N2rM  042_GDP_in_Euro_and_PPS_per_Inhabitant_N2iM</p>
<p><b>06 Transport</b></p>	<p><b>061 Transport infrastructure</b></p> <p>061_Transport_endowment_N3rM</p> <p><b>062 Passengers and goods transport</b></p> <p>062_Traffic_volumes_and_flows_N2rM</p> <p><b>066 Accessibility</b></p> <p>066_Typology_Multimodal_Accessibility_Potential_N2iM  066_Potential_accessibility_by_air_2001_N3iM  066_Potential_accessibility_by_rail_2001_N3iM  066_Potential_accessibility_by_road_2001_N3iM  066_Potential_accessibility_multimodal_2001_N3iM  066_Potential_accessibility_multimodal_Destination_AC12_N3iM  066_Potential_accessibility_multimodal_Destination_EU15_N3iM  066_Timetomarket_Accessibility_by_rail_N3iM  066_Timetomarket_Accessibility_by_rail_road_N3iM  066_Timetomarket_Accessibility_by_road_N3iM  066_Typology_Multimodal_Accessibility_Potential_N3iM</p> <p><b>067 Impacts of transport policy's / scenarios</b></p> <p>067_ICT_Policyscenario_N2iM  067_Scenario_Differences_GDP_growthrate_N2iM  067_SASI_model_N3iM</p>
<p><b>07 Research and Development</b></p>	<p><b>071 Invention and Innovation</b></p> <p>071_High-tech_patents_in_mill_population_N0iM  071_High-tech_patents_N0rM  071_Human_resource_in_science_technology/_percent_N0iM  071_Human_resource_in_science_technology_N0rM  071_RTD_FP4_Participation_N0rM  071_RTD_FP5_Participation_N0rM</p> <p><b>072 Facilities and Employment</b></p> <p>072_RD_personnel/_percentage_of_LabourForce_N0iM  072_RD_personnel_total_in_FTE_N0rM</p>

	<p><b>073 Finance and Expenditures</b></p> <p>073_RD_Expenditure_Business_sector_/_Euro_N0rM  073_RD_Expenditure_Business_sector_/_percent_N0iM  073_RD_Expenditure_Governm_Sector_/_Euro_N0rM  073_RD_Expenditure_Governm_Sector_/_percent_N0iM  073_RD_Expenditure_Higher-Educ_Sector_/_Euro_N0rM  073_RD_Expenditure_Higher-Educ_Sector_/_percent_N0iM  073_RD_Expenditure_Privat_Sector_/_Euro_N0rM  073_RD_Expenditure_Privat_Sector_/_percent_N0iM  073_RD_Expenditure_total_/_Euro_N0rM  073_RD_Expenditure_total_/_percent_N0iM</p>
<b>09 Communication technology</b>	<p><b>091 Infrastructure, supply</b></p> <p>091_Telecoms_Data_N0rM</p>
<b>10 Household oriented Infrastructure</b>	<p><b>102 Education</b></p> <p>102_Pupils_by_educational_level_1995_N3rM  102_Pupils_by_educational_level_2000_N3rM</p>
<b>11 Land use</b>	<p><b>111 Natural resources</b></p> <p>111_Coast_Borders_N2iM</p> <p><b>112 Land use</b></p> <p>112_Artificial_surface_N3iM  112_Artificial_surface_per_capita_N3iM  112_Artificial_surface_per_GDP_N3iM  112_Corine_Landcover_Level-1_N3iM  112_Corine_Landcover_Level-2_N3iM  112_Corine_Landcover_Level-3_N3iM  112_Land_Use_Typology_N3iM  112_Urban_Rural_Typology_N3iM</p>
<b>12 Environment</b>	<p><b>124 Natural hazards</b></p> <p>124_Earthquake_N3iM  124_Earthquake_N3rM  124_Flood_Events_N3iM  124_Flood_Events_N3rM  124_Forest_fires_N3iM  124_Forest_fires_N3rM  124_Volcano_Risk_N3iM  124_Vulnerability_N3iM</p>

<p><b>13 Agriculture</b></p>	<p><b>131 Land use</b></p> <p>131_Arable_Land_N2iM  131_Fallow_Land_N2iM  131_LFA_with_Permanent_Crops_N2iM  131_UAA_per_Holding_N2iM  131_UAA_with_Permanent_Crops_N2iM  131_UAA_with_Permanent_Grass_N2iM  131_UAA-Land_N2iM</p> <p><b>132 Farmer Structure</b></p> <p>132_Farm-Holders_change_90-97_N2iM  132_Farm-Holders_over_35_years_N2iM  132_Farm-Holders_over_65_years_N2iM  132_Old_Farm-Holders_Change_90-97_N2iM  132_Young_Farmers_Change_90-97_N2iM</p> <p><b>133 Employment</b></p> <p>133_Employed_Agricultur-Forestry-Fishing_N3iM</p> <p><b>134 Livestock</b></p> <p>134_Livestock_Units_per_Holding_N2iM</p> <p><b>135 Production</b></p> <p>135_Agricultural_Output_per_AWU_N2iM  135_Agricultural_Output_per_Hectare_N2iM  135_AWU_per_1000_hectares_N2iM  135_AWU_per_holding_N2iM  135_Fertilizer-Input_REGIO_N2iM  135_FNVA_per_AWU_N2iM  135_FNVA_per_hectare_of_UAA_N2iM  135_SGM_per_AWU_N2iM  135_SGM_per_Holding_N2iM</p>
<p><b>14 Social Situation</b></p>	<p><b>141 Poverty</b></p> <p>141_Lagging_Regions_N2iM</p>
<p><b>17 Tourism (tourists, infrastructure)</b></p>	<p><b>171 Arrival and stays</b></p> <p>171_Overnight_stays_N3rM  171_Tourists_arrivals_N3rM</p>
<p><b>18 Public Sector</b></p>	<p><b>183 Regional Policy</b></p> <p>183_Pre-Accession-Aid_by_potential_N0rM  183_Pre-Accession-Aid_N0iM  183_SF_Total_calculation_N2rM</p>

<b>19 Other data</b>	<b>191 Area</b>  191_Area_N0M 192_Regional Classification of Europe 192_Regional_Classification_of_Europe_N2M 192_Regional_Classification_of_Europe_final_Indices_N2M
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#### **5.1.4 ESPON database - new demands and continuity**

The data base does not include ESPON results elaborated within a project and finalised with the end of project 3.1. In reality this project just laid ground for a continuous spatial monitoring based on ESPON results and growing with new indicators coming from new projects. The data base has to change related to further demands without leaving the achievements behind. This two aspect will determine the future work, the management and improvement of the ESPON database.

On the one hand it should guarantee a continuous provision of regional and spatial information during the ESPON process, especially thinking of the successive ends of the different projects and in terms of the implementation of the ESPON core indicator list, which includes indicators seen as fundamental for the analysis of spatial structures and trends in Europe.

In this respect, the ESPON database co-ordinated and elaborated by project 3.1 will be a valuable input for the future maintenance and updating. After the end of project 3.1 the continuous maintenance and update will lie in the responsibility of project 3.2. The updating must and can only concentrate on the general indicators provided on the base of the European Statistical System co-ordinated by Eurostat and on those of special project related interests. As these data in general base on the Eurostat Regio database, the updating will be done according to the agreements for new data deliveries with Eurostat. The use and integration of data of national statistical institutions and other source must be decided in case.

On the other hand and of more importance within is the special focus on project related demands to the database for the elaboration of the scenarios in project 3.2, and for the integration of results of the observation of territorial dimension of the Lisbon/Gothenburg process in project 3.3, and of projects like 'Europe in the World' and the 'Integrated analysis of transnational and national territories'.

In this respect, the existing ESPON database feasible for present demands will be improved in its originally intended concerning time focus and also in spatial focus. Relating a broader time range, the integration of the data

resulting in the efforts of 3.2 to overcome this shortcoming with model generated data will be a big step for the ESPON data base.

Being aware of the problems of data harmonisation and regional coverage and considering the macro-regional and more spatial scope of the envisaged scenarios, the use of NUTS 3 strictly demanded by ESPON should not prevent a potential territorial and socio-economic analysis. A broader use of the more functional, and in the EU sense, so-called standard regions for socio-economic question – NUTS 2 - could be an appropriate level for those cases where data do not cover NUTS 3.

## **5.2 Core Indicators and typologies**

### **5.2.1 Core indicators**

The creation of a list of core indicator is one of the fundamental tasks of the ESPON project groups and the ESPON database. In this list fundamental regional information needed for regional analysis and research are defined on cross-border, transnational and Europe-wide structures and trends to support spatial policy recommendation in the European context.

It has been elaborated on the base of the suggestions by the TPGs. The version presented within this report includes the final ideas of the projects that ended in August 2004 and is the last compilation of project 3.1 as well.

It takes the final reports of the project related into consideration, the contributions in the run-up of the final reports and also includes the new projects that started later.

The investigation of the reports underlines that the joint definition of fundamental indicators, future oriented in elaboration and up date possibilities, is not consequently mirrored in the view of all the projects. Only 5 out of 15 reports refer to the term of core indicator at all, one of them not in the sense of the overall discussion of fundamental indicator but only in the TPGs own analytical context.

Being aware of the fundamental data problem, the list shows the feasibility of selected spatial indicators beyond general regional information and demonstrates that some regional information, even in themes usually provided by EUROSTAT, could only be integrated due to the TPG's intensive efforts or even not due to data gaps.

As written in the project 2.1.3 final report, a number of important indicators have not been forthcoming. In this context in particular an inventory of sites designated under Community/national environmental legislation or a simple indicator of environmental quality for each NUTS3 region has not been forthcoming.

These problems and difficulties related is part of a process bringing the results of ESPON into the European Statistical System. The strengths of ESPON should be used to define demands from the side of scientific users.

In this respect, one should not forget that the ESPON projects within 2 years do has laid considerable grounds for the definition and elaboration of indicators. A database has been created which could be easily compared to the establishment of national spatial planning observatories in several member states during the last decades.

By now, 103 core indicators have been identified. Various indicators could only be realised on the NUTS 2 level due to data availability. Those indicators will build the base of those regional statistics which have to be verified for further updating.

This updating could be done yearly for most statistics which are originally based on the Regio data of Eurostat.

**Table 8 ESPON - Core indicators by proposed TPG - October 2004**

Indicator	Potential Source of Indicator	Proposed by TPG	Regional level
Share of artificial surface	Corine	1.1.2	NUTS 3
Artificial surfaces per capita	Corine + REGIO	1.1.2	NUTS 3
Artificial surfaces per GDP (PPS)	Corine + REGIO	1.1.2	NUTS 3
Immigration	National Statistical Institutes, Estimations	1.1.2	NUTS 3
Tourism: number of arrivals	National Statistical Institutes, Estimations	1.1.2	NUTS 3
Tourism: number of overnight stays	National Statistical Institutes, Estimations	1.1.2	NUTS 3
Pupils by educational level	National Statistical Institutes, Estimations	1.1.2	NUTS 3
Population change	REGIO, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Total fertility rate	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Natural population growth	REGIO, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Migratory balance	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Share of Children			
Elderly people	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Dependency rate	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Post active dependancy ratio	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Ageing labour force	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Aged people versus youth	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Reproduction potential	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Population in "functional"/"stragetegic" age	International institutes, National Statistical Institutes, Estimations	1.1.4	NUTS 3
Passenger on airports	GISCO, others	1.2.1	NUTS 3
Transport network by mode	GISCO, others	1.2.1	NUTS 3

<b>Indicator</b>	<b>Potential Source of Indicator</b>	<b>Proposed by TPG</b>	<b>Regional level</b>
<b>Transport node my mode</b>	GISCO, others	<b>1.2.1</b>	NUTS 3
<b>Travel time by spatial level and transport mode</b>	GISCO, others, model calculations	<b>1.2.1</b>	NUTS 3
<b>Daytime accessibility by transport mode</b>	GISCO, others, model calculations	<b>1.2.1</b>	NUTS 3
<b>Travel costs by transport node</b>	GISCO, others, model calculations	<b>1.2.1</b>	NUTS 3
<b>Network distance to linear distance ratio</b>	GISCO, others, model calculations	<b>1.2.1</b>	NUTS 3
<b>Percentage of households with PCs</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>Cellular subscribers per 100 inhabitants</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>ADSL subscribers per 10,000 inhabitants</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>Proportion of households with Internet access</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>Internet users per 1000 inhabitants (at work, at school or at home)</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>Proportion of firms with own website</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>Proportion of firms making purchases using e-commerce</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>Value of sales by businesses made via the Internet</b>	others, GISCO	<b>1.2.2</b>	NUTS 2
<b>River flood events</b>	EU COM, REGIO, NEWCRONOS; National Statistical Institutes, Estimations	<b>1.3.1</b>	NUTS 2
<b>Volcanic eruptions</b>	The Smithsonian's Global Volcanism Program	<b>1.3.1</b>	NUTS 3
<b>Winter storms</b>	EC DG JRC (Natural Hazards project), EEA	<b>1.3.1</b>	NUTS 3
<b>Landslides / avalanches</b>	GTOPO30 USGS	<b>1.3.1</b>	NUTS 3
<b>Earthquake/amount of casualties</b>	NGDC Significant Earthquake Database, Global Seismic Hazard Assessment Program	<b>1.3.1</b>	NUTS 3
<b>Droughts</b>	From report "A drought climatology for Europe" (Royal Meteorological Society)	<b>1.3.1</b>	NUTS 3
<b>Forest Fires</b>	EC DG JRC (Natural Hazards project)	<b>1.3.1</b>	NUTS 3
<b>Extreme precipitation (heavy rainfall, hail)</b>	World Meteorological Organisation	<b>1.3.1</b>	NUTS 3
<b>Extreme temperatures (heat waves, cold waves)</b>	World Meteorological Organisation	<b>1.3.1</b>	NUTS 3
<b>Dam failures</b>	ICOLD (INTERNATIONAL COMMISSION ON LARGE DAMS ), World Dam Register	<b>1.3.1</b>	NUTS 3
<b>Nuclear power plants</b>	IAEA	<b>1.3.1</b>	NUTS 3
<b>Indicator</b>	<b>Potential Source of Indicator</b>	<b>Proposed by</b>	<b>Regional level</b>

		<b>TPG</b>	
<b>Hazards from production plants with hazardous production processes or substances (large-scale chemical works, weapons, fireworks ore processing plants, etc.)</b>	Member States have the obligation to report major accidents to the Commission. In order to fulfil its information obligations towards the Member States, the Commission has established a so-called Major-Accident Reporting System (MARS) and the Community Documentation Centre on Industrial Risks (CDCIR) at the Major-Accident Hazards Bureau ( <a href="http://mahbsrv.jrc.it/">http://mahbsrv.jrc.it/</a> ) established within its Joint Research Centre (JRC) in Ispra, Italy.	<b>1.3.1</b>	NUTS 3
<b>Hazardous waste deposits, such as nuclear waste or ore mining stockpiles and tailure dams</b>	ICOLD (only for tailure dams) , MARS, CDCIR	<b>1.3.1</b>	NUTS 3
<b>Marine transport of hazardous goods (oil etc.)</b>	ITOPF (International tanker owners pollution federation)	<b>1.3.1</b>	NUTS 3
<b>Richness of species identified of European importance</b>	International institutes, National institutions, National Statistical Institutes, Estimations	<b>1.3.2</b>	NUTS 2
<b>Extent and richness of semi-natural habitat type</b>	International institutes, National institutions, National Statistical Institutes, Estimations	<b>1.3.2</b>	NUTS 2
<b>Built up areas</b>	Corine		NUTS 2
<b>Natural Areas</b>	Corine		NUTS 2
<b>Intensivation/Extensivation of Agriculture</b>			NUTS 2
<b>Protected natural areas - designated areas</b>	International institutes, National institutions, National Statistical Institutes, Estimations	<b>1.3.2</b>	NUTS 2
<b>Fragmentation of natural area</b>	REGIO, National Statistical Institutes, Estimations	<b>1.3.2</b>	NUTS 2
<b>Natural areas dissected by road</b>	REGIO, National Statistical Institutes, Estimations	<b>1.3.2</b>	NUTS 2
<b>Market accessibility potential by spatial level and transport mode</b>	GISCO, others, model calculations	<b>2.1.1</b>	NUTS 3
<b>Travel time by spatial level and transport mode</b>	GISCO, others, model calculations	<b>2.1.1</b>	NUTS 3
<b>Travel costs by transport node</b>	GISCO, others, model calculations	<b>2.1.1</b>	NUTS 3
<b>Average speed to market</b>	GISCO, others, model calculations	<b>2.1.1</b>	NUTS 3
<b>Average time to market</b>	GISCO, others, model calculations	<b>2.1.1</b>	NUTS 3
<b>Impact of accessibility changes on GDP per capita</b>	Own model calculations	<b>2.1.1</b>	NUTS 3
<b>Impact of accessibility changes on Equivalent income measure of user benefits</b>	Own model calculations	<b>2.1.1</b>	NUTS 3
<b>Impact of accessibility changes on Employment</b>	Own model calculations	<b>2.1.1</b>	NUTS 3

<b>Indicator</b>	<b>Potential Source of Indicator</b>	<b>Proposed by TPG</b>	<b>Regional level</b>
<b>Impact of accessibility changes on Unemployment</b>	Own model calculations	<b>2.1.1</b>	NUTS 3
<b>R &amp; D personnel</b>	REGIO, National Statistical Institutes, Estimations	<b>2.1.2 / 3.1</b>	NUTS 2
<b>R &amp; D Expenditure</b>	REGIO, National Statistical Institutes, Estimations	<b>2.1.2 / 3.1</b>	NUTS 2
<b>Patents</b>	Eurostat - Regio	<b>2.1.2</b>	NUTS 2
<b>Patents structure</b>	Eurostat - Regio	<b>2.1.2</b>	NUTS 2
<b>Utilisable Agricultural Area (UUA) as a percentage of total land area,</b>	Eurofarm database, national statistical institutes	<b>2.1.3</b>	NUTS 3
<b>Percentage of farm holders under the age of 35 years,</b>	Eurostat REGIO Table A2EFARM	<b>2.1.3</b>	NUTS 2
<b>Percentage of farm holders over the age of 65 years</b>	Eurostat REGIO Table A2EFARM	<b>2.1.3</b>	NUTS 2
<b>Agricultural output per hectare</b>	Eurostat REGIO Tables A2ACCT97 and A2LAND	<b>2.1.3</b>	NUTS 2
<b>Agricultural output per AWU</b>	Eurostat REGIO Tables A2ACCT97 and A2LAND	<b>2.1.3</b>	NUTS 2
<b>Percentage value added by agriculture, forestry and fishing</b>	Eurostat REGIO Tables EVABP95 or XE3VABP	<b>2.1.3</b>	NUTS 3
<b>Value of fertiliser input per hectare of arable land</b>	Eurostat REGIO Tables A2ACCT97 and A2LAND	<b>2.1.3</b>	NUTS 2
<b>Electricity production by power of source</b>	EU institutions, NEWCRONOS, REGIO, International institutes, National Statistical Institutes, Estimations	<b>2.1.4</b>	NUTS 2
<b>Final energy consumption by energy type and consumption sector</b>	EU institutions, NEWCRONOS, REGIO, International institutes, National Statistical Institutes, Estimations	<b>2.1.4</b>	NUTS 2
<b>Energy prices for industry (net and tax included)</b>	EU institutions, NEWCRONOS, REGIO, International institutes, National Statistical Institutes, Estimations	<b>2.1.4</b>	NUTS 2
<b>Structural funds in Euro by funds involved</b>	EU institutions, National Administration and Statistical Institutes, Estimations	<b>2.2.1</b>	NUTS 3
<b>Structural funds in % regional GDP</b>	EU institutions, National Administration and Statistical Institutes, Estimations	<b>2.2.1</b>	NUTS 3
<b>Pre accession aid in Euro by programme involved</b>	EU institutions, National Administration and Statistical Institutes, Estimations	<b>2.2.2</b>	NUTS 3
<b>Pre accession aid in % of regional GDP</b>	EU institutions, National Administration and Statistical Institutes, Estimations	<b>2.2.2</b>	NUTS 3
<b>Total population</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3

<b>Indicator</b>	<b>Potential Source of Indicator</b>	<b>Proposed by TPG</b>	<b>Regional level</b>
<b>Area</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Population density</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Population by age</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 2
<b>Population by sex</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Educational level of population</b>	Special query REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Labour Force</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 2
<b>Labour Force by age</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 2
<b>Activity rates</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Unemployment rates</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Total employment</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Employment by sector of activity (NACE)</b>	Special query REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 2
<b>Employment by qualification and profession</b>	Special query REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 2
<b>Human Capital</b>	Human capital index; Rolf Derenbach, EU COMM	<b>3.1</b>	NUTS 2
<b>GDP total</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>GDP per capita</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Purchasing power indices</b>	Gesellschaft für Konsumforschung (GfK)	<b>3.1</b>	NUTS 3
<b>Productivity</b>	REGIO, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 3
<b>Productivity per hours worked</b>	REGIO, NEWCRONOS, LACOSTS, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 2
<b>Labour costs</b>	NEWCRONOS, LACOSTS, National Statistical Institutes, Estimations	<b>3.1</b>	NUTS 2

And this happened within a coordinated network of thematic oriented project groups and not in an in-office institutional framework.

### **5.2.2 Data problems and missing data**

From the very beginning, the project groups faced fundamental data demands:

- the provision of data on NUTS 3
- the spatial scope of EU25 +2+2

The most important data source in the regional statistical context is the Regio database providing necessary harmonised socio-economic data from national statistics of the Member States as well as original EU orientated data from sources like the Labour Force Survey.

In the circle of Eurostat data users, it is generally known that data tables do not always (or very often) contain data sets in full coverage neither related to the regional nor to the time coverage.

In the regional respect, adjustments or even new delimitation of the NUTS systematic have always caused gaps in information, only sometimes filled with backward related recalculation.

Regional adjustments are usually coincident with accession negotiations. In time respect, the different steps of European integration are very distinctly reflected in the data availability. Besides the regional effects, missing data in the time range originate in the adoption of EU definitions and the time period of first participation in EU surveys. Time series for even fundamental data go mostly back to the data of the last enlargement. Due to the early integration of data from Eastern European countries before accession, the time range goes back to the previous round of enlargement for which data have been mostly integrated after the event.

Concerning the ESPON regional coverage, a general challenge is the integration of data of the Non-EU participants like Norway and Switzerland with beside very fundamental data like population mostly not yet harmonised data or harmonised data according e.g. the Labour Force Survey only available on regional level beginning with 2002.

Facing this restrictions in the data situation and being aware that only a small proportion of data provided by Eurostat at all cover the regional level of NUTS 3, the TPGs laid great efforts to overcome the restricted data situation and to elaborate new data sources.

To overcome the data problems in these two countries in fields like labour market, estimations of regional data are very necessary. The national value of existing in EU context harmonised data has been regionally distributed

according to the existing regional profile of national defined data. By this the existing regional structures has been shifted related to the value base of harmonised data.

In a lot of cases the TPG's showed a lot of data creativity or have been searching successfully for alternative data and indicators. In some fields this search has been restricted to the old EU 15 because comparable data for the new Member States and the neighbouring countries do not exist.

This is the case for example in agriculture. Project 2.1.3 in this sense states that the availability of detailed territorial data on agriculture across Europe is surprisingly poor, given the huge extent of agricultural data collection and the bureaucratic burden on farmers. Very little data relating to agriculture are available at NUTS3 level from Eurostat, DG Regio or DG Agriculture, and where they do exist up to 91% of data are missing. DG Agriculture reported that they have no information on CAP expenditure below national level other than Farm Accountancy Data Network sample data, which shows support received by farms rather than expenditure.

In the field of urban topics, more elaborated data sets are necessary in future which will allow a more comprehensive analysis of urban areas as nodes in a polycentric development. For this socio-economic data and coherent time series at municipal scale are needed as well as data on flows between urban areas.

Related to land use and environmental issues the missing data on Norway and most of the new Member States and the only less detailed information on Sweden and Switzerland (only the 17 or even 8 classes instead of the 45 classes classification).

Fundamental need related to Eurostat regional data is the filling of data gaps in time series. In a lot of cases missing data due to changes in regional shape of NUTS areas in Regio could be filled by correct data from national sources. A general missing data inventory of Eurostat data and the use of national expertise could be of help to overcome the annoying time consuming searches for missing values which in fact exist during analysis processes. Eurostat as co-ordinator of the European Statistical System is asked to leave this service not to the user of the European statistics but to the provider.

### **5.2.3 Core typologies**

The most important ESPON task is the translation of political spatial concepts into more a concrete and measurable basis with the help of statistical and territorial analysis.

In this process regional classification and typologies indicate operationalised ways to access e.g. the fields of urban functionality and urban rural

relationship (polycentrism in broader context), of accessibility and problem related spatial and territorial structures.

Typologies of regions and territories are needed as background of spatial structures and pictures against which trends and policy impacts can be checked.

In a first phase they provide the territorial puzzle of structural types and regional profiles in a different thematic context. Based on indicators, types of spatial clusters and regional groups are identified which are defined by comparable structures.

On the basis of the elaborated typologies, statistical measures and indices can be developed to summarise spatial structures and trends with a quantitative, visual insight into spatial structure and trends in Europe.

**Table 9 Espon Core Typologies – October 2004**

Typology	Regional Types	TPG	Spatial scope	Regional level
<b>Functional urban areas (FUAs)</b>	1 Metropolitan European Growth Areas (MEGAs)	1.1.1	EU27+2	NUTS 3
	2 transnational / national FUAs			
	3 Regional / local FUAs			
<b>MEGAs</b>	1 Global nodes	1.1.1	EU27+2	NUTS 3
	2 European Engines			
	3 Strong MEGAs			
	4 Potential MEGAs			
	5 Weak MEGAs			
<b>Intra-urban settlement structures</b>	1 Sprawl	1.1.1	EU27+2	NUTS 3
	2 Monocentric			
	3 Polycentric			
	4 Sparsely populated			
<b>6 Type NUTS 3 FUAs</b>	1+ Monocentric NUTS 3 (FUA exceed NUTS 3 boundaries)	1.1.1	EU27+2	NUTS 3
	0+ NUTS 3 region neighbouring 1+ NUTS 3 region			
	1 monocentric NUTS 3 (only 1 FUA)			
	2 bipolar NUTS 3 (two FUAs)			
	3 polycentric NUTS 3 (three or more FUAs)			
	0 no FUA			
<b>19 Type NUTS 3 FUAs</b>	1+A MEGA FUA (exceeds NUTS3 boundaries)	1.1.1	EU27+2	NUTS 3
	1+B Transnational/national FUA (exceeds NUTS3 boundaries)			
	1+C Regional/local FUA (exceeds NUTS3 boundaries)			
	1B transnational/national FUA			
	1B- transnational/national FUA, but FUA population smaller than non-FUA population			
	1C regional/local FUA			
	1C- regional/local FUA, but FUA population smaller than non-FUA population			
	2A at least one of FUAs is MEGA			
	2B at least one of FUAs is transnational/national FUA			
	2B- at least one of FUAs is transnational/national FUA, but FUA population smaller than non-FUA population			
	FUA population			
	2C two regional/local FUAs			

Typology	Regional Types	TPG	Spatial scope	Regional level
	2C- two regional/local FUAs, but urban population smaller than rural population 3A at least one of FUAs is MEGA 3B at least one of FUAs is transnational/national FUA 3B- at least one of FUAs is transnational/national FUA, but FUA population smaller than non-FUA population 3C only regional/local FUAs 3C- only regional/local FUAs, but FUA population smaller than non-FUA population 0+ neighbouring 1+ NUTS3 region 0 no FUA			
<b>Urban - rural typology - 6 types</b>	1 High urban influence, high human intervention 2. High urban influence, medium human intervention 3. High urban influence, low human intervention 4. Low urban influence, high human intervention 5. Low urban influence, medium human intervention 6. Low urban influence, low human intervention	1.1.2	EU27+2	NUTS 3
<b>Urban - rural typology - 10 types</b>	1 Urban densely populated and high urban integration 2 Urban-rural, densely populated and high urban integration 3 Urban-rural, not densely populated but high urban integration 4 Urban-peripheral, not densely populated and low urban integration 5 Rural -urban, densely populated and high urban integration 6 Rural -urban, not densely populated but high urban integration 4 Rural-peripheral, not densely populated and low urban integration 8 Peripheral-urban, densely populated and high urban integration 9 Peripheral-rural, densely populated but high urban integration 10 Peripheral, not densely populated and low urban integration	1.1.2	EU27+2	NUTS 3

Typology	Regional Types	TPG	Spatial scope	Regional level
<b>Cross-border functionality and participation</b>	Symmetric with small differences between neighbouring regions and suitable infrastructure for cross-border integration (1)	1.1.3	EU27+2	NUTS 3
	Symmetric with small differences between neighbouring regions but important barriers for cross-border integration (3)			
	Asymmetric with large differences between neighbouring regions and suitable infrastructure for cross-border integration (2)			
	Asymmetric with large differences between neighbouring regions but suitable infrastructure for cross-border integration (4)			
<b>Population change</b>	Increase of population with in-migration and natural increase (1)	1.1.4	EU27+2	NUTS 3
	Increase of population with in-migration and natural decrease (2)			
	Increase of population with out-migration and natural increase (3)			
	Decrease of population with out-migration and natural decrease (4)			
	Decrease of population with in-migration and natural decrease (5)			
	Decrease of population with out-migration and natural increase (6)			
<b>Population change in regions with high share of elderly people</b>	Increase of population with in-migration and natural increase (1)	1.1.4	EU27+2	NUTS 3
	Increase of population with in-migration and natural decrease (2)			
	Increase of population with out-migration and natural increase (3)			
	Decrease of population with out-migration and natural decrease (4)			
	Decrease of population with in-migration and natural decrease (5)			
	Decrease of population with out-migration and natural increase (6)			
<b>Typology of migratory balances by ages</b>	Migratory balance according age groups (youth, middle age, older) 27 classes	1.1.4		NUTS 2

Typology	Regional Types	TPG	Spatial scope	Regional level
<b>Typology crossing mobility and migratory balances</b>	Combination of migration turnover related to population and migration balance	1.1.4		NUTS 2
<b>Typology of depopulation</b>	Very strong depopulation (1)	1.1.4	EU27+2	NUTS 2/3
	Strong depopulation (2)			
	Depopulation (3)			
	Possible depopulation (4)			
	No depopulation (5)			
<b>Accessibility and GDP</b>	1 Successful regions with high accessibility	1.2.1	EU27+2	NUTS 3
	2 Successful peripheral regions			
	3 Lagging regions in the European core			
	4 Lagging peripheral regions			
<b>Typology of infrastructure endowment</b>	D Strongly mobility dependency with need of process government (Low level of infrastructure density and poor use level)	1.2.1	EU27+2	NUTS 3
	C Risk of congestion and need for distribution of activity (High level of infrastructure density and poor use level)			
	B Congestion regions with need of infrastructure improvement (Low level of infrastructure density and good use level)			
	A Unproblematic and use adequate poor infrastructure but (Low level of infrastructure density and good use level)			
<b>Household telecommunications access and uptake</b>	1 Very high	1.2.2	EU27+2	NUTS 2
	2 High			
	3 Moderately high			
	4 Moderate			
	5 Low			
	6 Very low			
<b>Business telecommunications access and uptake</b>	1 Very high	1.2.2	EU27+2	NUTS 2
	2 High			
	3 Moderately high			
	4 Moderate			

Typology	Regional Types	TPG	Spatial scope	Regional level
	5 Low			
	6 Very low			
<b>Combined household and business telecommunications development</b>	1 Very high	1.2.2	EU27+2	NUTS 2
	2 High			
	3 Moderately high			
	4 Moderate			
	5 Low			
	6 Very low			
<b>Broadband penetration</b>	1 Low	1.2.2	EU27+2	NUTS 2
	2 Medium			
	3 High			
<b>Introduction of Competitive provision</b>	1 Early	1.2.2	EU27+2	NUTS 2
	2 Late			
<b>Broadband penetration / Introduction of Competitive provision</b>	1 High broadband - early competition	1.2.2	EU27+2	NUTS 2
	2 High broadband - late competition			
	3 Medium broadband - early competition			
	4 Medium broadband - late competition			
	5 Low broadband - early competition			
	6 Low broadband - late competition			
<b>Hazard potential and vulnerability</b>	Ordinal typology taking into account degree of hazards and vulnerability	1.3.1	EU27+2	NUTS 3
<b>Regions by type of impact of ICTs policies</b>	1 Regions reacting to efficiency and indiscriminate ICTs policies	2.1.1	EU27+2	NUTS 3
	2 Regions reacting to efficiency ICTs policies			
	3 Regions reacting with low ICTs policies			
	4 Regions reacting to cohesion ICTs policies			
<b>Lagging Regions</b>	1 lagging regions	2.1.1	EU27+2	NUTS 3
	2 potentially lagging regions			
	3 non lagging regions			

Typology	Regional Types	TPG	Spatial scope	Regional level
<b>Regional R&amp;D performance</b>	1 Weak at undertaking R&D and innovation	2.1.1	EU27+2	NUTS 3
	2 Average strengths in R&D and innovation			
	3 Mixed fortunes in undertaking R&D and innovation			
	4 Strong system of R&D and innovation			
	5 Exceptionally strong system of R&D and innovation			
<b>R&amp;D and innovation capacity</b>	High R&D capacity and high innovation capacity	2.1.2	EU15 (EU27+2)	
	High R&D capacity but low or medium innovation capacity			
	Low or medium R&D capacity but high innovation capacity			
	Medium R&D capacity and medium innovation capacity			
	Low R&D capacity and low innovation capacity			
<b>Rural Areas - Cluster EU 15</b>	1 Agricultural peripheral regions	2.1.3	EU27+2	
	2 Northern mixed-economy regions			
	3 Vine culture regions			
	4 Sweden			
	5 Agricultural tourism (coastal) regions			
	6 Macro-city regions			
	7 Core farming regions			
	8 Southern lagging regions			
	9 Diversified farming regions			
	10 Meso accessible regions			
<b>Rural Areas - Cluster N 12</b>	1 Polish cities	2.1.3	EU27+2	
	2 Dynamic remote regions			
	3 Static remote regions			
	4 Dynamic macro-accessible regions			
	5 Lagging remote regions			
	6 Meso accessible regions (Mediterranean. islands plus Bucharest)			
	7 Stable accessible regions			

Typology	Regional Types	TPG	Spatial scope	Regional level
<b>Dominant Structural funds spending</b>	R Regional development, productive infra-structure	2.2.1	EU15	NUTS 3
	A Agricultural, fishery, rural development			
	S Social integration, human resources			
	C Basic infrastructure, European cohesion			
<b>Structural Fund spending and regional performance</b>	Low Spending - High Performance	2.2.1	EU15	NUTS 2
	Low Spending - Medium Performance			
	Low Spending - Low Performance			
	Medium Spending - High Performance			
	Medium Spending - Medium Performance			
	Medium Spending - Low Performance			
	High Spending - High Performance			
	High Spending - Medium Performance			
	High Spending - Low Performance			
<b>Structural Fund spending and change or regional performance ranking</b>	Low Spending - Rise in Ranking	2.2.1	EU15	NUTS 2
	Low Spending - Stable in Ranking			
	Low Spending - Fall in Ranking			
	Medium Spending - Rise in Ranking			
	Medium Spending - Stable in Ranking			
	Medium Spending - Fall in Ranking			
	High Spending - Rise in Ranking			
	High Spending - Stable in Ranking			
	High Spending - Fall in Ranking			

<b>Typology</b>	<b>Regional Types</b>	<b>TPG</b>	<b>Spatial scope</b>	<b>Regional level</b>
<b>Sectoral Economic structure in the Candidate Countries</b>	Regions with large agriculture and low to medium employment density	2.2.2	ACC12	NUTS 3
	Regions with medium agriculture and low employment density			
	Regions with low agriculture, mostly strongly industrialised and low to medium employment density			
<b>Regional conditions based on potentials and bottlenecks</b>	Capital cities/major urban agglomerations	2.2.2	ACC12	NUTS 3
	Western border regions			
	Peripheral eastern and rural regions			
	Old industrial regions			
<b>Settlement structure</b>	1 Central Areas in agglomerated regions	3.1	EU27+2	NUTS 3
	2 Highly densely areas in agglomerated regions			
	3 Densely areas in agglomerated regions			
	4 Rural areas in agglomerated regions			
	5 Central Areas in densely populated regions			
	6 Densely areas in densely populated regions			
	7 Rural areas in densely populated regions			
	8 Rural area more densely populated			
	9 Rural area less densely populated			

## **GIS orientated instruments**

- 6.1 Basic elements of ESPON GIS**
- 6.2 WEB baesd GIS interactive cartographical portal-web GIS**
- 6.3 Hyperatlas**



## 6 Basic Elements of ESPON GIS

### 6.1 The ESPON map kit

(by Volker Schmidt-Seiwert)

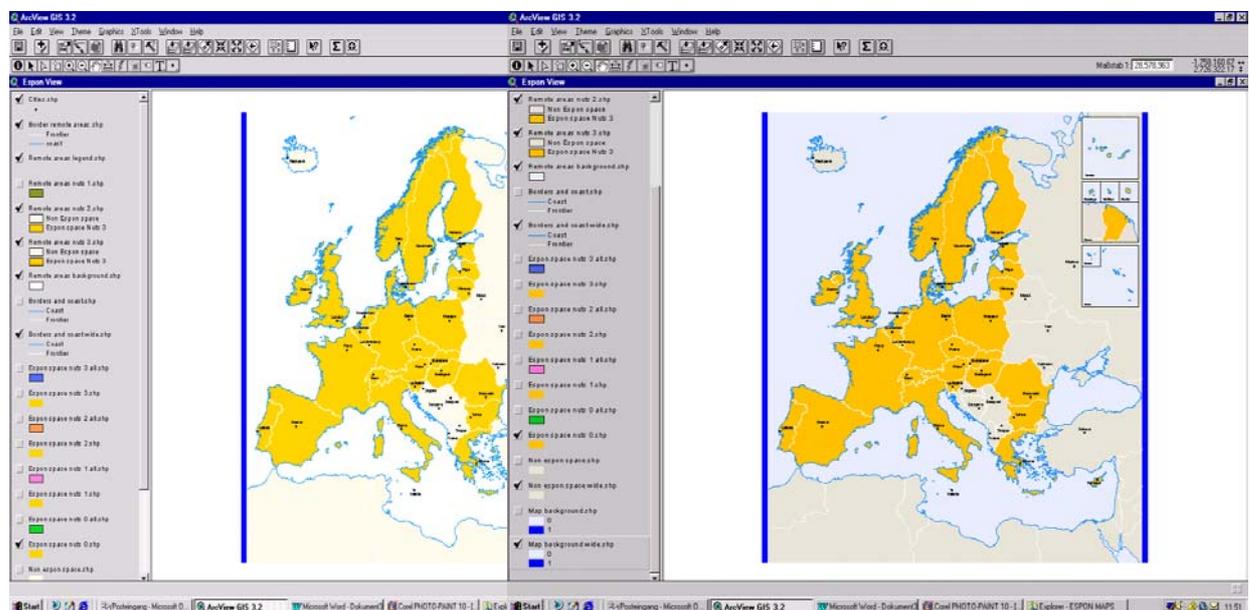
At the very beginning of the ESPON 2006 programme it was realised that the programme need a common or better a co-operate element to recognise result as ESPON result although it is not one single institution but a more or less closely connected network of research project at that consisting of partners from different European countries.

Thinking spatial and being aware, that most of the result will be visualised in maps, the idea having a common ESPON map layout was self-evident.

Project 3.1 provided a first draft which was discussed at the Mondorf ESPON Seminar.

On the basis of the agreed map design the ESPON map kit in form of an ArcView3.2 project was elaborated including coverage of all regional levels for the ESPON countries.

**Figure 33 Screenshot of ArcView version of the ESPON map design**



The cartographic elements and data provided (shape files) enables the construction of a map covering the EU 25+2+2 territory on different regional levels (NUTS 0, NUTS 1, NUTS 2, NUTS 3 and NUTS 23). For a complete cartographic presentation the surrounding countries were added (non ESPON space), including map background and borders and coast. The Remote areas and islands are covered with own shapes.

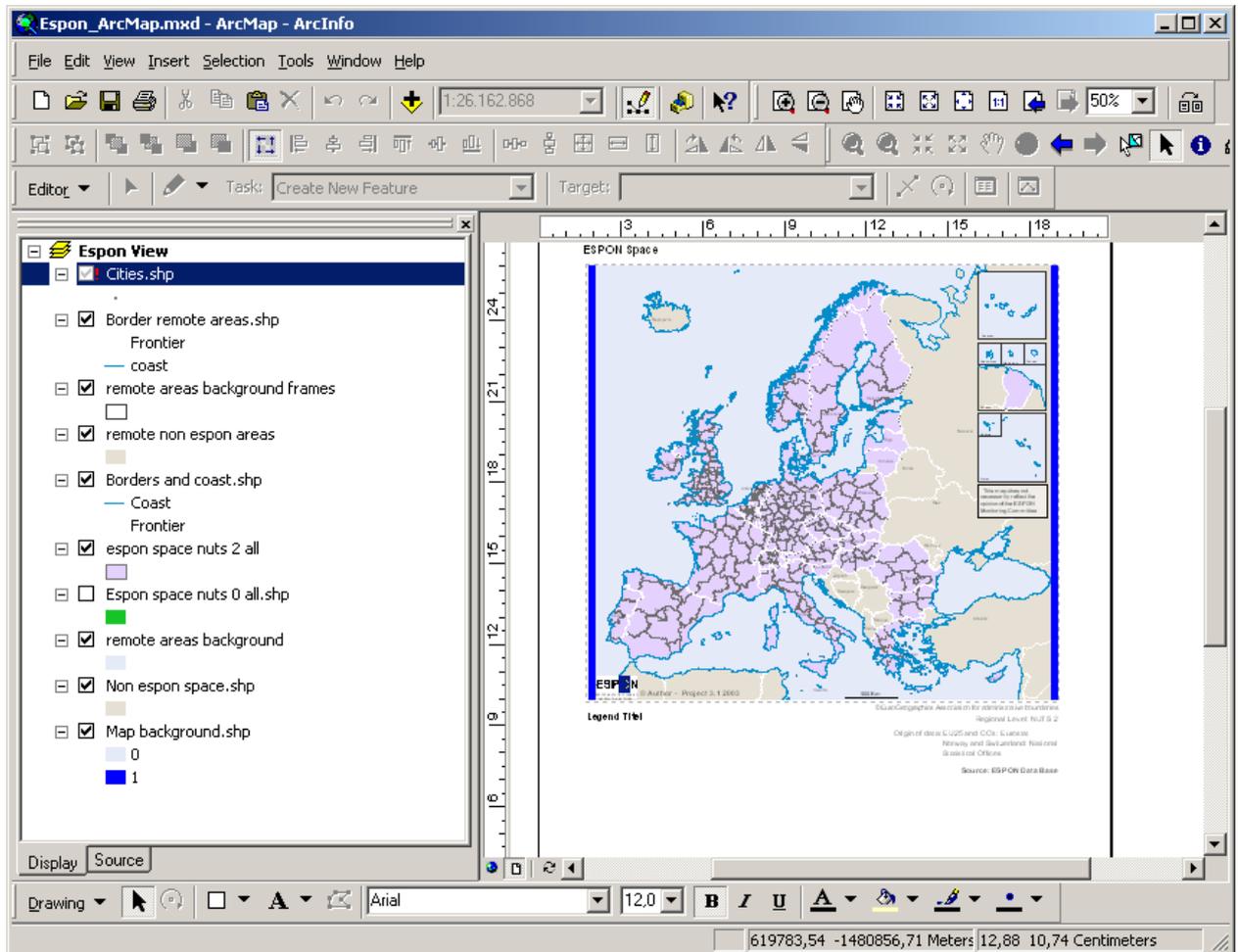
Thus, the ESPON TPG's obtained a unique tool to produce regionally based thematic maps. Intensive technical help and support by project 3.1 accompanies the diffusion of the idea of a common map design among the projects. The cartographic representation in the Second Interim Reports of the TPG's of the first round indicates the starting point of the ESPON map with respect to an increased use in the future.

In addition to the geographical data of the ESPON regions (NUTS 1 to NUTS 3) each TPG obtains a data set with vector data of the municipalities of the ESPON countries. By now, all regional and sub-regional territorial levels could be mapped and used for analytical purposes.

Concerning GIS, technical progress does not end and so the ESPON GIS had not come to an end. The fundamental ESPON map kit has been designed and distributed on the base of ESRI ArcView 3.2. To enable all TPG's who might be interested in a transfer to the newer ESRI ArcMap, the project 3.1 will provide each TPG interested with the appropriate means for successful migration.

It is worth to point out, that this is not a change in the overall ESPON map world, but as it is in the GIS world in general just another alternative independent approach. The advantage of the use of ArcGis is the easier integration of the ESPON design elements into the layout as well as scale and other cartographic standards.

**Figure 34** Screenshot of ArcMap version layout view of the ESPON map design



The ESPON mapping kit provided by 3.1 has been revised according to the TPG's suggestions related to corrections and improvement. In the actual use of the ESPON map standards considerable progress has been achieved, whereby also results of the several TPG's necessarily might have served as examples for other TPG's. Especially the easy and ready to include ArcMap version does help some TPG's to overcome cartographic challenges and fear of entering the cartographic world.

As the final reports show, it worked and besides some missing correct legal notes and disclaimers and some distorted maps or the use different

## 6.2 Web-based GIS

(by Panagiotis Getimis and Dionissios Kalivas, UEHR)

### 6.2.1 Introduction

ESPON WEB GIS SITE is the main task of WorkPackage 8 of the 3.1 project (Integrated Tools for European Spatial development) of the ESPON program.

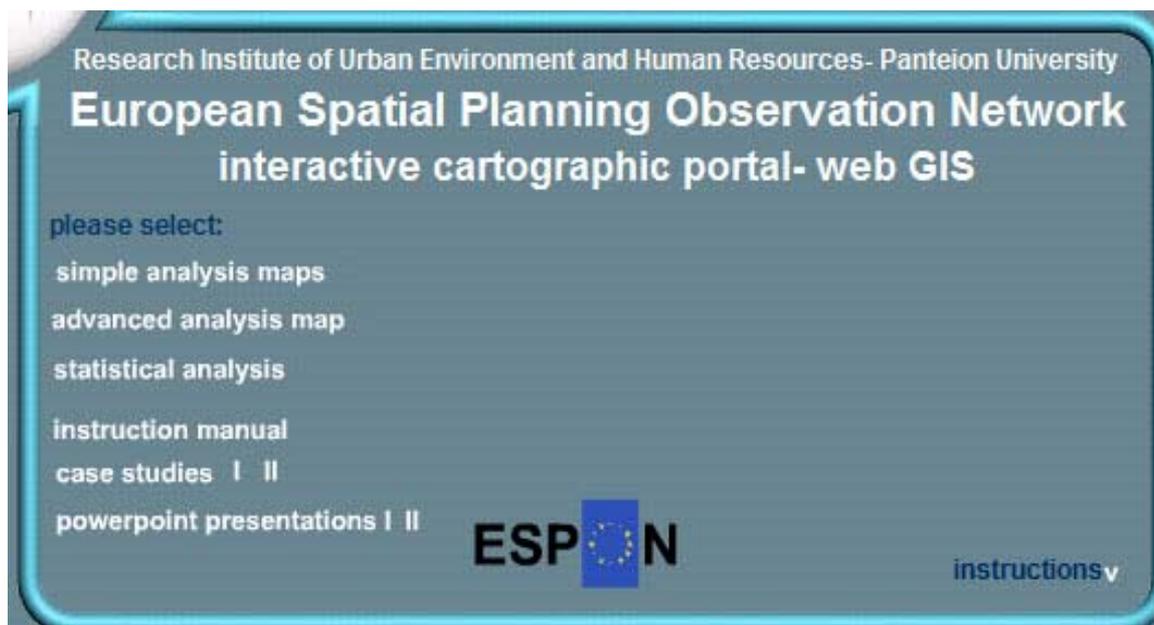
The Research Institute of Urban Environment and Human Resources (UEHR) of Panteion University in Greece is responsible for this task. The UEHR team which developed ESPON WEB GIS is: Dr. D. Kalivas Lecturer, I. Katsios, K. Dolkas, D. Bekatoros, G. Bouloudis, A. Giotis and B. Holloway.

The 3.1 project program plays a very important role in the collection, unification, development and elaboration of the results of all the other programs in 22 programs implemented in the framework of ESPON 2006. UEHR, by using these results (statistical data, spatial indicators) which are included in the ESPON Database, have brought out and created a geographical data base, tools for spatial analysis and harmonised cartographic presentation and for the dissemination of results via Internet.

The site contains three parts:

- **Simple Analysis Maps.**
- **Advanced Analysis Map.**
- **Statistical Analysis.**

The site also contains on line manual and case studies.



### **6.2.1.1 SIMPLE ANALYSIS MAPS**

It includes predefined maps, each, giving to the users the following capabilities: Query and Spatial Selection, Buffer, Toggle and Zooming tools.

#### **6.2.1.1.1 DATA CATEGORY SELECTION**

In this section, by the category and subcategory that the user is interested in can be displayed on the screen.

#### **6.2.1.1.2 PAN AND ZOOM TOOLS**

A very important set of tools is included such as:

- Zoom in
- Zoom out
- Zoom to Full Extent
- Zoom to Active Layer
- Back to the Last Extent
- Pan
- Pan to North
- Pan to South
- Pan to West
- Pan to East
- Measure
- Set Units

#### **6.2.1.1.3 LEGEND**

The user has also the ability to view a legend with predefined classification for each visible layer in the overview map area.

#### **6.2.1.1.4 QUERIES – SELECTION**

In this group of tools that are also important are:

- Identify Tool
- Query Builder Tool
- Find tool
- Geographical Selection Tools
- Buffer Tool

- Metadata Tool

### 6.2.1.2 ADVANCED ANALYSIS MAP

In order to properly work the Advanced Analysis Map for the first time requires the java plug-in which is automatically downloaded from the internet.

- This part of the WEB GIS offers to the users the possibility to create active maps, corresponds to a Data Navigator category/subcategory, from the developed Geodatabase, alter the geographical layer properties - changing the symbols and the labels for the selected attribute, classify a layer-data table, utilization Advanced Query and has built-in Statistics.

The Advanced Analysis Map requires first time the java plug-in. The user must restart his/her computer after the downloading and installation.

#### 6.2.1.2.1 Add Layers – Geodatabase Connection

The user has the opportunity to Add Layers (which is given him/her the choice to select and add data from the ESPON geodatabase), she/he must open the "ArcSDE – Add ArcSDE Connection" in the Catalogue window and complete the fields that are required.

Beside the map tools which had been described in the Simple Analysis Map, like **Identify, Query builder, Find and Graphic selection, Previous extend, Zoom to full extent, Zoom to active layer of geographical information, Zoom out, Zoom in, Pan one direction, Pan, buffer and toggle**, the user, through the Advanced Analysis Map, has the additional capabilities: **Alter the geographical layer properties - changing the symbols and the labels for the selected attribute, classify a layer-data table, utilization-advanced Query and built-in Statistics.**

#### 6.2.1.2.2 Layer Properties

In this section the user has the ability, by activating the selected layer, to view an analytical description with the capacities that the Layer Properties part can be developed. The user has also the following opportunities:

- to change the name of the layer\_as it appears in the legend and set the visible scale range for the layer
- to change the symbol's size, type, and colour (Labels tab)
- to change the symbology of the layer (Symbols tab).

#### **6.2.1.2.3 Utilization-Advanced Query and has built-in Statistics**

The query builder tool allows the searching of records (e.g. polygons, points), of a selected layer, based on their attribute values. The user can search by numeric or string value.

The user also can calculate statistics for a layer's numeric fields by clicking the **Statistics** button on the Query Builder dialog box.

Moreover at the end of the Map site the user has a view of the metadata that have some information about all the data that are contained in the database.

#### **6.2.1.3 STATISTICAL ANALYSIS**

This part of the application gives the ability to the user, to query the database for statistical\indicator data. The results depend on the parameters that the user defines. After making a data compilation, the user can see the selected data as a chart, the corresponding metadata and some basic statistical information (Min, Max, Average, Coefficient Variation and Standard Deviation).

The use of this part of the application has been simplified to three steps:

*Step 1. Query the database*

*Step 2. Data selection.*

*Step 3. Display the selected data*

#### **6.2.1.4 Web based GIS technical outline**

Due to the advanced demands of GIS capabilities and functionalities of the ESPON program, the WebGIS tool has combined many different platforms, elements and techniques to a common web interface. In order to achieve that, the following components have been used:

- **Shape files** (that contain the initial geographical information / maps)
- **Access database** (used as an indicator / raw data gathering tool)
- **Conversion software** (built in Visual Basic and used for converting data from access format to a specially designed MySQL database)
- **Data export plug-in** (built in JSP and used for exporting data from MySQL format to DBF files in order to join indicator / raw data with Shape files)
- **Database initialization software** (built in Java Applet and used to create an empty MySQL database)

- **MySQL server** (used to store indicators / raw data)
- **MsSQL server** (used to store SDE Layers, consisting of both indicators / raw data and maps / geographical information)
- **ArcIMS server** (used to produce interactive maps in two forms: Simple and Advanced analysis maps)
- **ArcSDE server** (used to provide ArcIMS with maps and data for the advanced analysis maps)
- **Statistical analysis tool** (built in JSP)

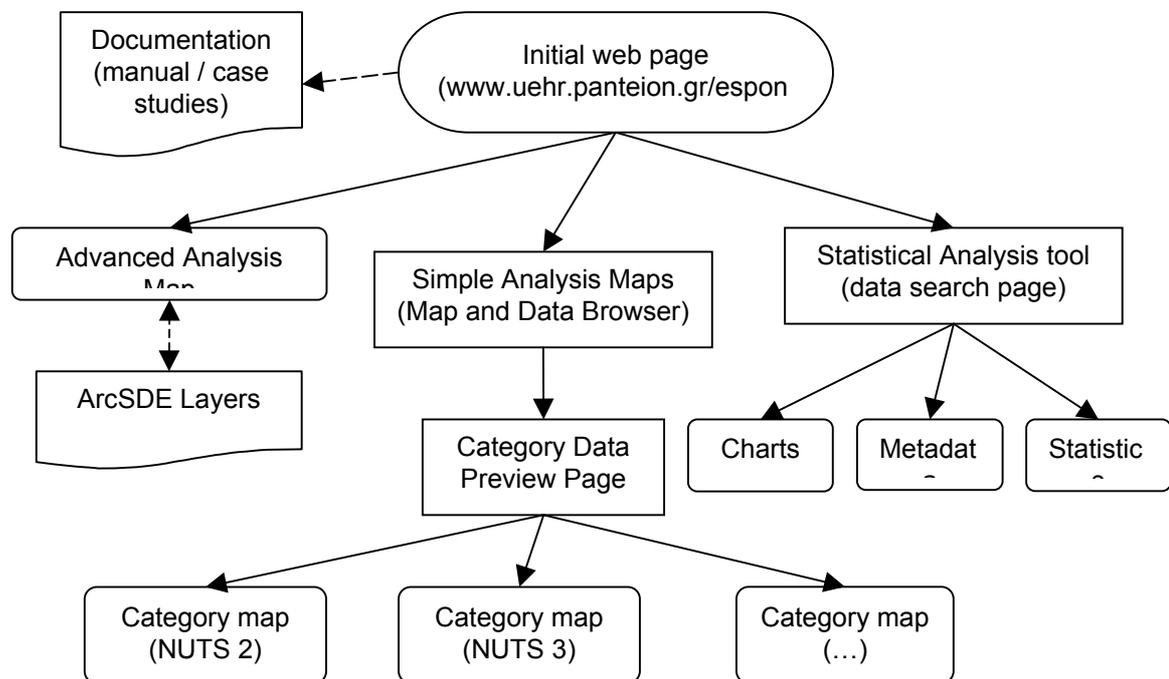
#### **6.2.1.5 Web GIS Security**

Since the data of the ESPON project are not intended to be used in public, security measures must be taken in order to restrict access only to the ESPON partners. Unfortunately, the variety of the components used in order to offer maximum GIS and analysis capabilities do not allow the building of a single security platform where the end-user could logon once in order to use all of the available functions. Thus, in order to secure all the data-providing areas of the site, each component has been locked separately. So:

- Both Advanced and Simple Analysis (HTML and Java) websites of the ArcIMS server have been locked.
- The Statistical Analysis tool has been locked manually. In this case the username and password is checked with every page request.
- The SDE Layers have been locked using MsSQL passwords

All the produced pages from ArcIMS Advanced Analysis, ArcIMS Simple Analysis and Statistical Analysis tool have been unified in a common web interface. Thus all maps, tools and function are accessible from a single web address ([www.uehr.panteion.gr/espon/](http://www.uehr.panteion.gr/espon/)), in other words a single web site. The structure of this site is show in the figure bellow:

**Figure 35 The Web based GIS final structure.**



### 6.2.2 Structure of the site

The analysis of ESPON data (geographical - shapefiles and statistical-attributes) through the internet, is an interactive way that has been elaborated to satisfy the communication within ESPON 2006 (TPGs, MC, ECP, MU) and also to present the results of it (maps, tables, queries) to the public.

For the Web GIS Site the ArcIMS software is used, which allows the delivery of a wide range of GIS maps, data and applications through Internet. In order to meet the different user requirements two different viewers (HTML and JAVA) have been developed to present the same information but using different capabilities of geographical data analysis.

The ESPON Web GIS Portal has been developed with three options according with the groups of users, the different demands and requirements. The first case is the "lightweight" version (**Simple Analysis Maps**) that presents static maps with a pre-defined classification of a particular current data or indicators. Through this, the access is easier for the users. In the second case (**Advanced Analysis Map**) a more detailed approach is allowed, through the use of a Java viewer, which displays dynamic maps via the Internet. Using this approach the user can develop active thematic maps on

demand by connecting and retrieving data that are stored in the Data Base Management System (that gives the user additional functionalities like classification of any data or indicator).

Moreover, the user with more advanced needs can also be connected with the server where the tables of data are stored, using a third client application such as ArcExplorer, ArcView or ArcMap and perform locally advanced applications that are supported by the particular application.

On the other hand, the third case (**Statistical Analysis**) gives the ability to the user, to query the database for statistical/indicator data. The results depend on the parameters that the user defines. After making a data query, the user can see the selected data as a chart, the corresponding metadata and some basic statistical information (Min, Max, Average, Coefficient of Variation and Standard Deviation).

Furthermore it is important to mention that Maps (enhanced with spatial analysis tools), tabular data, metadata and monovariate statistical analysis are organized, following the DataNavigator ESPON program guidelines, in categories (19) and subcategories (64) in Nuts 0, Nuts 1, Nuts 2 and Nuts3 geographical level.

Finally the metadata table is a very important aspect for the site. Each table contains meta-information for the data that are presented within the map. If there are too many data within a category then the user should search for the desired data/ indicator. The html pages which represent the metadata tables have been separated with the same way as they have been given on the ESPON Access Data Base.

## **Using the application**

### *Simple Analysis Maps*

It includes predefined maps, with each of them giving the users the following capabilities: Query and Spatial Selection, Buffer, Toggle and Zooming tools. For this reason the following tools are used: Pan and Zoom, Previous extend, Zoom to full extend, Zoom to active layer of geographical information, Zoom out, Zoom in, Pan one direction, Find, Search, Graphic selection, Measure, Set units, Select line or polygon, Clear all selection, Query builder, Legend, Buffer (within a distance around a point, a line or a polygon feature) identify and print.

### *Advanced Analysis Map*

This environment requires the user to install once in his/her machine the Java Runtime Environment. For the storage and the retrieval of the statistical data we developed a data base using the relational DBMS

Microsoft SQL Server. As soon as he/she gains access to the initial map he/she can then establish a connection with the previous server. The software ArcSDE has been used to link the geographical data and the statistical database in order to earn all of the benefits of using a relational DBMS and to model complex features and behaviour required by GIS.

This part of the WEB GIS offers the users the capability to develop active maps, using a Data Navigator category/subcategory, from the created Geodatabase, add layer, alter the geographical layer properties - changing the symbols and the labels for the selected attribute, classify a layer-data table, utilization of Advanced Query and has built-in Statistics. Also the user can configure the layout of the classification that is the colours and the number of ranged for the classified field.

Moreover the user besides the ability for dynamic adding and classifying data has the ability of querying the data and again has the previous classical abilities of zooming, panning.

#### *Statistical Analysis*

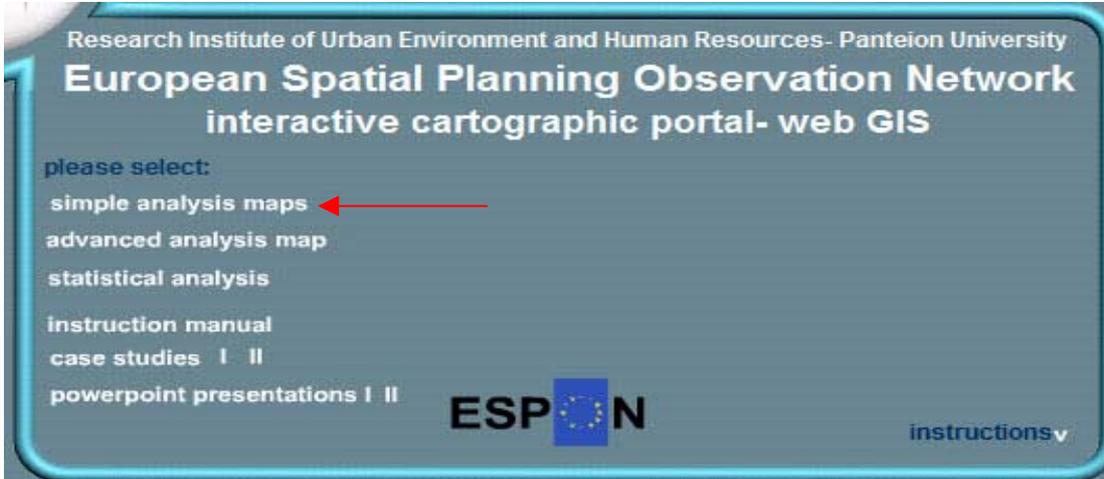
The statistical analysis option provides the user with a monovariate analysis. The user can select a data table and he/she can view not only certain statistics (e.g. mean, max, min, std, coefficient of variation) of the selected variables (indicators/data) but also the graphical presentation of them in the form of charts.

### **6.2.3 Using ESPON web GIS**

**Case study I. Find the NUTS3 areas in the European Union (EU-25) in 1996, that have Gross Domestic Product per Capita (Euro) higher than 15000.**

## STEPS

1. The user clicks on the **Simple Analysis Maps** button.

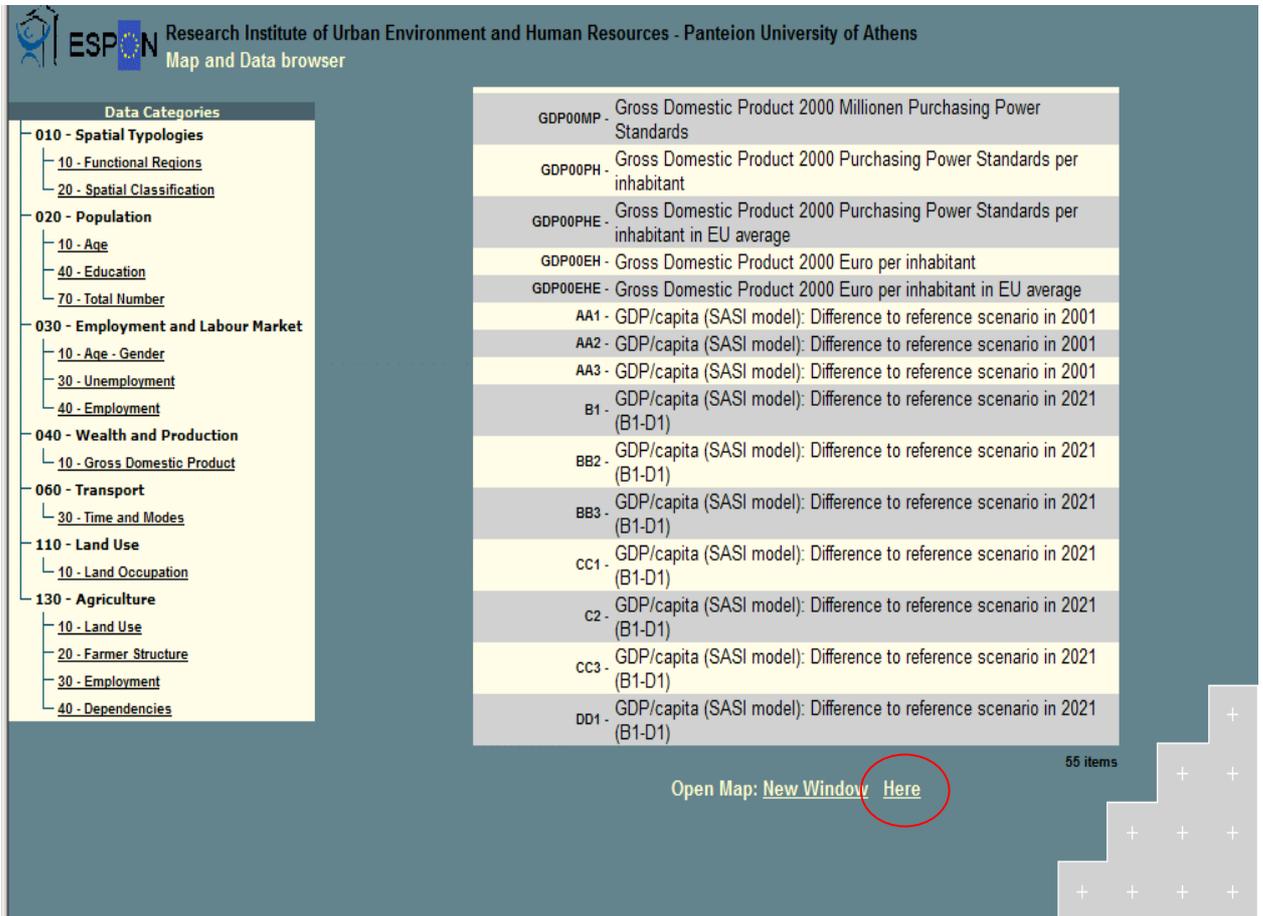


2. After searching in the database of each Sub-category in the NUTS3 geographical level, the user selects the *Gross Domestic Products* subcategory of the *Wealth and Production* category, particularly the indicator "GDP96EH" which corresponds to the case study query.

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Map and Data browser

Data Categories	NUTS 3 data
010 - Spatial Typologies	A1 - Impact on regional welfare for the A1 scenarios in % of GDP
10 - Functional Regions	A2 - Impact on regional welfare for the A2 scenarios in % of GDP
20 - Spatial Classification	A3 - Impact on regional welfare for the A3 scenarios in % of GDP
020 - Population	BB1 - Impact on regional welfare for the B1 scenarios in % of GDP
10 - Age	B2 - Impact on regional welfare for the B2 scenarios in % of GDP
40 - Education	B3 - Impact on regional welfare for the B3 scenarios in % of GDP
70 - Total Number	C1 - Impact on regional welfare for the C1 scenarios in % of GDP
030 - Employment and Labour Market	CC2 - Impact on regional welfare for the C2 scenarios in % of GDP
10 - Age - Gender	C3 - Impact on regional welfare for the C3 scenarios in % of GDP
30 - Unemployment	D1 - Impact on regional welfare for the D1 scenarios in % of GDP
40 - Employment	GDP95ME - Gross Domestic Product 1995 Millionen EURO
040 - Wealth and Production	GDP95PH - Gross Domestic Product 1995 Purchasing Power Standards per inhabitant
10 - Gross Domestic Product	GDP95PHE - Gross Domestic Product 1995 Purchasing Power Standards per inhabitant in EU average
060 - Transport	GDP95EH - Gross Domestic Product 1995 Euro per inhabitant
30 - Time and Modes	GDP95EHE - Gross Domestic Product 1995 Euro per inhabitant in EU average
110 - Land Use	GDP96ME - Gross Domestic Product 1996 Millionen EURO
10 - Land Occupation	GDP96MP - Gross Domestic Product 1996 Millionen Purchasing Power Standards
130 - Agriculture	GDP96PH - Gross Domestic Product 1996 Purchasing Power Standards per inhabitant
10 - Land Use	GDP96PHE - Gross Domestic Product 1996 Purchasing Power Standards per inhabitant in EU average
20 - Farmer Structure	<b>GDP96EH - Gross Domestic Product 1996 Euro per inhabitant</b>
30 - Employment	GDP96EHE - Gross Domestic Product 1996 Euro per inhabitant in EU average
40 - Dependencies	GDP97ME - Gross Domestic Product 1997 Millionen EURO
	GDP97MP - Gross Domestic Product 1997 Millionen Purchasing Power Standards

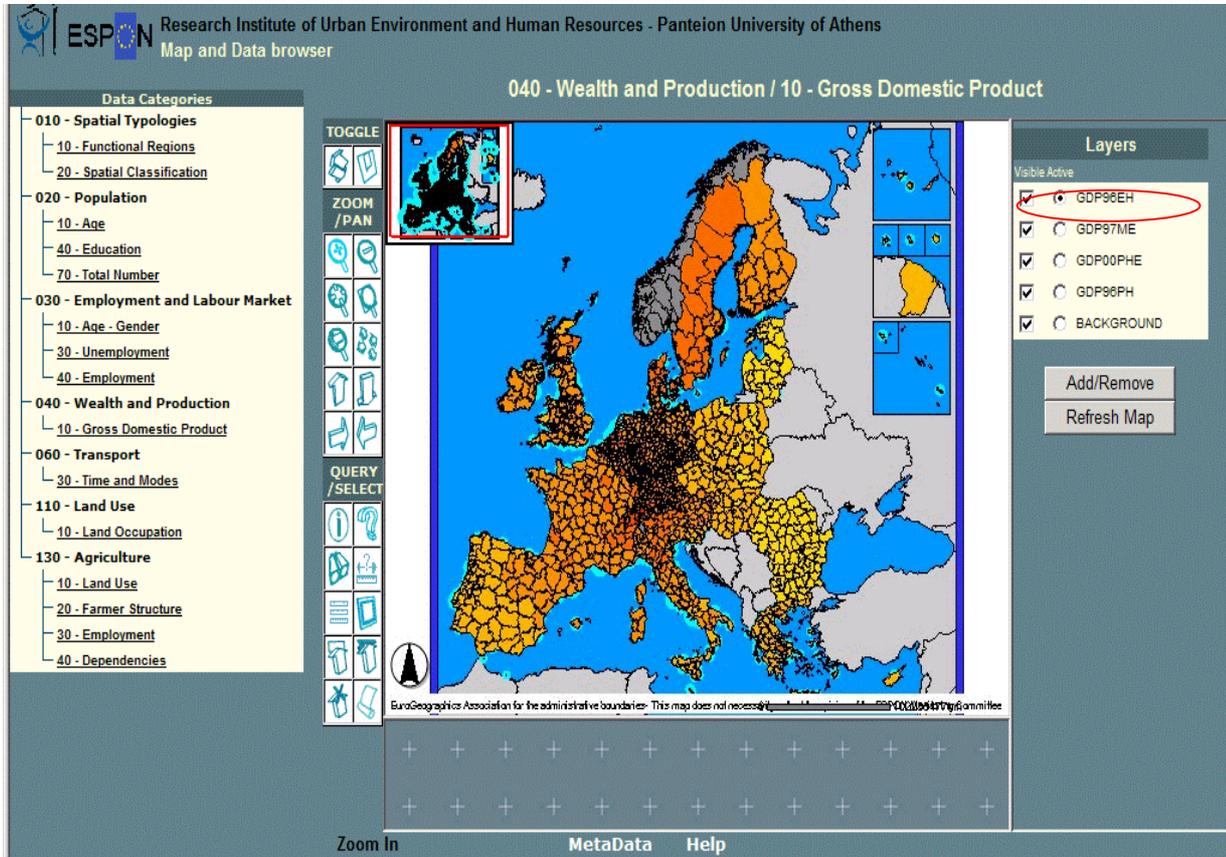
3. The user clicks the **New Window** or **Here** button in the NUTS3 data catalogue. This way, the user may observe the cartographic results for each selected field.



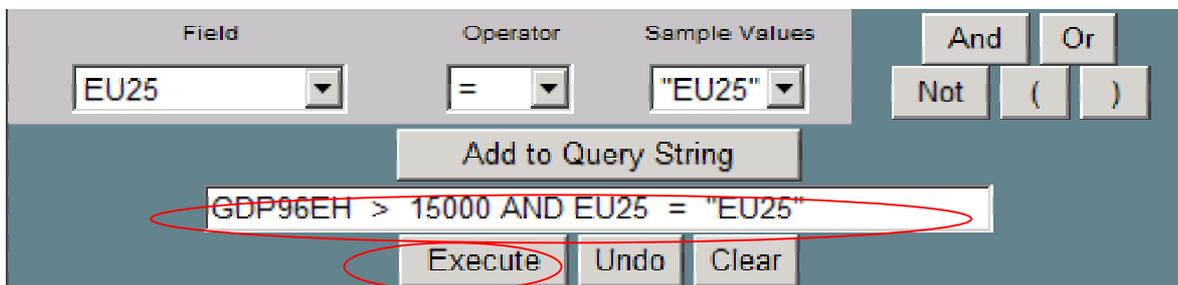
4. After selecting the **Here** or **New Window** button, the user must enter the **user name** and the **password** in order to be presented the map.



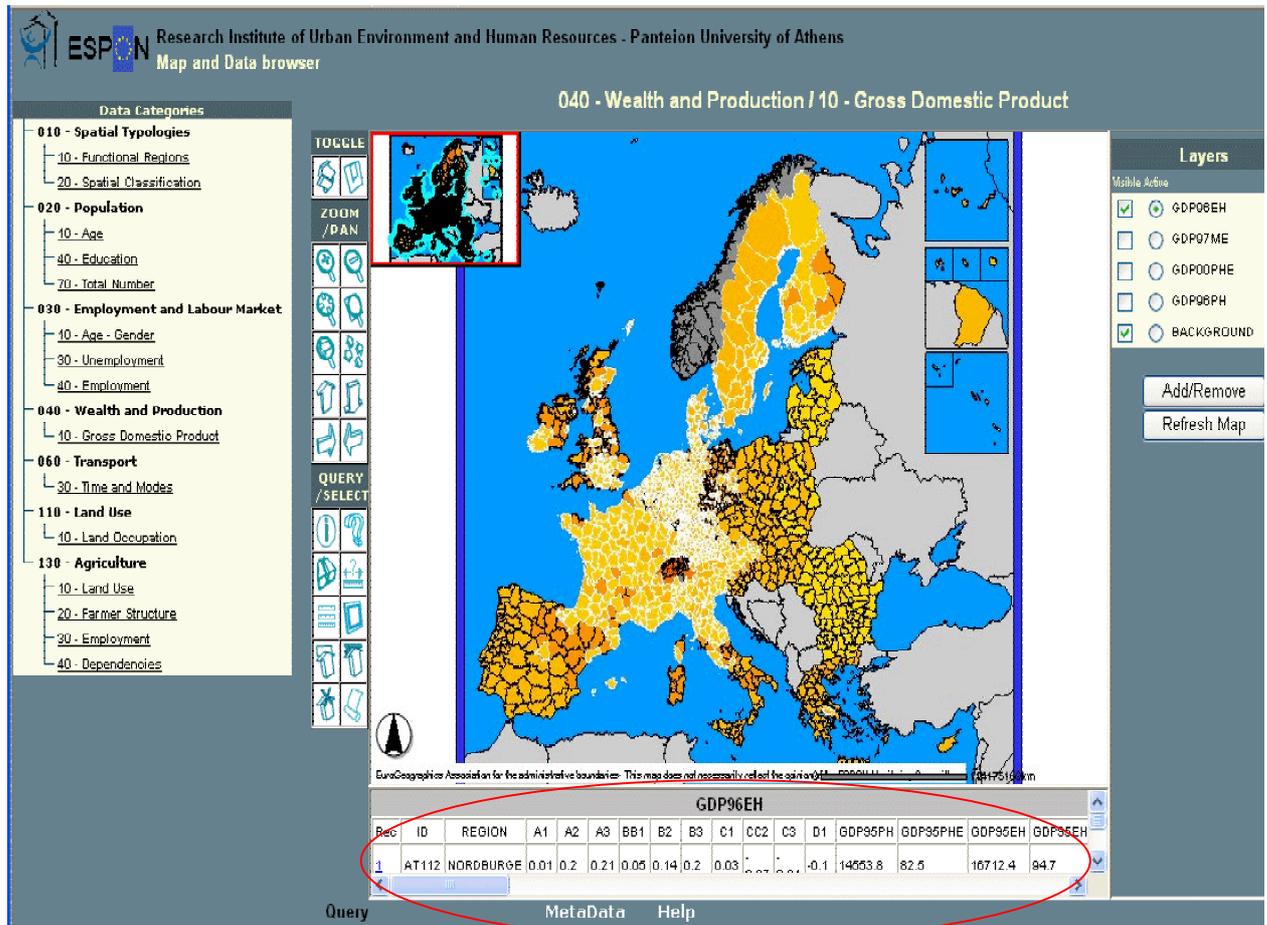
5. In order to build a query, the layer currently active, must also be checked as show below.



6. The user presses the query button and completes the following query.



7. When the user clicks the **Execute** button, the following window appears.



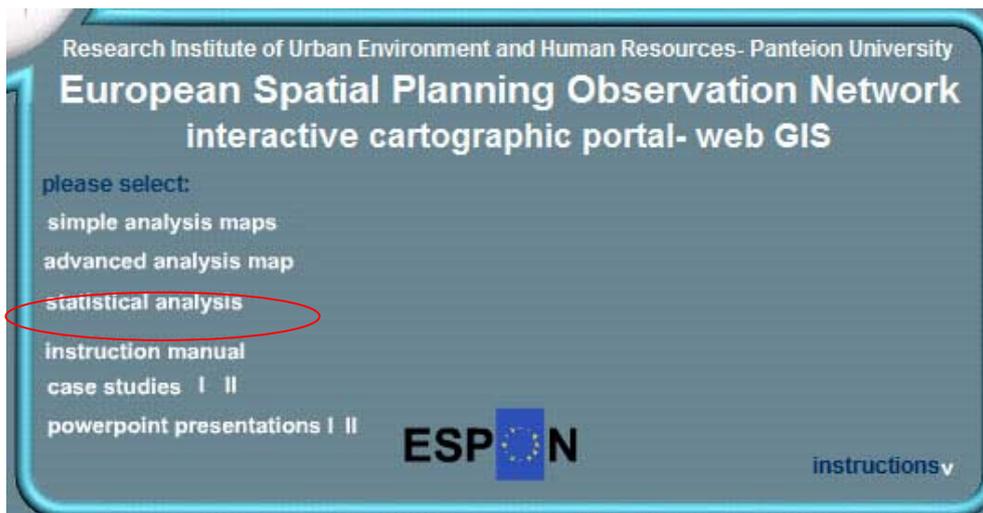
**Cartographic Results.** The appropriate features are highlighted in the map with yellow colouring. The user can observe that the areas which have Gross Domestic Product per capital (Euro) > 15000 in 1996, are all the EU15 members states except for Spain (without Madrid prefecture), Greece (without Athens prefecture), south Italy and north England.

**Statistical Results.** The Text Frame displays the data of the selected area.

**Case study II. Selection the NUTS3 areas in the European Union (EU-25) whose Gross Domestic Product per Capita (Euro) in 1996 is higher than the 70 percent of the average GDP value on that same year.**

**STEPS**

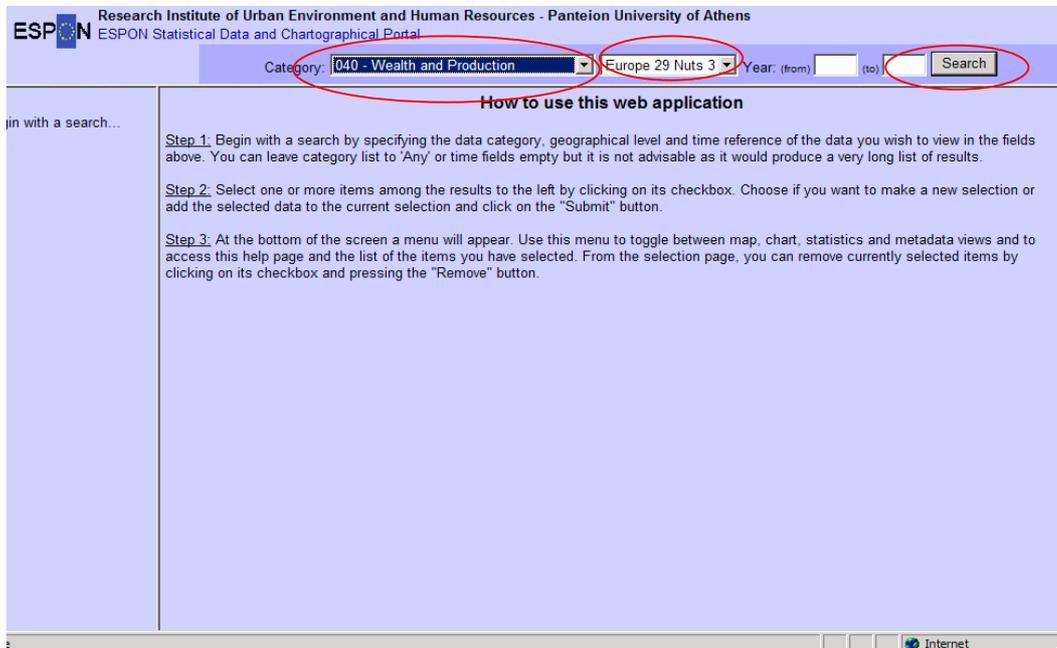
1) The user clicks on the **Statistical Analysis** button.



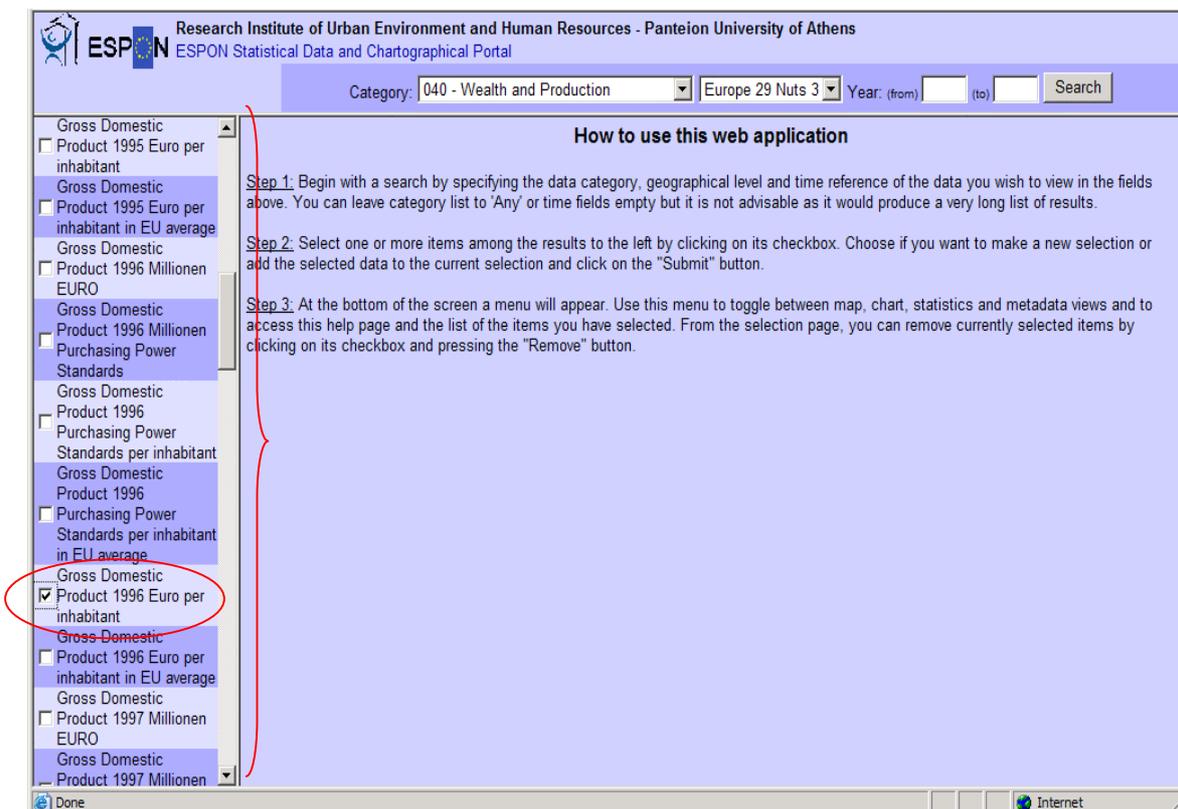
2) The user must enter the **user name, password** and press **logon**.

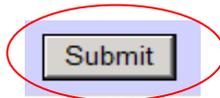
A screenshot of a login form on a light purple background. At the top, a red message reads 'This is a restricted area! Enter Username and Password to proceed...'. Below this, there are two input fields: 'Username:' and 'Password:'. Each field has a small blue square icon to its right. Below the input fields is a 'logon' button.

3) Moreover s/he selects the **Wealth and Production** Category and **Europe 29 Nuts3** geographical level. Then the user presses the **Search** button.

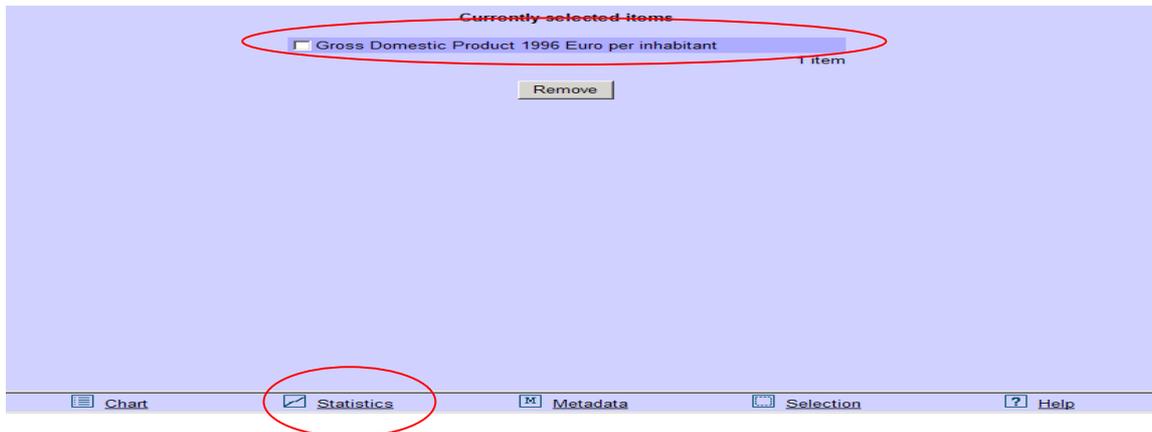


4) The user clicks the Gross Domestic Product 1996 Euro per Capita in the field's catalogue that appears in the left hand section of the screen.





At the bottom of the left hand section of the screen, the user must press the **Submit** button. Then the following window appears.



The currently selected item is displayed. If the user clicks the statistics button, s/he can observe the basic statistical information that the Statistical Analysis section of the site offers such as Min, Max, Average, Coefficient of Variation and Standard Deviation.

GDP96EH	Gross Domestic Product 1996 Euro per inhabitant
Min	570.00
Max	70611.40
Sum	2.08
Average	15934.07
Standard deviation	9205.52
Coefficient variation	57.77 %
Variance	8.47
Polygons with data	1309

The average value is inside the red cycle. On that basis, the user may calculate the 70 percent with regard to the average GDP value, namely 11153, 89.

Then the user must follow the same procedures as previously (goes to the Simple Analysis Maps, clicks on the *Wealth and Production* subcategory of Gross Domestic Product category, selects the active GDP96EH layer as shown and presses the query tool). Complete the query text frame as follows:

Field: EU25 Operator: = Sample Values: "EU25"

Buttons: And Or Not ( )

Add to Query String

GDP96EH > 11153.85 AND EU25 = "EU25"

Buttons: Execute Undo Clear

**Cartographic Results.** The appropriate features are highlighted in the map with yellow colouring and the user can observe that in 1996 all EU15 member states have Gross Domestic Product per capita (Euro) > 15000 except for Western Spain and Greece (without Athens and Thessaloniki prefecture)

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Map and Data browser

040 - Wealth and Production / 10 - Gross Domestic Product

Data Categories:

- 010 - Spatial Typologies
  - 10 - Functional Regions
  - 20 - Spatial Classification
- 020 - Population
  - 10 - Age
  - 40 - Education
  - 70 - Total Number
- 030 - Employment and Labour Market
  - 10 - Age - Gender
  - 30 - Unemployment
  - 40 - Employment
- 040 - Wealth and Production
  - 10 - Gross Domestic Product
- 060 - Transport
  - 30 - Time and Modes
- 110 - Land Use
  - 10 - Land Occupation
- 130 - Agriculture
  - 10 - Land Use
  - 20 - Farmer Structure
  - 30 - Employment
  - 40 - Dependencies

TOGGLE

ZOOM / PAN

QUERY / SELECT

Layers

Visible Active

- GDP96EH
- GDP97ME
- GDP00PHE
- GDP96PH
- BACKGROUND

Buttons: Add/Remove Refresh Map

Map showing Europe with yellow highlighted regions.

Table: GDP96EH

Rec	ID	REGION	A1	A2	A3	BB1	B2	B3	C1	CC2	C3	D1	GDP96PH	GDP96P
1	AT111	MITTELBUR	0.01	0.49	0.51	0.05	0.28	0.34	0.03	0.00	0.00	0.02	10574.3	50.9

Buttons: Query MetaData Help

**Statistical Results.** The Text Frame displays the data of the selected area.

**Case study III. Which NUTS3 areas in the EU29 geographical area, bear the highest values of Gross Domestic Product per capita (Euro) in 1998.**

This is a good example that needs to be solved with Advanced Analysis Map that includes spatial and non - spatial statistical processes.

The first thing that the user has to do is to examine the 1998 descriptive statistics (min, max, e.t.c.) of GDP per inhabitant (variable name: GDP98EH) by using the statistics from the Query builder tool.

The second step is to examine the spatial distribution of GDP98EH by observing labels on the map, using the map tips tool or using graduated colours for some groups of values.

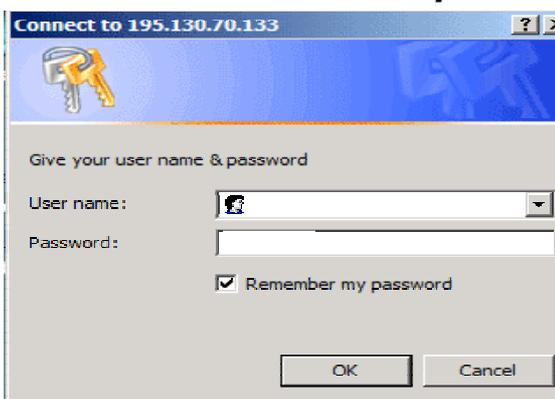
The last step is to examine the spatial correlation with certain features (e.g. pentagon area).

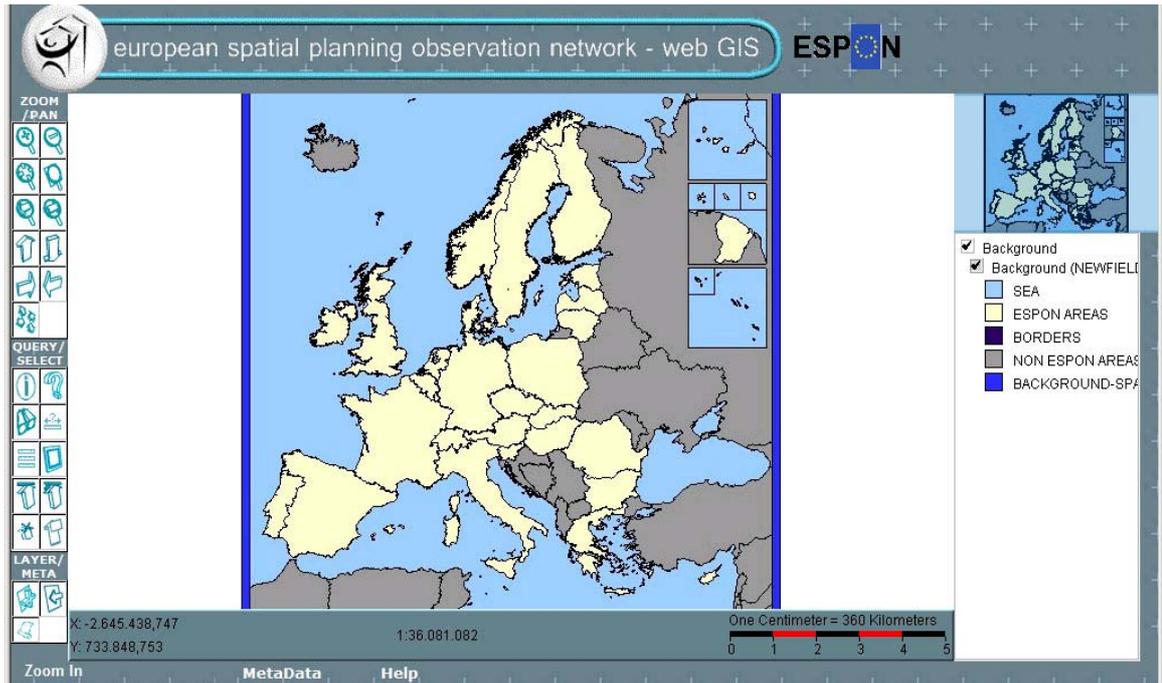
**STEPS**

1) The user clicks on the **Advanced Analysis Map** button

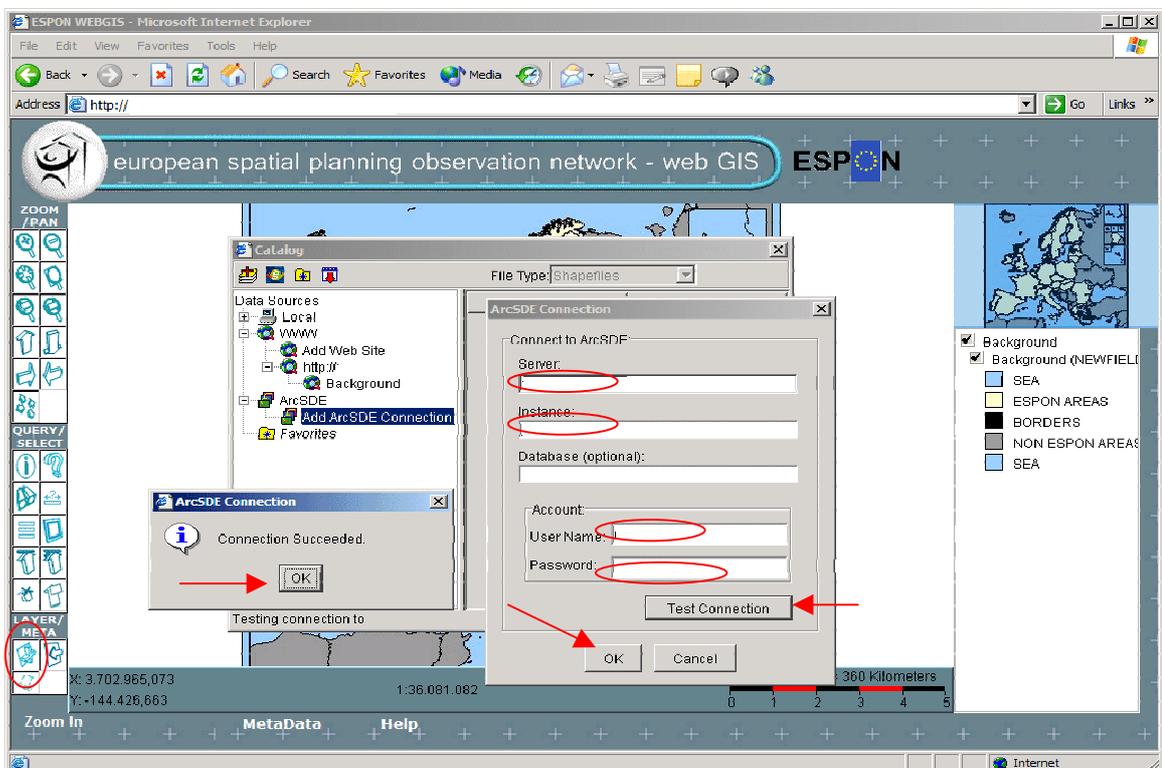


2) The Advanced Analysis Map requires first time the java plug-in. You must restart your computer after the downloading and installation. The user must enter the **user name** and **password**.





3) When the user clicks the Add Layer button  (which offers him/her the opportunity to select and add data from the ESPON geodatabase), s/he must open the "ArcSDE – Add ArcSDE Connection" in the Catalogue window and complete the fields highlighted with red circles.



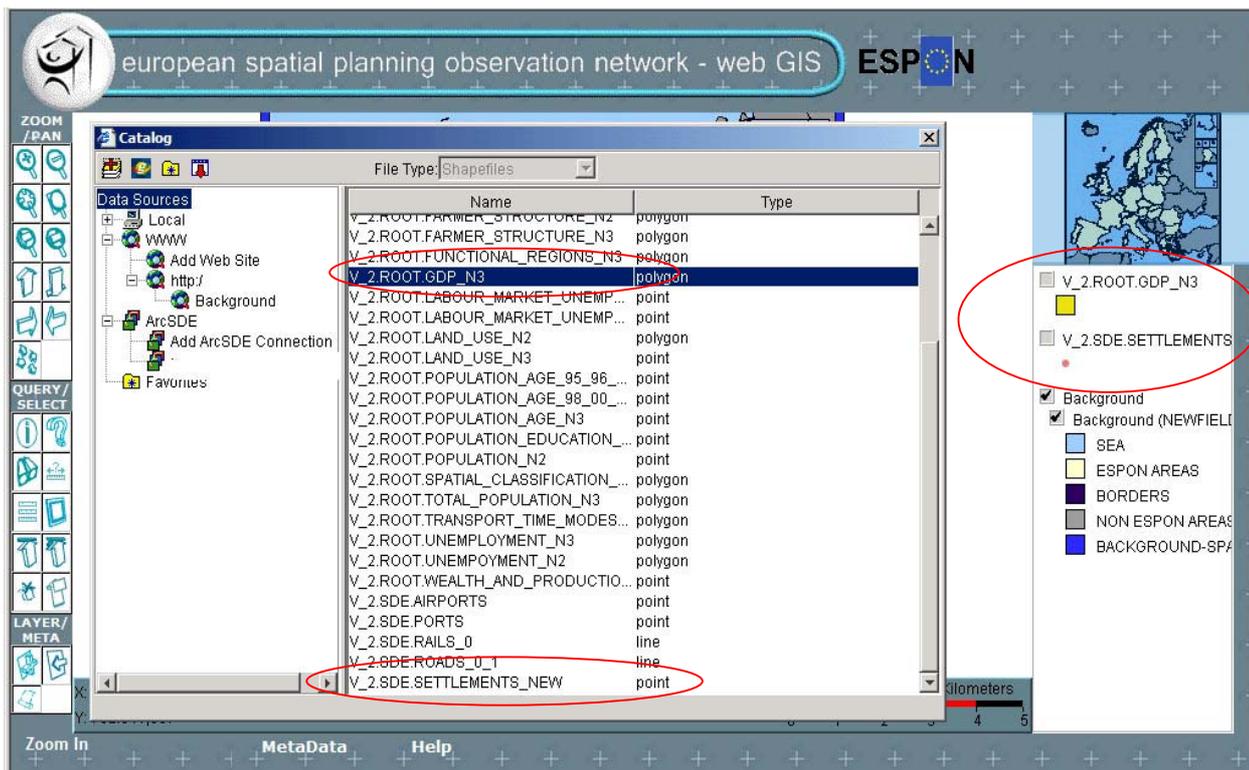
4) When the user completes the fields, he/she must press the **Test Connection** button.

5) The ArcSDE Connection window appears (press OK).

6) Press OK.

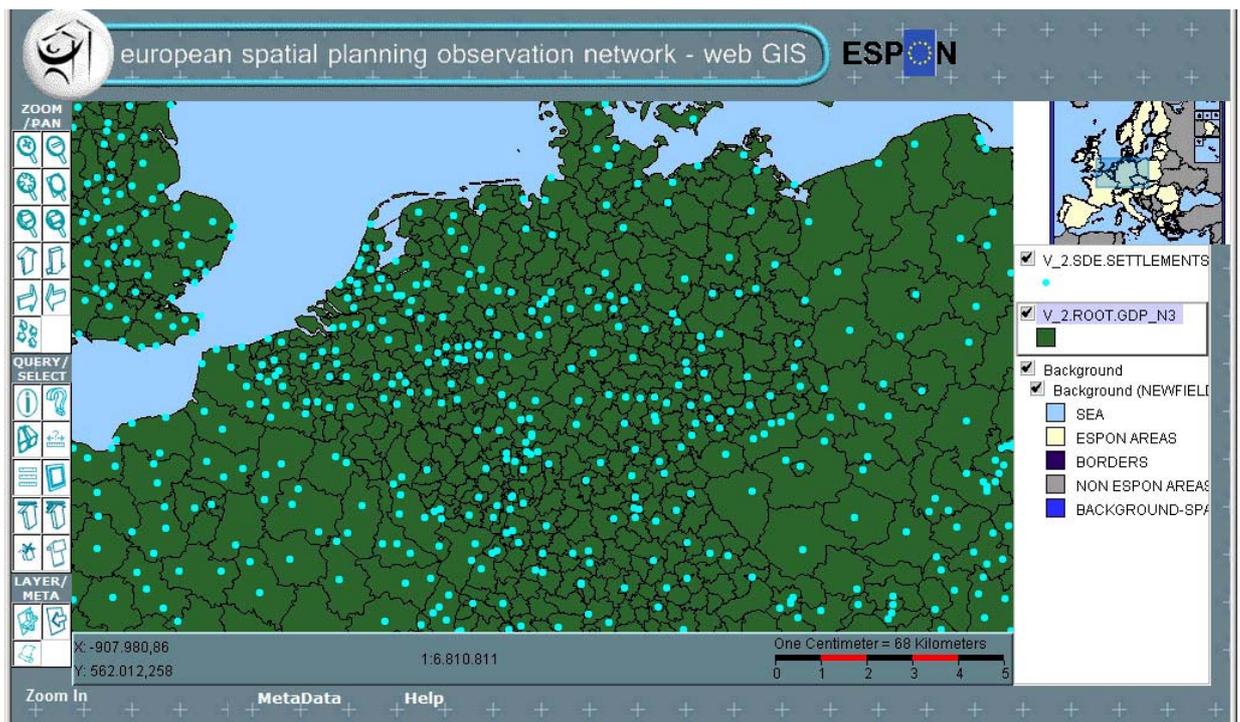
7) Then a catalogue of layer names comes up. From this catalogue, we choose the GDP\_N3 and Settlements New layers (NUTS\_3 geographical level). The layers are selected either by double clicking on the name of each of them or single clicking on the first button of the Catalog window.

8) The selected layer is added on the Table of contents area.

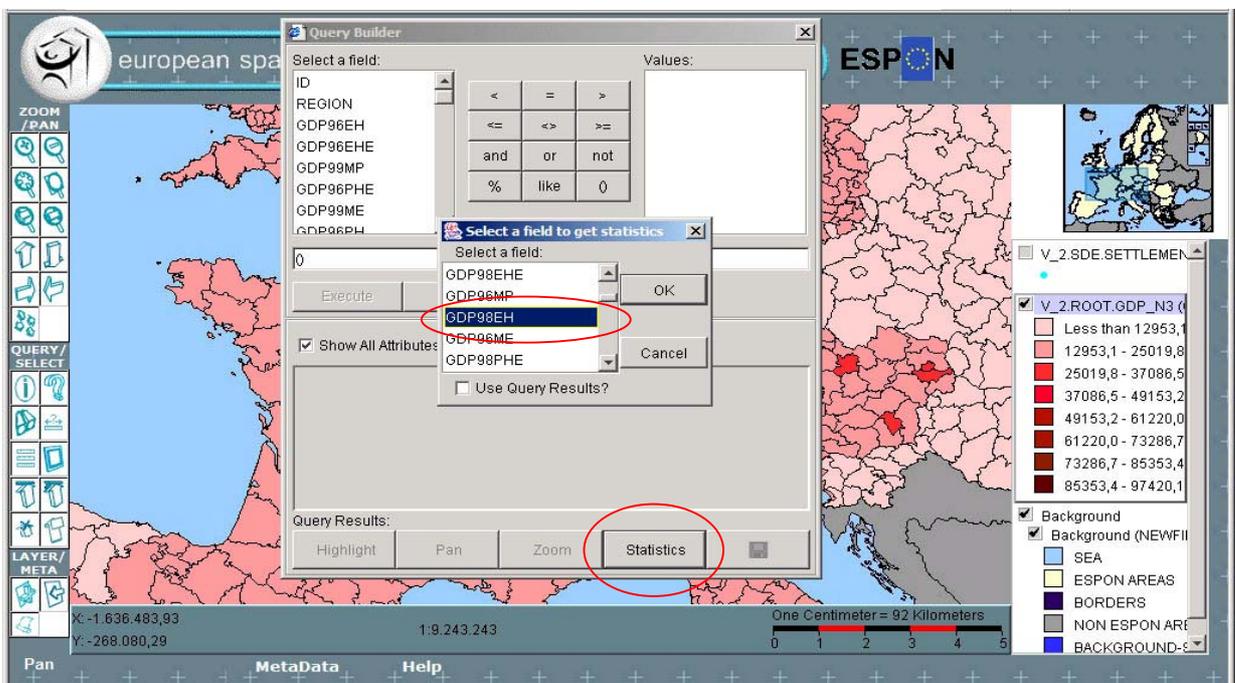


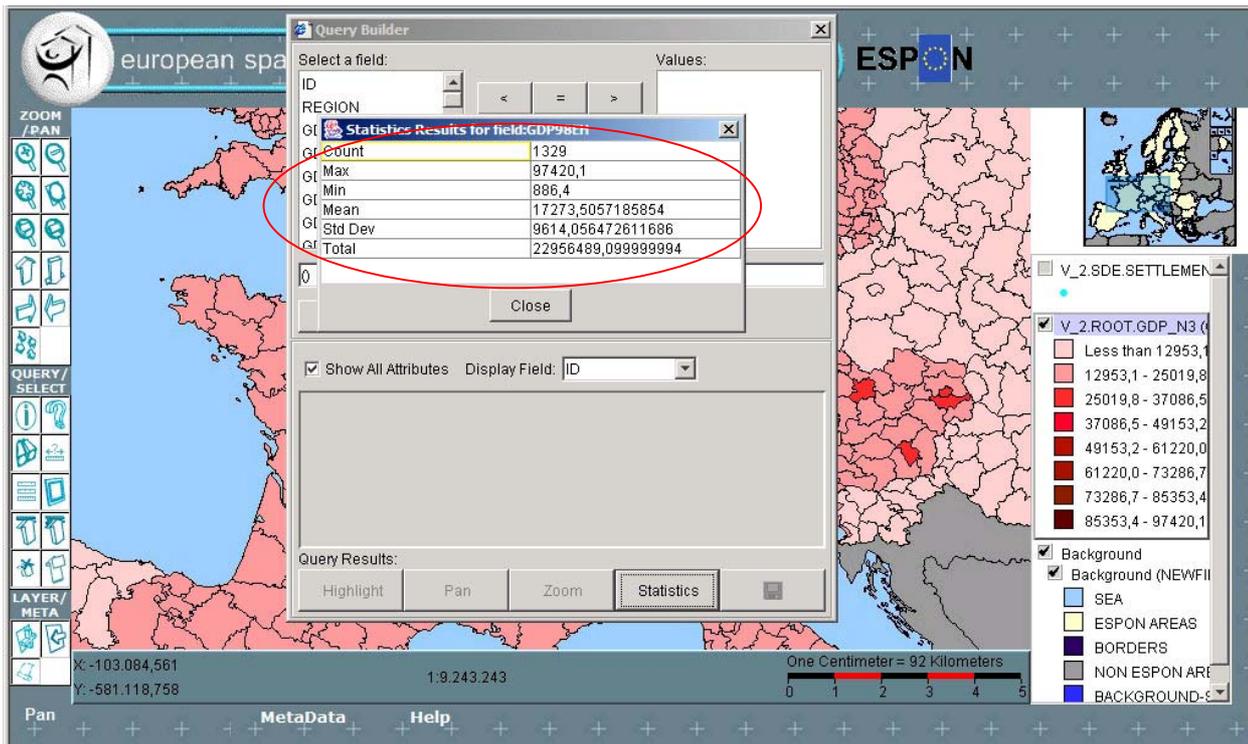
9) Close the Catalogue window.

10) The site presents the two selected layers



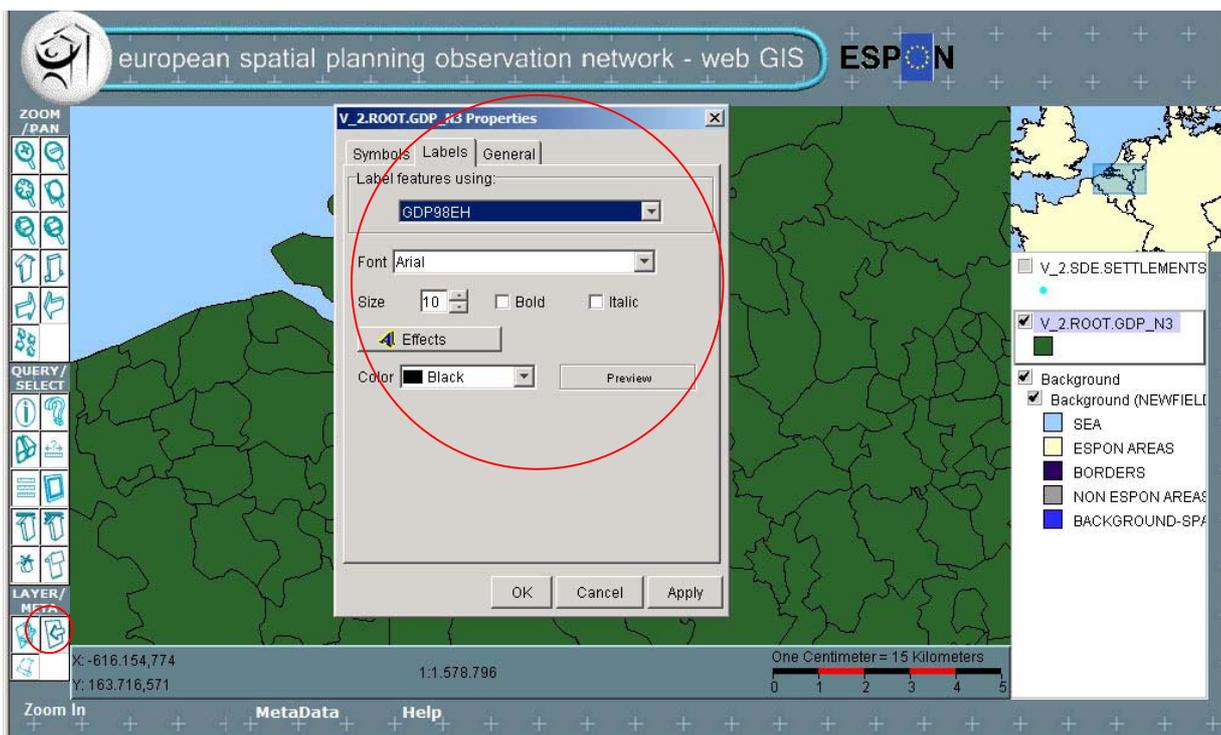
11) Using the Query Builder button we select the **GDP98EH** field from the GDP\_N3 layer. Through this button, the user has the ability to calculate the basic statistical values (min, max, mean, total and Std Dev).





Results:(**Min: 886, 4, Max: 97420,1 Mean: 17273,5**)

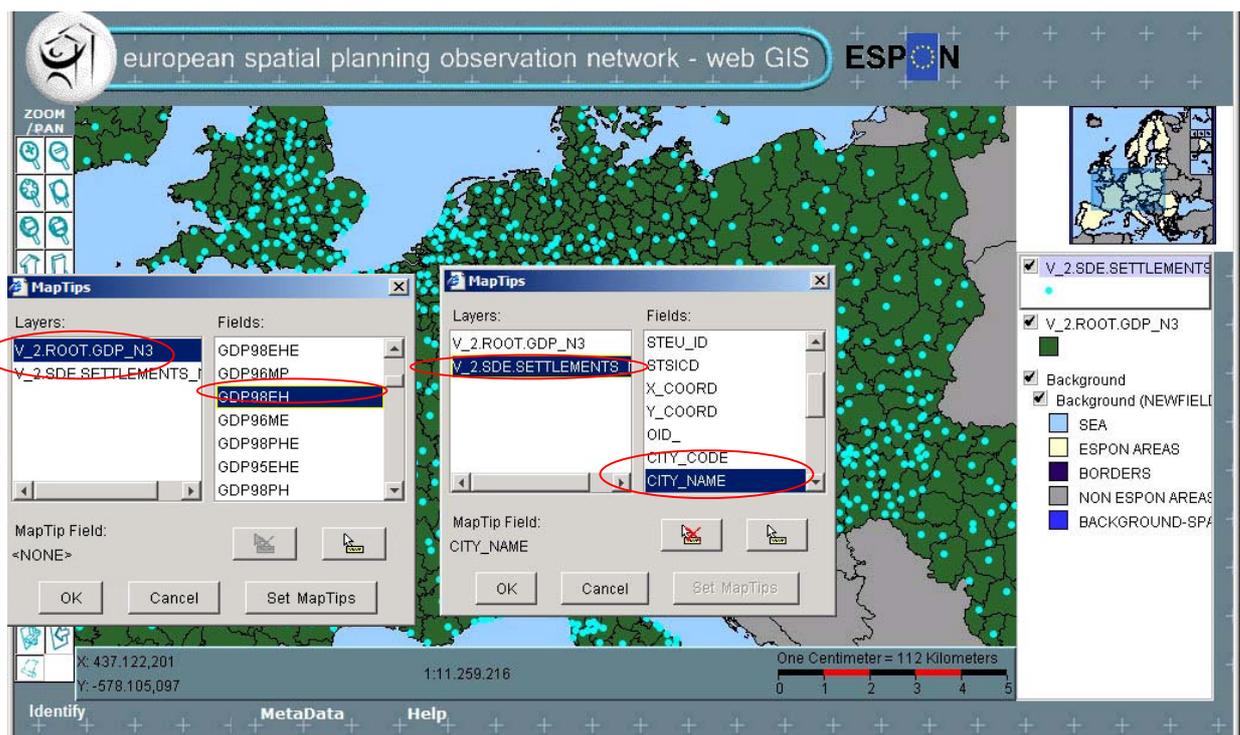
12) If the user wants to see the values of each field, s/he must press the Layer Properties button, choose the suitable field of each layer and press **OK**.

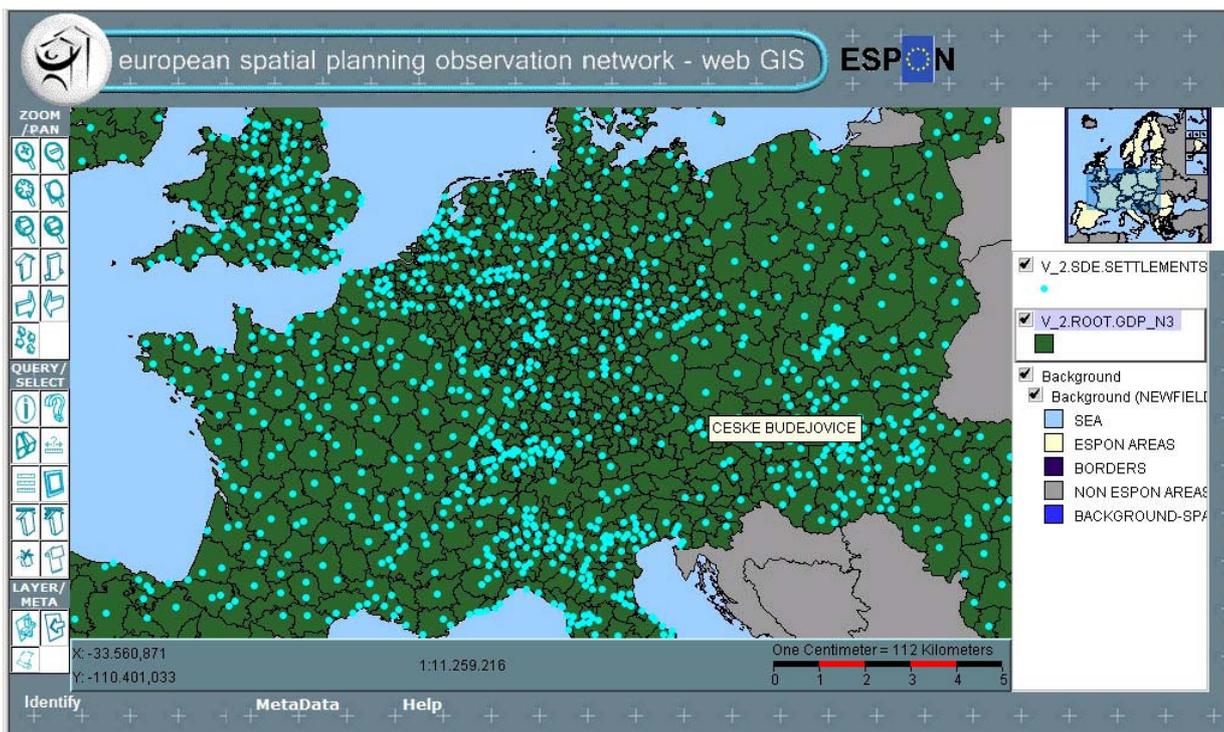
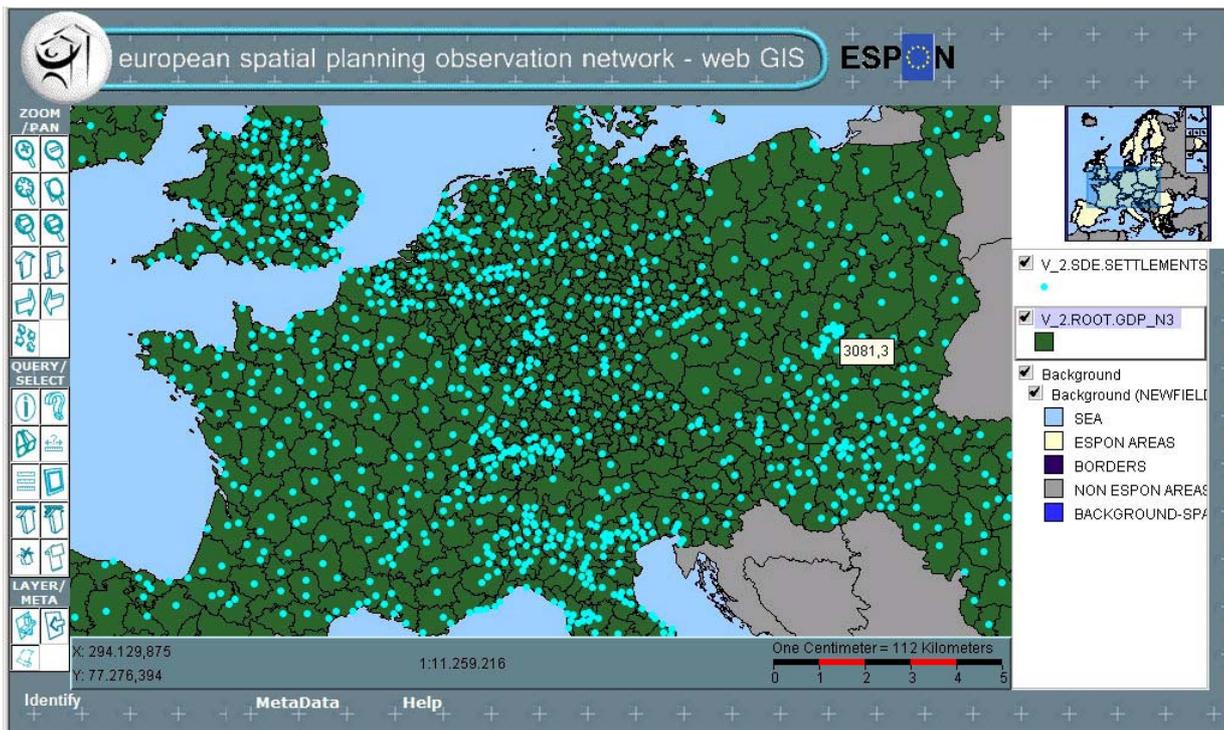


13) Upon this, the following picture of the site is illustrated. Using the **pan** button, the user may review the values of the current field of the study area. As a result, s/he could discover the areas with the highest GDP per capita values in 1998.

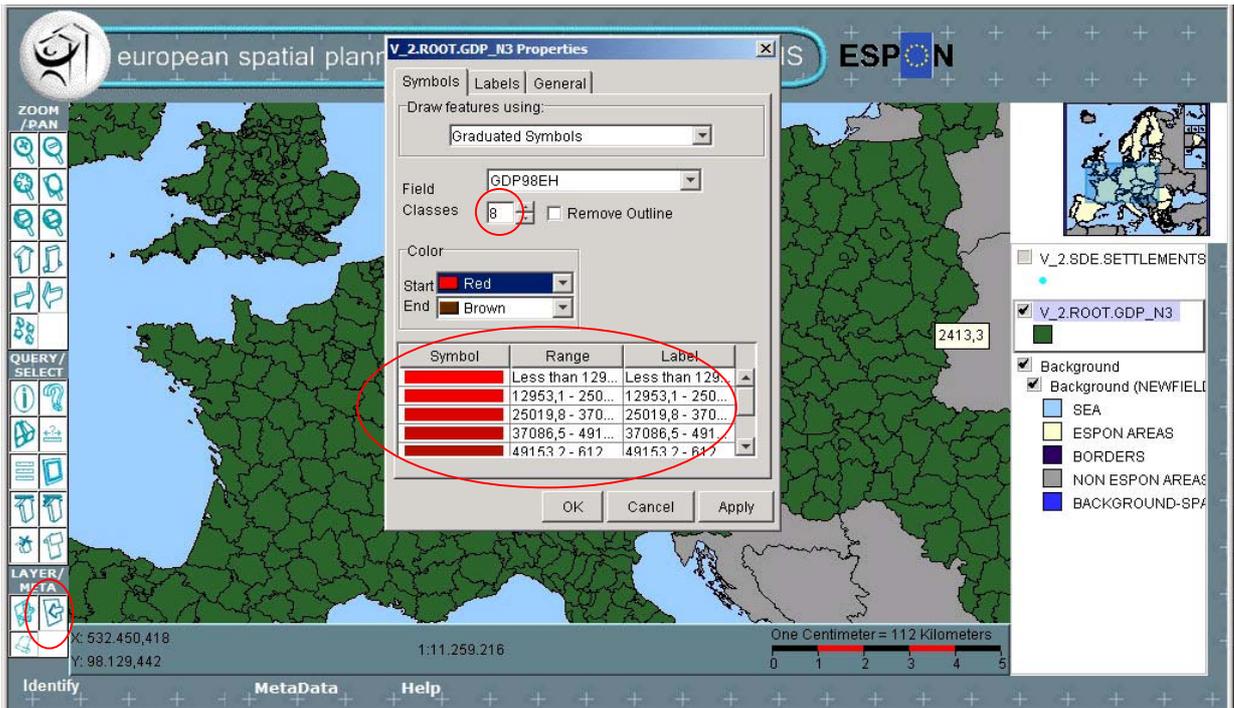


14) Another way for the user to see the values for each Nuts areas is the following: Using the map Tips button , select the fields of each layer.

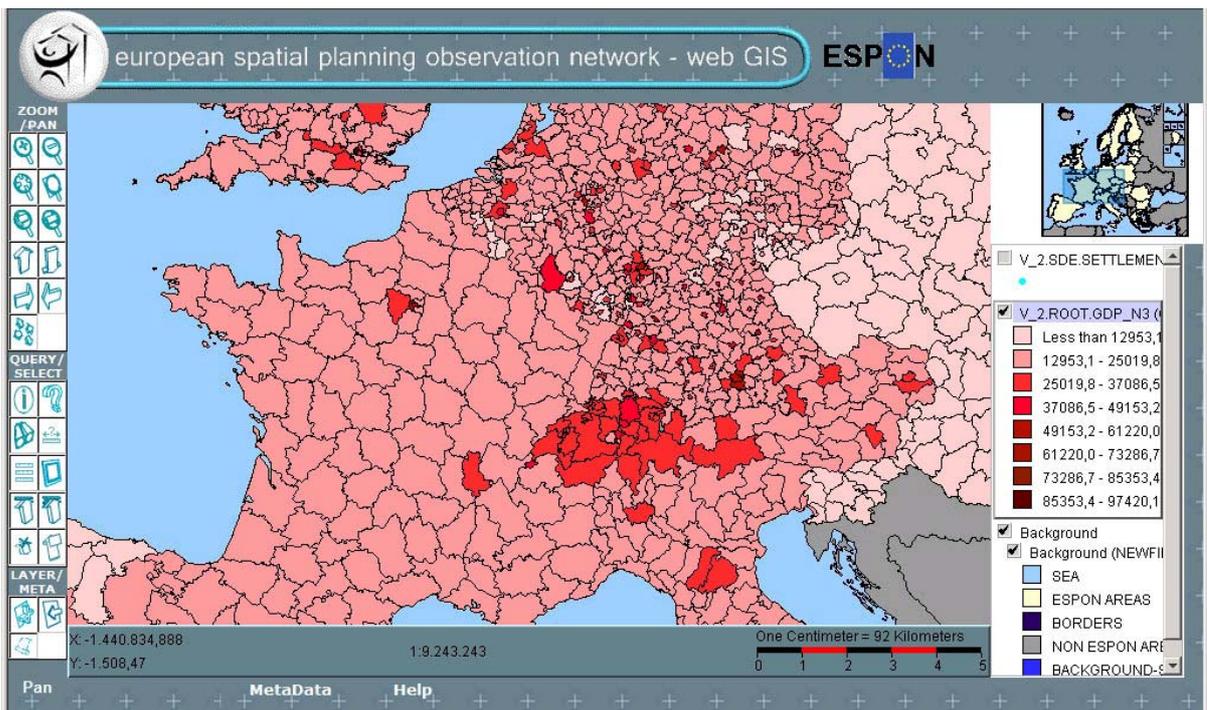




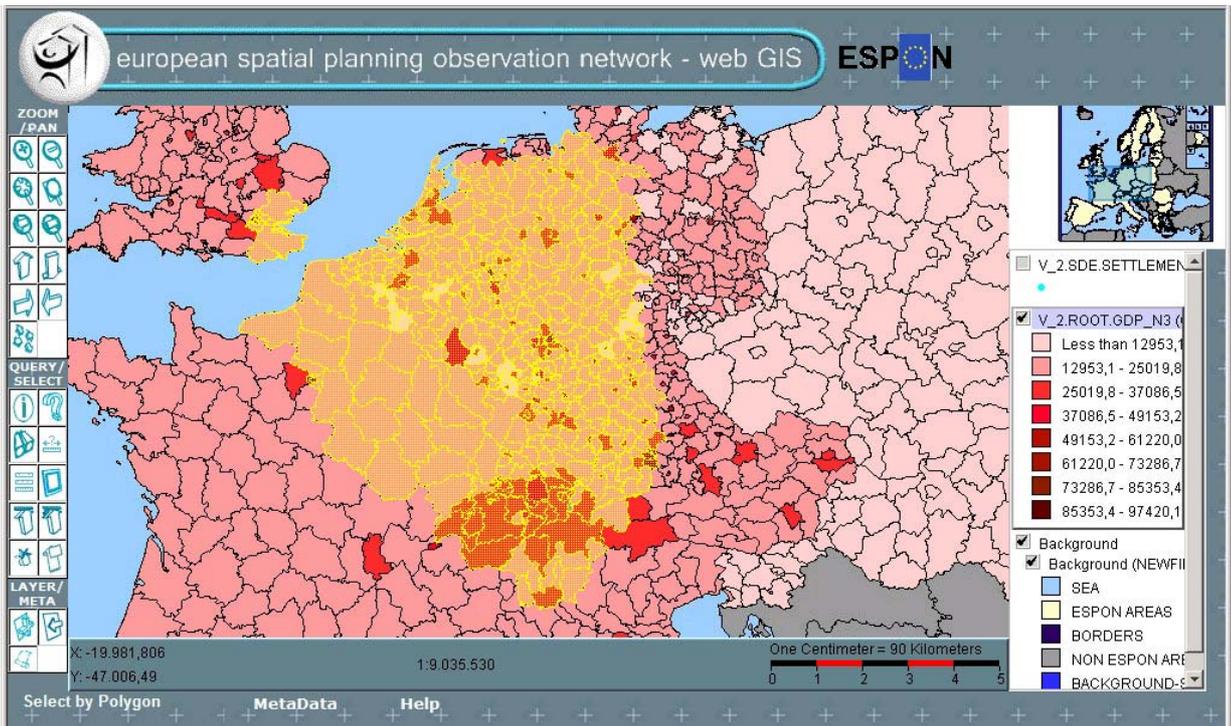
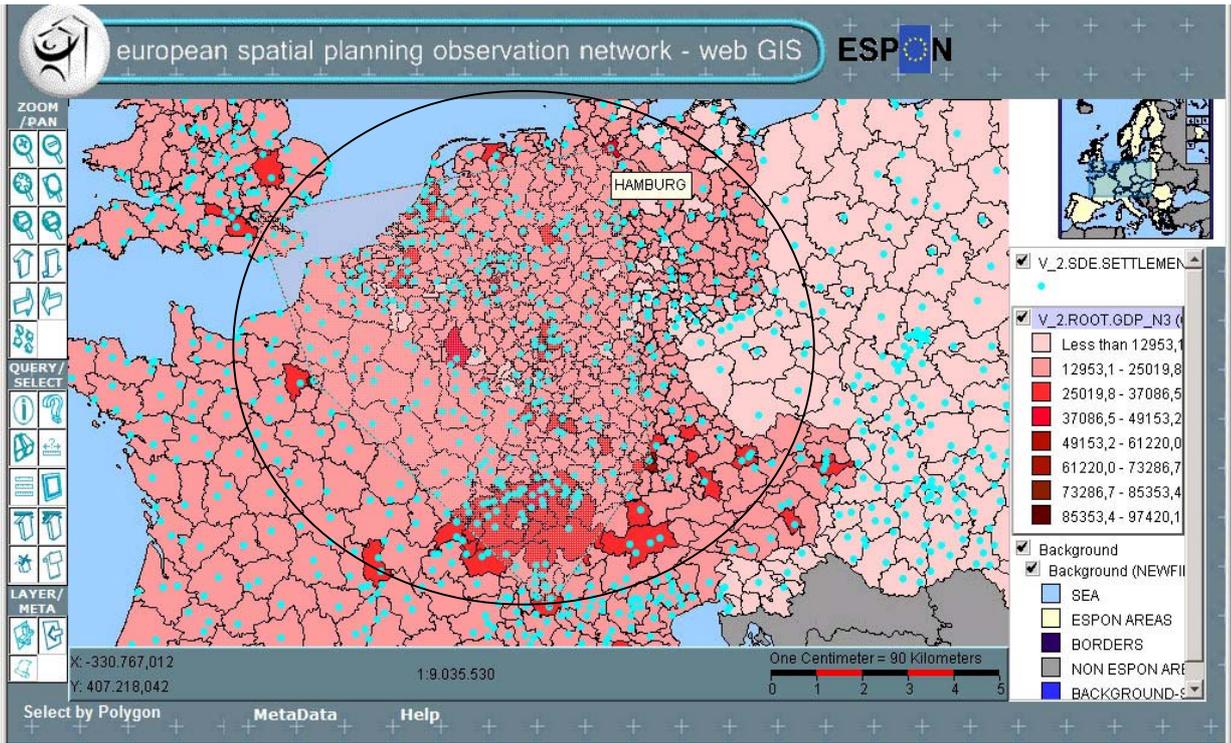
15) A further way for the user to find the areas with the highest GDP per capita values in 1998 is to use the Layer properties button, draw the feature by using the Graduated Symbols methods for the current field and separate its values in eight categories.



16) We press **OK** and it is illustrated the following picture of the site.



The user can now realise that the highest values are presented in areas, included in the Pentagon area (London, Paris, Milano, Munich and Hamburg).



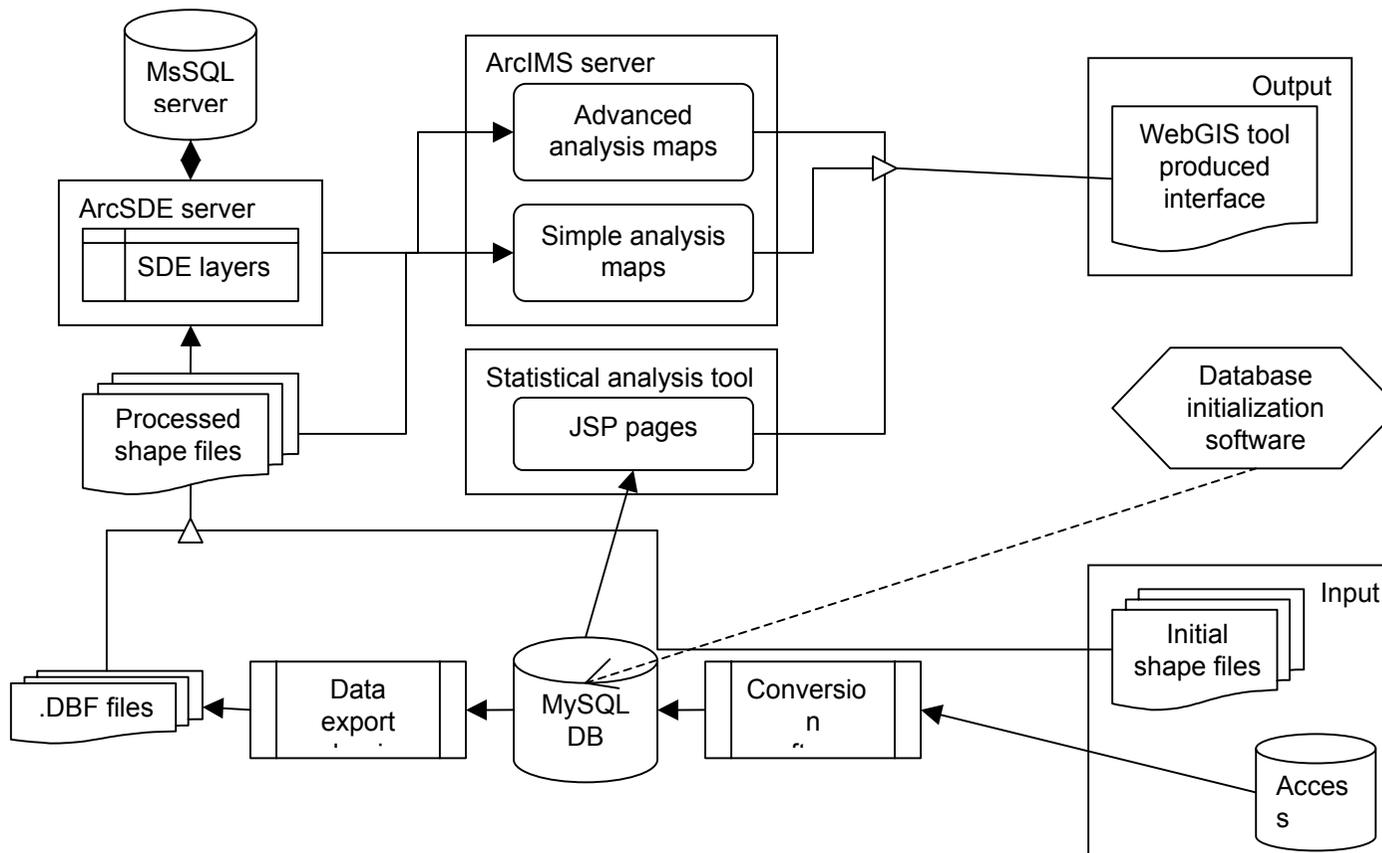
## 6.2.4 WebGIS tool technical outline

### 6.2.4.1 The WebGIS tool components

Due to the advanced demands of GIS capabilities and functionalities of the ESPON program, the WebGIS tool has combined many different platforms, elements and techniques to a common web interface. In order to achieve that, the following components have been used:

- **Shape files** (that contain the initial geographical information / maps)
- **Access database** (used as an indicator / raw data gathering tool)
- **Conversion software** (built in Visual Basic and used for converting data from access format to a specially designed MySQL database)
- **Data export plug-in** (built in JSP and used for exporting data from MySQL format to DBF files in order to join indicator / raw data with Shape files)
- **Database initialization software** (built in Java Applet and used to create an empty MySQL database)
- **MySQL server** (used to store indicators / raw data)
- **MsSQL server** (used to store SDE Layers, consisting of both indicators / raw data and maps / geographical information)
- **ArcIMS server** (used to produce interactive maps in two forms: Simple and Advanced analysis maps)
- **ArcSDE server** (used to provide ArcIMS with maps and data for the advanced analysis maps)
- **Statistical analysis tool** (built in JSP)

The figure below outlines the way these components work together in order to deliver the final result.



**Figure 36 Connection between the WebGIS tool components.**

### 6.2.4.2 Description of the WebGIS components

Each of the WebGIS tool components plays a very specific role in the workflow from data input to final results.

#### The Access Database

All indicators, raw data and metadata are first gathered within a single Access Database. This database contains pairs of tables: One for indicator / raw data and one for metadata. The structure of indicator / raw data tables is defined by the corresponding geographical level (NUTS 2, NUTS 3, Cities etc) while the structure of the metadata tables remains the same. The matching between the indicator / raw data and the metadata is based on the order of the column in which the data appear. An example of the database structure is show below:

**Figure 37 The Access Database Structure.**

T1 : Table	NUTS_2	M5069NA01	TNA01	ALLTOG01
DE11		21,3	91,45327	1952,2844
DE12		12	49,61641	1301,54671
DE13		7,5	38,64223	1020,82853
DE14		5,3	29,51787	839,75019
DE21		26	112,85547	2073,70581
DE22		3,2	19,73747	577,8456
DE23		4,3	16,226	529,73647
DE24		2,7	15,68502	527,70253
DE25		5,6	34,54416	834,14117
DE26		5,3	25,37219	634,03671
DE27		4,2	26,77371	861,07035
DE3		16,2	63,65103	1772,94044
DE4		4,5	23,50943	1273,93596
DE5		5	21,98772	321,20486
DE6		14,7	74,7536	900,90571
DE71		22,9	115,15755	1920,24001
DE72		4,4	19,63351	507,39017
DE73		7,4	37,30843	611,642
DE8		2	5,52101	835,88773
DE91		4,5	32,8945	790,22537
DE92		10,9	42,69166	1021,85779
DE93		8,3	37,34961	810,68594
DE94		8,1	43,4503	1159,57018
DEA1		20,9	115,95683	2580,78188
DEA2		18,8	107,26247	2102,74079
DEA3		8,2	50,99229	1249,92411
DEA4		8,5	43,8412	968,54859
DEA5		13,5	66,60005	1876,60005

TI_META : Table	SPQR	FIELD_OF_DE	EDU_MAL_505	EDU_total_NoA	EDU_all_togeh
S	ESPN_Projec	3.1	3.1	3.1	3.1
S	Source_of_data	BBR	BBR	BBR	BBR
S	Author	J. Bublys/V. Sc	J. Bublys/V. Sc	J. Bublys/V. Sc	J. Bublys/V. Sc
S	Regional_refere	NUTS 2	NUTS 2	NUTS 2	NUTS 2
S	Time_reference	2001	2001	2001	2001
S	Frequency_of_c	Yearly	Yearly	Yearly	Yearly
S	Origin_of_data	Eurostat - Regi	Eurostat - Regi	Eurostat - Regi	Eurostat - Regi
S	Variable_name	males with edu	persons with ec	persons with ec	persons with ec
S	Variable_descri	Statistical raw	Statistical raw	Statistical raw	Statistical raw
S	In_case_indicat				
P	Theoretical_Pos	Population Stru	Population Stru	Population Stru	Population Stru
Q	Calculation_alg				
R	Characterisatio	S	S	S	S
R	Policy_Relevan	ESDP Policy O	ESDP Policy O	ESDP Policy O	ESDP Policy O
*	Navigator	020-40	020-40	020-40	020-40

#### The Initial Shape Files

All maps are received in ESRI Shape File format. Each geographical level (NUTS 2, NUTS 3, Cities etc) corresponds to one map, thus to one Shape File. These files contain no other data save the polygons / points IDs in order to offer the ability to join indicator / raw data later on.

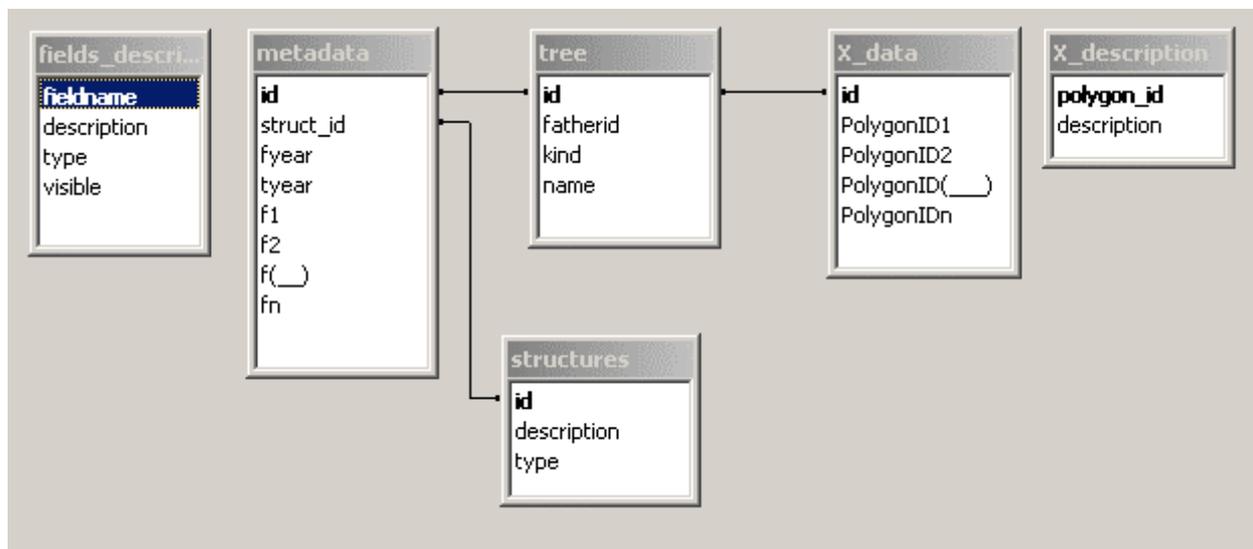
## The MySQL Database

In order to offer search capabilities, data organization, categorization and other functionalities, a special database has been designed and implemented in MySQL format. The MySQL platform has been chosen mainly because:

- Of its proven reliability and security on web environments.
- Of its exceptional data-retrieval speed.
- Of its practically limitless capabilities (able to manage millions of data records and thousands of table columns).

The table Structure (tables, table fields and relations between the tables) of the MySQL database is shown in the figure below:

**Figure 38 The MySQL database table structure.**



## Description of the MySQL Database Tables

- [tree]: This is the main table of the database. As the name implies, it implements a tree data structure with categories and data for its nodes.
- [metadata] and [fields\_description]: The metadata table contains all the metadata that correspond to the data nodes of the [tree] table. The metadata fields are defined during the database initialization (*see next section: The Database initialization software*). The name of the fields are stored in the [fields\_description] table.
- [X\_data] and [X\_description]: Each geographical level (NUTS 2, NUTS 3, cities etc) corresponds to one pair of these tables. The description table contains the names of each polygon (regions) or points (usually cities)

while the data table contains the indicator / raw data for the data nodes of the [tree] table. The geographical levels (or structures) are defined during the database initialization (see next section: *The Database initialization software*).

- [structures]: This table contains additional information for the geographical levels, like the name (ex "NUTS 2") and the type (polygon, point or line).

### The Database Initialization Software

Since the metadata fields and the geographical levels (NUTS 2, NUTS 3, Cities etc – often referred to as "data structures") can vary, and since special tables must be created in the database in order to support those variable metadata and data structures, creating a new database manually would be a very complicated procedure. In order to automate this procedure, a special web application has been developed. This application has two main functions: The creation of a new database based on metadata fields defined by the user (in this case the project administrator) and the adding of multiple data structures. The part of the application that helps creating a new database has been developed in JSP and Macromedia Flash, while the part that helps adding new data structures to a new database has been developed in JSP and Java Applet. The user interface of these two sub-application is show in the figures below:

**Figure 39** Creating a new database.

The screenshot shows a web application window titled "Create a new Database". At the top, there are two input fields: "administrator username" and "database name". Below these is a scrollable list box containing "ESPON Project" and "Source of Data". To the right of the list box, under the heading "metadata fields:", there is a "caption" input field, a "type" dropdown menu set to "text", a "visible" dropdown menu set to "Yes", and an "add to list" button. At the bottom of the list box are "remove" and "remove all" buttons. At the bottom right of the window is a large "create" button.

**Figure 40 Adding a new data structure to the database.**

The screenshot shows a software window for adding a new data structure. It contains the following elements:

- Database:** Sample
- Username:** [Empty]
- Password:** [Empty]
- File Name:** C:\Documents and Settings\dennisbek\test.txt
- Buttons:** Browse... and Open
- Table:**

ID	Description
GR1	Attiki
GR2	Sterea Ellada
GR3	Kyklades
GR4	Ipiros
GR5	Kriti
- Description:** Greece NUTS 1
- Type:** Polygon
- Costruct** button

During the database creation, the metadata fields are defined manually by the user (project administrator) while, during the insertion of a new data structure, the structure data (polygons / points IDs and descriptions) are imported from a text file which is easily created from the initial shape files using any GIS software able to manage Shape File (ex ArcView, ArcGIS etc).

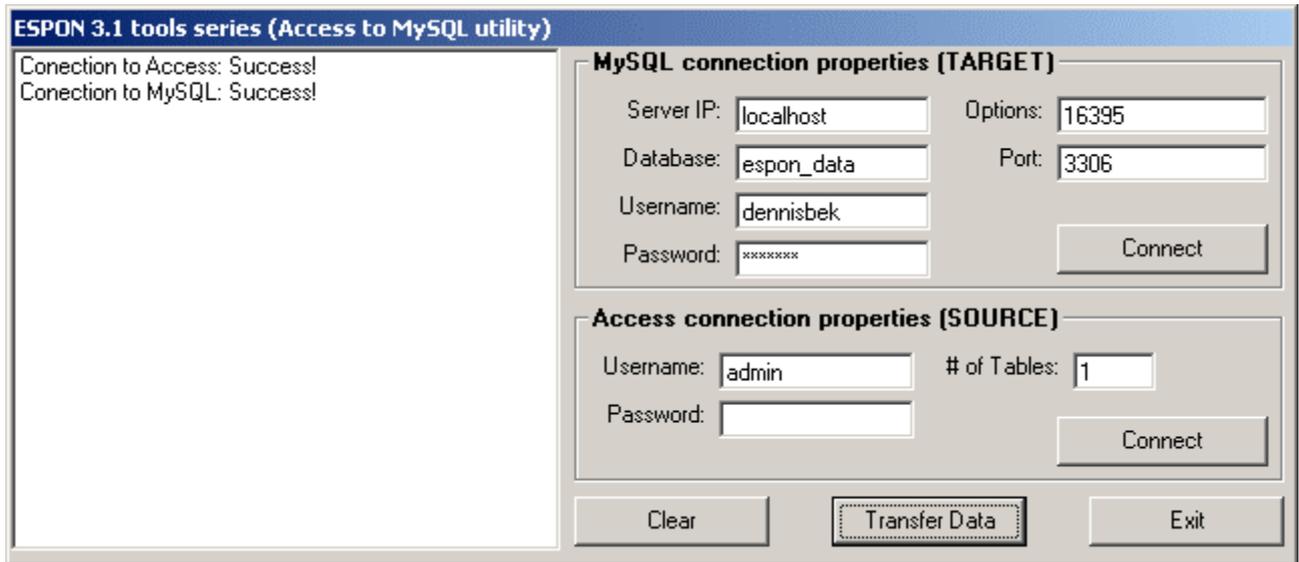
In order to further automate the procedure, the data categories (Data Navigator categories) are automatically inserted to the database during its initialization. Updating the categorization (adding / removing / editing categories) is rare and easy to implement manually so no special software has been developed in order to serve such purpose.

While the database creation (thus the definition of the metadata fields) must be executed in the initial phase of the project development, adding a new data structure is possible at any later time.

### **The Data Conversion Software**

The conversion of the gathered data from the Access database to the MySQL database could not of course be conducted manually as it would take too much time and, as with any manual operation, it could produce many errors. So, a special software has been developed, in Visual Basic, in order to automate this procedure. The Data Conversion Software establishes two parallel connections, one to the Access database and one to the MySQL database, and converts the data from one structure to another without any interference from the user.

**Figure 41 The Data Conversion Software.**

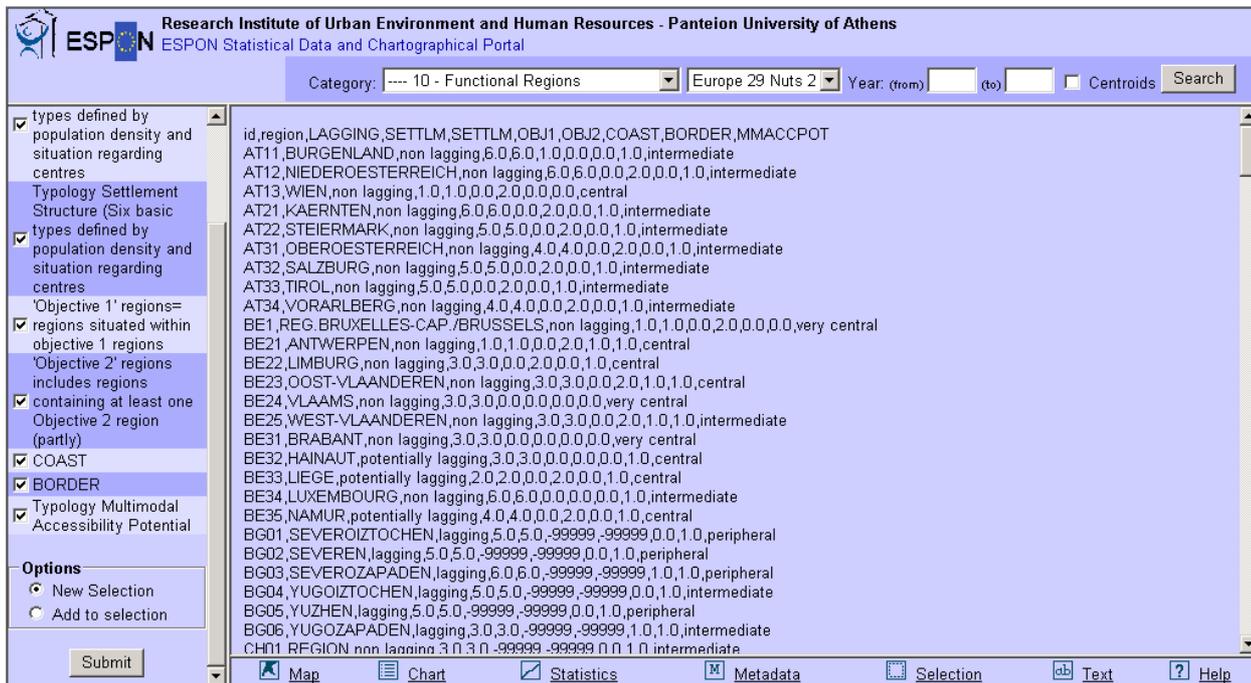


In order for the data conversion to be conducted properly, the integrity of the data has to be thoroughly checked before initiating the conversion procedure. The data categorization must also be predefined in order to ensure that the data categories of the Access database match those of the MySQL database.

### **The Data Export Plug-in**

In order to create maps with ArcIMS, indicator / raw data and geographical data must be joined to shape files. To help this procedure, a JSP plug-in has been added to the Statistical Analysis tool that produces specially formatted web pages. The contents of these pages are copied and pasted to a text editor and saved as text files. An example of the Data Export Plug-in is show in the figure below:

**Figure 42 The Data Export plug-in.**



The data are stored in separate text files base on the geographical level, the Data Navigator Category and weather they are centroids or not.

The data export plug-in is of course not deployed together with the on-line version of the Statistical Analysis tool, since it has been designed for internal use only.

### The .DBF Files

The exported text files (*see section 2.6*) are joined with the initial (empty) shape files (*see section 2.2*) based on the polygons / points IDs, which are also exported from the Data Export Plug-in, using any GIS software (ArcView, ArcGIS etc). During this procedure, a new .DBF file is being created for each exported text file.

### The Processed Shape Files

A copy of the initial Shape Files (*see section 2.2*) is created for each new .DBF file (*see section 2.7*). The initial (empty) .DBF file of each of these copies is replaced by the new one producing as many new (processed) Shape Files as the number of the exported text files.

## **The SDE Layers / MsSQL Server**

The Processed Shape Files (see *section 2.8*) are converted to SDE Layers using the [shp2sde] command of the ArcSDE server. The ArcSDE server has been set up to use MsSQL server for storage. Storing shape files as SDE Layers to MsSQL server creates various databases and tables, managed by ArcSDE server without needing further interference of the user.

## **The ArcIMS Server**

ArcIMS server offers two ways of creating interactive maps: The HTML websites ("Simple Analysis Maps") using shape files (in this case the processed shape files) and the Java websites ("Advanced Analysis Map") using SDE Layers. In both cases, the websites are created by using the built-in ArcIMS website editing software and then customized as far as the interface is concerned. Additionally, during customization, some extra functionalities are added to the websites by intervening manually to their HTML / JavaScript code.

ArcIMS server uses Apache server for publishing the websites and Tomcat as Servlet Engine and Java SDK (version 1.3.1\_02).

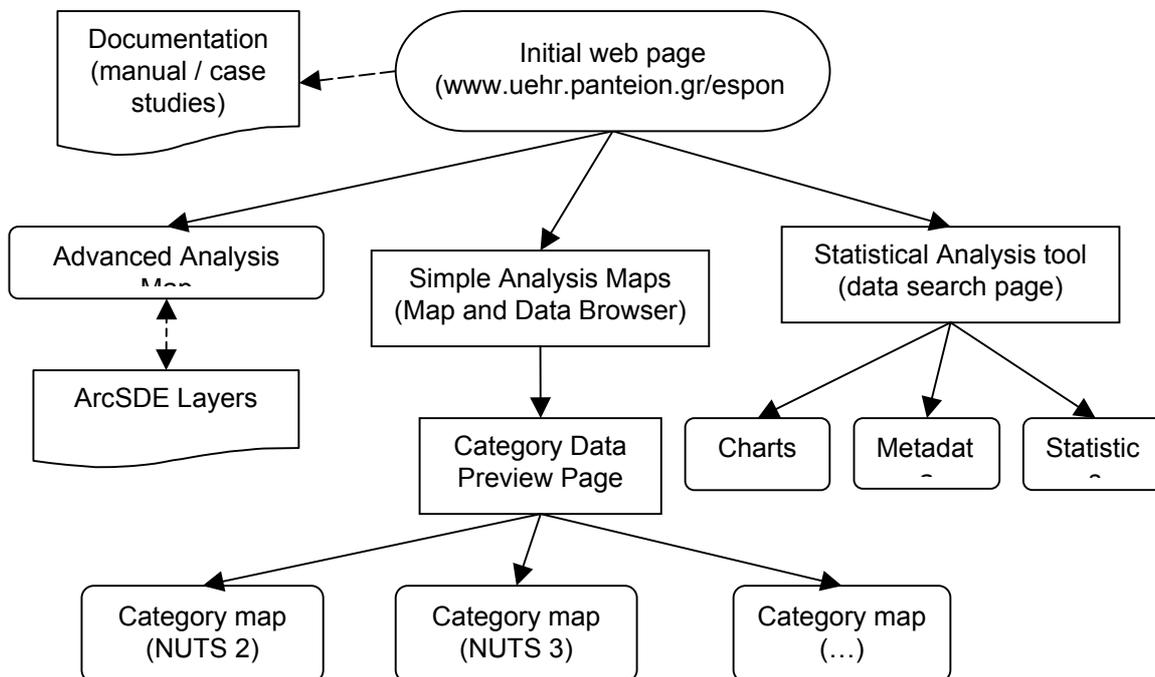
## **The Statistical Analysis Tool**

The statistical Analysis Tool offers many additional non GIS functions. It has been implemented in JSP and produces dynamic HTML pages. It draws data directly from the database in order to offer search and data selection capabilities and then build charts, display metadata and calculated monovariate statistics that correspond to the data selected by the user.

## **The Produced Interface**

All the produced pages from ArcIMS Advanced Analysis, ArcIMS Simple Analysis and Statistical Analysis tool have been unified in a common web interface using some additional HTML pages. Thus all maps, tools and function are accessible from a single web address ([www.uehr.panteion.gr/espon/](http://www.uehr.panteion.gr/espon/)), in other words a single web site. The structure of this site is show in the figure bellow:

**Figure 43 The WebGIS Tool Final Structure.**



### 6.2.4.3 Security

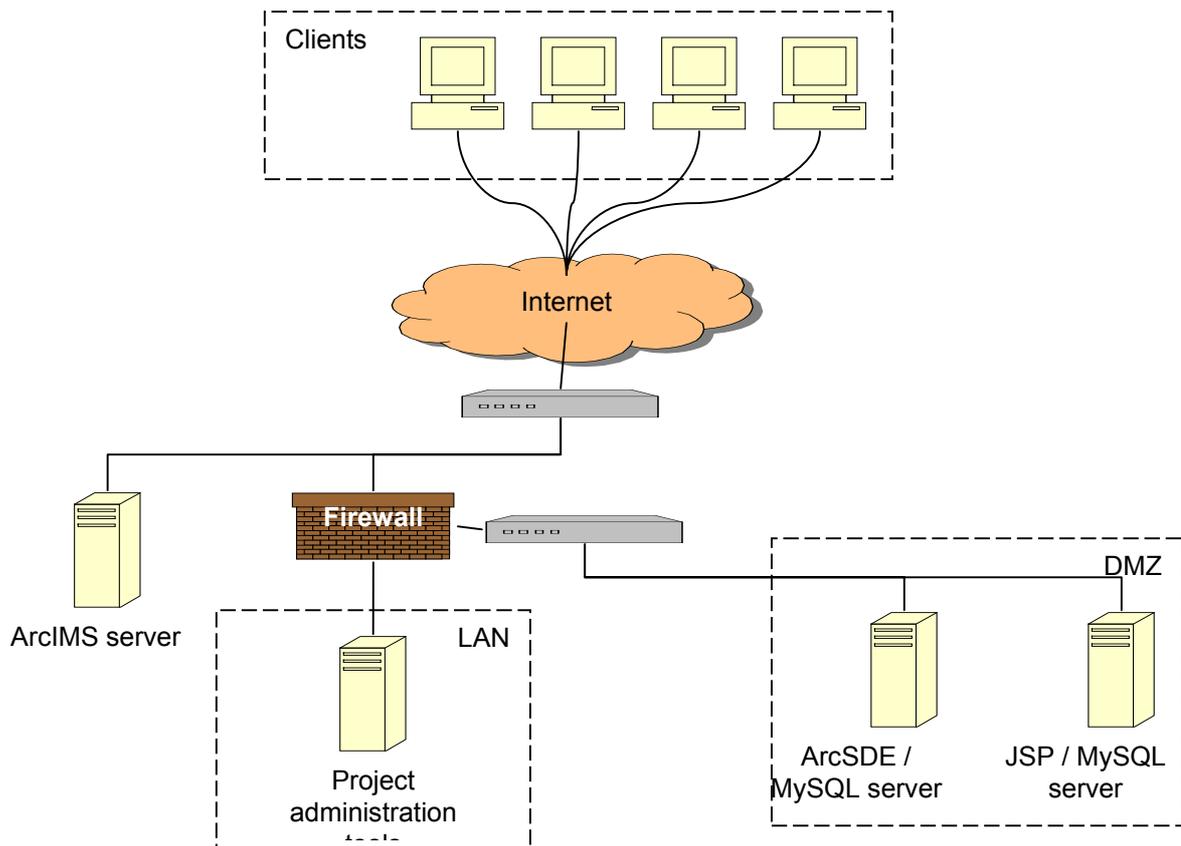
Since the data of the ESPON project are not intended to be used in public, security measures must be taken in order to restrict access only to the ESPON partners. Unfortunately, the variety of the components used in order to offer maximum GIS and analysis capabilities do not allow the building of a single security platform where the end-user could logon once in order to use all of the available functions. Thus, in order to secure all the data-providing areas of the site, each component has been locked separately. So:

- Both Advanced and Simple Analysis (HTML and Java) websites of the ArcIMS server have been locked by using Apache passwords to the directories that contain the map folders / files.
- The Statistical Analysis tool has been locked manually with Session logon and password management. In this case the username and password is checked with every page request.
- The SDE Layers have been locked using MsSQL passwords (used when ArcSDE server establishes a connection with MsSQL server).

#### 6.2.4.4 Network Architecture

All the software described above has been installed on machines which are connected on a structured TCP/IP network with access to the Internet as shown in the figure below:

**Figure 44 Connection of the used machines.**



Currently the servers are connected with each other with common 100Mbps TCP/IP connections using UTP cables (class 5) while the connection to the internet is being established with an 11Mbps Antenna (T3 wireless).

### 6.3 The Hypercarte project

(by Olivier Cuenot, Jérôme Gensel, Claude Grasland, Liliane Lizzi, Hervé Martin, Philippe Martin, H el ene Mathian, Sa id Oulahal, Jean-Marc Vincent, from the teams ID-Imag, LSR-Imag, UMR G eographie-Cit es UMS-RIATE)

HyperCarte is a project that proposes a package of modules for interactive cartography. The project focuses on the development of a methodology easily understood that allows the analysis and visualisation of a spatial phenomenon taking into account its multiple possible representations. Statistical observations of the territory are complex, and one representation, directly linked to a precise objective, is the result of a combination of different choices relative to the territories and geographical scales, and the statistical indicators. This is of interest for researchers as well as development policy decision-makers.

Thus, the principal innovative aspect of the HyperCarte project lies on this perspective based on the popularisation of methods coming from spatial analysis such as the fitting of territorial scales, gradients, discontinuities.... This supposes an effort of pluridisciplinary cooperation between geographers and computer scientists in order to create new maps in real time according to the different choices. An important effort has concerned ergonomics and time of calculus.

The HyperCarte project consists in:

- the development of fundamental cartographical modules
- the implementation of these modules to different geographical databases

#### 6.3.1 The first module : Multiscalar Territorial Analysis (MTA)

**Multiscalar Territorial Analysis** is the first package of very specific spatial analysis tools and gives the opportunity to derive several indicators on the basis of the ratio of two initial geographical indexes according to different spatial contexts.

*Multiscalar Territorial Analysis* is based on the assumption that it is not possible to evaluate the situation of a given territorial unit without taking into account its relative situation and localisation. Regions belong to territorial and spatial systems. Indeed, from a policy point of view and in a social science perspective, contrasts and gradients are of much more interest than absolute values. Furthermore, aggregating and disaggregating territorial units make it possible to see how local values add up to form territorial contexts and regional positions.

**Whatever** the indexes used for political decisions, they have to be evaluated in relative terms. This may be done according to various territorial contexts. Thus one spatial organisation may be examined from **three** different viewpoints, which are three territorial contexts. They are differentiated according to the scale of political intervention or action they are referring to and that have a sense for the questioning: a global one, a medium one and finally a local one. Thus what is represented is the deviations to the three reference values associated to these different levels.

Let us take the example of the European Union (25), at the level of the region (NUTS2 for instance), and let the observed index be the wealth per resident in the regions (GDP/inh.). It is possible with HyperCarte to consider the level of wealth of the regions relatively to three territorial contexts, and not only from an absolute point of view. The chosen contexts may be for instance respectively: (1) the whole European Union (2) the country (3) the neighbourhood defined by contiguous regions.

HyperCarte proposes for such an indicator seven maps that will be described furthermore in sections 5 and 6.

The three first ones described the two parent distributions (here, wealth and population) and their ratio, that is the chosen index's one.

Then, three maps show the relative distributions to the three chosen contexts. For the above example there are first the deviation of a region to the European reference area, secondly the deviation of a region to its national reference area, and in the third place the deviation of a region to the local reference area.

The seventh map proposes a synthesis of the different combination of the three previous relative maps.

Some political justifications about the contextual and multilevel mapping, based on the European example:

The first map where the referent context is the global one is the classical way of mapping an index when the chosen context is the studied area. The values of the indices are converted into a global index.

The second map, corresponding to the intermediate level, here the national one, is very important to combine with the previous one. Indeed, many contradictions can appear between both levels, with important political consequences.

The third one is based on the local differential between one region and the neighbouring ones according to various criteria of proximity (contiguity, time-distance). According to recent research in the field of spatial economy and regional science, those local advantages/handicaps appear to be of crucial importance for the regional cohesion because they are strongly connected with the action of economic or social actors.

The multiscalar approach proposed to evaluate the same index at various scales. In terms of territorial cohesion, it is indeed very important to evaluate the level of development of a region according to at least three levels.

### **6.3.2 The input data**

Prior to be operational, the module has to be initialised with a set of text files.

The necessary input data are:

- - The geometry associated to the elementary zoning\*.
- - The statistics associated to the elementary units\*
- - The dictionary that gives the composition of the upper territorial units in terms of elementary units
- - The definition of some specific areas included in the whole observed area.

HyperCarte modules only use these information, no changes may be done inside the applied modules.

Once the data are imported, they are stored in a .HYP file.

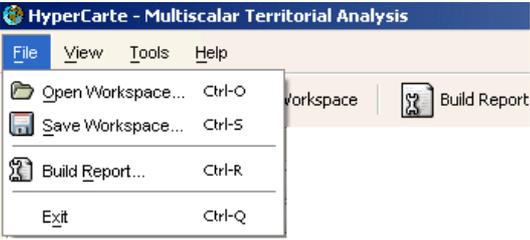
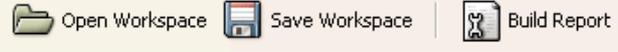
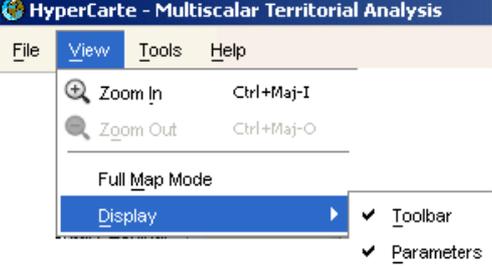
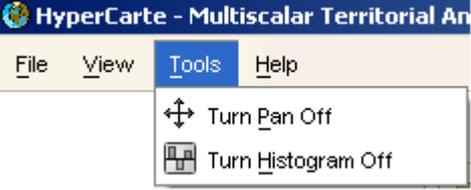
### **6.3.3 Working with HyperCarte : the main window**

HyperCarte is totally interactive. It works with three sets of parameters, which are linked to one or more maps. At any time, the user can change the different input parameters, and the linked maps are immediately updated. The user has also the possibility to configure each map individually: number

of equivalence classes, statistical progression (arithmetic or geometric), the palette of colours .... This gives the possibility to generate a very accurate collection of maps.

HyperCarte works with only one window which is composed by: a menu bar, a tool bar, 3 boxes for the parameters, and a collection of the 7 calculated maps.

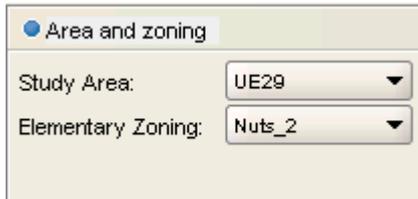
### The menu bar and the toolbar

<p>The menu "<b>File</b>" concerns exclusively</p> <p>the files where the parameters entered in the three boxes and that define the "workspace", may be stored in a XML file,</p> <p>the report which is the edition of the different maps created in a HTML file.</p>	
<p>The user can find also these items as icons in the <b>Tool bar</b>.</p>	
<p>The menu "<b>view</b>" concerns the appearance of the map (zoom in, zoom out) as well as the display of different parts of the window (toolbar, parameters)</p>	
<p>The menu "<b>Tools</b>" has 2 options and allows to deal with the other functions of the cursor:</p> <p>-the "<b>pan</b>" allows to move the map inside the window.</p> <p>The "<b>histogram</b>" is only useful for the synthesis map, and display for each region the three contextual deviations (see section 6)</p>	

### 6.3.4 The MTA's parameters

#### Definition of the Study area and Elementary zoning

Obviously, this is the first step of the different choices to do. This allows the definition of the basis of the study: which spatial extension (area) and at which geographical level? Which division will be the *elementary zoning*?



Area and zoning

Study Area: UE29

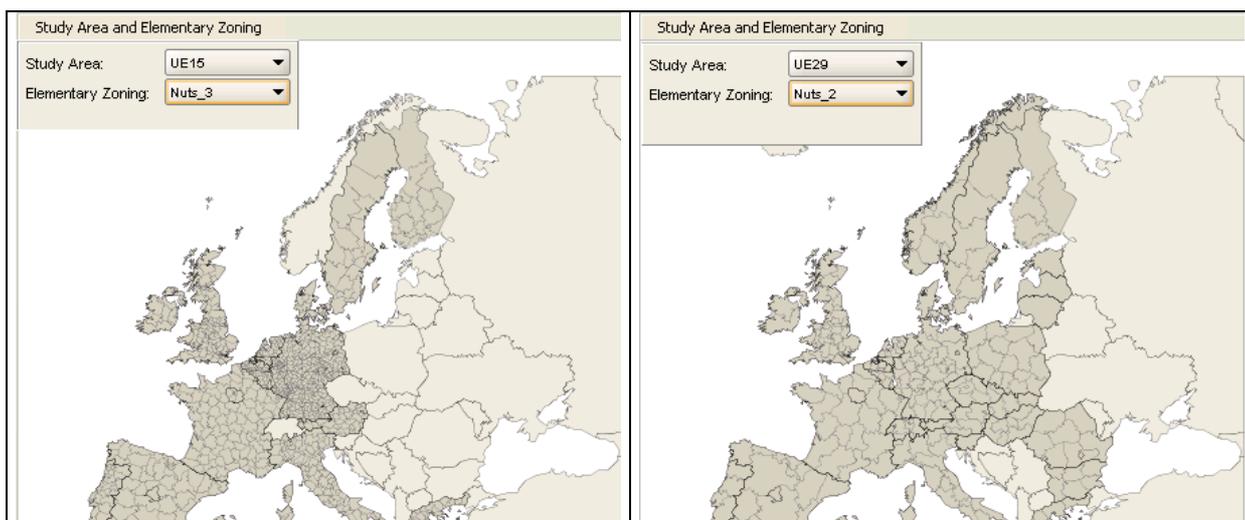
Elementary Zoning: Nuts\_2

These two parameters have to be selected in the two respective pop up lists: The different propositions are internal and come from the a priori implementation.

“Study Area” indicates the spatial extension that will be mapped.

“Elementary zoning” indicates the set of elementary units that will be studied. The associated map (see the thumb index: “[Study area and elementary zoning](#)”) allows the user to follow his choices: the selected area is mapped when the chosen elementary zoning is drawn.

**Figure 45** Different combination between “Study area” and “Elementary zoning”



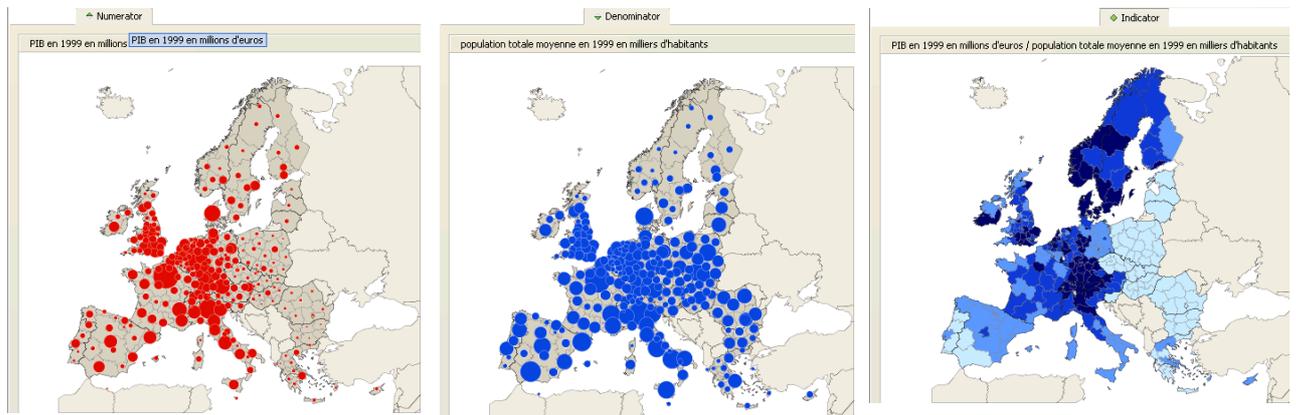
◆ the indexes

HyperCarte only works with size variables (that is only variables that may be aggregate at upper level by sum) .and proposes a multiscalar cartography of the ratio of two size variables In order to define the studied ratio, the user may combine every couple of these types of variables, in the window "ratio", by choosing each of them in the two popup list.

◆ Ratio	
Numerator:	PIB en 1999 en millions d'euros
Denominator:	population totale moyenne en 1999 en milliers d'habitants
Ratio :	Numerator / Denominator

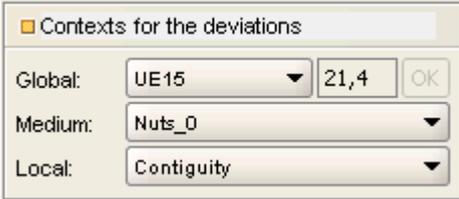
Three maps are linked respectively to these three choices. Two representations with proportional circles for the size variables, and one representation with graduated colours for the ratio (see figure 2).

**Figure 46 Elementary maps : from size variables to the ratio**



## The contexts for deviation mapping

As it has been already described in section 2, the user has to define here the three territorial contexts corresponding to three different levels of spatial observation: **global**, **medium** and **local**.



Contexts for the deviations		
Global:	UE15	21,4 OK
Medium:	Nuts_0	
Local:	Contiguity	

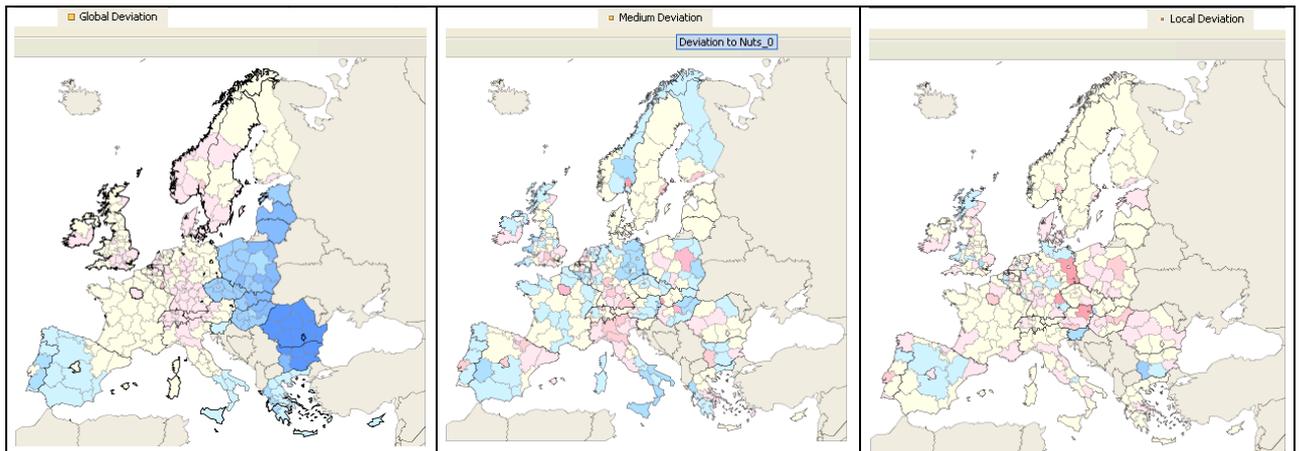
The **global context** may be the whole “study area” chosen. In this case the associated map will be the same as the map associated to the ratio itself. So the user may choose another global context or a reference value. For instance, in the example of the EU, even if the study area is the 29 potential countries, it may be of interest to observe the spatial differentiations according to an another global reference, for instance the global value associated to EU15. For this level, the user may also exogenously enter a value. At first this value is initialised with the global area’s value.

The **medium context**, on the other hand, has to be a geographical zoning that is an aggregation of the “*elementary zoning*” previously chosen.

The **local context** indicates which proximity relation will be the basis of the neighbourhood’s definition for each elementary unit. That is usually “contiguity”, but it may be also relation based on distances since they have been introduced in the HYP file (units that are at distance less than X km), or time-distances, ..... Then, each elementary unit’s value will be compared to its neighbourhood’s value.

Three other maps are linked to these choices (figure 3). The values of the deviations are transformed into global indexes 100. Thus values may be interpreted in terms of percentage of the reference value. The maps are drawn with double progression frame, centred on 100, in order to highlight the regions that are under their reference value (100) and the ones that have upper values.

**Figure 47 Multiscalar representation: deviations to three contexts**



 The synthesis map

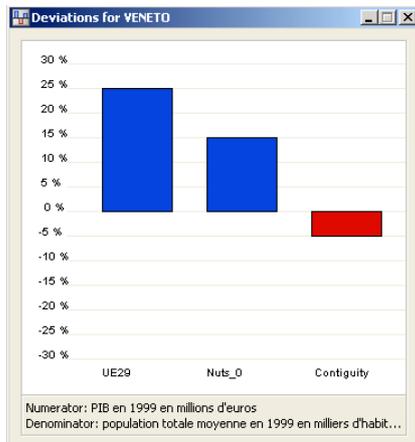
The three relative positions may be summarized in one synthetic map. The *elementary units* are classified in 8 classes according to their three relative positions.

Close to the map, on the thumb index “options”, the user has to specify which point of view he wants to favour, in order to reduce the whole combinatory of possible cases. First one should indicates whether the point of view is to underline the regions whose ratio is greater than one or more contextual values, or less than them, according to the studied indicator (see the boxed text). Then, one can choose the value that will be the threshold.

Legend	Options	Explanation
Threshold value must be higher than 100% when criterion is 'Higher than'. It must be lower than 100% when selecting 'Lower than'.		
Criterion:	Higher than ▼	
Threshold Value:	100 %	
<input type="button" value="OK"/>		



**Figure 49** another summary of contextual deviations:



Multiscalar typologies of regions for political decisions: the example of the European level

When the policymakers want to build political scenarios or to evaluate propositions of Structural Funds, they need a synthetic view on the situations of regions according to the various territorial contexts which can modify the situation of a given region. The question of *perequation* (transfer from "advanced" to "lagging" region) is very sensible and it is important to propose a complete view of the scales where those *perequation* processes can take place, according to the principle of subsidiary. As an example, we analyse how the picture of "lagging" regions is modified when the previous criterion of Objective 1 (less than 75% of the mean value of GDP) is applied simultaneously at three scales (European, national, local). Simultaneously, it is possible to propose a typology of "advanced regions" based on the symmetric criteria of more than 133% of the mean value of GDP at those three scales. According to this methodology, it is possible to demonstrate that very few regions are "lagging at all scales" and "advanced at all scales". Many are in more complex situations like certain regions of Switzerland or Norway which are "advanced" at European scale but "lagging" at their national or local scales. Reversely, the metropolitan regions of candidate countries are very often "lagging at European scale" but "advanced at national and local scales".

## 6.3.5 Tools to work with the maps

### 6.3.5.1 Summary of the different maps

Thumb index	Maps
 Area and zoning	<p>This map visualises the study area and elementary zoning chosen.</p>
 Numerator	<p>This map shows for each unit of the elementary zoning, the value of the indicator chosen for the numerator.</p>
 Denominator	<p>This map shows for each unit of the elementary zoning, the value of the indicator chosen for the denominator.</p>
 Indicator	<p>This map shows the distribution of the ratio (numerator/denominator) over the units of the elementary zoning.</p>
 Global Deviation	<p>This map proposes a relative perspective of the distribution of the ratio (numerator/denominator) over the units of the elementary zoning: each absolute measure is put in relation with a reference value. Here the reference value is common for the whole area. The index value is 100 when an elementary unit has exactly the same value than the reference value or area. It is 200 when the elementary unit measure is twice the reference one, it is 50 when this is half the reference area.</p>
 Medium Deviation	<p>This map proposes a relative perspective of the distribution of the ratio (numerator/denominator) over the units of the elementary zoning: each absolute measure is put in relation with the value of its upper unit in the reference zoning. The index value is 100 when an elementary unit has exactly the same value as its reference unit. It is 200 when the elementary unit measure is twice the reference one's, it is 50 when this is half the reference unit.</p>
 Local Deviation	<p>This map proposes a relative perspective of the distribution of the ratio (numerator/denominator) over the units of the elementary zoning: each absolute measure is put in relation with the value of its neighbourhood, as defined by the local reference. The index value is 100 when an elementary unit has exactly</p>

	the same value than its neighbourhood. It is 200 when the elementary unit measure is twice its neighbourhood, it is 50 when this is half its neighbourhood.
 Synthesis	This map proposes a synthesis of the different perspectives due to the three different contexts. The synthesis is based on a deviation threshold, either by upper values or by lower value. This is to be chosen by the user, because it depends of the meaning of the ratio. For instance high values of unemployment rates point out different types of regions than high values of an indicator of resources. According to which regions have to be differentiated (lagging ones or winning ones), one has first to chose the point of view of the synthesis. Then, a typology of the regions that verify the condition at least for one context is realised.

### 6.3.5.2 The different appearances and functions of the mouse cursor.



At any time, the position of the mouse cursor on the map gives information about the elementary unit that it points. The content of this information window depends on the map. It gives first the name of the unit, and the values associated to the selected unit.

The information window

Details	
Unit	BOURGOGNE
Numerator	33 100
Denominator	1 610
Indicator	20,6
Deviation(s)	90% (index 100 = Nuts_0)



Except for the synthesis map, a left click every where on the map change the function of the cursor, to "Pan" if this option is on. (see section 4).



On the synthesis map, when the mouse cursor is a "hand", it indicates that the histogram function is on. A right click on a specific region opens its histogram window (see section 5, figure 5)

### 6.3.5.3 Legend, classes and explanation

Close to each map are three thumb indexes containing tools and help to change and understand the cartography: The choices are valid for the current map.

Legend	Options	Explanation
248,0 208,0 175,0 147,0 123,0 103,0 86,0 72,0 60,2	(N) (2) (3) (4) (20) (42) (101) (76) (24)	

Legend	Options	Explanation
Paletts Color:		
Classes Number:	4	
Progression:	<input checked="" type="checkbox"/> Geometric <input type="checkbox"/> Arithmetical	

This map proposes a relative perspective of the distribution of the ratio (numerator/denominator) over the units of the elementary zoning: each absolute measure is put in relation with a reference value. Here the reference value is common for the whole area. The index value is 100 when an elementary unit has exactly the same value than the reference value or area. It is 200 when the elementary unit measure is twice the reference one, it is 50 when this is half the reference area.

**Legend** : displays the bounds of the classes (left) and the count of each (right) and the colour associated.

**Options**: gives three possibilities to change appearance in the map. The choices are instantaneously taken into account.

**palette colour**: allows first to choose between four defined palettes, and secondly to inverse the displayed progression.

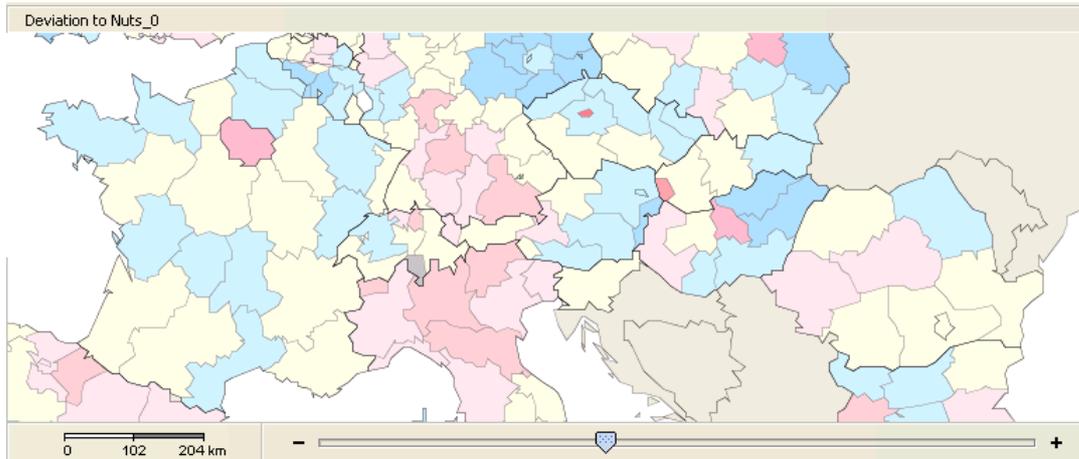
**Classes number**: allows the user to choose exactly the level of differentiation he wants, between 2 and 10 classes.

**Type of progression**: the user can choose the progression of the successive bounds: either arithmetic (classes with equal amplitude) or geometric (classes with increasing amplitude). The default choice is geometric, because usually the distribution is not symmetric around the value 100. The first choice is appropriate when the distribution is symmetric around the value 100.

**Explanation**: gives some lines in order to help the reading of the chosen map.

### 6.3.5.4 Zoom

It is possible at any time to zoom a map, either with the menu **view** or with the cursor at the bottom of the window. The scale bar follows the zoom in or out. Any change is applied to every maps.



### 6.3.6 The report

Hypercarte proposes in the menu **File** to save the whole collection of maps for a given set of parameters and the table containing the rough data and the deviations. This report is stored as a set of web file in a directory that have to exist already. The names of files are generic:

"*index.html*", the file to be run to display the report. The maps in the report are saved at the current scale.

"*map0.png*" to "*map7.png*" contain the seven maps.

**Figure 50** The report begins with a remind of the parameters (see figure 6).

## Hypercarte Report

### Parameters

#### Space and Zoning

- **Study Area:** UE29
- **Elementary Zoning:** Nuts\_2

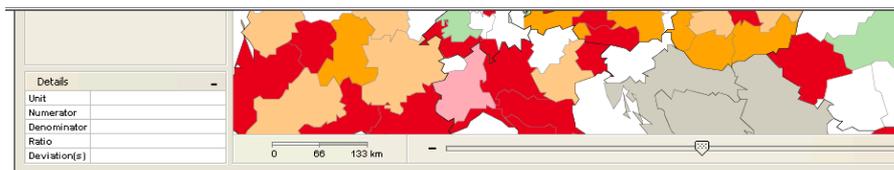
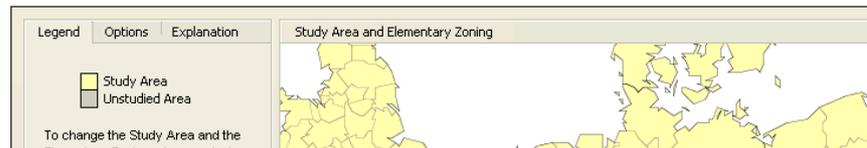
#### Indicator

- **Numerator:** Average population of females in 1999 in thousands
- **Denominator:** Average population of males in 1999 in thousands

#### Contexts of Reference

- **Global:** UE25
- **Medium:** Nuts\_0
- **Local:** Contiguity

### Generated maps



**Table of generated results**

Code	Name	Numerator	Denominator	Indicator	Global Deviation	Medium Deviation	Lo Devi
		POPME99E	POPMH99E	POPME99E/POPMH99E	UE25	Nuts_0	Cont
UKL2	EAST WALES	542	527	1,03	98,0	99,8	
UKL1	WEST WALES AND THE VALLEYS	952	914	1,04	99,2	101,1	
SI	SLOVENIA	1017	970	1,05	99,8	100,0	
UKK4	DEVON	554	521	1,06	101,2	103,1	
UKK3	CORNWALL AND ISLES OF SCILLY	254	240	1,06	100,5	102,4	
UKK2	DORSET AND SOMERSET	610	575	1,06	100,9	102,8	
UKK1	GLOUCESTERSHIRE, WILTSHIRE AND NORTH SOMERSET	1100	1080	1,02	96,9	98,8	
DE73	KASSEL	650	619	1,05	100,0	100,3	
DE72	GIESSEN	540	521	1,04	98,7	98,9	
DE71	DARMSTADT	1892	1818	1,04	99,1	99,3	
FR26	BOURGOGNE	827	784	1,05	100,4	99,6	
FR25	BASSE-NORMANDIE	731	693	1,05	100,4	99,6	

## Figure 51 Glossary

**Elementary unit:** the set of elementary units compose (cover) the whole area, and constitute the *elementary zoning*\*.

**Elementary zoning:** smallest division of the studied area. Each unit of this zoning is called elementary unit.

### 6.3.7 Origin of the data

All the data come from the ESPON database at NUTS3 level. But some data missed and so have been estimated.

The missing data have been fulfilled in the following way.

#### **Male/female population in 1999**

For the French off-metropolitan regions, the data come from the INSEE (French national institute of statistics), and has been recalculated on the basis of the average total population of the ESPON database.

#### **Births/deaths in 1999**

For Cyprus, data calculated after the variables "population" and "births per thousands" of the World Development Indicator (WDI 2003).

For Malta, data estimated after the variable ESPON "average total population" and the birth rate of WDI 2003.

For the regions of Estonia, data estimated after the regional values 2000 and the index of national growth of observed births between 1999 and 2000 (Regio database).

#### **Unemployment and active population in 2000**

For Greece, Portugal, Malta and two Spanish units of Ceuta et Melilla, data estimated after NUTS 2 data population in 2000 and the variable of average population in 1999 at NUTS 3 level.



## **Cross-sectoral analysis and breakdowns for territories**

- 7.1 Data for cross-sectoral analysis**
- 7.2 Regional Classification of Europe  
RCE**
- 7.3 National and transnational  
breakdown of ESPON results**



## 7.1 Data for cross-sectoral analysis

(by Christian Muschwitz, Lutz Benson, TAURUS; Volker Schmidt-Seiwert, Ingo Heidbrink, BBR)

The data for a cross sectoral statistical analysis have to fulfil several requirements.

They must be available without gaps for the EU 27+2 on a level as upto-date as possible (at least for the year 2000). The data should have preferably been available for all regions for the same period respectively at the same point in time.

An analysis on NUTS 3 level regarding the requirements mentioned above for a cross-sectoral analysis would have been almost impossible, in that case the number of useful indicators would have been up to five to ten indicators at the most. The analysis was decided to be done on NUTS 2 level. By using NUTS 2 as the spatial level it was possible to take into account 38 individual indicators.

The ESPON database became the starting point of the analysis. Additionally the ESPON 3.1 project undertook extensive efforts to close the gaps and to generate a substantial area-wide data base for the EU 27+2. This included an analysis of all available sources, namely the core indicator list, ESPON data base, ESPON map collection and all interim reports to identify indicators being appropriate to close the existing gaps. Furthermore there has been an intensive discussion with the TPGs on the selection of indicators, further (so far unconsidered) data and the possible closure of data gaps for several regions by the TPGs themselves. A better part of the missing data could be supplemented by Eurostats Regio database and enquiries at several national statistical offices.

A few gaps could not be closed by using original data despite the intensive efforts described above. In these cases approximation procedures had to be applied.

Depending on the particular indicators and based on plausibility considerations the following procedures were made use of:

- filling gaps by setting on national mean, minimum or maximum
- approximation through NUTS 1 data or neighbouring regions data
- recoding national data based on the allocation of related variables
- trend extrapolation of data available for previous time periods

One major outcome of this work is a unique database covering the whole EU 27+2 area. This is on its own a very valuable output of the RCE-process. Additionally this database could be a fruitful starting point for future research. The whole dataset and a short description of each indicator can be found in table 10. The column titled "polarity" is showing the direction, in which the indicators are supposed to influence the performance in their respective thematic field. For instance the "ageing" indicator in the demography category: A higher value indicates a bigger share of senior citizens which is negative for the demographic development of a population.

**Table 10 Set of indicators used for RCE**

Theme and indicators	Description	Polarity
<b>Economy</b>		
GDP per capita	In PPS	+
Expenditure on R&D	Share of GDP	+
R&D Business Enterprise Sector	BES R&D personnel per 1.000 active person	+
GDP per capita growth	In Euro	+
Firms with own website	Proportion of all firms	+
Employment in tertiary sector	Share of total employment	+
Employment in primary sector	Share of total employment	-
<b>Labour market</b>		
Unemployment	Unemployment rate 2001	-
Development of unemployment	Change 1998-2001 in percent	-
Youth unemployment	Unemployed < 25 years per 1.000 inh. 15-<25 years	-
Labour force replacement ratio	Population ages 10-19 / population ages 55-64	+
R&D personnel	Total R&D personnel per 1.000 active person	+
High educated population	Highly educated population / total educated pop.	+
Employment density	Number of persons employed per km <sup>2</sup>	+
Internet users	Share of all inhabitants	+
<b>Demography</b>		
Population density	Number of persons per km <sup>2</sup>	+
Ageing	Share of population in the ages over 65 in percent	-
Reproduction potential	20-29 years in 2020 per 20-29 years in 2000	+
Population growth	Change 1995-2000 in %	+
<b>Environment</b>		
Artificial surface	Share of total area (Corine)	-
Natural surface	Share of total area (Corine)	+
Agriculture intensity	Output/input ratio	-
<b>Hazards</b>		
Flood events	Regional average number of flood events	-
Winter storms	Probability of having winter storms	-
Risk of radioactive contamination	Distance from nuclear power plants	-
Earthquake hazard potential	Mean value of grid points inside NUTS 2 boundaries	-
Volcanoes	Number of all volcanoes in NUTS 2 area	-
Oil hazards	Average of 3 indicators (harbours, pipeline, refineries)	-

<b>Accessibility</b>		
Potential accessibility	By road	+
Potential accessibility	By rail	+
Potential accessibility	By air	+
Potential accessibility	Multimodal	+
<b>Spatial structure</b>		
Settlement structure	Count of types with population=0	-
Concentration of population	Change of region 's share of EU 27+2 pop. in percent	+
Concentration of GDP	Change of region 's share of EU 27+2 GDP in percent	+
Time to market meso-scale	Accessibility by rail and road, weighted by pop.	-
Time to market macro-scale	Accessibility by rail and road, weighted by pop.	-
Functional Urban Areas	Share of population living in FUA	+

## **7.2 Regional Classification of Europe (RCE)**

(by Christian Muschwitz, Lutz Benson, TAURUS)

The major aim of the ESPON programme is to provide in a first step an overview of the actual spatial situation in Europe including the identification of the actual trends and constraints. In a second step and as an analytical result a politically relevant guidance should be given. It is obvious that such an ambitious aim is hard to achieve with a broad range of different thematic projects. Therefore the need for instruments or procedures putting the different parts of the thematic puzzle together in order to draw a European spatial picture using a cross-sectoral analysis method.

The ESPON Project 3.1 tries with the RCE a first step in this direction. Within the give timeframe, the given results of the first two and a half years of the ESPON Programme 2006 it is obvious that the focus was to investigate and develop a first approach. This should present first results and lay ground for a further and deeper scientific discussion in the ESPON Programme.

More complex and sophisticated multivariate techniques may be used in future projects, when a basic understanding of the indicator set and the method is developed and agreed.

As expressed in the tender, a first attempt to conduct synthetic cross-sectoral analyses by combining selected indicators of different thematic projects has already been made in the SPESP study programme; studies of this kind, improved and refined, will be needed for the ESPON, too.

Due to this need ESPON 3.1 initiated a procedure which finally led to a comprehensive analysis of European spatial development. Starting point for the so called Regional Classification of Europe developed within this project is the consideration that the typologies and indicators developed by the TPGs reflect the potentials and challenges with reference to the sectoral aspects.

One major reference point for this analysis is the territorial structure with a focus on the ESPON core typologies for polycentrism (FUA classification), urban-rural relations and accessibility.

The task of the RCE was to bring together those sectoral potentials and weaknesses in a wider perspective and to evaluate the cross-sectoral performance of the EU 27+2 regions. With the help of the RCE one should be able to answer the question which parts of Europe show high accumulations of prosperity or most intense sets of problems to overcome and which parts show a more average level, with some sectoral highlights, but also some sectoral hindrances.

### **7.2.1 Approach**

In order to reach this aim ESPON 3.1 has tried to develop an instrument that should lead to this synoptic perspective through an interactive procedure. This means that the TPGs contribute to this task e.g. by answering a questionnaire and providing data on their thematic field, while ESPON 3.1 conducts the analyses based on these contributions. Both a cross-thematic SWOT analysis and a Regional Classification of Europe (RCE) were planned to be carried out in this manner. The quality of such an analytical method depends on one hand on the approach and on the other hand also largely on the quality of the TPGs' input.

The approach was focused on a SWOT analysis that summarises the descriptive results of all TPGs and that serves as a pathfinder for the Regional Classification of Europe. The SWOT Analysis of the ESPON 3.1 project is described in chapter 9.1.

Despite many attempts by ESPON 3.1 to introduce and guide the TPGs in order to enable them to fill out the questionnaire for the SWOT (which had been formulated by ESPON 3.1 for this tool), the main part of the TPGs could not deliver their contributions in accordance with that request. The inputs of the TPGs often did not follow the default process and structure of the analytical steps. Therefore these inputs often were not applicable to our approach.

At this stage it became evident that the foreseen SWOT procedure had to be replaced by another analytical process. Thus a new approach was introduced by ESPON 3.1 to allow implementing at least the Regional Classification of Europe as the ESPON core cross-sectoral analysis. This second approach aims at identifying indicators and applying simple quantitative methods whereas the selection of indicators is now deliberately done by ESPON 3.1 itself and not by the TPGs. The selection of indicators is based on the analysis of the available sources: core indicator list, core typologies, ESPON data base, ESPON map collection and interim reports. As an important source of sectoral content the outcomes of the SWOT analyses (first

approach) were taken into account to identify indicators with a high thematic relevance.

Following intensive internal discussion and taking into account data availability ESPON 3.1 chose (for analytical reasons) seven thematic fields of spatial development to be the core of further RCE analysis: economy, labour market, demography, environment, hazards, accessibility and spatial structure.

With these fields project 3.1 had a solid base for the ESPON measurement of European NUTS 2 regions and was able to draw a broad picture of the spatial patterns and development in the EU 27+2. The aim was to back each of the seven fields with a broad spectrum of indicators characterising the status quo as well as the future perspective – an aim that ESPON 3.1 was able to achieve by and large.

A strong relation between the RCE and the ESDP core concepts is given. Two core concepts of the ESDP – accessibility and spatial structure (FUAs and polycentrism) – are forming a substantial component of the RCE. Sustainability, the third core concept, will play an important role regarding the process of aggregation and weighting the indicators, this will be explained in the due context.

Nevertheless some constraining remarks have to be made. Due to the problems described above, the original backing of the indicators (originally they should have been provided by the due TPGs) is missing. As a consequence some compromises had to be made concerning the analysis of the data, which had to be limited to some rather straight-forward statistical analyses. Because of limited data availability some projects are no longer represented in the data set with their own original data. In these cases ESPON 3.1 tried to close the data gaps by implementing previously unused data sources, which were discovered by own research activities.

### 7.2.2 Methodology

As described above in detail the whole RCE process aims to combine and to summarise of information from the various thematic and policy impact projects, covering a comprehensive spectrum of factors determining the spatial development. Basic and widely discussed possibilities of reducing spectrums of indicators to a few aggregated indices or an overall index are:

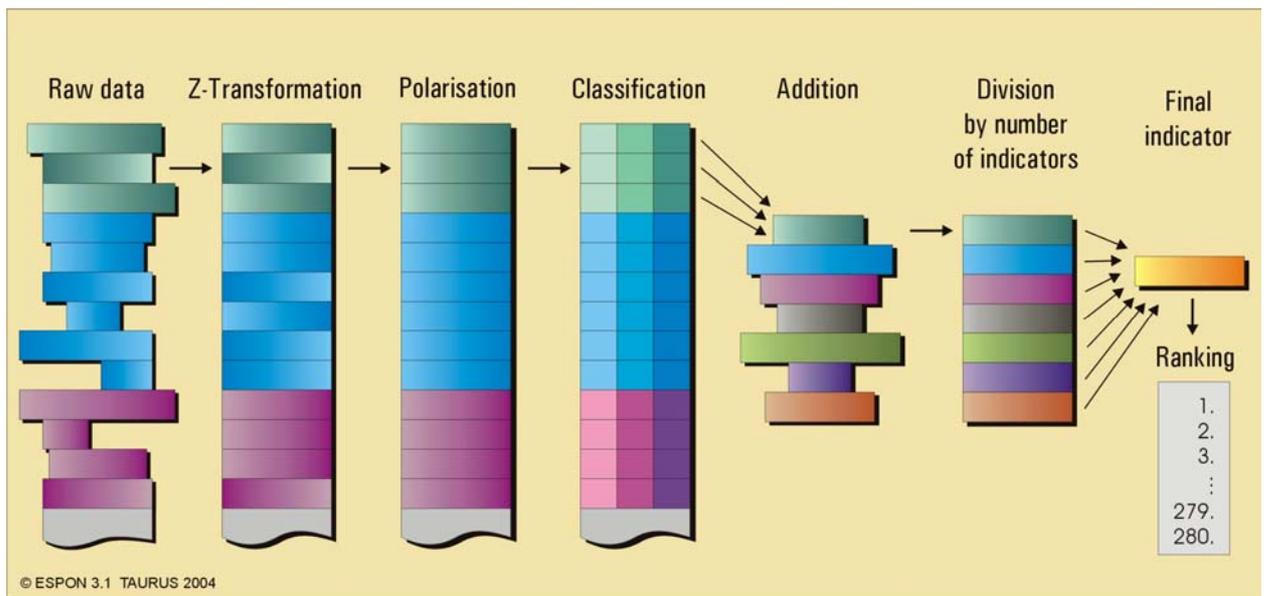
- Using quantitative threshold values / minimum standards
- Aggregation of individual indicators to a single index by using procedures like additive and multiplicative combinations
- Multivariate analysis, such as factor, discriminant or cluster analysis

The first approach is not applicable, because the necessary standards do not exist. From political official quarters merely rough standards have been verbalised for only a few indicators (e.g. GDP per capita in connection with the EU regional policy). The third approach is often characterised by results that are not transparent and hard to follow. Thus the second approach was chosen, being a rather simple but easy to understand technique for creating an index. More complex and more sophisticated multivariate techniques may be used in future research projects, when a basic understanding of the indicator set and its conclusions has developed.

Even after this fundamental decision many ways are open for the actual calculation. ESPON project 3.1 decided to follow two different approaches, in detail described in the annex 'Regional Classification of Europe'. A comparison of both approaches revealed that the results react surprisingly little to the different aggregation methods. The results of both techniques show highly significant correlation, varying between .73 (Kendall's TAU-b) and .9 (Spearman's rank correlation coefficient).

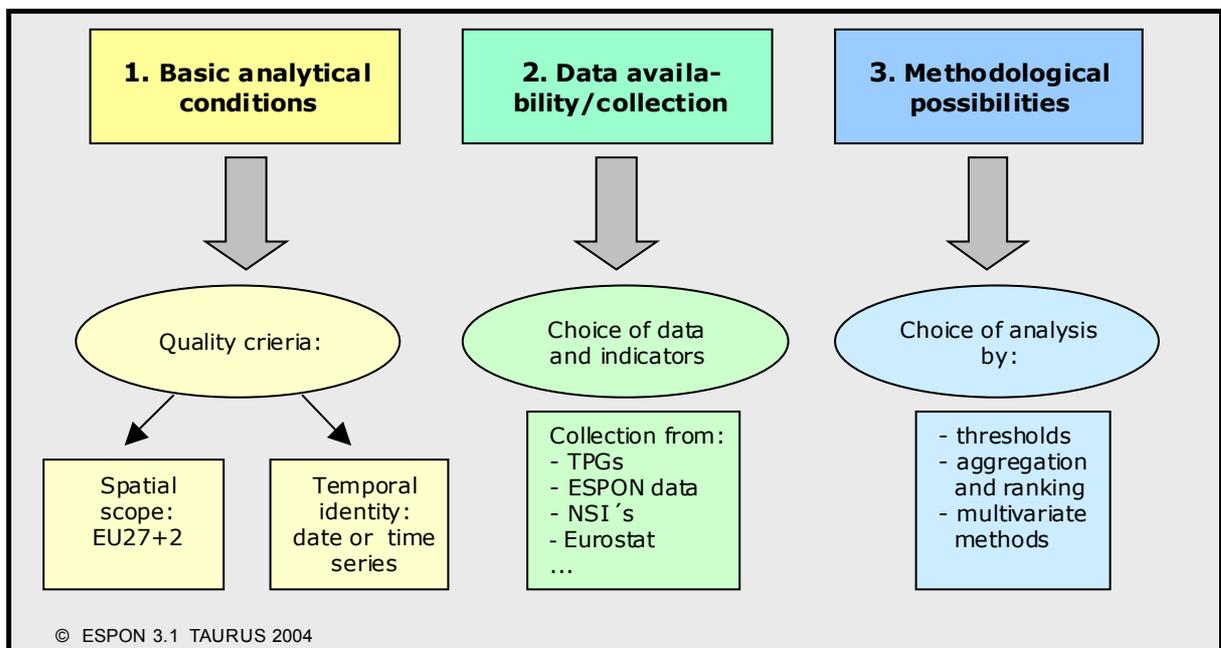
ESPON 3.1 eventually chose the approach that makes most sense regarding the overall concept of sustainable development as put forward by the ESDP. The requirement of a well-balanced, not one-sided development led to the decision to chose the approach that reduces the influence of extremal values on the final result. Therefore a region with only one single strength cannot score very high, vice versa only a single weakness does not necessarily lead to a bad overall performance.

**Figure 52 From raw data to ESPON ranking**



The chosen approach can be briefly characterised by classifying the mean-standardised individual indicators into three classes and then aggregating them with equal weights to seven thematic indices. These seven indices – again with equal weights – form the overall index which is the basis for the final ESPON ranking. The above figure is illustrating the steps leading from the raw data to the ESPON ranking whereas the figure below is summarising the whole methodological process.

**Figure 53 The way towards the ESPON RCE**



### **7.2.3 Thematic Results**

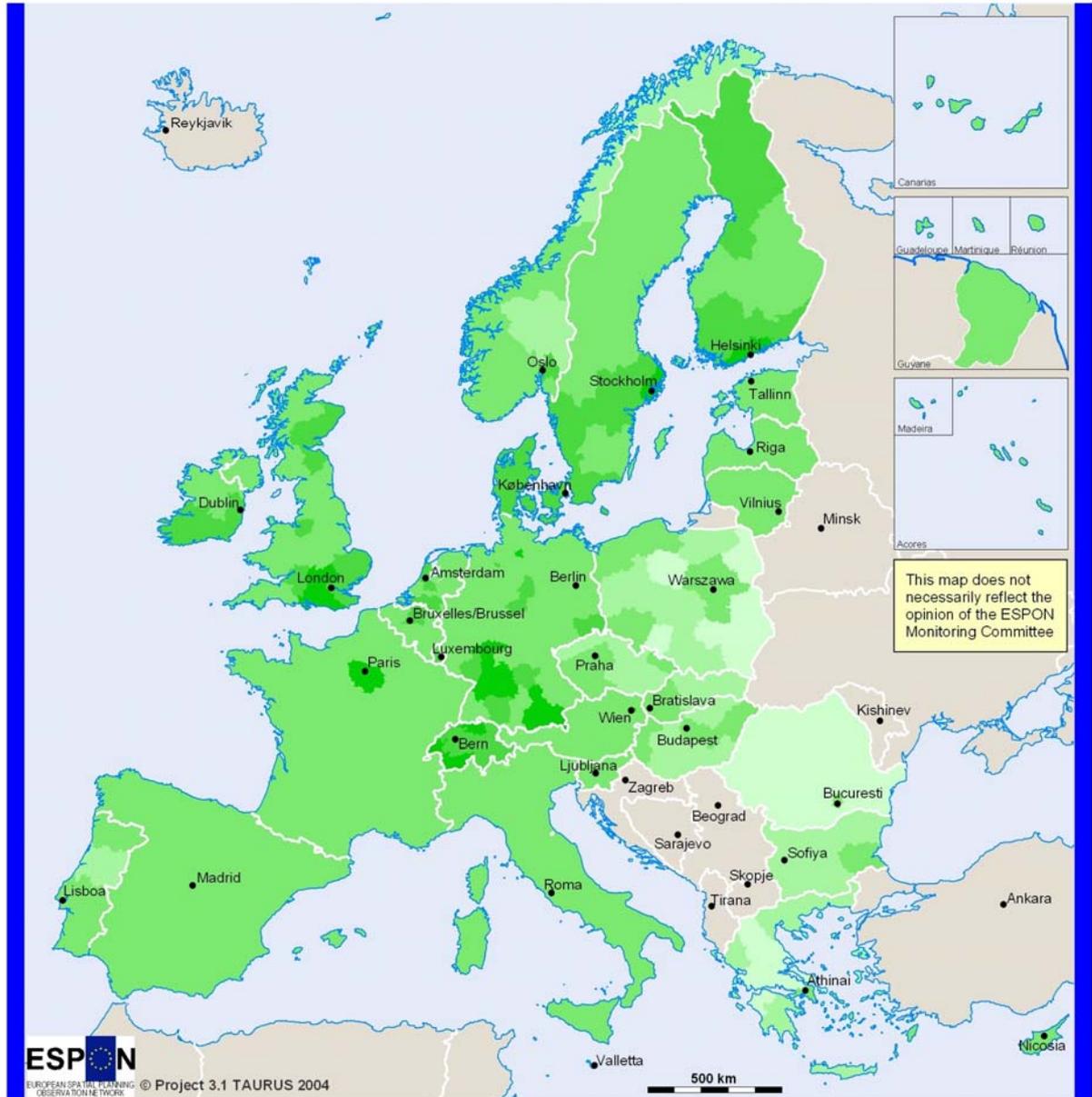
After the detailed description of the process, the utilised data and the applied methods, an overview of the essential results of the statistical analysis is given. To establish an understanding of the complex thematic results and the final overall ranking the proceeding is explained step by step. In a first step thematic results are presented. The project 3.1 has a look at the performance of regions in seven topics: economy, labour market, demography, environment, hazards, accessibility and spatial structure (see table 10). Differences and similarities of the complex thematic results are also described. In the final step an RCE overall performance (Map 15), being a synthesis of the performance in the seven thematic fields, is produced and analysed. Finally a last ranking is developed from the RCE and the question of coherence between the RCE performance and the regional settlement structure is examined.

#### **7.2.3.1 Economy**

The economy is a traditional field of spatial analysis . Using the RCE with the given data the economic performance of the EU 27+2 regions is presented Map 8. A set of seven economic indicators (GDP per capita, Expenditure on R&D, R&D Business Enterprise Sector, GDP per capita growth, Firms with own website, Employment in tertiary sector, Employment in primary sector) is used. Map 8 identifies outperformers as economically well-situated and wealthy regions in contrast to challenging regions. What is striking is a wide spread of regions with an average economic performance, covering the whole area of Spain and Italy as well as wide parts of Portugal, France, Austria, Germany, Scandinavia, the Benelux states and the UK. The outperforming regions are mainly restricted to capital areas such as London, Île de France and Brussels, some southern parts of Germany and three Swiss border regions.

## Map 8 Regional Classification of Europe - economy

### Regional classification of Europe - economy



**ESPON**  
 EUROPEAN SPATIAL PLANNING  
 OBSERVATION NETWORK  
 © Project 3.1 TAURUS 2004

#### Performance on economic indicators

- underperforming
- below average
- average
- above average
- outperforming

© EuroGeographics Association for administrative boundaries  
 Regional Level: NUTS 2  
 Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
**Source: ESPON Data Base**

With the exception of some areas in Norway and in Portugal all regions with an economic performance below average can be found in the Eastern parts of Europe. These regions are mainly concentrated in a belt reaching from Poland all the way down to Greece, although the picture is not as homogenous as one might have expected. There are also some spots of better economic performance scattered all over the new member states with the Baltic states quite ahead and even performing better than a longtime member state like Greece.

### **7.2.3.2 Labour market**

Moving on to the labour market index (Map 9) strong ties to economic performance can be clearly discovered. This is a result of the closely-related indicators that were used (Unemployment, Development of unemployment, Youth unemployment, Labour force replacement ratio, R&D personnel, High educated population, Employment density, Internet users). The economic indicator "employment in tertiary sector and primary sector", for instance, is thematically connected with employment density as one of the eight labour market indicators. Map 9 illustrates this conclusion. Map 9 also differentiates between outperformers as economically well-situated and wealthy regions in contrast to underperformers. Outperformance is once again concentrated on capital regions and Switzerland with apparent good overall results. But the European spatial pattern is obviously more scattered and there are some slight, but very interesting differences. While outperforming on economic indicators, a couple of regions like Île de France, Helsinki or southern Germany get worse off when taking into account a broad range of labour market indicators whereas Stockholm or London can hold their leading position.

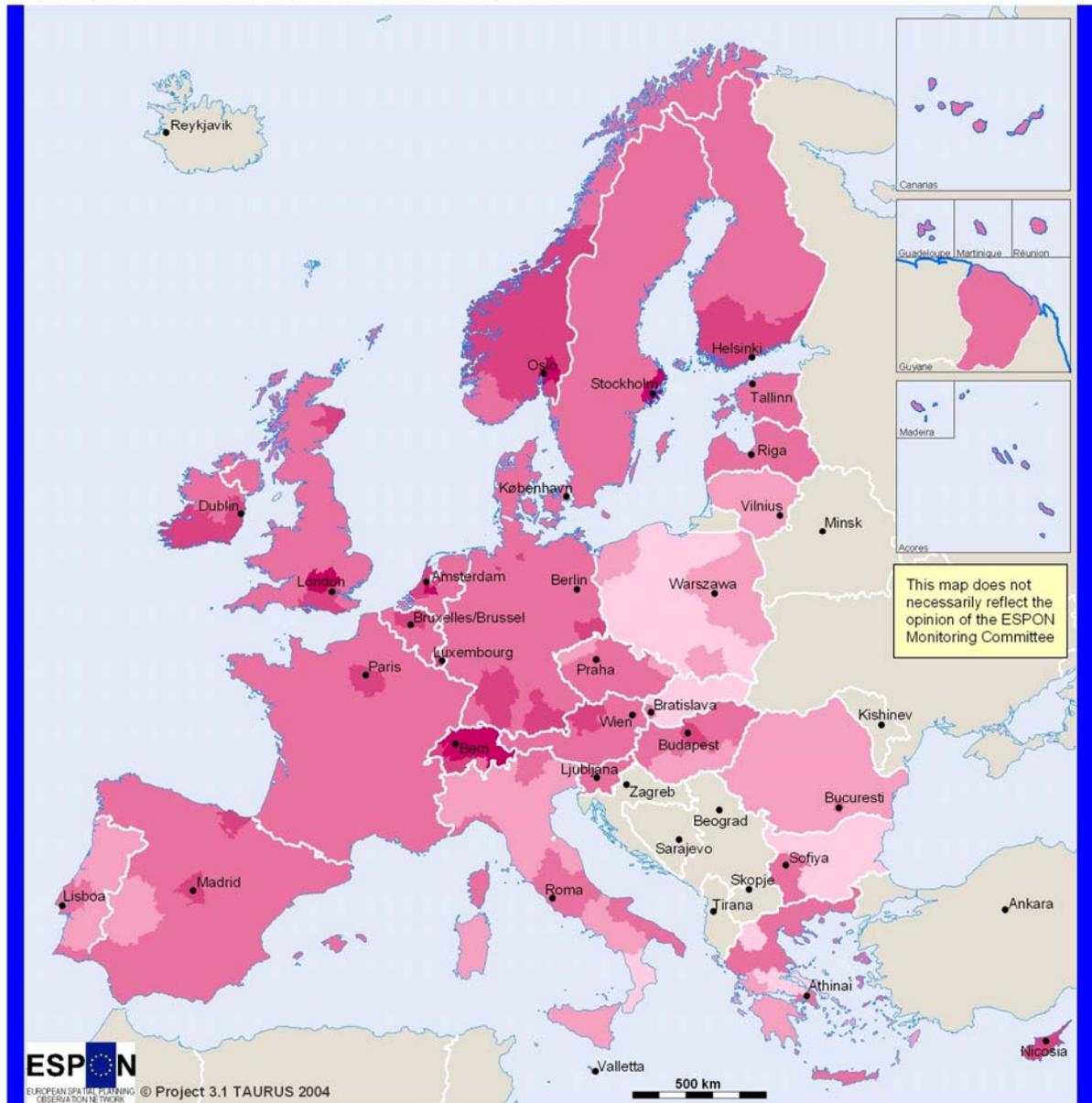
On the other hand there are several peripheral, eastern and south-eastern regions which look quite better compared to economic performance. Some of them like Budapest, wide parts of the Czech Republic, Bucharest, Sofia, parts of Greece as well as Latvia and Estonia can even reach the European average when focussing on a broad spectrum of labour market indicators.

All in all this can lead to the conclusion that economic performance might be an important, but no commensurate condition for labour market performance and that other decisive factors also have to be taken into account. Excellent economic performance does not necessarily lead to an excellent situation and perspective on the regional labour market and vice versa.

Furthermore it has to be emphasised that the labour market index has a strong future perspective by including a high share of indicators measuring potentials rather than status quo.

## Map 9 Regional Classification of Europe – labour market

### Regional classification of Europe - labour market



ESPON  
EUROPEAN SPATIAL PLANNING  
OBSERVATION NETWORK © Project 3.1 TAURUS 2004

#### Performance on labour market indicators

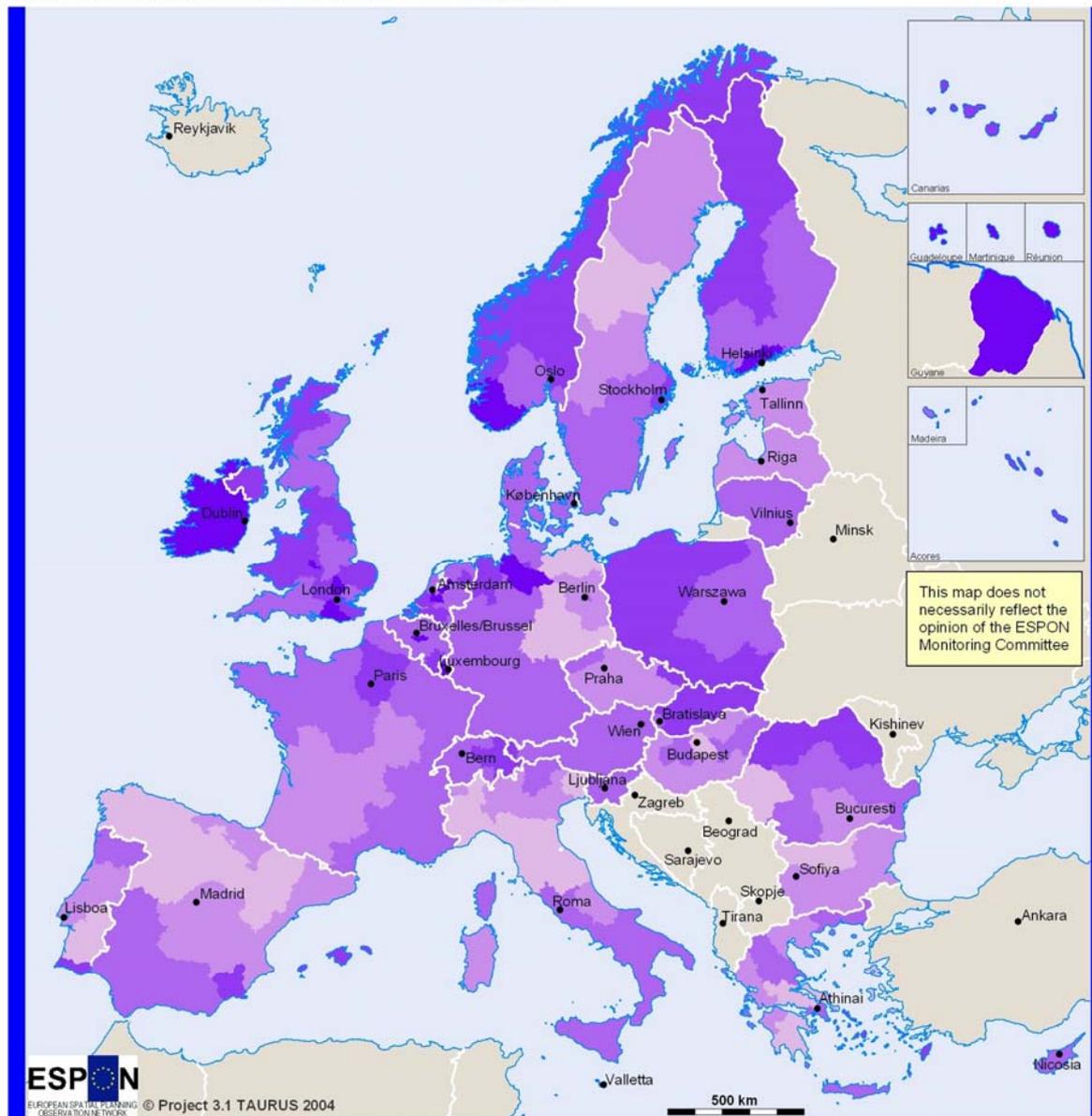
- underperforming
- below average
- average
- above average
- outperforming

© EuroGeographics Association for administrative boundaries  
Regional Level: NUTS 2  
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
**Source: ESPON Data Base**

### 7.2.3.3 Demography

**Map 10 Regional Classification of Europe - demography**

**Regional classification of Europe - demography**



**ESPON**  
EUROPEAN SPATIAL PLANNING  
OBSERVATION NETWORK © Project 3.1 TAURUS 2004

**Performance on demographic indicators**

- underperforming
- below average
- average
- above average
- outperforming

© EuroGeographics Association for administrative boundaries  
Regional Level: NUTS 2  
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
**Source: ESPON Data Base**

The demographic performance considers an up-to-date and complex theme, represented by four indicators (Population density, Ageing, Reproduction potential, Population growth).

The map shows a regional classification ranging from outperformer to underperformer. In this case outperformer means a region with a relatively vital and young population, whereas underperformer characterises a declining and ageing population. With regard to the demographic situation (Map 10) in the EU 27+2 regions a spatial pattern is emerging which is quite different from the first two themes. Neither is there a clear core-periphery division nor any other obvious spatial trends. Regions facing the biggest demographic problems can be found in the South (Spain, Italy and Greece), the North (Sweden) and the Centre (East Germany) as well as in the East (Hungary, Romania, Bulgaria) of Europe.

The same holds true for the well-performing regions which are also quite dispersed. Greater areas of regions performing above average can be found in a belt in the West (France, UK, Ireland, Benelux, Western Germany, Norway) in the East (Finland, Baltic states, Poland, Slovakia, Austria, Romania), but also in the South (Portugal, Spain, Italy) and in ultraperipheral areas (DOM of France, Acores, Canarias).

Regarding the overall pictures two points need to be emphasised. On the one hand a remarkable amount of regional disparities can be observed for many countries of the EU 27+2. On the other hand the picture drawn so far is a relative comparison with reference to the EU 27+2. In the background of declining and worsening demographic developments in the EU 27+2 as a whole, even the well-performing regions might be just the one-eyed kings among the blind. Therefore demographic development will possibly be an important issue for many nations and the whole of Europe during the next decades.

#### **7.2.3.4 Environment**

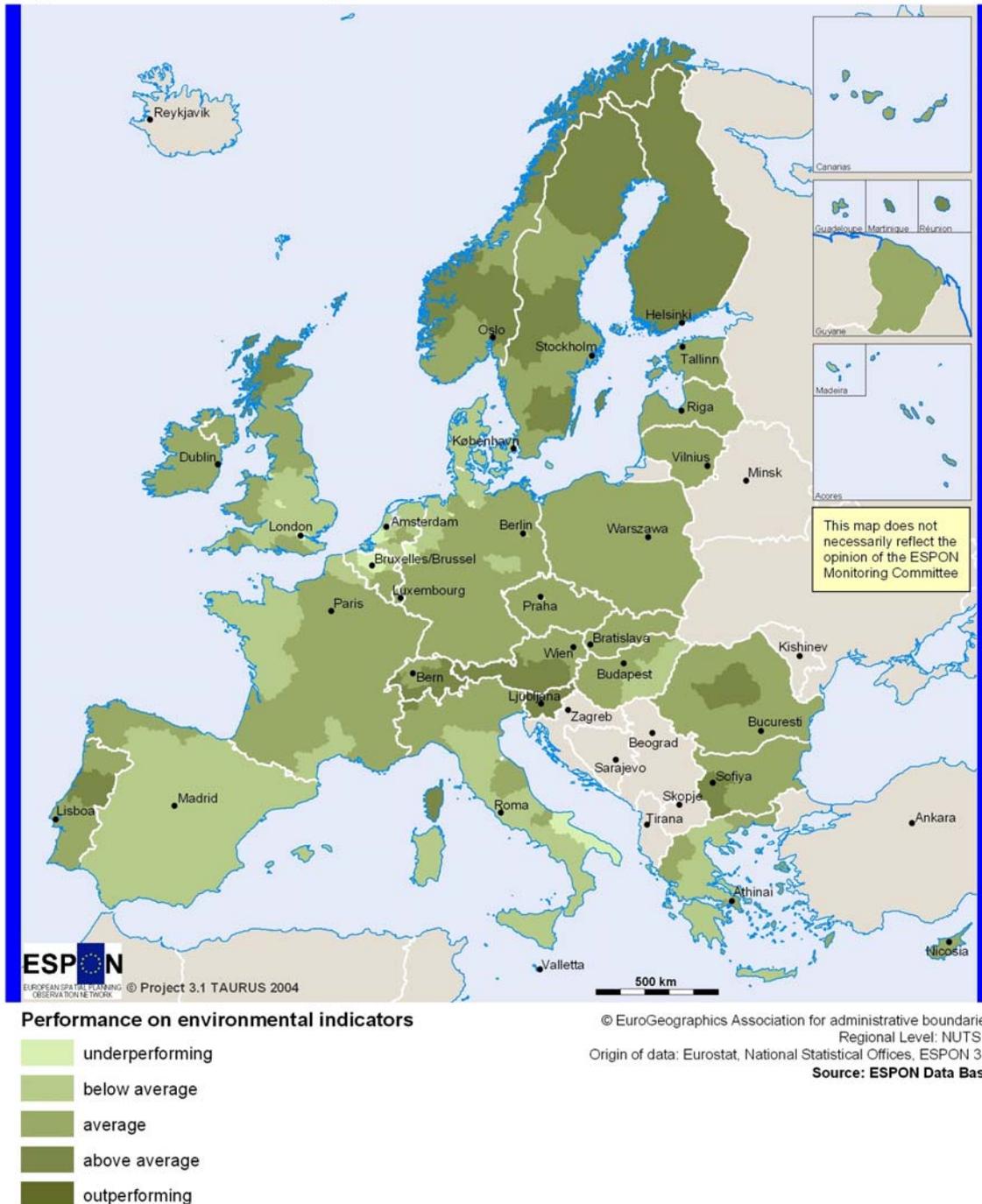
Turning towards environment (Map 11) it has to be mentioned that the availability of suitable indicators has not been very satisfying, so that the picture drawn so far remains rather vague. Only three indicators (Artificial surface, Natural surface, Agriculture intensity) can be used for an environmental map. On the other hand some more indicators with relation to environmental issues are essential parts of the hazards index, so that the two maps put together are giving a more complete view.

The environment index differentiates between outperformers and underperformers. Outperformers represent regions in which environmental indicators perform very well. With regard to the environment index it is apparent that the upper class could not be filled since none of the European regions could be judged as outperforming. Most regions are performing around the average with some exceptions of underperforming regions with either highly concentrated economic activity (London, Brussels, Düsseldorf, Hamburg) or intensive agriculture (Southeast of Italy). Regions performing

above average are mainly restricted on sparsely populated areas with low economic activity, i.e. mountain areas, peripheral regions.

### Map 11 Regional Classification of Europe - environment

Regional classification of Europe - environment

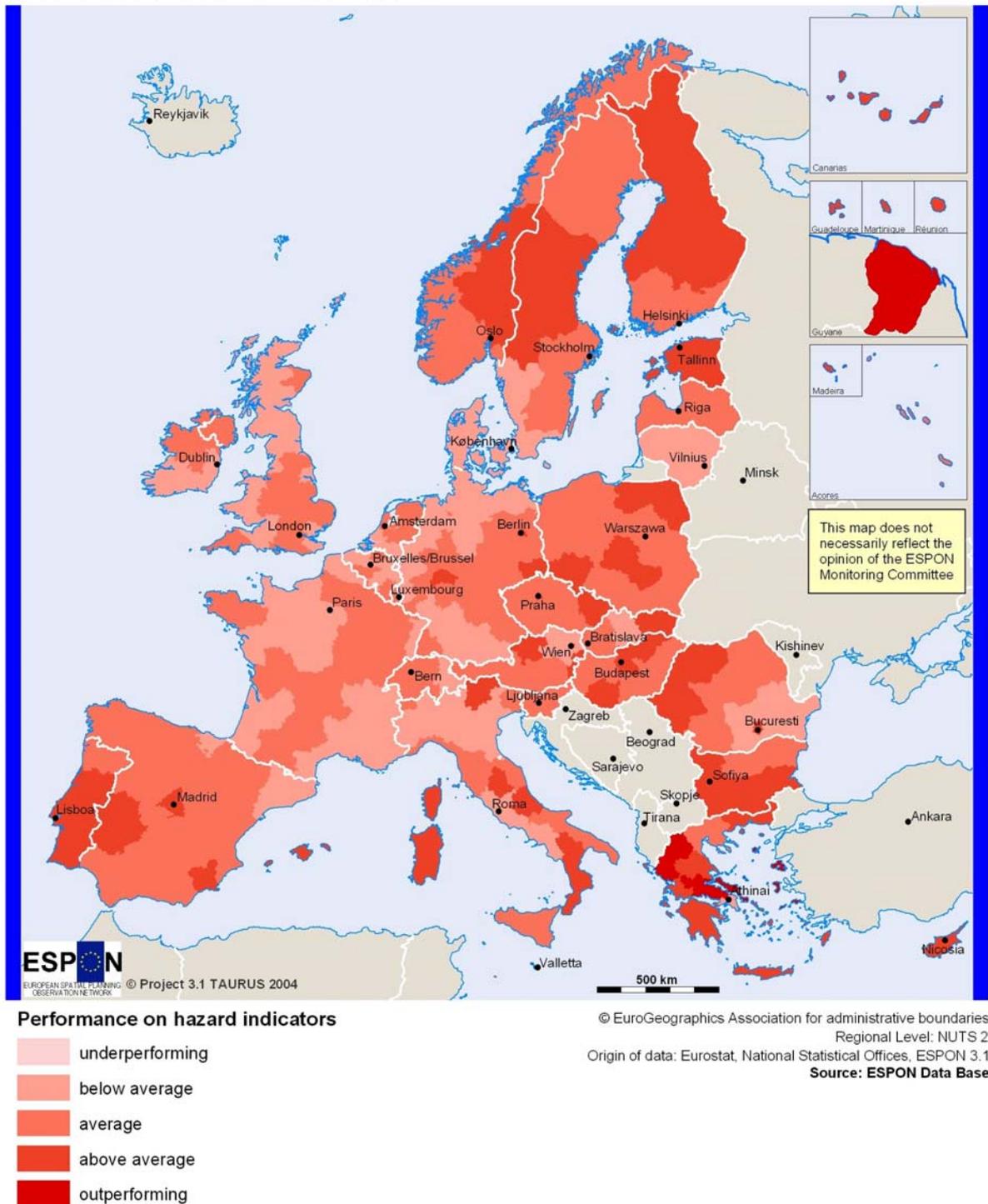


### 7.2.3.5 Hazards

Moving on to the hazard index (Map 12), the picture drawn can be described as a patchwork, obviously there is no spatial trend identifiable.

## Map 12 Regional Classification of Europe – hazards

### Regional classification of Europe - hazards



Altogether six hazard indicators (Flood events, Winter storms, Risk of radioactive contamination, Earthquake hazard potential, Volcanoes, Oil hazards) establish the regional performance. Regions are again classified in five performance categories between underperformer and outperformer. The

bottom class (underperforming) is unfilled, thus regions seriously threatened by all kinds of hazards cannot be identified in the EU27+2. Most regions below average are located in Western Europe (France, Germany, Denmark, UK and Northern Italy), but a clear spatial pattern cannot be discovered.

There are also not too many outperforming regions, the few one can find, are located in Greece and the French Caribbean. Relatively well performing areas can mainly be found in the Eastern and Northern parts of Europe as well as on the Iberian peninsula. But still no country can be clearly assigned to a certain class. This vague result might be related to the set of indicators, which is wide spread including earth quake potentials as well as the risk of radioactive contamination. Since the set of indicators includes two man-made hazards, a slight negative tie to economic activity and distribution of population is not surprising.

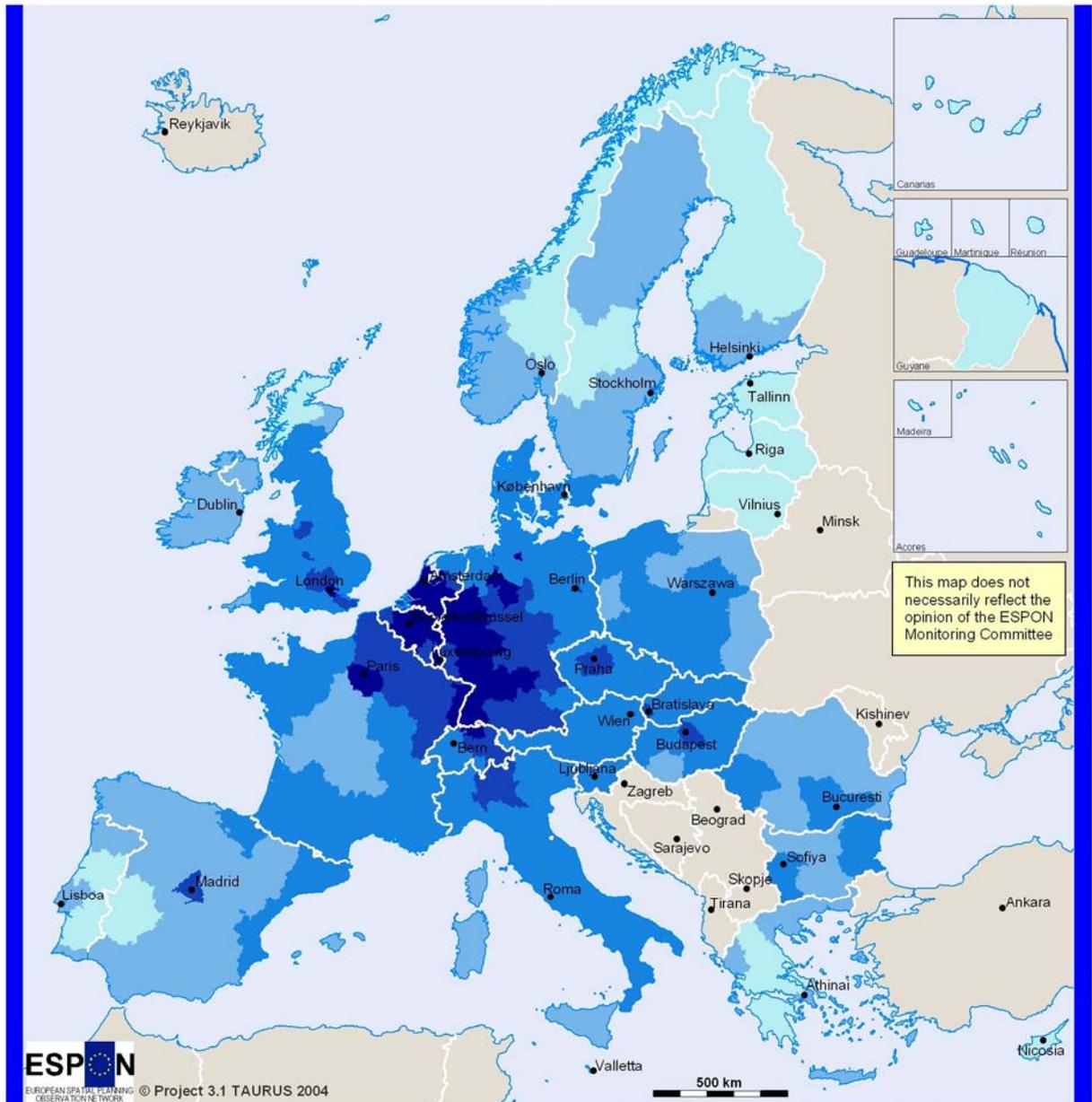
#### **7.2.3.6 Accessibility**

Turning to accessibility (Map 13) an explicit spatial pattern is emerging, showing a clear core-periphery divide is emerging. The map is a visible result of the regional characteristics of four accessibility indicators (By road, By rail, By air, Multimodal). Outperformers are, as opposed to the underperformers, very well accessible by air, rail and road. The outperforming regions conglomerate in the core of Europe, especially along the "blue banana", including Paris, the Rhine-Main area, Luxembourg, Brussels and London. From the core to the periphery the performance on accessibility diminishes, reaching the lowest level in regions in Greece, Portugal, Norway, Sweden, Finland, Scotland and the Baltic States.

Moreover – and not surprisingly – a hierarchical pattern can be observed in the peripheral areas with the capitals and neighbouring regions performing much better than the others and sometimes even reaching an above average level (as Madrid or Budapest).

## Map 13 Regional Classification of Europe - accessibility

### Regional classification of Europe - accessibility



#### Performance on accessibility indicators

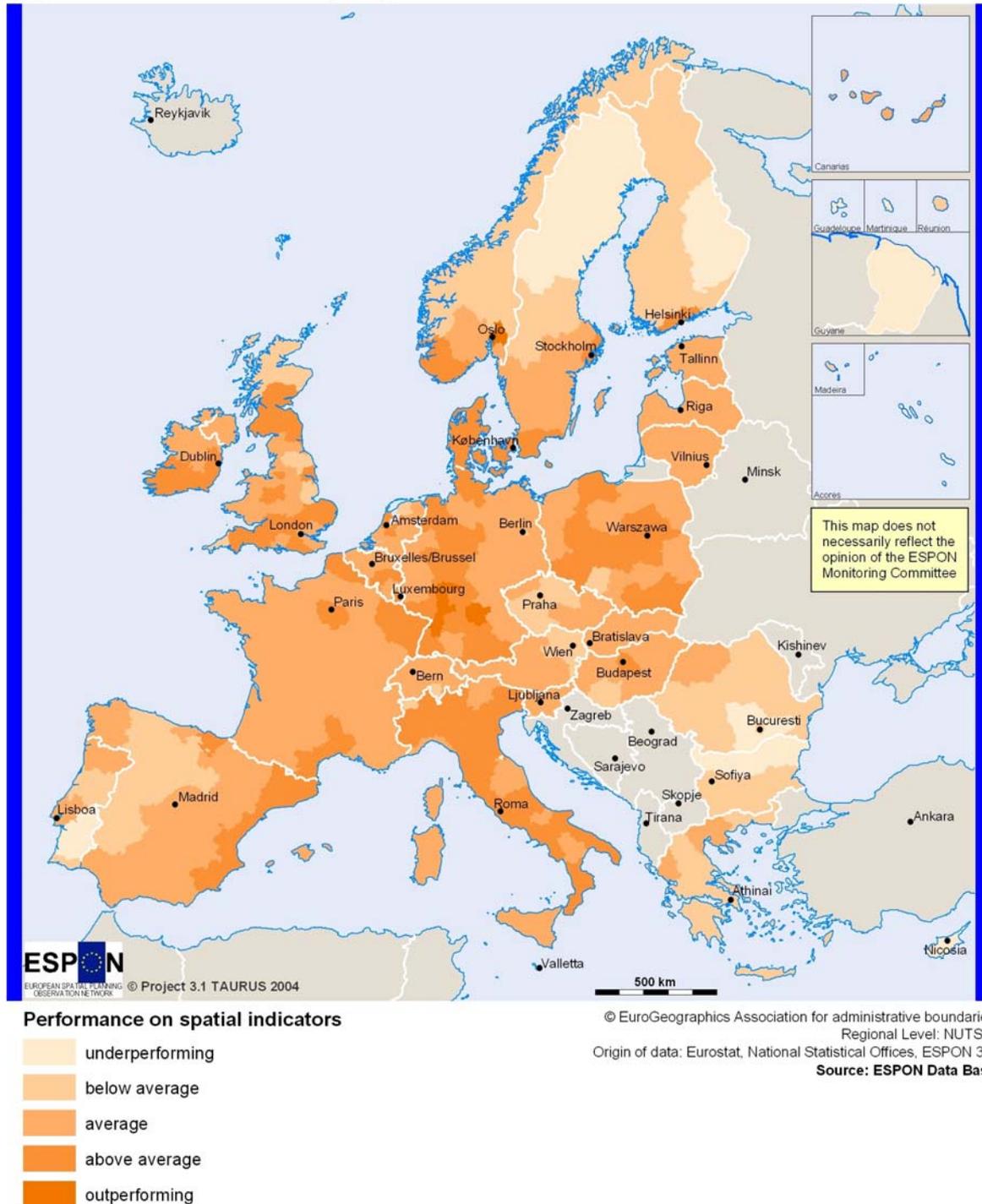
- underperforming
- below average
- average
- above average
- outperforming

© EuroGeographics Association for administrative boundaries  
Regional Level: NUTS 2  
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
Source: ESPON Data Base

### 7.2.3.7 Spatial structure

Finally moving on to the spatial structure (Map 14), a slight core-periphery divide can be identified.

Regional classification of Europe - spatial structure



Map 14 Regional Classification of Europe – spatial structure

Regions are, once again, classified in classes between outperformer and underperformer, which are developed from a set of six indicators (Settlement structure, Concentration of population, Concentration of GDP, Time to market meso-scale, Time to market macro-scale, Functional Urban Areas). Underperformer are regions in which all indicators have low scores. All underperforming regions and most of those below average are situated at the margin of the EU 27+2 area (Portugal, Spain, UK, Northern parts of Scandinavia, Romania, Bulgaria, Greece and ultraperipheral areas). But there are also examples located in the European centre like some Austrian, Swiss, Czech and Italian regions.

Only a few outperformers can be found, namely the regions of Darmstadt, Karlsruhe and Mittelfranken in Southern Germany as well as Oslo in Norway. Many regions performing above average are along an imaginary line way down from Southern Norway via Denmark and Germany to Southern Italy.

Regarding the new EU-member states, some of them seem to have a quite positive spatial structure. Poland shows a good performance, also the Baltic States, Slovenia and parts of Hungary score quite good in comparison with some long-time members of the EU.

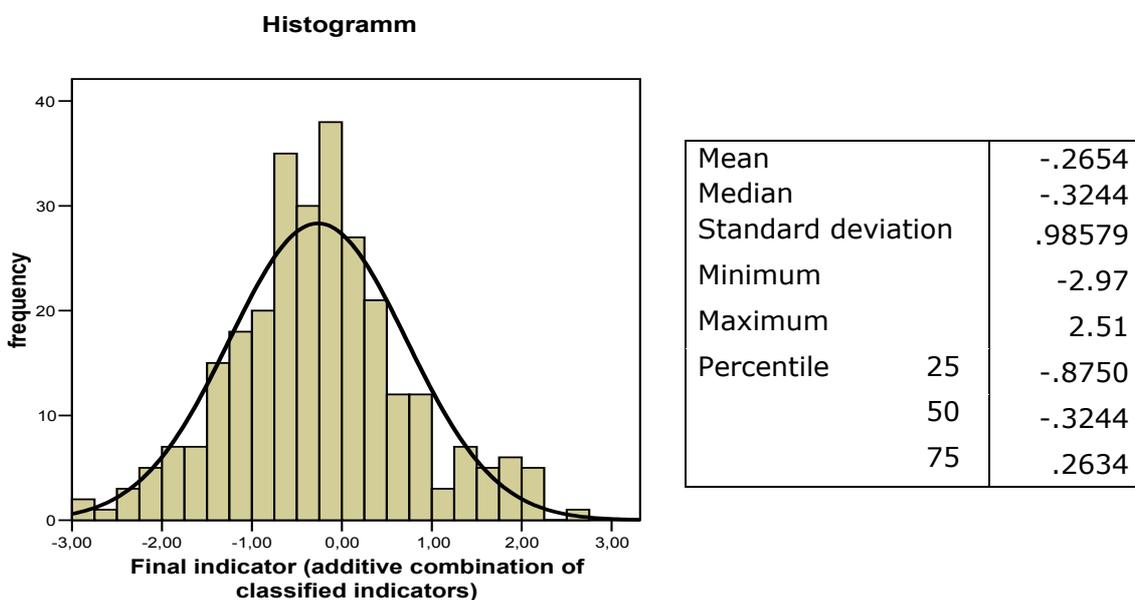
Furthermore it has to be emphasised that the index of spatial structure is including a high share of indicators reflecting recent developments and regional potentials. Therefore this index may have the strongest future perspective among all seven thematic indices.

## 7.2.4 The Regional Classification of Europe - overall results

After analysing the performance on different thematic fields the next step of the RCE is to bring together the single thematic results in one overall classification. This includes all advantages and disadvantages such an aggregation of information goes along with.

Before drawing the map and to get a first impression of the results let us have a quick look at some important parameters of distribution characterising the overall RCE.

**Figure 54 Parameters of distribution of RCE**



Source: ESPON Project 3.1

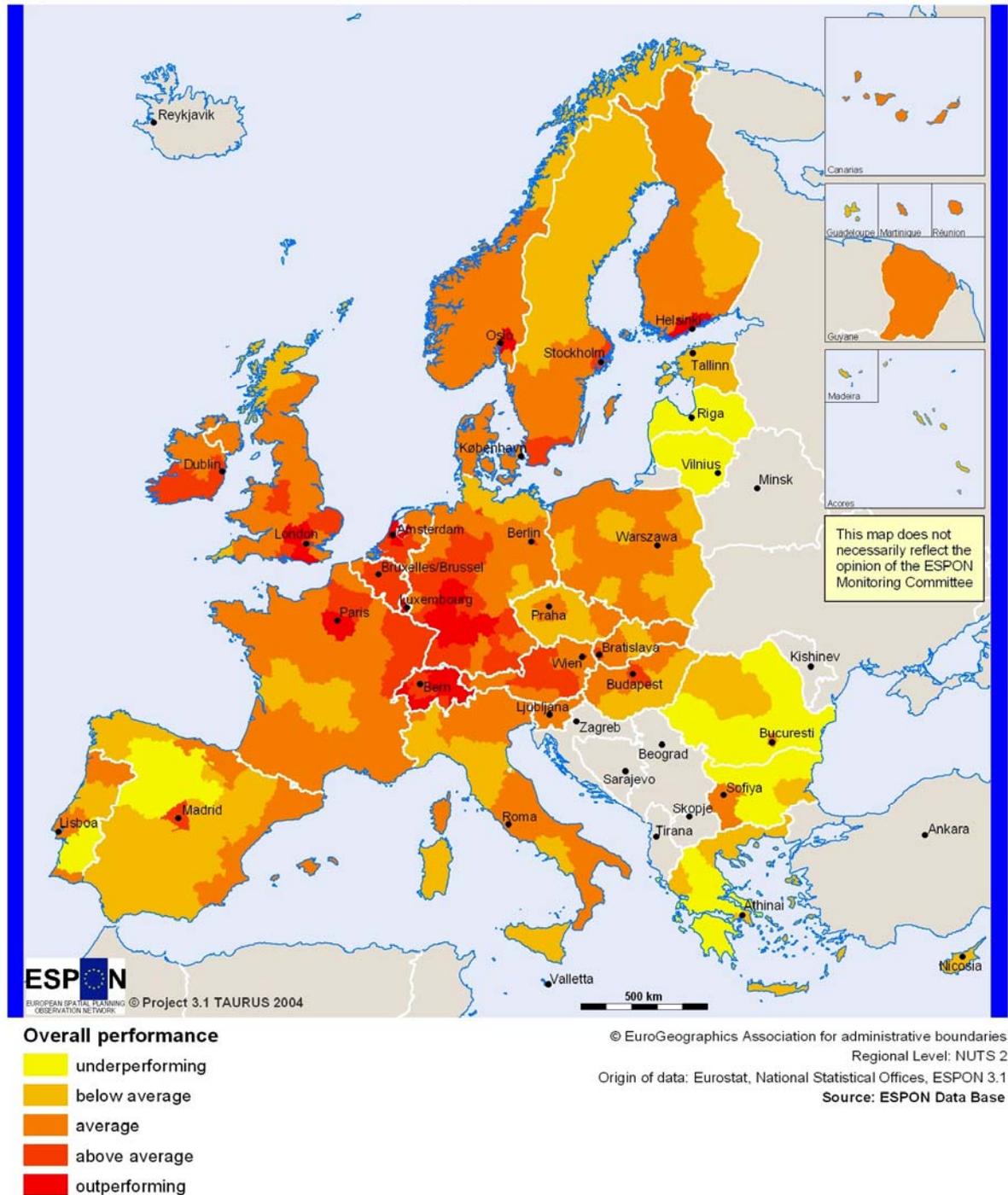
The histogram shows the RCE rankings by the absolute frequency of the reached values. As visible in the histogram, the minimum and maximum values are in an almost identical distance from the mean. In both the negative and the positive extrema there are cases clearly distinct from the others. Also striking is the range from 1.25 to 2.25 where there is a clear concentration of cases in some kind of top flight quite ahead of the others.

Statistically the counting of the value scores matches almost a normal distribution. These results lead to the intention that the introduced methodology (ESPON RCE) produces a clear and differentiated ranking.

Using these values and drawing a map of Europe, an interesting picture of the EU territory develops:

## Map 15 Regional Classification of Europe – overall performance

Regional classification of Europe - overall performance

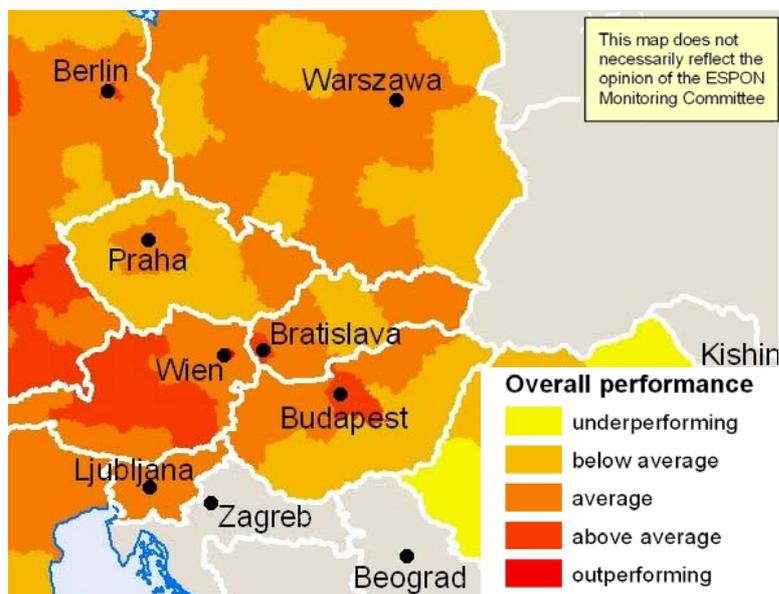


When having a first look at this map, one might observe a spatial pattern which seems quite familiar for some parts of Europe, but is also new and astonishing in other parts. Striking is a core-periphery divide based on core urban and remote rural regions. On the one hand there is a clear

concentration of underperforming regions in the South and East of Europe, whereas most of the regions performing above average are located in a belt spanning from Ireland and London over Paris, the Benelux countries, wide parts of Western Germany down to Switzerland and Austria. Regions performing above average and lying beyond this area are restricted to some of the well-known capital regions (Madrid, Oslo, Helsinki, Stockholm, Bratislava and Budapest).

So much concerning the familiar results. But when going into details, resp. shifting to other parts, the map shows somehow unexpected findings. A first interesting finding might be that there are couple of regions scattered all across the new member states which are able to reach the EU 27+2 average. These regions are even performing better than some parts of the EU15. Especially the direct neighbours to the former EU 15, Poland, Hungary, Slovakia and the Czech Republic, show remarkable areas with a good overall performance (Map 16). These findings are obviously good news in the sense that promising starting points for future development are already existing in the new member states.

**Map 16 Neighbours to former EU15: Remarkable section of the overall performance**

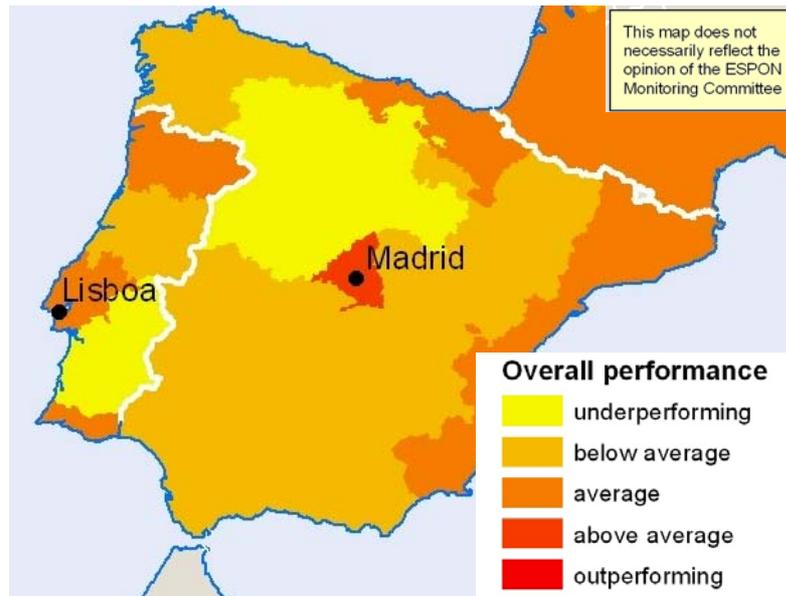


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 Regional Level: NUTS 2  
 Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
 Source: ESPON Data Base

Zoom-in without scale

On the other side it is alarming to see that despite longtime political support quite a lot of regions in Southern Europe are showing a poor overall performance, even falling behind wide parts of the new member states. Nevertheless a good overall performance can be observed especially for several regions on the Iberian peninsula which are able to reach or even to exceed the EU 27+2 average (Map 17).

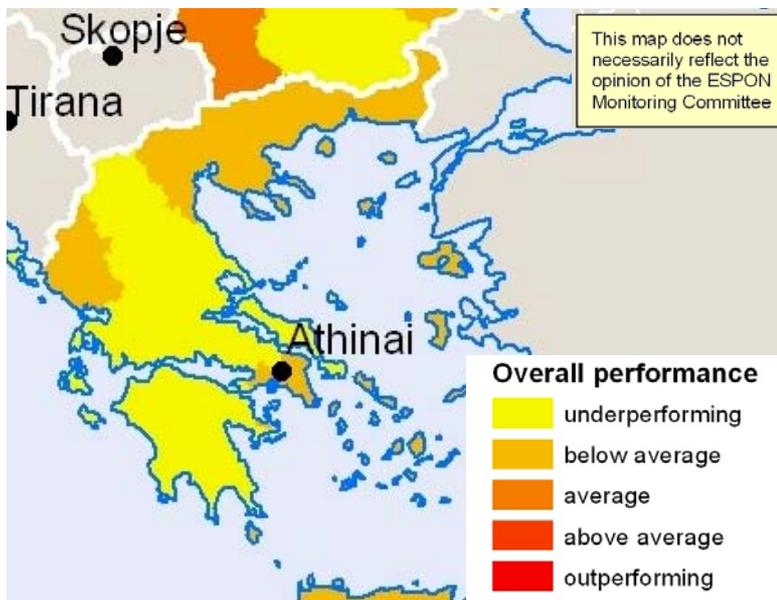
**Map 17 Iberian peninsula: Remarkable section of the overall performance**



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Regional Level: NUTS 2  
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
Source: ESPON Data Base

Zoom-in without scale

**Map 18 Greece: Remarkable section of the overall performance**



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Regional Level: NUTS 2  
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1  
Source: ESPON Data Base

Zoom-in without scale

Focussing on single countries rather diverse levels regarding intranational disparities can be discovered. Rather homogenous nations like Italy, Ireland or Poland can be found as well as nations facing quite remarkable regional differences in overall performance like Spain, France, Germany, the UK or the Scandinavian countries.

When looking for details many more interesting questions arise. One of them might be the analysis of rather unexpected results. I.e. why are some parts of Austria are better than Vienna; why is the region of Dresden, often perceived as a role model for relatively good economic development in Eastern Germany, perform not so good than their neighbouring regions? Answering these kinds of questions is made possible by the detailed regional results for all thematic indices and the overall index that can be found in the annex.

### **7.2.5 ESPON ranking**

In a final step ESPON 3.1 developed a ranking of the 280 European NUTS 2 regions by simply replacing the numeral values of the RCE with ranks between 1 for the best performing and 280 for the worst performing region. In the following a glance will be taken at the regions at the top as well as at the bottom of the ranking. The complete results of the ranking and additional information on the performance of the 280 NUTS 2 regions in the

seven thematic indices have been attached without any further interpretation in the annex 'Regional Classification of Europe'.

One short note before we turn to the results: the RCE is characterised by a very broad approach looking in an integrated manner at different aspects of spatial development. It is an elaborated and extensive instrument taking many dimensions into account, as described earlier in terms of the ESDP concept. The comparison with a proceeding based on a single indicator shows how valuable and sophisticated such an elaborated approach is. For that purpose we used an adopted indicator for the measurement of regional welfare, the GDP (PPS) per inhabitant.

Looking at the Top 25, the overall RCE ranking is drawing a picture, which seems familiar in some aspects at first glance. But there are also some spectacular changes compared to established spatial patterns. Under the Top 25 of the RCE are mainly regions from the North and the Centre of Europe. Strongly represented are in particular the United Kingdom (4), the Benelux countries (5), Germany (6) and Switzerland (5). The majority of these regions are large agglomerations. But also less densely populated areas like in Switzerland or regions without a large centre like Gießen or Flevoland are represented. A look at the particular results (see annex) shows that the outperformers of the overall ranking do also perform above average on the thematic indices. If there are exceptions, these occur in the field of demography, accessibility, environment and/or hazards. But the overall outperformers are able to compensate these weaknesses (if present) by abundantly clear strengths in the other fields.

Moving on to the comparison with the GDP ranking mentioned above, some parallels occur. Altogether 15 regions score the Top 25 in both rankings. This does not surprise, most notably because there are obviously correlations between the fields of economy, accessibility and labour market. But the particular ranking positions differ considerably. This emphasises the added value of the multi-dimensional approach of the RCE ranking. The Brussels region is particularly outstanding – although having a very high GDP, Brussels just scores position 18 in the RCE ranking. Regions like Oberbayern or Hamburg are not able even to hold their rank among the Top 25 when applying a wider perspective of regional development. On the other hand regions like Mittelfranken, Bedfordshire, Hertfordshire, Karlsruhe and several Swiss regions are able to enter the Top 25 due to a very homogenous positive performance on many thematic fields.

**Table 11 Top 25 of European Regions –ranking after RCE and GDP**

Rank	Overall ranking RCE	Reporting: Ranking after GDP (PPS) per inhabitant
<b>TOP 25</b>		
1.	<b>Luxembourg</b>	<b>Inner London</b>
2.	<b>Berkshire, Bucks and Oxfordshire</b>	<b>Région Bruxelles-capitale</b>
3.	<b>Inner London</b>	<b>Luxembourg</b>
4.	<b>Utrecht</b>	Hamburg
5.	<b>Darmstadt</b>	<b>Oslo Og Akershus</b>
6.	<b>Île de France</b>	<b>Île de France</b>
7.	Mittelfranken	Oberbayern
8.	<b>Suisse Du Nord-Est</b>	<b>Zürich</b>
9.	Bedfordshire, Hertfordshire	<b>Wien</b>
10.	<b>Zürich</b>	<b>Darmstadt</b>
11.	<b>Stuttgart</b>	<b>Uusimaa (suuralue)</b>
12.	<b>Uusimaa (suuralue)</b>	<b>Utrecht</b>
13.	Karlsruhe	Bremen
14.	<b>Wien</b>	Trentino-Alto Adige
15.	<b>Oslo Og Akershus</b>	Åland
16.	Suisse Centrale	Lombardia
17.	Flevoland	<b>Suisse Du Nord-Est</b>
18.	<b>Région Bruxelles-capitale</b>	<b>Stockholm</b>
19.	Surrey, East and West Sussex	<b>Stuttgart</b>
20.	Rheinessen-Pfalz	Emilia-Romagna
21.	<b>Noord-Holland</b>	<b>Noord-Holland</b>
22.	Gießen	<b>Berkshire, Bucks and Oxfordshire</b>
23.	Suisse Orientale	Salzburg
24.	Région Lémanique	Southern and Eastern
25.	<b>Stockholm</b>	Groningen

bold: Regions scoring among the Top 25 on both rankings

non-bold: Regions scoring among the Top 25 only in one of the rankings

There are tendencies identifiable, why some regions score the Top 25 only in one of the two rankings. The RCE ranking seems to be in favour of prosperous urbanised, but not so densely populated areas in the centre of Europe, therefore showing a good performance on environment and/or accessibility and/or spatial structure, which represents also very unique qualities of regions. Some agglomerations obviously get off worse when applying a wider focus like the RCE is doing, since they have really serious problems in fields like environment, hazards or demography.

When turning to the Bottom 25 (Table 12) the picture drawn by the RCE gets really surprising and interesting. The possible expectations for several regions from the new member states to be part of the Bottom 25. This is true for eleven of them, mainly located in Bulgaria (4) and Romania (5) with a Romanian region taking rank no. 280. But the remaining 14 regions are located in the former EU 15. Seven Greek regions are part of the Bottom 25, four of them belong even to the Bottom 10 group of RCE, but none them to the Bottom 25 of GDP. More Bottom 25 regions are located in Spain (4) and in Portugal (2).

Looking on the single thematic results of the Bottom 25 one can observe mainly a rather poor combined performance on the indices for economy, labour market, accessibility and spatial structure whereas some (!) of the regions might get slightly better off and reaching an average level regarding demography, environment or hazards.

Compared to the Top 25 the parallels between RCE and GDP ranking are even more declining. Regarding GDP only regions from the new member states can be found among the Bottom 25, most of them to be found in Poland, Romania and Bulgaria. That is a quite different result as the one for the RCE described above. When applying the wider RCE perspective, some Greek, Spanish and Portuguese regions have to be judged to be on the same level as the most underperforming regions in Eastern Europe.

A conclusion might be that these regions of former EU 15 indeed made some progress during the last decade regarding pure economic strength, last but not least with the help of the EU cohesion policy. But the situation in other fields and also on other economic indicators is still looking alarming. When looking into the single thematic results it becomes obvious that virtually all of them are getting bad scores for demography, labour market, accessibility, spatial structure and even on our multidimensional economic index. Taking into account that a positive impulse for the regions in Eastern Europe of the new members or candidates might be initiated by the EU, the underperforming regions in Southern Europe may fall behind even more in the near future. This might be an important result of the RCE with high policy relevance, since it emphasises a need for new concepts and a wider perspective of cohesion policy.

**Table 12 Bottom 25 of European Regions – ranking after RCE and GDP**

Rank	Overall ranking	Reporting: Ranking after GDP (PPS) per inhabitant
<b>Bottom 25</b>		
256.	Centro (PT)	Yugozapaden
257.	La Rioja	Malopolskie
258.	Mellersta Norrland	Kujawsko-Pomorskie
259.	Extremadura	Bucuresti
260.	Aragón	Észak-Magyarország
261.	Voreio Ai gaio	Opolskie
262.	<b>Nord-Est</b>	Észak-Alföld
263.	<b>Vest</b>	Swietokrzyskie
264.	<b>Sud-Vest</b>	<b>Latvija</b>
265.	Ionia Nisia	Warminsko-Mazurskie
266.	<b>Severoiztochen</b>	Podkarpackie
267.	<b>Latvija</b>	Podlaskie
268.	Lietuva	Lubelskie
269.	Castilla y León	<b>Vest</b>
270.	Thessalia	Yugoiztochen
271.	<b>Sud</b>	Centru
272.	<b>Sud-Est</b>	<b>Sud-Est</b>
273.	<b>Yuzhen Tsentralen</b>	<b>Severoiztochen</b>
274.	Dytiki Macedonia	<b>Severozapaden</b>
275.	Dytiki Ellada	<b>Sud-Vest</b>
276.	Alentejo	<b>Severen Tsentralen</b>
277.	Peloponnisos	Nord-Vest
278.	<b>Severozapaden</b>	<b>Yuzhen Tsentralen</b>
279.	Sterea Ellada	<b>Sud</b>
280.	<b>Severen Tsentralen</b>	<b>Nord-Est</b>

bold: Regions scoring among the Top 25 on both rankings

non-bold: Regions scoring among the Top 25 only in one of the rankings

Considering the described results and methods, it is obvious that the RCE shows a differentiated and also honest impression of European spatial development. Existing problems, even in non-economic aspects, become quite obvious and „punish“ by leading to a challenging overall performance.

Furthermore we confirm the point of view, that high economic power is not all-dominant, especially with regard to regional welfare. On the one hand economic power can not compensate for all possible weaknesses. On the other hand an acceptable level of economic wealth can not be reached with a moderate economic power. A descriptive example of the honest impression of the RCE shows the position of the Dutch region Flevoland. Taking a closer look on it, the regional identity is much better characterised by rank no. 17

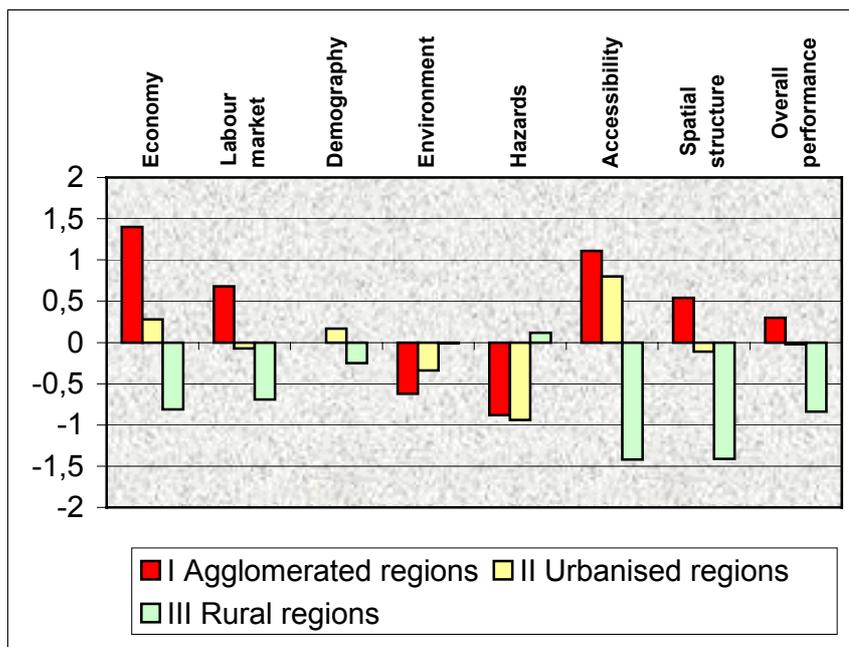
in the RCE-ranking than by the GDP-ranking (rank no. 153). But the GDP-ranking was the decisive factor for the EU regional policy to classify Flevoland as Objective-1 region.

### 7.2.6 RCE performance and its relation to settlement structure

In a final step a first attempt shall be made to shed some light on the question what is characterising the well-performing and bad-performing regions.

For this purpose the RCE results are brought together with a typology of settlement structures recently developed by the Federal Office for Building and Regional Planning (BBR) for the NUTS 2 regions of EU 27+2. In its simplest form this typology, based on regional population density and the existence of a big regional centre, is differentiating between three types of settlement structures on NUTS 2 level: 72 agglomerated regions, 94 urbanised regions and 110 rural regions.

**Figure 55 Average Performance of different types of settlement structure**



Source: ESPON Project 3.1

Figure 55 is summarizing the average performance depending on settlement structure for the overall RCE, as well as for the seven thematic fields. It is quite surprising what a clear picture is emerging.

On all thematic fields except for demography, environment and hazards a stable pattern can be identified. The agglomerations are always showing the best average performance, while the rural areas are forming the lower end and the urbanised regions are ranging somewhere in the middle between

those extrema. Except for accessibility there is always a remarkable clear difference between agglomerated and urbanised regions.

Turning to demography urbanised regions are showing the best performance. Reasons for this may be found in phenomena like suburbanisation, rural-urban migration or migration of young families out of agglomerated regions. But concerning demography all in all, the differences between the three types are rather small.

With regard to hazards and environment rural areas are taking the lead, what is not really surprising. While urbanised regions can exceed the agglomeration regarding environment, they are even more endangered by hazards on average.

These single thematic results finally sum up to a best overall performance for agglomerated regions, followed by urbanised regions with the rural regions quite a way behind. This clear divide between agglomerations and urbanised regions on the one hand and rural regions on the other hand may be surprising insofar as the RCE integrated thematic fields clearly in favour of the last-mentioned. Nevertheless these are not able to compensate obvious weaknesses to be observed on fields like economy, accessibility and spatial structure.

This interpretation has been relying so far solely on one parameter – the mean. More details including information about standard deviation, minima and maxima can be found in the “Annex – regional Classification of Europe”. On basis of this information it becomes clear that settlement structure is explaining a remarkable share of the differences regarding the RCE performance. But there is still a lot of variation left within the groups which cannot be explained by looking at settlement structure.

For example the best performing region Luxembourg is not an agglomeration in the classical sense (the BBR typology). It is somehow atypical, belonging to the urbanised regions, being of course not a densely populated metropolitan area, but holds some institutions of EU-wide influence and is therefore an important capital region.

Furthermore the best performing rural region Suisse Orientale is even reaching the Top 25, whereas the worst performing agglomerated region Sicilia can be found on rank 248 and is therefore almost part of the Bottom 25.

Thus the RCE ranking shows, that the status “agglomeration” alone, does not necessarily lead to a top performance, nor is the label “underperformer” equal to the “rural”.

### **7.2.7 Summary and some conclusions**

At the end some concluding remarks shall be made, trying to summarise the most important findings of the RCE process and their policy relevance as well as drawing some conclusions regarding methodological aspects and future research.

#### **... on main findings and their policy relevance**

When looking back on the RCE results and the ESPON-ranking three aspects have to be highlighted.

Although some new spatial patterns like hazards or demography have been added for the first time, the broad spatial pattern, especially for the all time high scoring regions, has not changed dramatically. Good and outperforming regions are located in the Centre of Europe except from some peripheral capital regions. This can be seen ambivalently. On the one hand it could be seen as an expected finding; on the other hand this underlines the seriousness of this method, because no real dramatic changes should occur at the upper end.

Nevertheless compared with traditional spatial analyses there is an obvious shift in favour of regions with good, but not excellent economic performance, compensated by excellent performance on other fields. Contradictory to that, some agglomerations would not find themselves in the position they have been used to, since they have serious disadvantages regarding environmental or demographical aspects or may be seriously threatened by different kinds of hazards.

The results at the bottom of the RCE and the ESPON ranking have been really surprising. On the one hand, a close look at the underperforming regions revealed a high share of regions located in the southern parts of the former EU 15. Some might have been able to catch up during the last decade regarding GDP per capita, but their overall situation is challenging. On the other hand, regions scattered over most of the new member states with a solid basis for future development can be found. Some of them already reach or even exceed the EU 27+2 average.

Which conclusion can be drawn for regional and spatial policy based on these main findings? EU regional policy obviously had positive effects on hard economic factors such as GDP and helped to initiate a process of catching up. But when widening the perspective, regional policy does not automatically lead to substantial improvements in the broad spectrum of dimensions of regional development as investigated in the ESPON context.

So it can be doubted if a regional policy with a strong focus on economic factors - regarding analysis as well as instruments - and only limited influence on other policies, will really be able to close these gaps. An

incomplete identification of regions as well as a not fully suitable mixture of means could be the consequence.

The ESPON 3.1 RCE findings could be a good starting point for a widely focussed spatial development policy, as a complement to traditional regional policy. Such a new policy should take a strong coordinating role and combines the sectoral policies, without losing the spatial goals, put forward by the ESDP, as a guideline.

Findings such as that settlement structure does indeed matter regarding regional performance, could be a first hint, that such a paradigm shift could have success.<sup>1</sup>

### **... on methodology**

In general the importance of spatial development and spatial planning is demonstrated, but in some member states both are observed with scepticism, especially by politics. The ability to bring spatial topics together and to get an extensive impression of potentials and challenges of regions does serve in the range of politics as a reliable base for decisions.

Although the RCE describes a pragmatic and simple statistical approach, it offers, in the opinion of ESPON 3.1, a new and enriching perspective, drawing a much broader picture of spatial development in the EU 27+2 than it would be possible with other more narrow-focussed approaches.

Certainly there are disadvantages with the aggregation of information, but these are expectedly based on the methodology, as mentioned in the respective parts. But in our opinion the advantages do compensate the disadvantages by far.

Problems do exist in terms of data availability, which appear with every enlargement of the EU. The data set for the cross-sectoral RCE does not exceed the SPESP data set developed for the EU 15.

This situation required the time-consuming development of a data set, therefore methodological developments fell behind.

A further meaningful methodological development would be a stronger consideration of the ESPON core concepts for polycentrism, urban-rural relations and accessibility. Last but not least out of data availability reasons they are accounted for just under restrictions. They are integral part of the RCE ranking, but there does not exist any explicit analysis if and how they are influencing sectoral and cross-sectoral spatial developments. This leads us to the final topic.

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<sup>1</sup> Although it has to be emphasised that it is definitely not a wanted perspective to turn the whole of Europe into agglomerated or urbanised areas.

### **... on further research**

The RCE has been a first important step to utilize a unique database established for the regions of EU 27+2. But this database as well as the RCE is offering many more options for future research.

Interesting questions for further in-depth analysis could be:

- What kind of interrelations exist between the different topics? Are there complementarities, conflicts or even causal relations?
- A more differentiated analysis on the influence of settlement structure: i.e. what characterises excellent performing rural areas or poor performing agglomerated regions, what other factors might be decisive?
- Evaluation by perspective (status quo, development, potential) respectively a more tightly focussed analysis using the same or even more indicators. These should include time series and panel data assuring that the efficiency of the spatial measures taken can be identified reasonably.
- Using multivariate approaches, for example clustering regions due to their performance on the thematic fields. This indeed could help to understand how the different spatial themes are interrelated. Such an understanding could help to eliminate contradictory sectoral effects of means or even more, could help to identify the optimal specific mix of sectoral efforts.
- Other fields for further research as an in-depth analysis of the influence of the ESPON core typologies have already been mentioned under the methodological conclusions.

### 7.3 National and transnational breakdown of ESPON results

(by Volker Schmidt-Seiwert, Ingo Heidbrink, BBR)

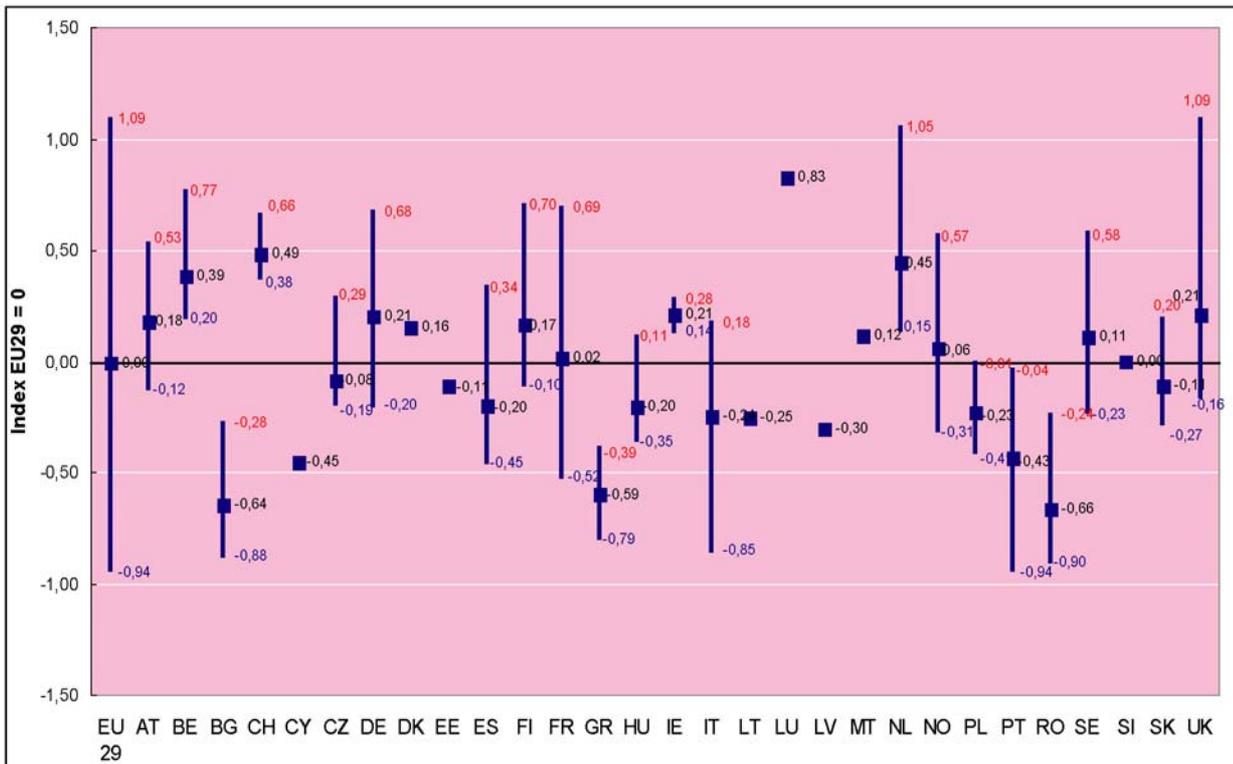
#### 7.3.1 National and transnational breakdown of ESPON results

The indicators developed in the RCE, improving and complementing the TPG indicators of the ESPON data base are also suitable for a further investigations of the spatial pattern and situation. Within the ESPON projects a wide range of thematic typologies have been developed. These typologies base on special thematic analysis to distinguish between different groups of the topic related characteristics.

##### 7.3.1.1 European regions by comparison by thematic fields by RCE

The following charts show for each country the regional disparities in the thematic fields as the range between minimum (red) and maximum (blue). The national average values are indicated by the black square. The regional distribution is based on NUTS 2 – values.

##### Overall thematic field



Considering the regional disparities based on an overall picture, which result from an additive linkage of the seven z-transformed thematic indicators, the differences between the EU15 countries and the 10 new Member States are obvious, but a general distinction is not so clearly to detect. Bulgaria and

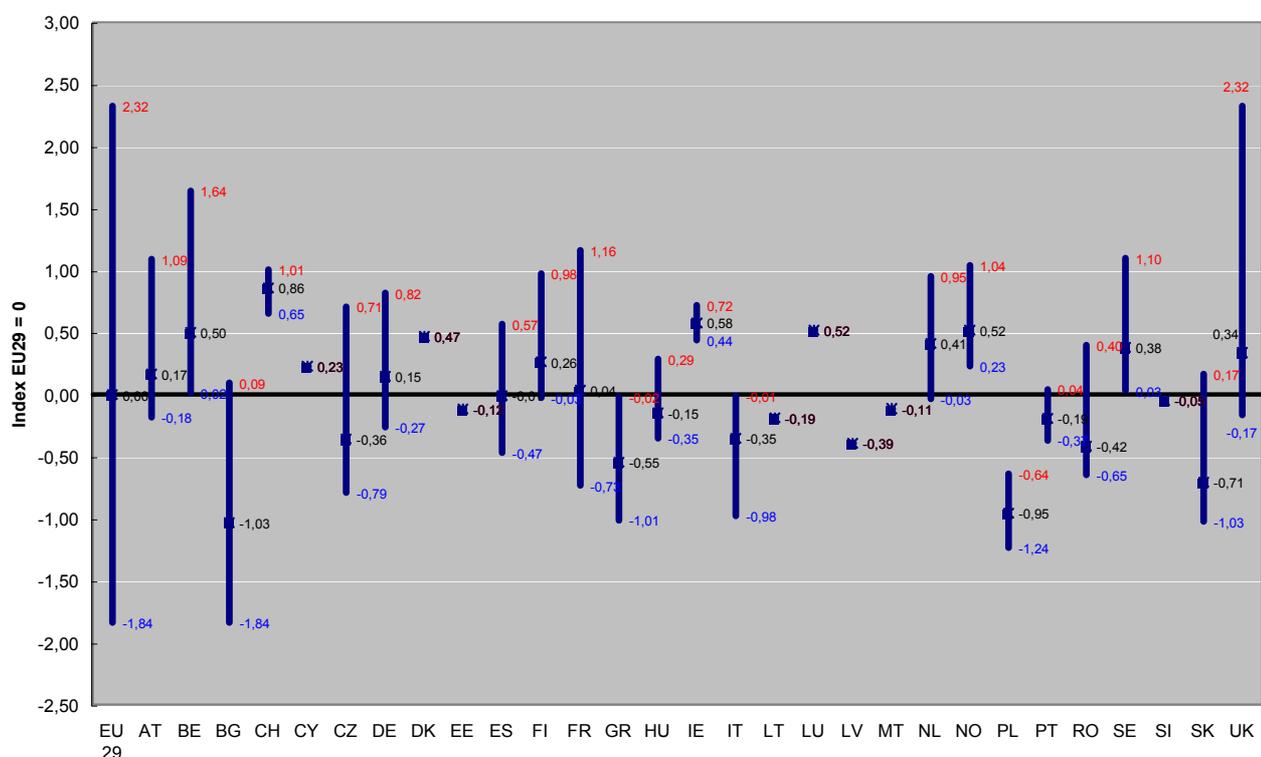


regional disparities are great in these countries. Weak performing in the old Member States are Greece and Portugal whit regions which spread almost complete below the average.

From the new Member States, the characteristic and spreading of the Czech regions is the best and with a slightly lower national average comparable with Spain.

In Poland, the regional variation is quite small, the performance in comparison weak. Romania has the lowest regional value and great disparities on a low in total level.

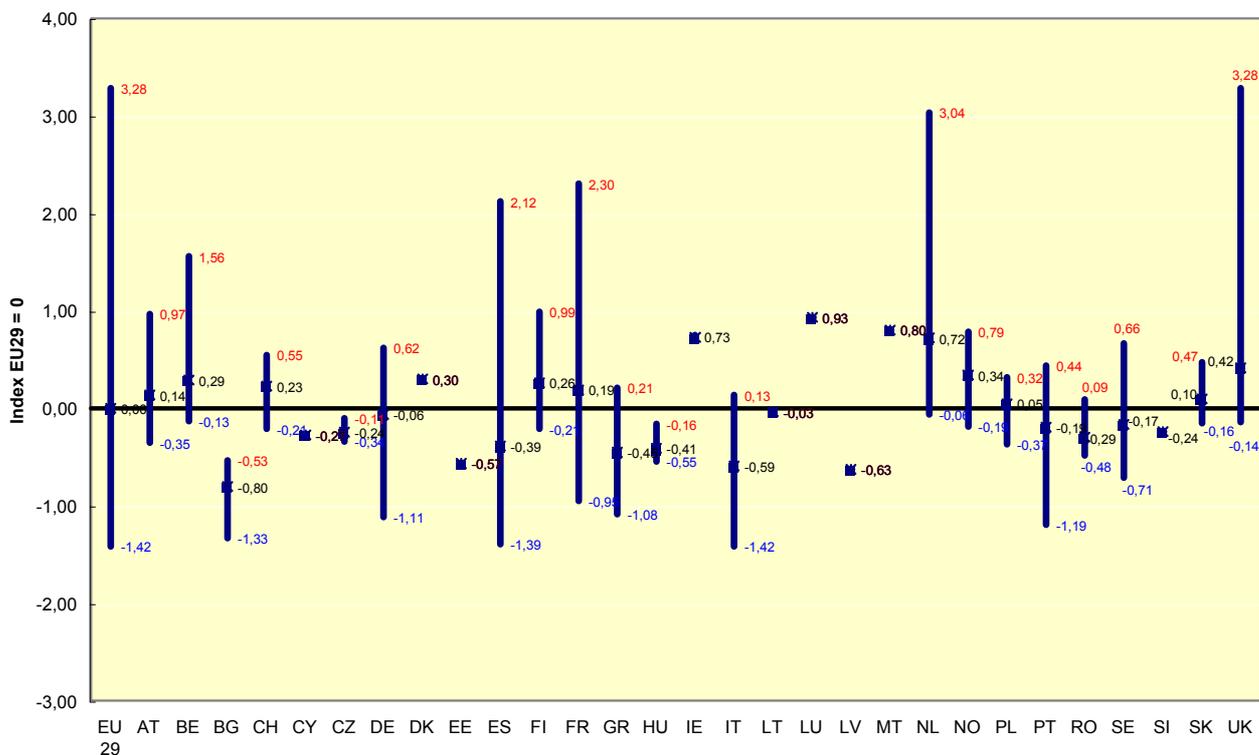
## Labour market



In field of labour market only Switzerland and Ireland and the one region states of Luxembourg and Cyprus perform in general above EU25+2+2 average. In the EU 15 besides a few regions almost all with values above average. The United Kingdom shows the highest regional variation and the highest value on labour market index at the same time.

Of special interest within the new Member States is the Czech Republic, which not only perform best compared to the other acceded countries, but also better than e.g. Greece.

## Demography

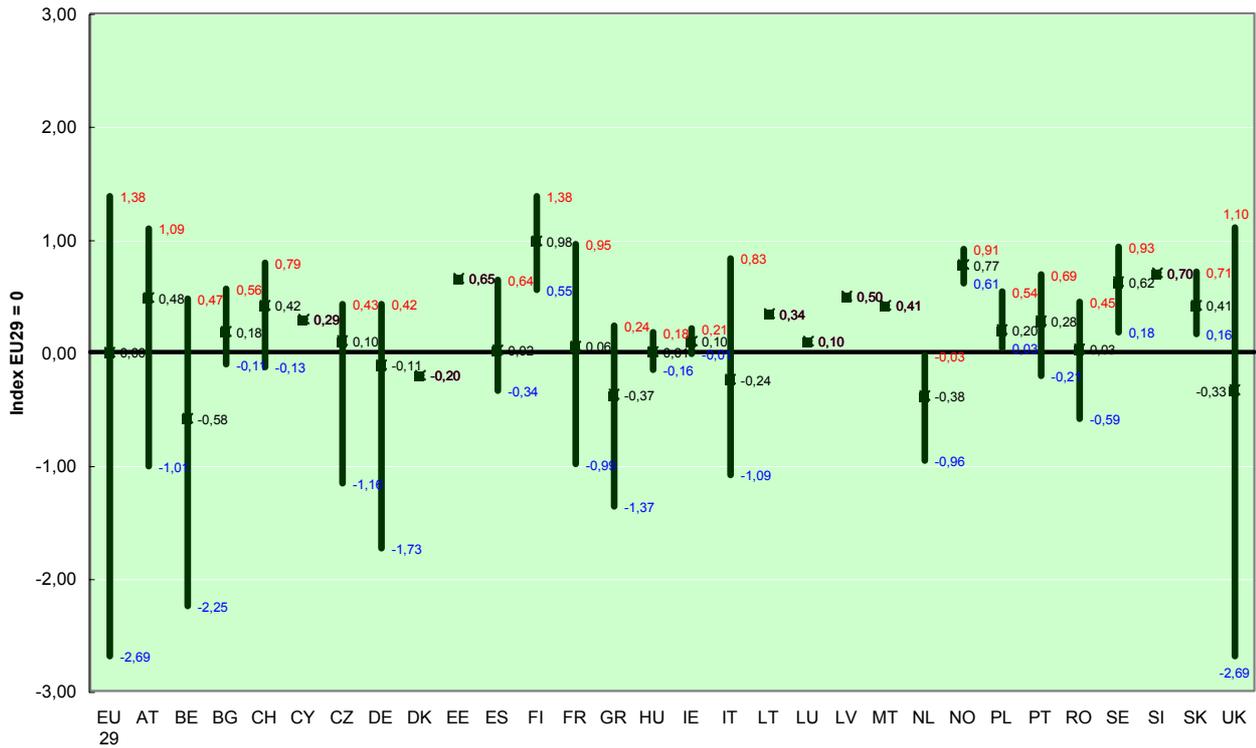


In the field of demography the United Kingdom, the Netherlands, France and Spain have very high values above the average, but at the same time with the highest regional variations. A second group of countries within the EU 15 is built by Germany, Italy and Portugal with regional variations under average, the first two known as 'old' countries of the old European Union.

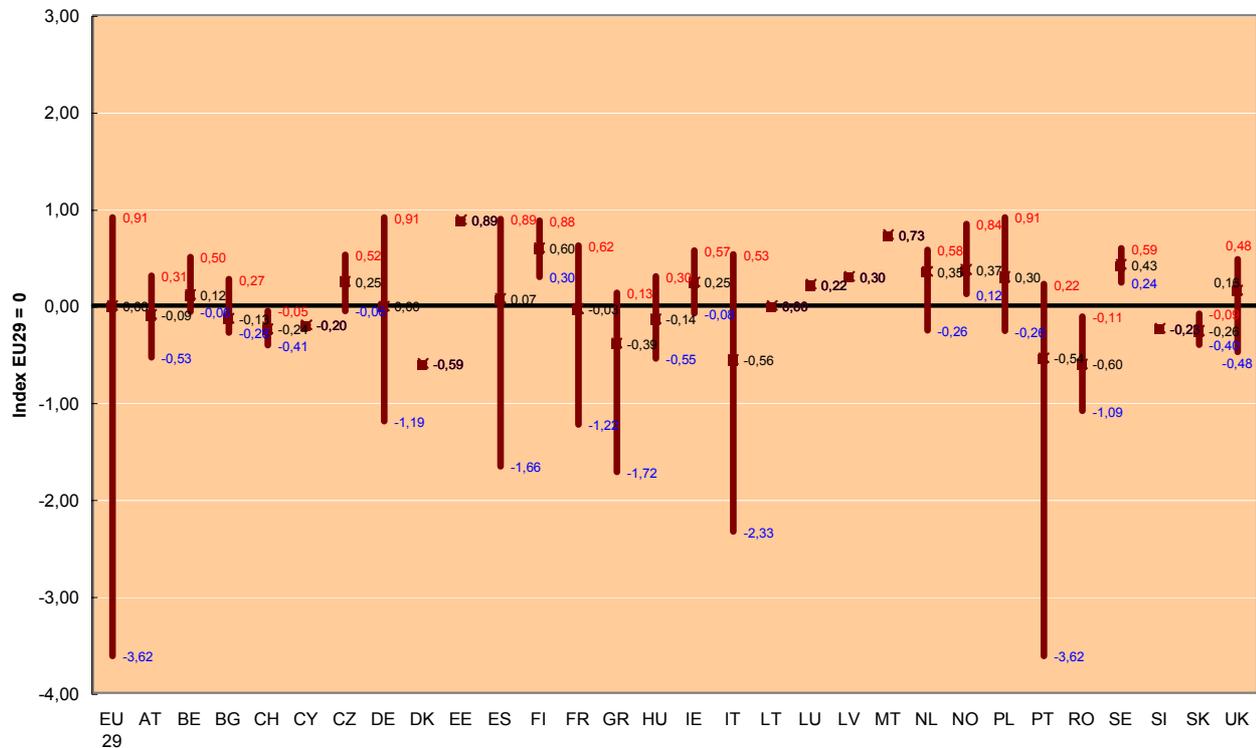
Remarkable little regional differences have the Czech Republic and Hungary but also the other new Member States and Romania with almost all regional values in the range below average.

## Environment

In field of environment the national average values are mostly all situated above average or near the EU25+2+2 average, but the regional differences reach far below. The lowest regional values can be found in United Kingdom, Belgium and Germany. Remarkable are the regional differences in the United Kingdom which cover nearly the whole EU25+2+2 range. The Northern countries, especially Finland have compared to the average high values with little regional differences, and so do almost all of the new Member States, with the exception of the Czech Republic.

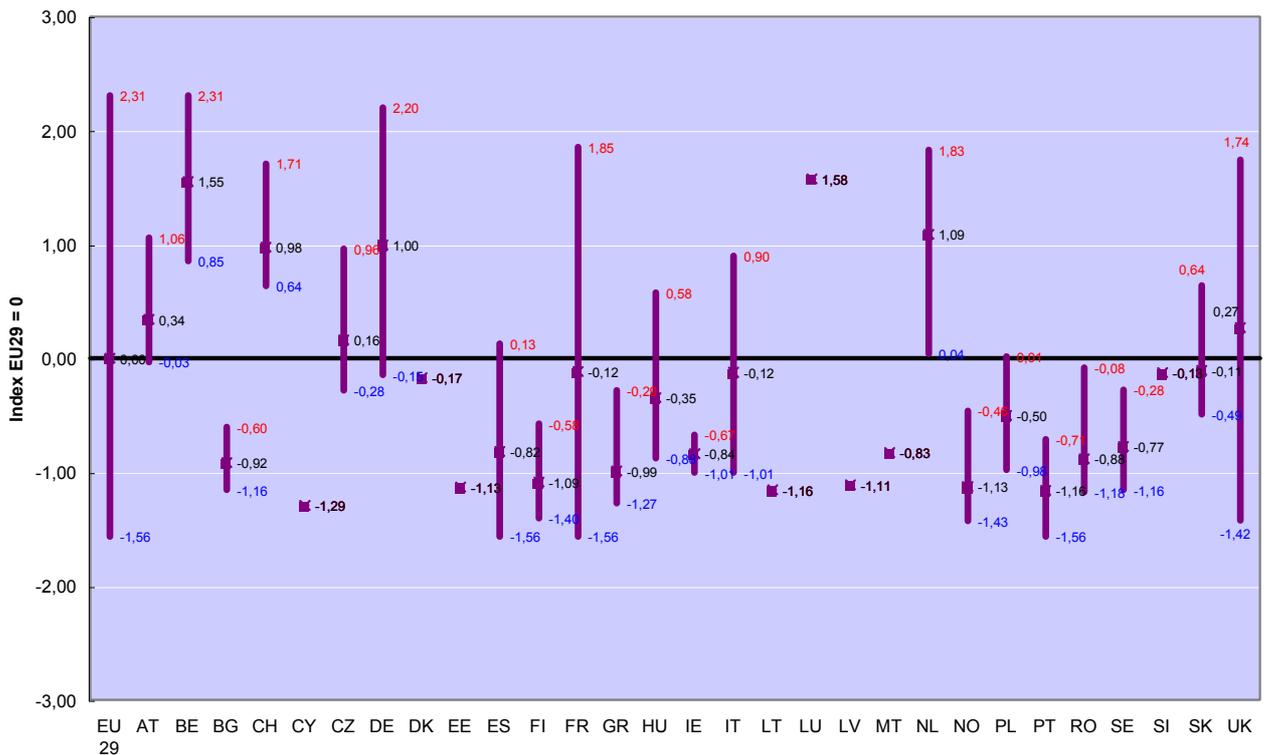


## Hazards



In some of the countries the regional differences are quite great like in Portugal, Italy, Greece, Spain and Germany. The Northern countries are more or less in total situated above average.

## Accessibility



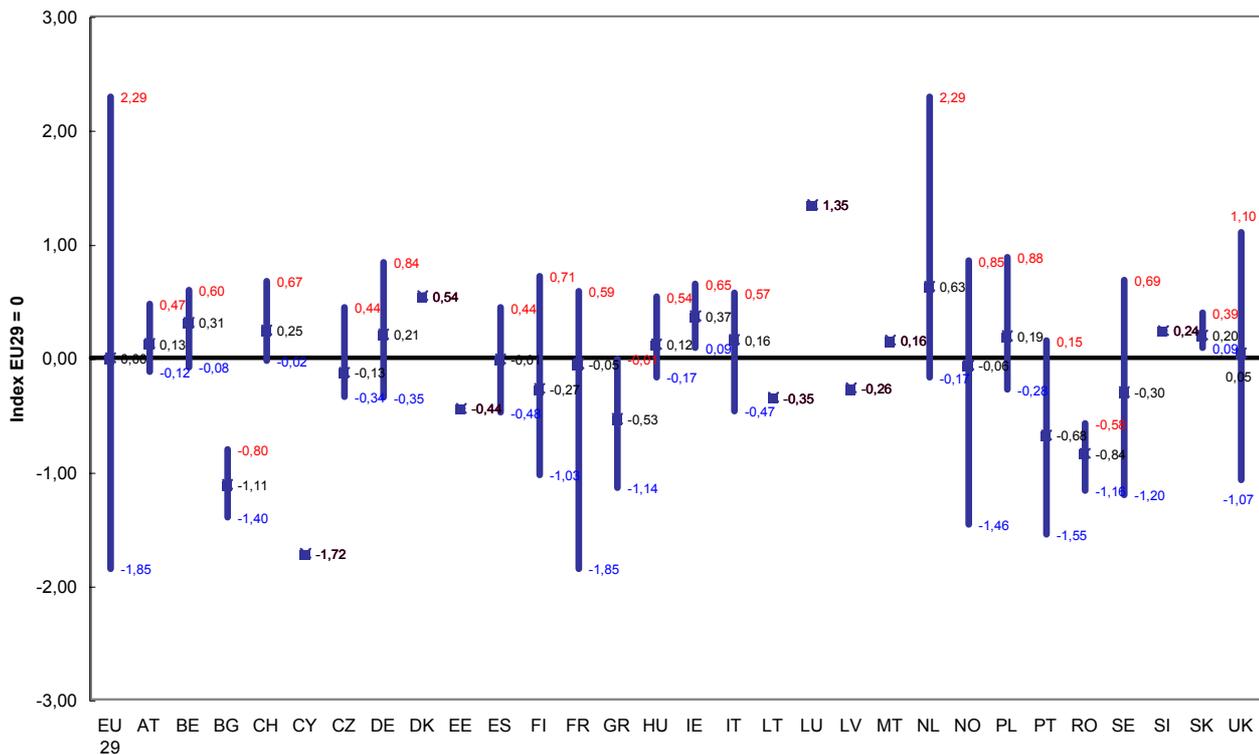
In accessibility the variation within the regions in EU25+2+2 area is very high. Particularly in the United Kingdom, in France and in Germany. Within the last nearly almost above average, whereas in the other two the differences reaches far below average.

'Accessibility countries' in total are Austria, Belgium and the Netherlands, followed by Germany and the Czech Republic.

## Spatial structure

In the field of spatial structure the Netherlands has the highest national average but belongs also to those countries with the greatest internal regional differences. So have Norway, France, Norway, Portugal, Great Britain and Finland. But these countries with national averages below the EU 25+2+2 value and tending to below average regional performance.

Little or less internal differences with above average national and almost overall regional values have Austria, Belgium, Switzerland and Germany, Ireland and Slovakia as representative of the new Member States.



### 7.3.1.2 The regional situation

In order to characterise the specific regional situation according the seven thematic categories, a simple methods, identifying in how many of the fields a region is situated above, about or below the EU25+2+2 average of the 280 NUTS 2. By this, in a integrated pictures of the regions will be possible, paying attention to the fact, that no single thematic field could be interpreted by itself but only in the combination of all fields influencing and determinating each other. The combination of fields and the amount of thematic problems or opportunities does outline the regional situation.

To do this, the z-transformed scores of the seven thematic categories which were developed by the RCE-analysis, were classified for each of - regions as follows:

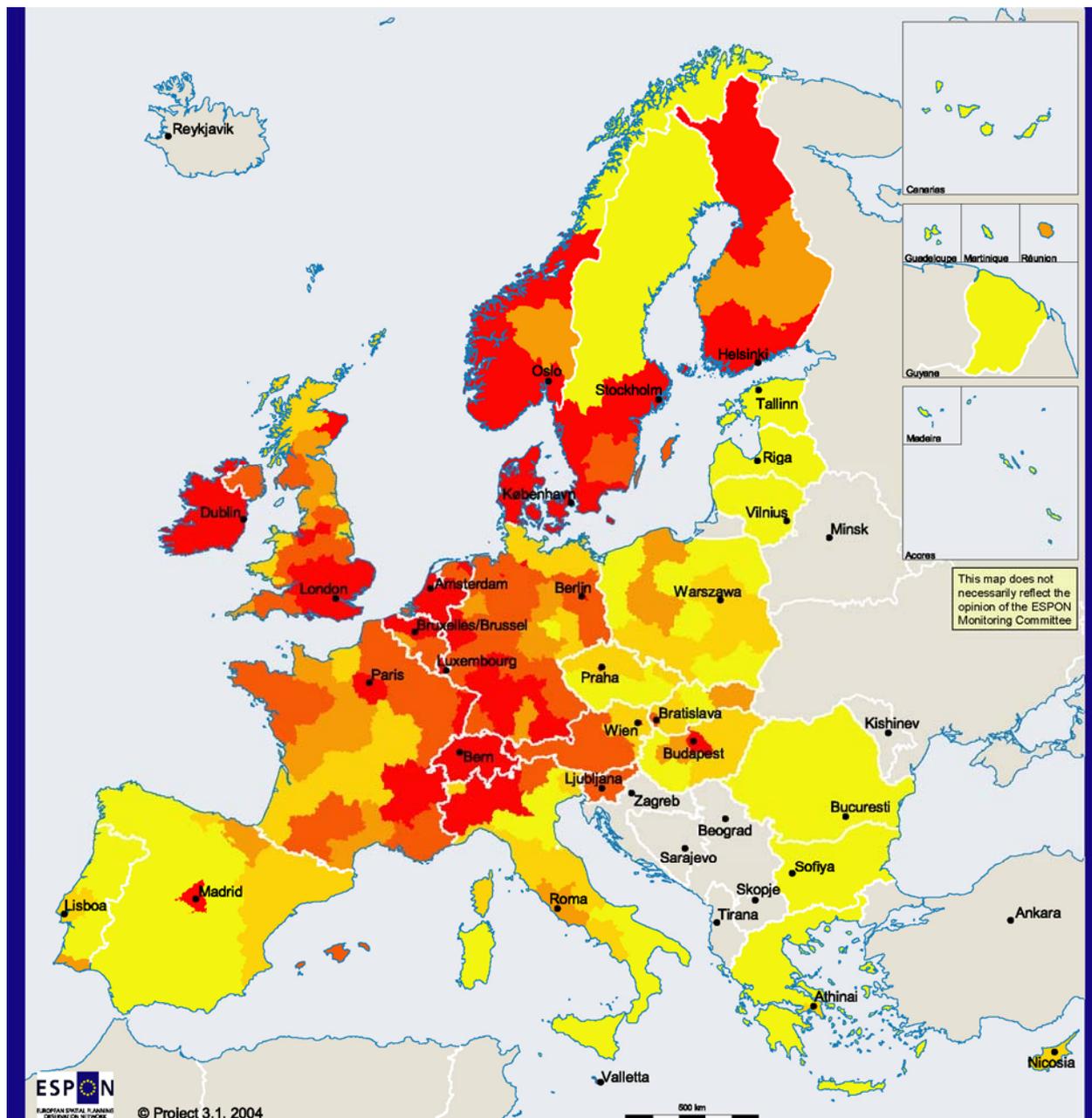
- $> \frac{1}{2}$  standard deviation = above average
- $\pm \frac{1}{2}$  standard deviation = average
- $< \frac{1}{2}$  standard deviation = below average

The sum of cases a region is evaluated as above average, around and below average determines the classification of the region into the five classes:

- 1: above average - the region is in the majority of the fields above average
- 2: average with tendency to above average - the region is in the majority of the fields average, in the remaining mostly above average
- 3: average - the region is in the majority of the fields average
- 4: average with tendency to below average - the region is in the majority of the fields average, in the remaining mostly below average
- 5: below average - the region is in the majority of the fields below average

The above average regions are easily to identify in their core areas as regions of the Global cities, the European engines and the strong MEGAS of the FUA typology of the project 1.1.1. The average regions with positive tendencies are either presented by the potential MEGA regions or could be interpreted as growth axis between the strong regions connecting the strong centres of highest importance including the main economic centres of the Pentagon as well as the emerging centres in the New Member States like Bratislava or Budapest.

**Map 19 Regional situation**



This map does not necessarily reflect the opinion of the ESPON Monitoring Committee



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**Overall classification**

- Above average
- Average, tendency to above average
- Average
- Average, tendency to below average
- Below average

© EuroGeographics Association for the administrative boundaries

Regional level: NUTS 2

Origin of data: Eurostat, National Statistical Offices, Project 3.1

Source: ESPON Database

### 7.3.1.3 National Breakdown of ESPON result -Country sheets

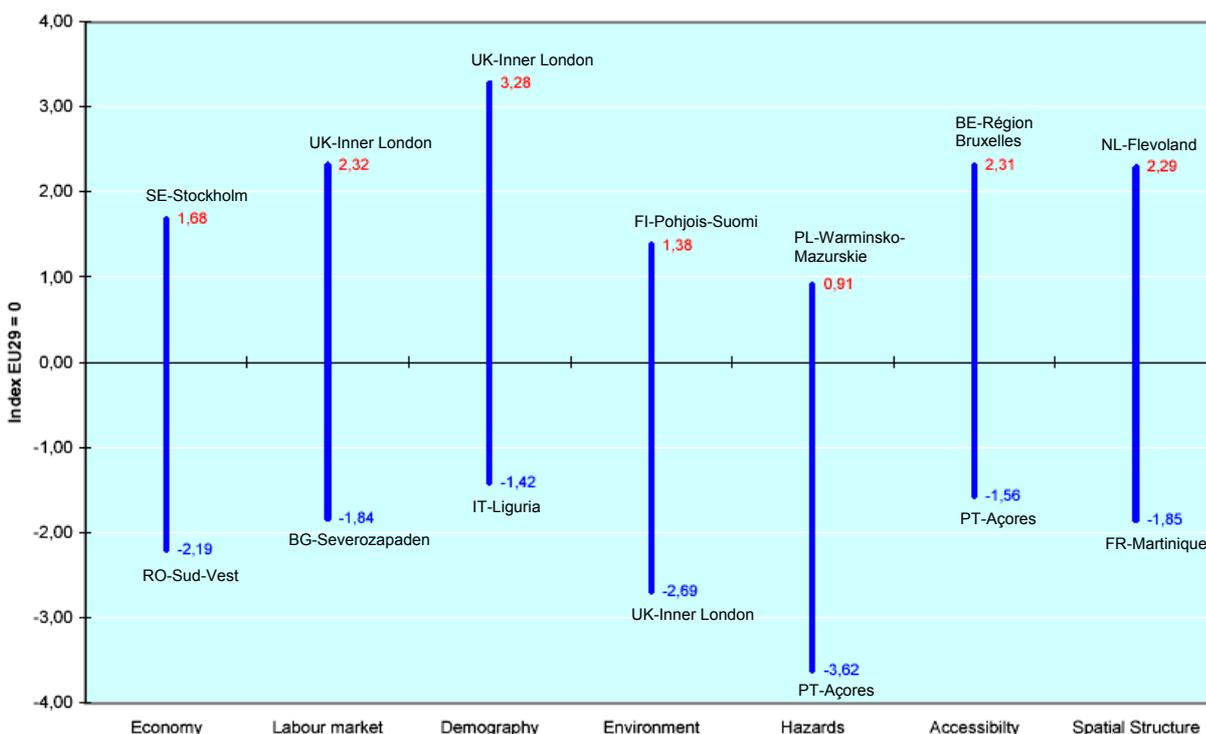
**Table 13 EU 25+2+2: Basic indicators**

Category	Indicator	absolute	min	max
	Area in km <sup>2</sup>	4.696.315	31	154.312
<b>Economy</b>	GDP in PPS per capita, 2000	19.111	4.175	54.151
	Research & Development expenditure, share of GDP (%), 2000	1,8	0,1	6,1
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	4,3 <sup>1</sup>	0,0	21,4
<b>Labour market</b>	Unemployment rate (second quarter), 2001	8,6	1,2	33,3
	Change of unemployment rate in pp, 1998-2001	-1,0	1,8	36,3
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	77,3 <sup>1</sup>	11,2	267,3
	Research & Development personnel (total) per 1000 active persons, 2002	8,0 <sup>1</sup>	0,0	28,0
	Population with high educational level, share of population total education (%), 2002	20,7	5,0	45,8
<b>Demography</b>	Population in 1000, 2000	495.571	26	10.979
	Population density, 2000	105	53	3.869
	Population development in %, 1995-2000	0,9	-6,6	20,9
	Population over 65 years, share of total population (%), 2000	15,6	1,4	24,7
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	2,1 <sup>1</sup>	1,3	6,4
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,2 <sup>1</sup>	0,0	3,9
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	100	37	177
<b>Spatial structure</b>	FUA-Population, share of total population (%)	63,5	0,0	157,7

<sup>1</sup> Arithmetic mean from NUTS2-values

- In the fields of hazard and demography are the highest regional variations in the EU25+2+2 area. The disparities in economy and accessibility are compared to this less strong.
- Highest values in economy have the strong regions Stockholm, Inner London, Oberbayern (Munich) and Brussels, while the twenty lowest values are regions from Romania (7x), Poland (5x), Greece (7x) and Portugal (1x). Six of the ten strongest regions in economy belong also to the Top-10 in labour market. The ten regions with the lowest values in this field are Bulgarian regions (3x) and Polish regions (7x).
- In regard to the field of demography are the four of the ten regions with lowest values from Spain (4x). The ten regions with the highest values in this field are from the United Kingdom (3x), France (2x), the Netherlands, Belgium, Finland, Austria (each 1x).
- In the field of environment are four of the ten regions with highest values from Finland and three from Austria, while London and Brussels have the lowest values in this field.
- In the field of hazards are four of the ten regions with lowest values from Italy. In accessibility and spatial structure the remote areas and the north Norwegian regions have lowest values, while the best regions in accessibility are Belgium and German regions. Regions with highest values in spatial structure are mostly from the Netherlands, Luxembourg and the United Kingdom.

**Figure 56 EU25+2+2: Regional spread of RCE-indices by thematic field**



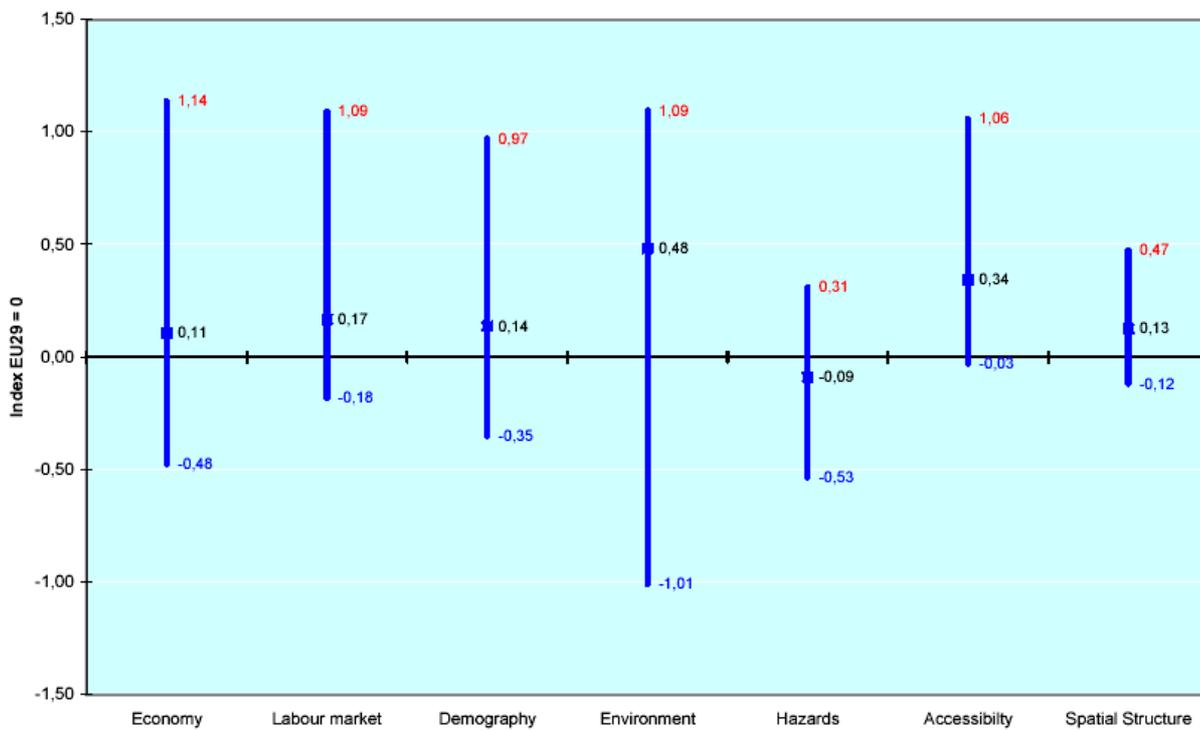
**Table 14 Austria: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	83.859	415	19.173
<b>Economy</b>	GDP in PPS per capita, 2000	25.442	16.205	34.412
	Research & Development expenditure, share of GDP (%), 2000	1,7	0,2	3,0
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	5,2	0,6	10,3
<b>Labour market</b>	Unemployment rate (second quarter), 2001	3,4	2,1	4,9
	Change of unemployment rate in pp, 1998-2001	-1,2	-1,7	-0,8
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	30,1	22,2	38,9
	Research & Development personnel (total) per 1000 active persons, 2002	8,0	0,7	17,9
	Population with high educational level, share of population total education (%), 2002	17,5	13,0	21,7
<b>Demography</b>	Population in 1000, 2000	8.103	278	1.606
	Population density, 2000	96	53	3.869
	Population development in %, 1995-2000	0,8	-0,7	2,2
	Population over 65 years, share of total population (%), 2000	15,5	12,4	18,1
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,8 <sup>1</sup>	1,3	2,2
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,2 <sup>1</sup>	1,0	2,5
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	102 <sup>2</sup>	87	144
<b>Spatial structure</b>	FUA-Population, share of total population (%)	35,5 <sup>1</sup>	0,0	96,5

<sup>1</sup> Arithmetic mean from NUTS2-values

- In six of the seven thematic fields the average value of Austria lies above the EU25+2+2 average. Only in hazards the average value lies below the EU25+2+2 average.
- With regard to economy and environment it is apparent, that in these fields the spread between the regions is the widest. In economy, Vienna has the highest value of Austrian regions and thus it is under the top-15 regions of the EU25+2+2-area.
- The spatial structure and hazards have the lowest variance of the Austrian regions.

**Figure 57 Austria: Regional spread of RCE-indices by thematic fields**



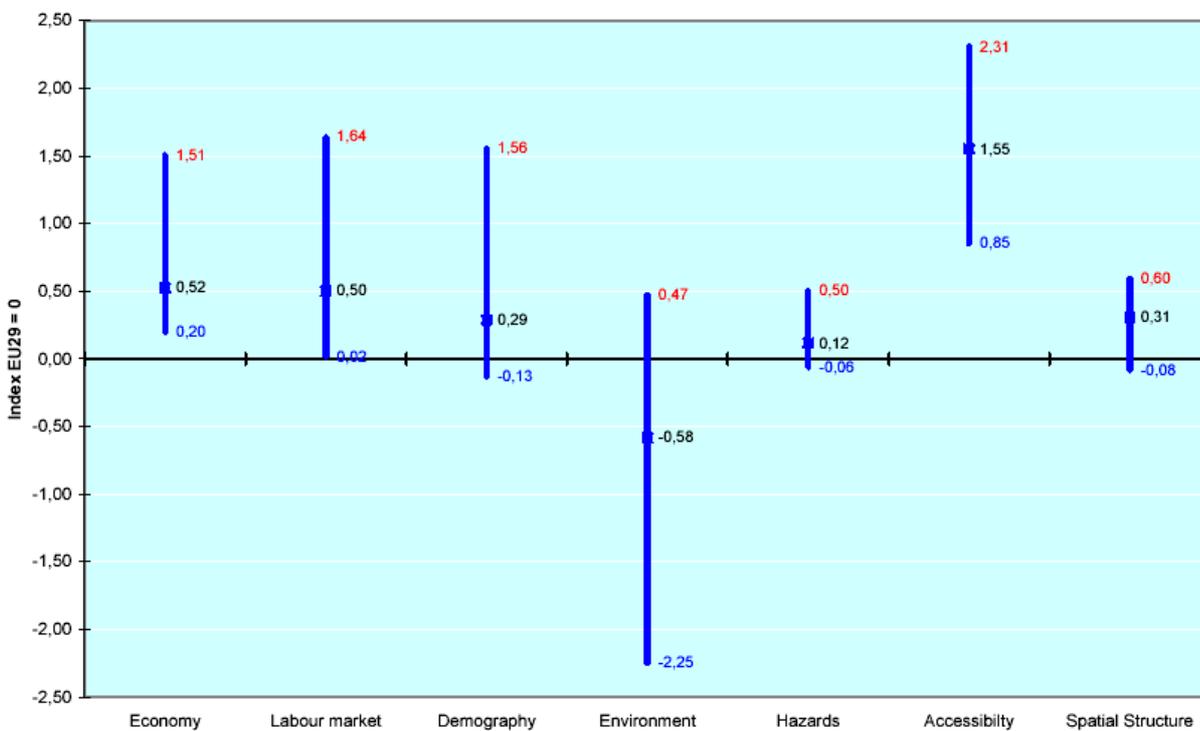
**Table 15 Belgium: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	30.518	161	4.440
<b>Economy</b>	GDP in PPS per capita, 2000	24.176	15.943	49.332
	Research & Development expenditure, share of GDP (%), 2000	2,0		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	8,1	5,9	9,2
<b>Labour market</b>	Unemployment rate (second quarter), 2001	6,6	2,6	12,8
	Change of unemployment rate in pp, 1998-2001	-2,9	-4,4	-1,6
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	60,6	26,4	111,8
	Research & Development personnel (total) per 1000 active persons, 2002	12,7	8,8	16,3
	Population with high educational level, share of population total education (%), 2002	29,4	22,1	42,6
<b>Demography</b>	Population in 1000, 2000	10.239	247	1.644
	Population density, 2000	336	56	5.944
	Population development in %, 1995-2000	1,1	-0,6	4,0
	Population over 65 years, share of total population (%), 2000	16,8	13,8	18,1
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,6 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,5 <sup>1</sup>	0,0	2,5
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	140 <sup>1</sup>	107	177
<b>Spatial structure</b>	FUA-Population, share of total population (%)	69,9	0,0	100,5

<sup>1</sup> Arithmetic mean from NUTS2-values

- Apart from the environment, Belgian regions are above the EU25+2+2 average. Regarding the environment, Bruxelles region shows the lowest value, which is the lowest of European regions in this field behind Inner London.
- At the same time, Bruxelles has the highest value of European regions in accessibility.
- Regarding the economy, labour market and demography also have clearly better values than on average.
- In hazards and spatial structure, Belgian regions have the lowest variance of the Belgium regions.

**Figure 58 Belgium: Regional spread of RCE-indices by thematic field**



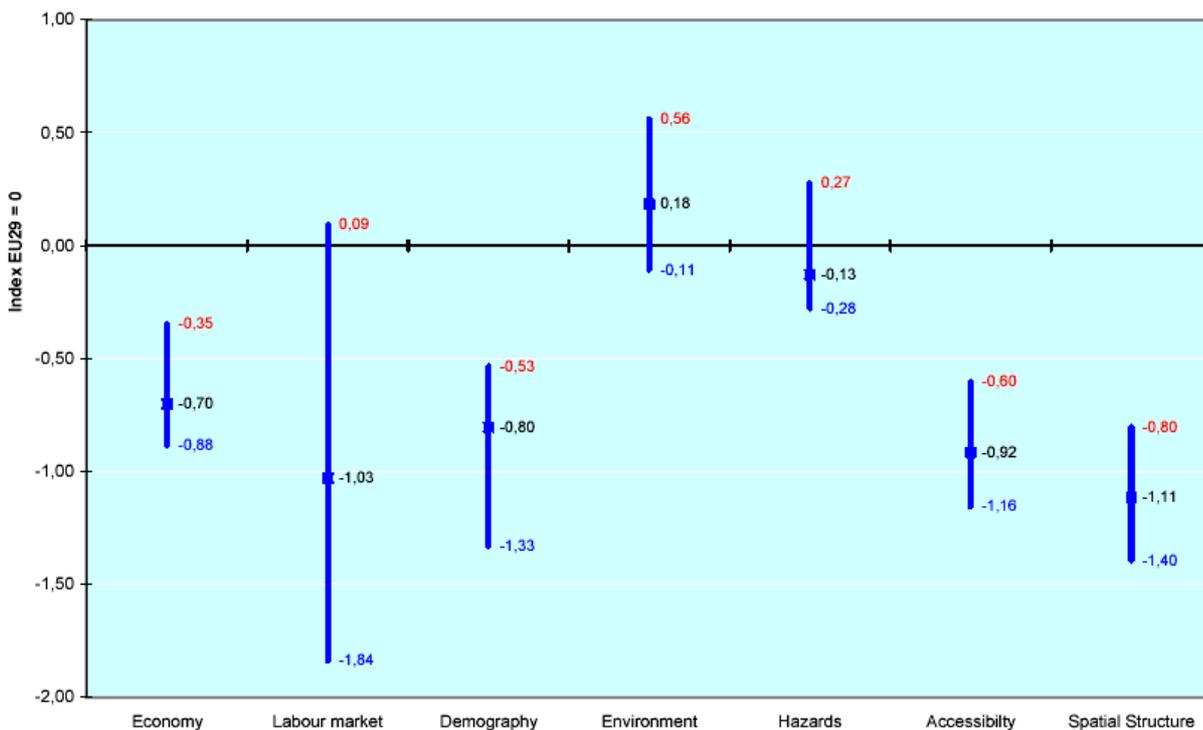
**Table 16 Bulgaria: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	110.910	10.601	27.496
<b>Economy</b>	GDP in PPS per capita, 2000	5.991	5.017	8.048
	Research & Development expenditure, share of GDP (%), 2000	0,5	0,0	1,2
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	0,6	0,1	1,4
<b>Labour market</b>	Unemployment rate (second quarter), 2001	19,9	9,7	32,8
	Change of unemployment rate in pp, 1998-2001	3,9	-2,3	9,2
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	135,5	59,0	267,3
	Research & Development personnel (total) per 1000 active persons, 2002	4,4	0,0	11,9
	Population with high educational level, share of population total education (%), 2002	21,6	16,0	30,0
<b>Demography</b>	Population in 1000, 2000	8.191	586	2.143
	Population density, 2000	74	55	106
	Population development in %, 1995-2000	-2,8	-5,8	-1,1
	Population over 65 years, share of total population (%), 2000	16,2	14,5	21,3
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,9 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	57 <sup>1</sup>	44	75
<b>Spatial structure</b>	FUA-Population, share of total population (%)	59,7	38,3	70,3

<sup>1</sup> Arithmetic mean from NUTS2-values

- Bulgarian regions are largely below the average. In particular with regard to the economy, labour market, demography, accessibility and spatial structure the Bulgarian regions are in a comparatively substandard position.
- The the Bulgarian regions show biggest differences regarding the labour market. In this field, Yugozapaden region has the highest value and is also above the EU25+2+2 average. However, the region in the ESPON area with the lowest value in this field is also situated in Bulgaria (Severozapaden).
- Severozapaden has one of the lowest values in demography in the EU25+2+2-regions.
- There are above-average regions in Bulgaria with regard to the environment and partially in hazards.

**Figure 59 Bulgaria: Regional spread of RCE-indices by thematic field**



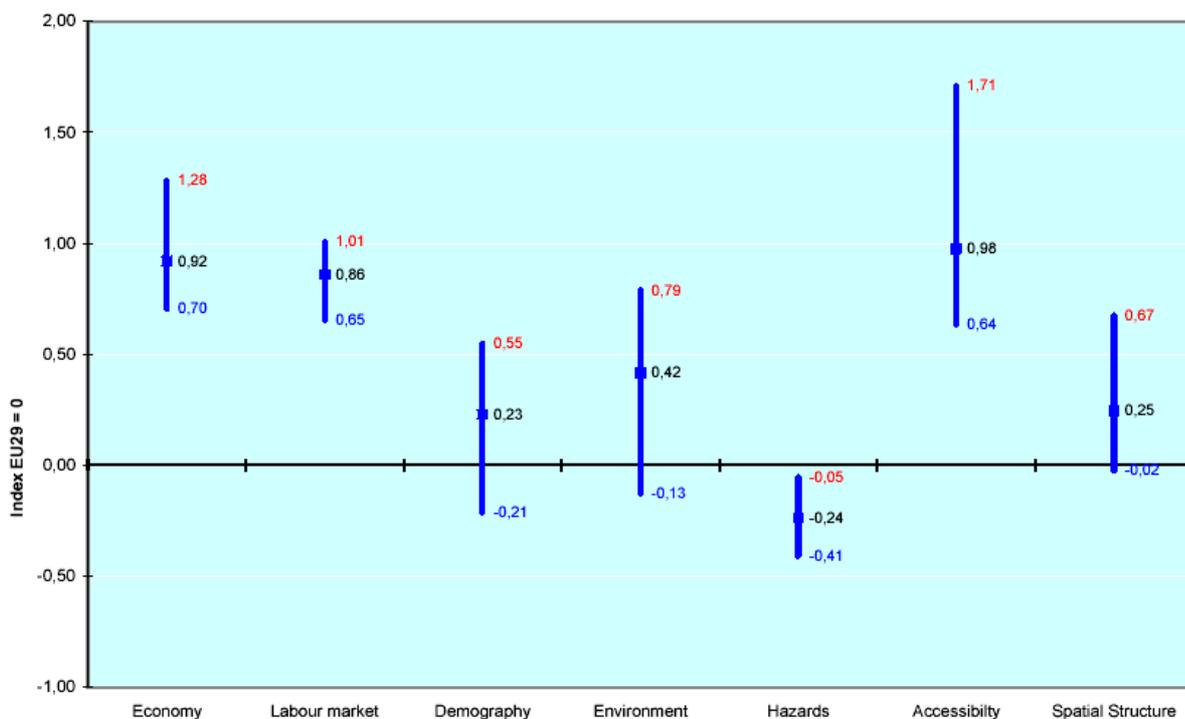
**Table 17 Switzerland: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	41.284	1.729	11.521
<b>Economy</b>	GDP in PPS per capita, 2000	26.815	21.822	34.654
	Research & Development expenditure, share of GDP (%), 2000	2,6		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	16,2	16,2	16,2
<b>Labour market</b>	Unemployment rate (second quarter), 2001	1,7	1,6	4,3
	Change of unemployment rate in pp, 1998-2001	-1,2	-2,1	-0,8
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	23,9	14,8	39,8
	Research & Development personnel (total) per 1000 active persons, 2002	23,4		
	Population with high educational level, share of population total education (%), 2002	25,7	21,0	29,4
<b>Demography</b>	Population in 1000, 2000	7.164	309	1.656
	Population density, 2000	174	90	693
	Population development in %, 1995-2000	1,5	0,8	2,7
	Population over 65 years, share of total population (%), 2000	15,3	13,6	17,3
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	2,2 <sup>1</sup>	1,9	2,5
<b>Hazards</b>	Regional average number of flood events, 1987-2002	2,2 <sup>1</sup>	1,6	3,0
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	125 <sup>1</sup>	108	164
<b>Spatial structure</b>	FUA-Population, share of total population (%)	64,6 <sup>1</sup>	44,8	92,0

<sup>1</sup> Arithmetic mean from NUTS2-values

- The comparison of Swiss regions within European regions shows a distinctive above-average position. High values are achieved in the fields of accessibility, economy and labour market.
- Zurich is the Swiss region with the highest values regarding the economy, labour market, accessibility and spatial structure. Regarding the economy, Zürich counts among the top-10 of European regions.
- In the fields of accessibility and environment the highest regional variation can be found. Low regional variations exist in labour market and hazards.
- Only in hazards are the Swiss regions below EU25+2+2 average.

**Figure 60 Switzerland: Regional spread of RCE-indices by thematic field**



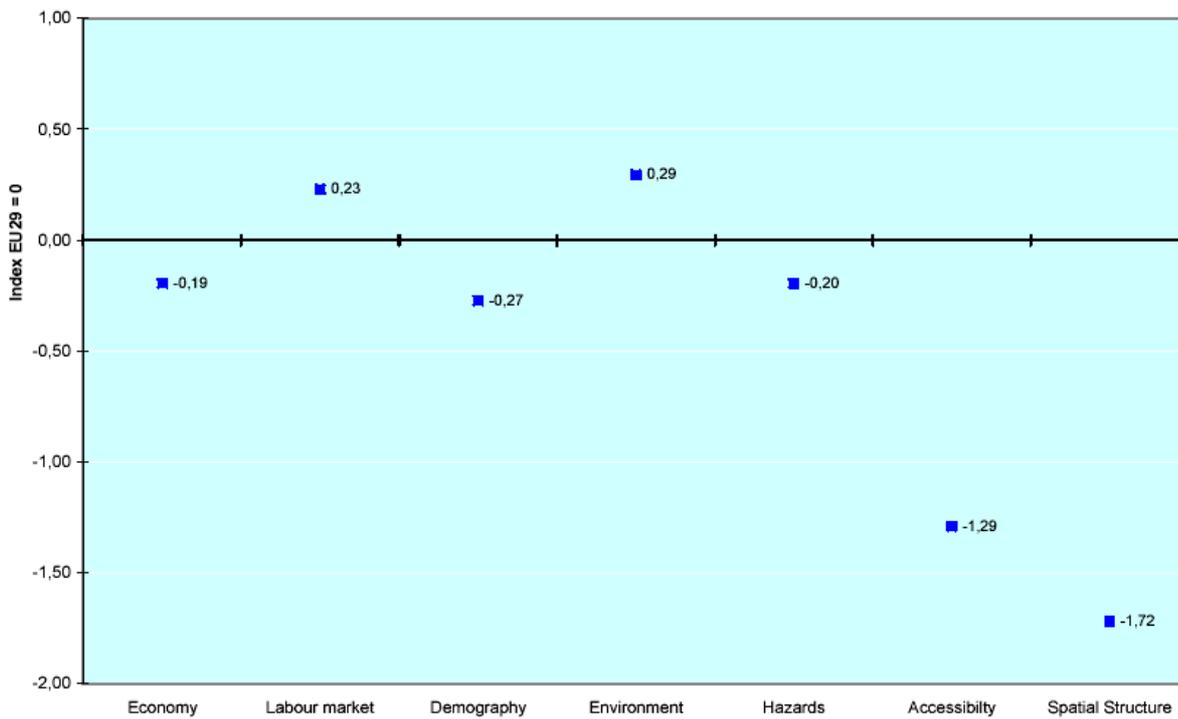
**Table 18 Cyprus: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	9.251		
<b>Economy</b>	GDP in PPS per capita, 2000	17.589		
	Research & Development expenditure, share of GDP (%), 2000	0,3		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	0,6		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	4,0		
	Change of unemployment rate in pp, 1998-2001	0,6		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	34,9		
	Research & Development personnel (total) per 1000 active persons, 2002	2,5		
	Population with high educational level, share of population total education (%), 2002	30,8		
<b>Demography</b>	Population in 1000, 2000	785		
	Population density, 2000	85		
	Population development in %, 1995-2000	-6,6		
	Population over 65 years, share of total population (%), 2000	11,7		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	2,3 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	51 <sup>1</sup>		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	67,5		

<sup>1</sup> Arithmetic mean from NUTS2-values

- In the fields of labour market and environment, Cyprus is better than the EU25+2+2 average.
- With regard to the spatial structure, Cyprus has one of the lowest values among the regions of the EU25+2+2 area. It is similar in the field of accessibility while economy, demography and hazards are only slightly below average.

**Figure 61 Cyprus: Regional spread of RCE-indices by thematic field**



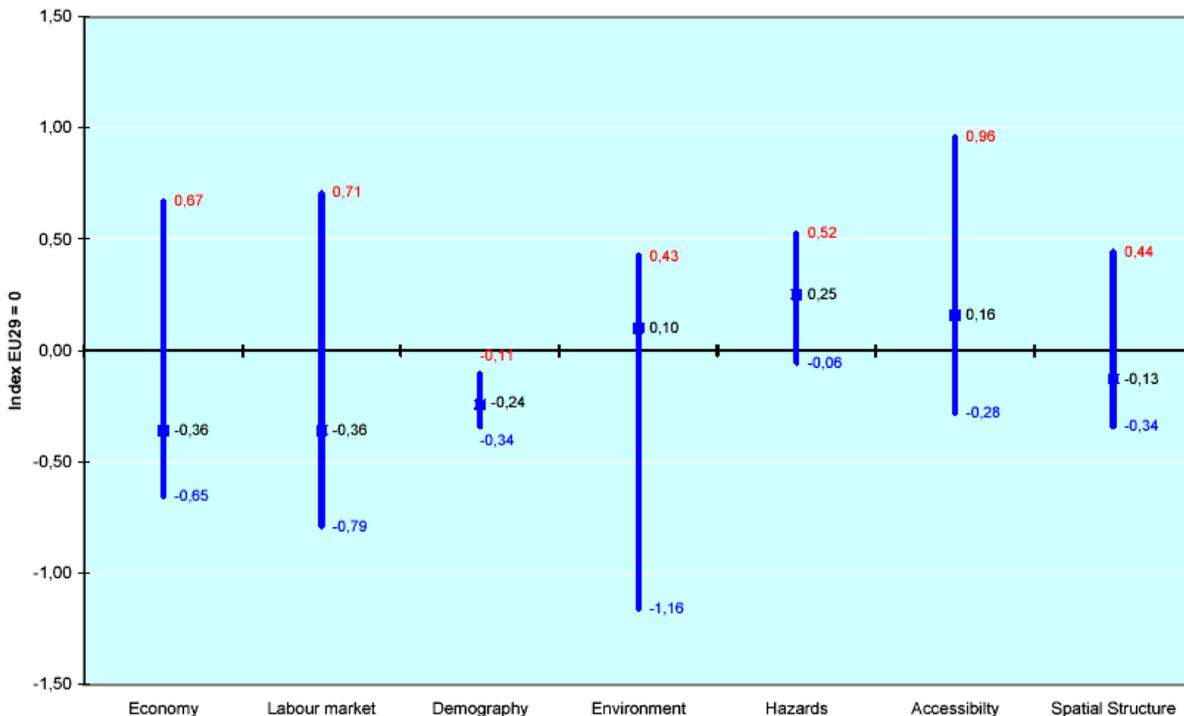
**Table 19 Czech Republic: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	78.860	496	17.616
<b>Economy</b>	GDP in PPS per capita, 2000	12.621	10.170	26.855
	Research & Development expenditure, share of GDP (%), 2000	1,3	0,2	3,1
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	2,3	0,6	4,4
<b>Labour market</b>	Unemployment rate (second quarter), 2001	8,0	3,0	13,6
	Change of unemployment rate in pp, 1998-2001	2,1	1,0	4,7
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	67,3	27,1	108,1
	Research & Development personnel (total) per 1000 active persons, 2002	5,1	1,1	17,0
	Population with high educational level, share of population total education (%), 2002	12,1	7,4	27,5
<b>Demography</b>	Population in 1000, 2000	10.278	1.111	1.659
	Population density, 2000	130	67	2.393
	Population development in %, 1995-2000	-0,5	-2,3	0,3
	Population over 65 years, share of total population (%), 2000	13,8	12,0	16,3
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,5 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,1 <sup>1</sup>	1,0	1,2
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	94 <sup>1</sup>	71	138
<b>Spatial structure</b>	FUA-Population, share of total population (%)	60,0	10,3	133,9

<sup>1</sup> Arithmetic mean from NUTS2-values

- Only with regard to demography, the Czech regions are consistently below average with a small variance.
- Regarding the economy and labour market, the national value is below average too, but the regions vary stronger and some regions are above average.
- The maximum range with the lowest values is to be found in the field of environment.
- Praha has got a special position among the Czech regions. Regarding the economy, labour market, hazards, accessibility and spatial structure Praha has the highest values in the Czech Republic while regarding environment it has the lowest value.

**Figure 62 Czech Republic: Regional spread of RCE-indices by thematic field**



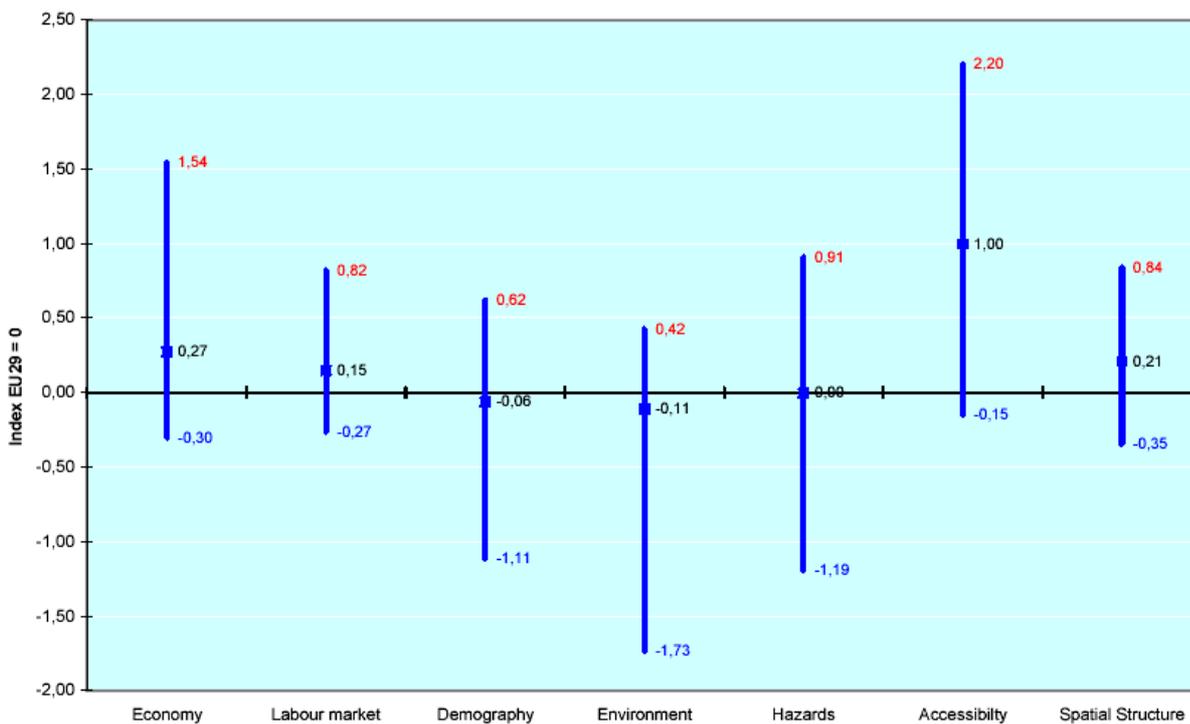
**Table 20 Germany: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	357.020	404	29.477
<b>Economy</b>	GDP in PPS per capita, 2000	23.807	14.137	40.737
	Research & Development expenditure, share of GDP (%), 2000	2,4	0,4	6,1
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	7,9	0,9	21,4
<b>Labour market</b>	Unemployment rate (second quarter), 2001	7,8	3,1	16,9
	Change of unemployment rate in pp, 1998-2001	-1,8	-5,5	-0,5
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	46,9	19,2	103,4
	Research & Development personnel (total) per 1000 active persons, 2002	12,2	2,0	28,0
	Population with high educational level, share of population total education (%), 2002	22,2	15,6	31,4
<b>Demography</b>	Population in 1000, 2000	82.163	512	5.264
	Population density, 2000	230	77	3.799
	Population development in %, 1995-2000	0,8	-4,4	5,1
	Population over 65 years, share of total population (%), 2000	16,2	14,2	19,1
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,8 <sup>1</sup>	1,4	2,5
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,7 <sup>1</sup>	0,0	3,6
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	119 <sup>1</sup>	76	173
<b>Spatial structure</b>	FUA-Population, share of total population (%)	59,6	14,4	157,7

<sup>1</sup> Arithmetic mean from NUTS2-values

- In Germany there are high regional variations in each thematic field.
- With regard to the economy, there are two German regions under the European top-10. These are Upper Bavaria, which takes the third place behind Stockholm and Inner London, and Stuttgart.
- In the field of accessibility, the regions Darmstadt and Düsseldorf belong to the best regions in the EU25+2+2 area.
- The German average value is only below the EU25+2+2-average regarding demography and environment. Regarding demography, there are regions of the East German Länder (in particular Chemnitz, Halle, Dessau) which have the lowest values in the European comparison.
- Regarding the environment, there are also German regions with low values like Hamburg, Berlin and Bremen.

**Figure 63 Germany: Regional spread of RCE-indices by thematic field**



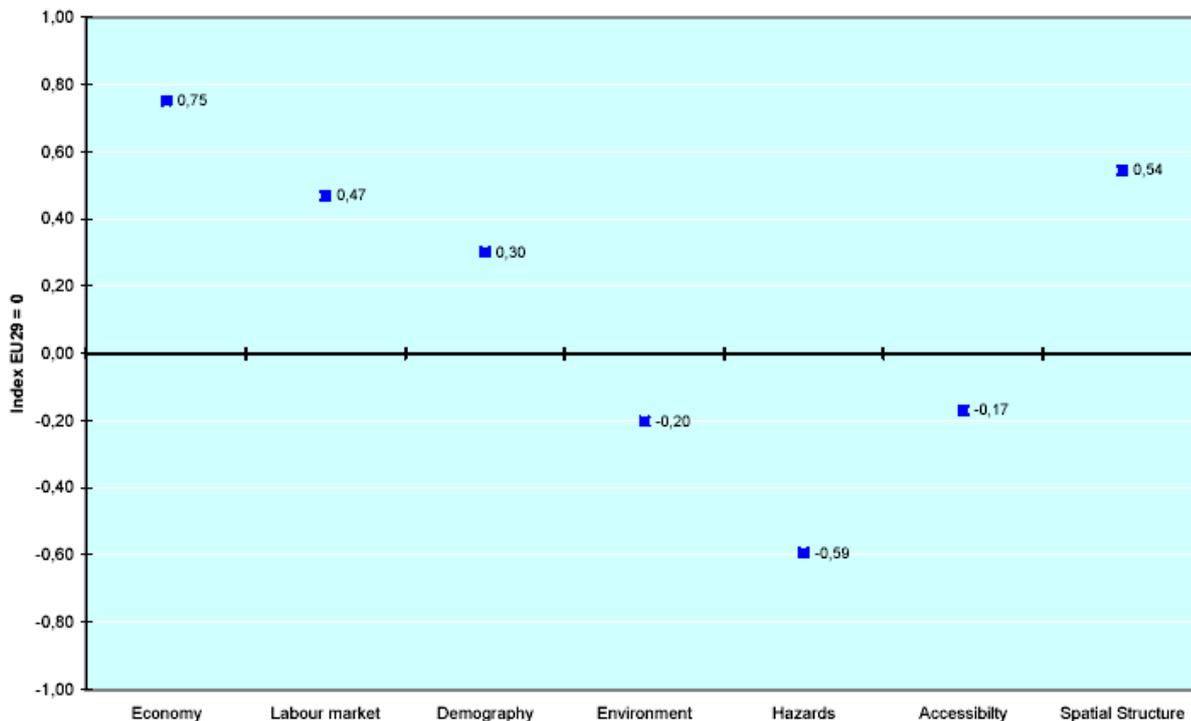
**Table 21 Denmark: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	43.094		
<b>Economy</b>	GDP in PPS per capita, 2000	26.925		
	Research & Development expenditure, share of GDP (%), 2000	2,2		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	9,1		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	4,4		
	Change of unemployment rate in pp, 1998-2001	-0,5		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	58,9		
	Research & Development personnel (total) per 1000 active persons, 2002	14,0		
	Population with high educational level, share of population total education (%), 2002	28,4		
<b>Demography</b>	Population in 1000, 2000	5.330		
	Population density, 2000	124		
	Population development in %, 1995-2000	2,2		
	Population over 65 years, share of total population (%), 2000	14,8		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,8 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	95 <sup>1</sup>		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	98,2		

<sup>1</sup> Arithmetic mean from NUTS2-values

- In four thematic fields Denmark is above the EU25+2+2 average. These are economy, spatial structure, labour market and demography.
- With regard to economy, Denmark is among the first thirteen regions in the EU25+2+2 area. In the field of labour market, Denmark belongs to the first fifteen regions.

**Figure 64 Denmark: Regional spread of RCE-indices by thematic field**



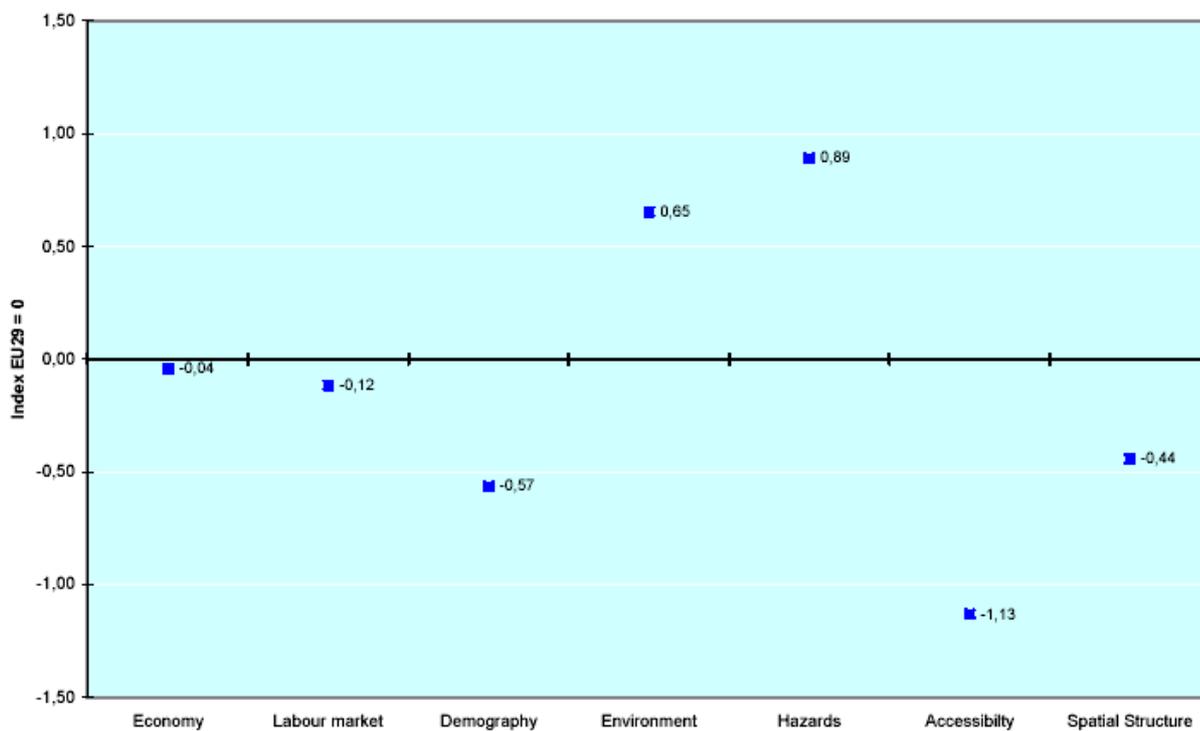
**Table 22 Estonia: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	45.228		
<b>Economy</b>	GDP in PPS per capita, 2000	9.147		
	Research & Development expenditure, share of GDP (%), 2000	0,7		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	1,1		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	12,4		
	Change of unemployment rate in pp, 1998-2001	2,8		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	88,2		
	Research & Development personnel (total) per 1000 active persons, 2002	6,3		
	Population with high educational level, share of population total education (%), 2002	29,6		
<b>Demography</b>	Population in 1000, 2000	1.439		
	Population density, 2000	30		
	Population development in %, 1995-2000	-3,5		
	Population over 65 years, share of total population (%), 2000	14,5		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,8 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	50 <sup>1</sup>		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	68,2		

<sup>1</sup> Arithmetic mean from NUTS2-values

- In the field of hazards, Estonia reaches one of the best values within the ESPON area. In environment, Estonia is also above the EU25+2+2 average.
- In accessibility, is Estonia below the average value. The fields of economy and labour market are among the EU25+2+2 average.

**Figure 65 Estonia: Regional spread of RCE-indices by thematic field**



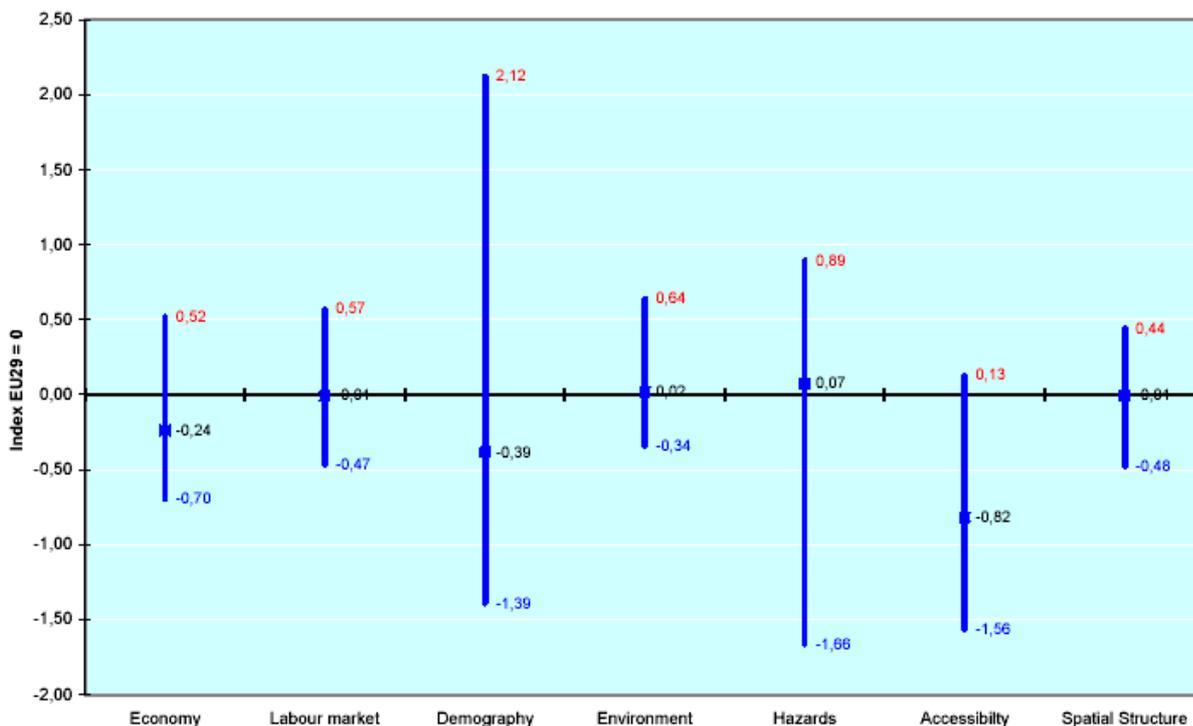
**Table 23 Spain: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	504.790	31	94.193
<b>Economy</b>	GDP in PPS per capita, 2000	18.452	11.808	24.902
	Research & Development expenditure, share of GDP (%), 2000	0,9	0,2	1,7
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	2,5	0,2	7,0
<b>Labour market</b>	Unemployment rate (second quarter), 2001	13,1	6,1	22,3
	Change of unemployment rate in pp, 1998-2001	-5,9	-7,5	-2,4
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	109,6	57,7	157,2
	Research & Development personnel (total) per 1000 active persons, 2002	6,9	1,9	13,4
	Population with high educational level, share of population total education (%), 2002	25,8	18,8	36,4
<b>Demography</b>	Population in 1000, 2000	39.733	139	7.208
	Population density, 2000	79	22	4.487
	Population development in %, 1995-2000	1,4	-2,4	7,7
	Population over 65 years, share of total population (%), 2000	16,8	11,9	21,6
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	3,0 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,8 <sup>1</sup>	0,0	1,9
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	66 <sup>1</sup>	37	115
<b>Spatial structure</b>	FUA-Population, share of total population (%)	75,7	33,3	104,0

<sup>1</sup> Arithmetic mean from NUTS2-values

- The Spanish regions have the highest regional variations in demography. But the Spanish demography index is below the EU25+2+2 average.
- Four of the ten EU25+2+2 regions with the lowest values are Spanish regions. These are the northern regions of Principado de Asturias, Castilla y León, Aragón and Galicia. Ceuta y Melilla is the Spanish region with the highest values in demography .
- Like all European remote areas the Spanish remote areas have the lowest values in accessibility in the EU25+2+2 area.
- In labour market, environment, spatial structure and economy less regional variations are to be found.
- In the field of economy the region of Madrid does not have a very high value and lies on the 57. rank of the ESPON regions.

**Figure 66 Spain: Regional spread of RCE-indices by thematic field**



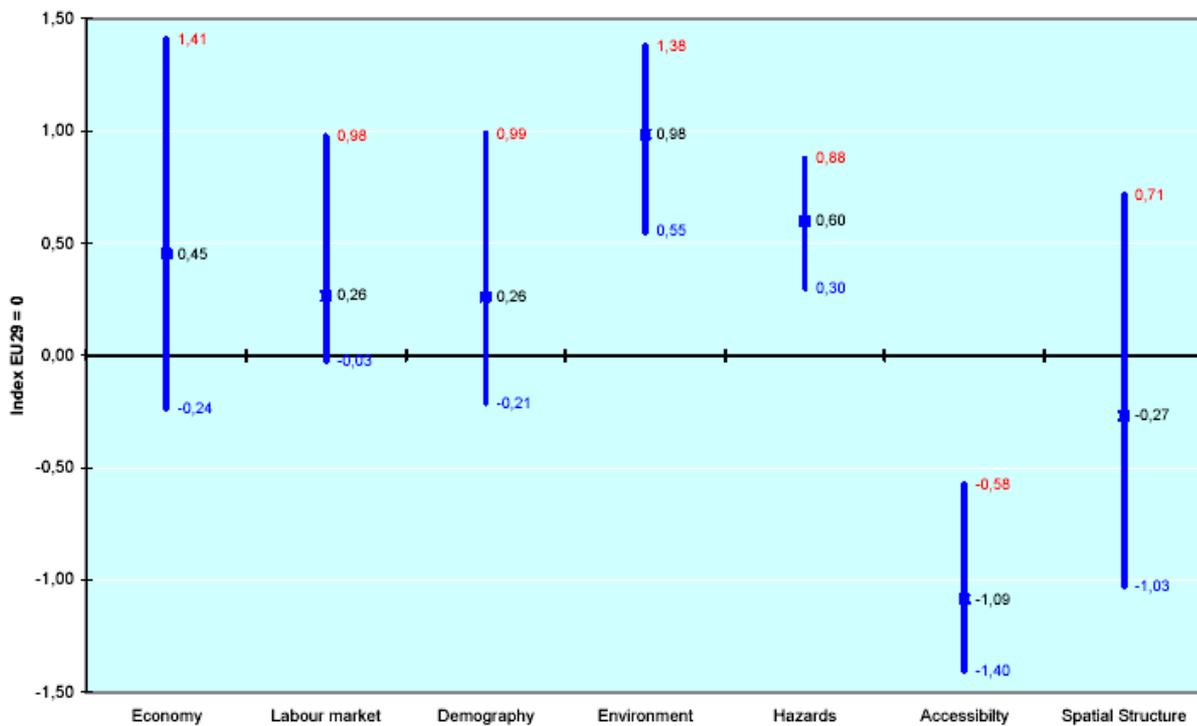
**Table 24 Finland: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	304.530	1.527	128.294
<b>Economy</b>	GDP in PPS per capita, 2000	23.504	16.691	32.678
	Research & Development expenditure, share of GDP (%), 2000	3,4	0,2	4,5
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	11,5	0,0	11,6
<b>Labour market</b>	Unemployment rate (second quarter), 2001	9,1	1,3	13,5
	Change of unemployment rate in pp, 1998-2001	-2,7	-3,0	-1,1
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	103,3	48,6	144,0
	Research & Development personnel (total) per 1000 active persons, 2002	20,5	0,1	20,6
	Population with high educational level, share of population total education (%), 2002	33,7	23,5	41,4
<b>Demography</b>	Population in 1000, 2000	5.171	26	1.820
	Population density, 2000	17	4	151
	Population development in %, 1995-2000	1,4	-3,0	6,7
	Population over 65 years, share of total population (%), 2000	14,8	11,5	17,0
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,5 <sup>1</sup>	1,4	1,7
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	59 <sup>1</sup>	42	86
<b>Spatial structure</b>	FUA-Population, share of total population (%)	79,0	59,9	100,3

<sup>1</sup> Arithmetic mean from NUTS2-values

- In Finland there are high regional variations in economy, spatial structure, demography and labour market.
- In the field of economy Uusimaa (suuralue) is the Finnish region with the sixth highest value in the EU25+2+2 area.
- The region Väli-Suomi has one of the lowest values in accessibility within the EU25+2+2 area.
- In environment and hazards the Finnish regions are totally above the European average.

**Figure 67 Finland: Regional spread of RCE-indices by thematic field**



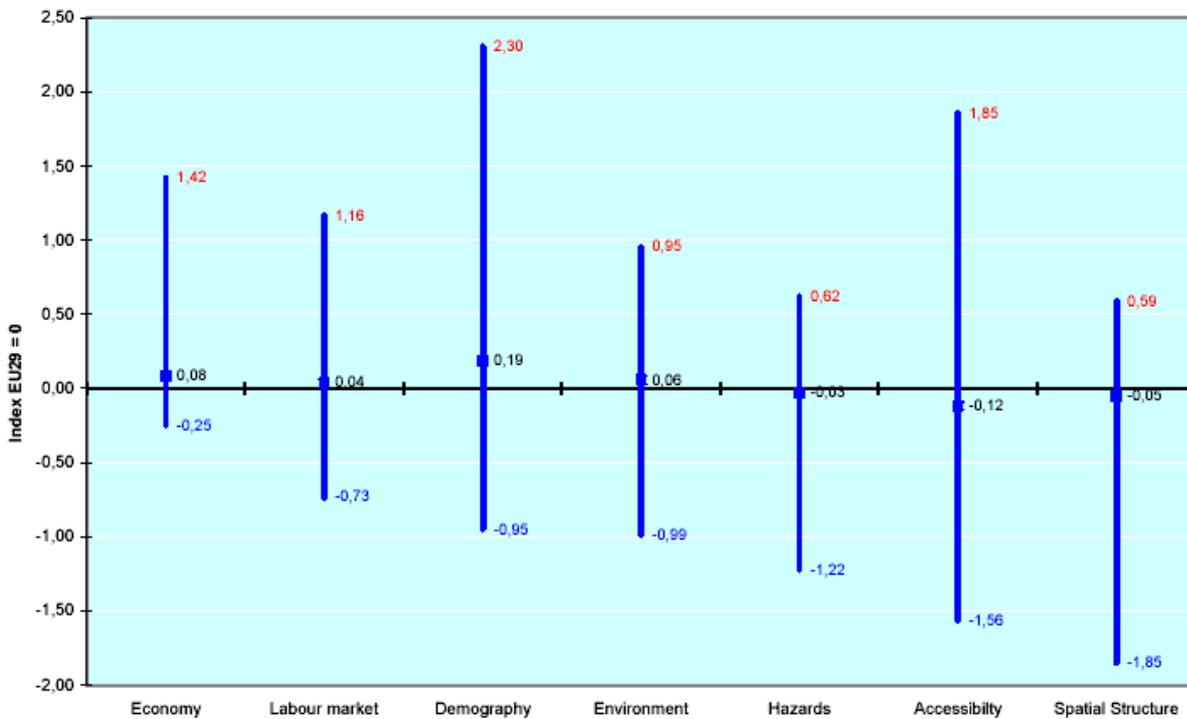
**Table 25 France: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	633.252	1.128	83.934
<b>Economy</b>	GDP in PPS per capita, 2000	22.700	11.083	35.509
	Research & Development expenditure, share of GDP (%), 2000	2,1	0,3	3,4
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	6,9	0,0	13,9
<b>Labour market</b>	Unemployment rate (second quarter), 2001	8,5	4,8	33,3
	Change of unemployment rate in pp, 1998-2001	-2,9	-4,0	0,8
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	68,9	41,3	260,0
	Research & Development personnel (total) per 1000 active persons, 2002	12,5	2,8	23,1
	Population with high educational level, share of population total education (%), 2002	24,6	16,4	36,1
<b>Demography</b>	Population in 1000, 2000	60.408	155	10.979
	Population density, 2000	108	2	914
	Population development in %, 1995-2000	1,3	-1,6	6,9
	Population over 65 years, share of total population (%), 2000	15,8	1,4	23,0
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	2,3 <sup>1</sup>	1,5	6,4
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,2 <sup>1</sup>	0,0	2,5
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	80 <sup>1</sup>	37	159
<b>Spatial structure</b>	FUA-Population, share of total population (%)	69,9	0,0	102,0

<sup>1</sup> Arithmetic mean from NUTS2-values

- The french regions show high regional variations in all thematic fields, with average values in the range of the EU25+2+2 average.
- The highest variations are in demography. Here it has to be considered that the French regions with the highest values are remote areas.
- In the fields of accessibility and spatial structure the remote areas have the lowest values of the regions in ESPON area.
- The predominance of Île de France becomes apparent in regard to economy (rank 5 of the EU25+2+2 regions), labour market (rank 3) and accessibility (rank 7).

**Figure 68 France: Regional spread of RCE-indices by thematic field**



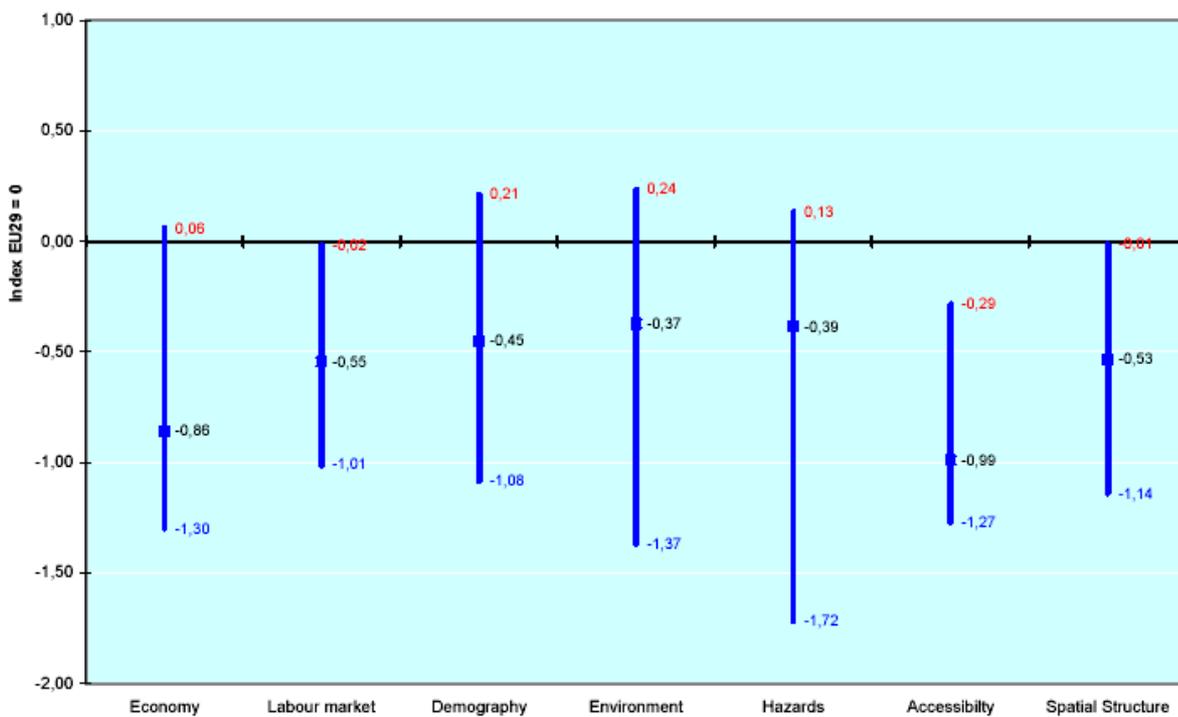
**Table 26 Greece: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	131.626	2.307	18.811
<b>Economy</b>	GDP in PPS per capita, 2000	15.098	10.474	17.790
	Research & Development expenditure, share of GDP (%), 2000	0,7	0,1	1,0
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	0,5	0,1	1,9
<b>Labour market</b>	Unemployment rate (second quarter), 2001	10,2	5,8	15,8
	Change of unemployment rate in pp, 1998-2001	-0,6	-4,5	4,5
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	101,5	65,4	176,7
	Research & Development personnel (total) per 1000 active persons, 2002	6,0	0,5	10,0
	Population with high educational level, share of population total education (%), 2002	18,8	8,4	23,7
<b>Demography</b>	Population in 1000, 2000	10.554	183	3.451
	Population density, 2000	83	32	906
	Population development in %, 1995-2000	1,1	-2,4	4,6
	Population over 65 years, share of total population (%), 2000	17,3	15,0	23,0
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	3,9 <sup>1</sup>	2,5	5,7
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,5 <sup>1</sup>	0,0	2,0
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	62 <sup>1</sup>	43	103
<b>Spatial structure</b>	FUA-Population, share of total population (%)	65,8	19,1	109,0

<sup>1</sup> Arithmetic mean from NUTS2-values

- Greek regions are largely below the EU25+2+2 average. Only regarding demography, environment and hazards there is at least one region, which is better than the EU25+2+2 average.
- In the field of economy only Attiki is above the EU25+2+2 average. Regarding labour market Attiki also has the highest value within the Greek regions. This is almost the average value of the ESPON area.
- Hazards is the field with the highest, accessibility with the lowest regional variation.

**Figure 69 Greece: Regional spread of RCE-indices by thematic field**



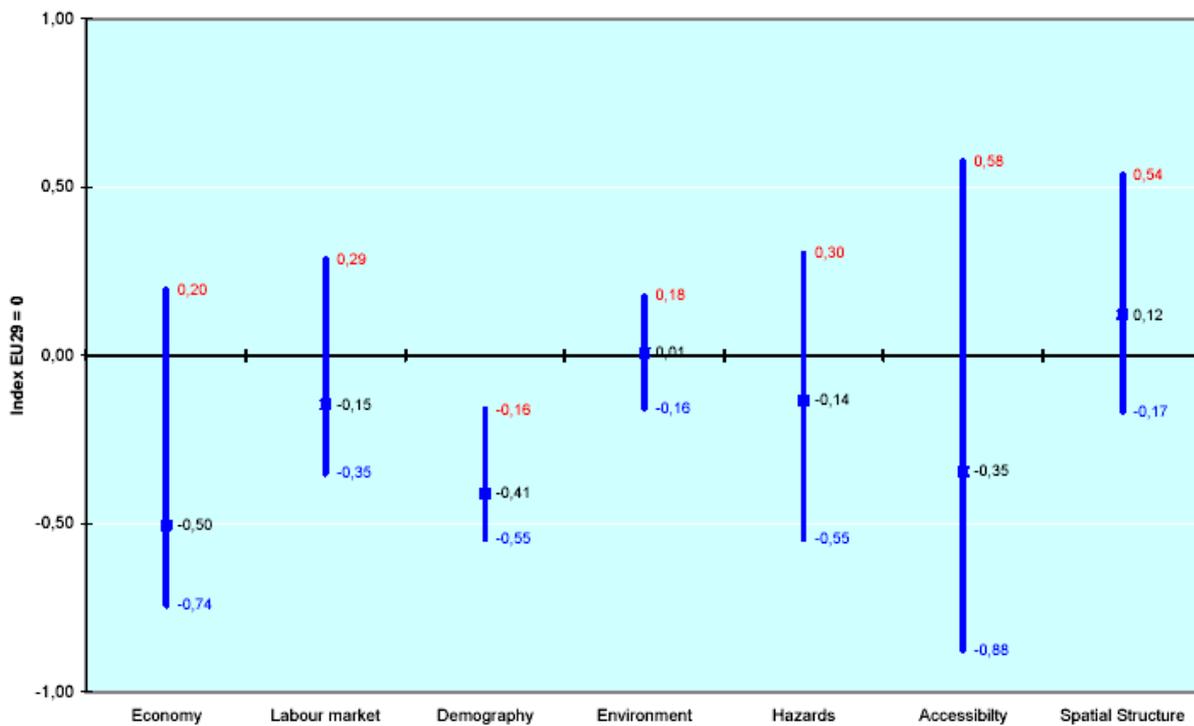
**Table 27 Hungary: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	93.029	6.918	18.314
<b>Economy</b>	GDP in PPS per capita, 2000	11.426	7.330	17.270
	Research & Development expenditure, share of GDP (%), 2000	0,8	0,2	1,3
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	1,7	0,3	3,8
<b>Labour market</b>	Unemployment rate (second quarter), 2001	5,7	2,0	11,3
	Change of unemployment rate in pp, 1998-2001	-3,2	-5,2	-2,1
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	37,0	11,2	65,6
	Research & Development personnel (total) per 1000 active persons, 2002	5,6	1,7	11,8
	Population with high educational level, share of population total education (%), 2002	14,4	10,5	21,4
<b>Demography</b>	Population in 1000, 2000	10.043	975	2.844
	Population density, 2000	108	69	411
	Population development in %, 1995-2000	-2,0	-2,6	-0,9
	Population over 65 years, share of total population (%), 2000	14,6	13,2	15,4
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,6		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,2	0,0	2,9
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	77	50	128
<b>Spatial structure</b>	FUA-Population, share of total population (%)	80,8	63,9	95,7

<sup>1</sup> Arithmetic mean from NUTS2-values

- Only in two of seven thematic fields the average value for Hungary is slightly better than the EU25+2+2 average. These are spatial structure and environment.
- The highest regional variations are to be found in the field of accessibility. Here the region Közép-Magyarország (Budapest) has the highest value.
- Concerning economy and labour market the region of Budapest also has the highest values of Hungarian regions. These values are above the average of the EU25+2+2 area.
- Demography is the only field in which Hungarian regions are completely below the EU25+2+2 average.
- 

**Figure 70 Hungary: Regional spread of RCE-indices by thematic field**



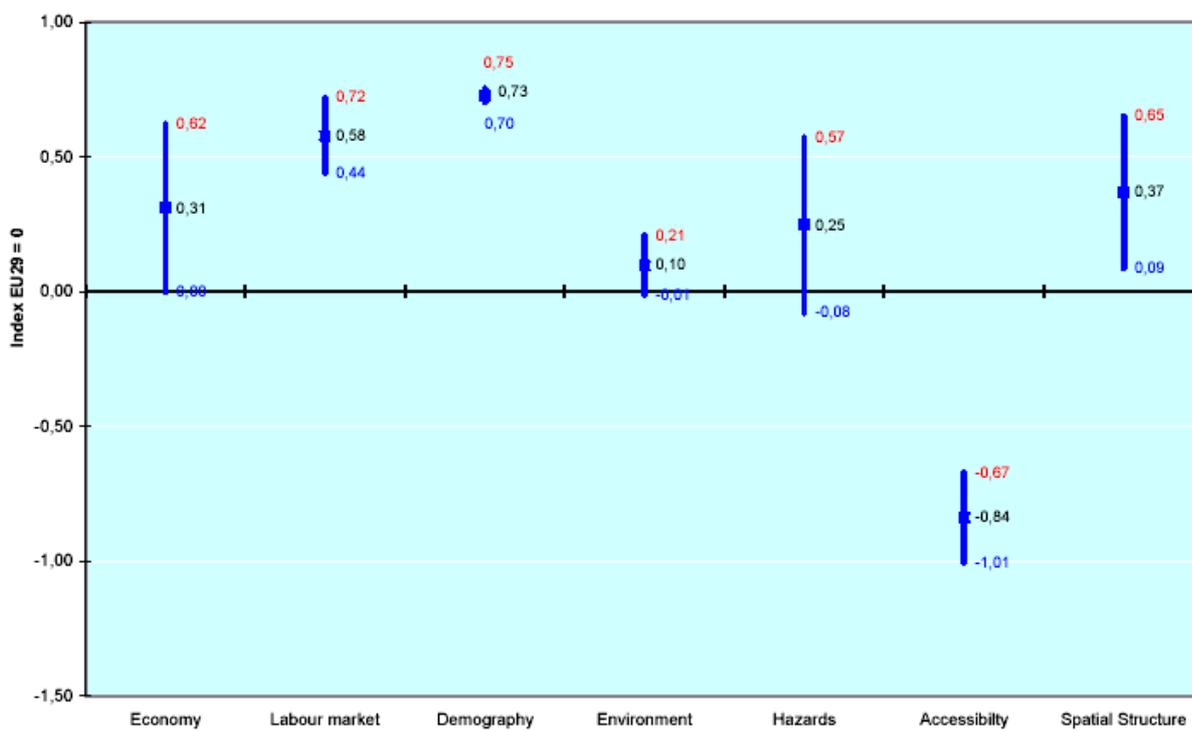
**Table 28 Ireland: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	70.273	33.276	36.997
<b>Economy</b>	GDP in PPS per capita, 2000	26.223	19.106	28.770
	Research & Development expenditure, share of GDP (%), 2000	1,2		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	4,8		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	3,7	3,4	4,6
	Change of unemployment rate in pp, 1998-2001	-4,2	-4,3	-3,9
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	31,2	29,7	34,9
	Research & Development personnel (total) per 1000 active persons, 2002	7,0	7,0	7,0
	Population with high educational level, share of population total education (%), 2002	25,8	20,1	27,6
<b>Demography</b>	Population in 1000, 2000	3.777	996	2.780
	Population density, 2000	54	30	75
	Population development in %, 1995-2000	5,1	4,9	5,1
	Population over 65 years, share of total population (%), 2000	11,2	10,6	12,8
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,9	1,9	2,0
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,1	1,0	1,2
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	70	61	79
<b>Spatial structure</b>	FUA-Population, share of total population (%)	38,4	9,9	48,7

<sup>1</sup> Arithmetic mean from NUTS2-values

- The two regions of Ireland are in six of seven fields above the EU25+2+2 average.
- Only in the field of accessibility Irish regions are below average.
- Strong distinctions between the Irish regions exist in regarding economy, hazards and spatial structure.

**Figure 71 Ireland: Regional spread of RCE-indices by thematic field**



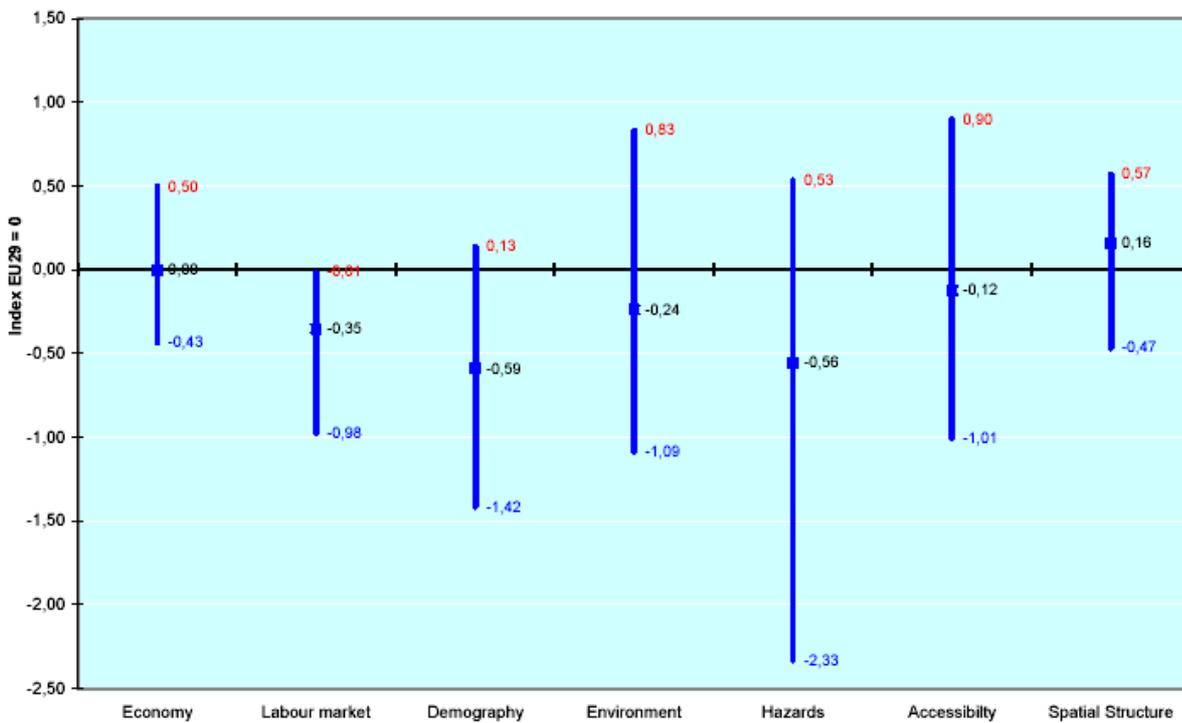
**Table 29 Italy: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	301.316	3.264	25.707
<b>Economy</b>	GDP in PPS per capita, 2000	23.588	14.200	31.578
	Research & Development expenditure, share of GDP (%), 2000	1,1	0,3	1,9
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	2,7	0,0	7,2
<b>Labour market</b>	Unemployment rate (second quarter), 2001	9,5	3,0	24,8
	Change of unemployment rate in pp, 1998-2001	-2,3	-4,8	-0,6
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	101,7	26,7	184,4
	Research & Development personnel (total) per 1000 active persons, 2002	6,3	1,5	11,6
	Population with high educational level, share of population total education (%), 2002	10,9	7,5	13,4
<b>Demography</b>	Population in 1000, 2000	57.680	120	9.065
	Population density, 2000	192	37	425
	Population development in %, 1995-2000	0,7	-2,3	3,0
	Population over 65 years, share of total population (%), 2000	18,0	13,6	24,7
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	3,2 <sup>1</sup>	2,3	5,2
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,1 <sup>1</sup>	0,0	2,6
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	86 <sup>1</sup>	60	124
<b>Spatial structure</b>	FUA-Population, share of total population (%)	79,4	38,6	90,1

<sup>1</sup> Arithmetic mean from NUTS2-values

- The average values of Italian regions are only regarding spatial structure above the EU25+2+2 average. In the field of economy the Italian average value is within the European average.
- The Italian region with the highest value in economy is Lazio (Roma).
- In the field of hazards the Italian regions are very diverse. Four of the ten EU25+2+2 regions with the lowest values in hazards are Italian regions. In particular the region of Sicilia has a very low value in this field.
- The southern region of Calabria has the lowest value regarding labour market within the Italian regions.

**Figure 72 Italy: Regional spread of RCE-indices by thematic field**



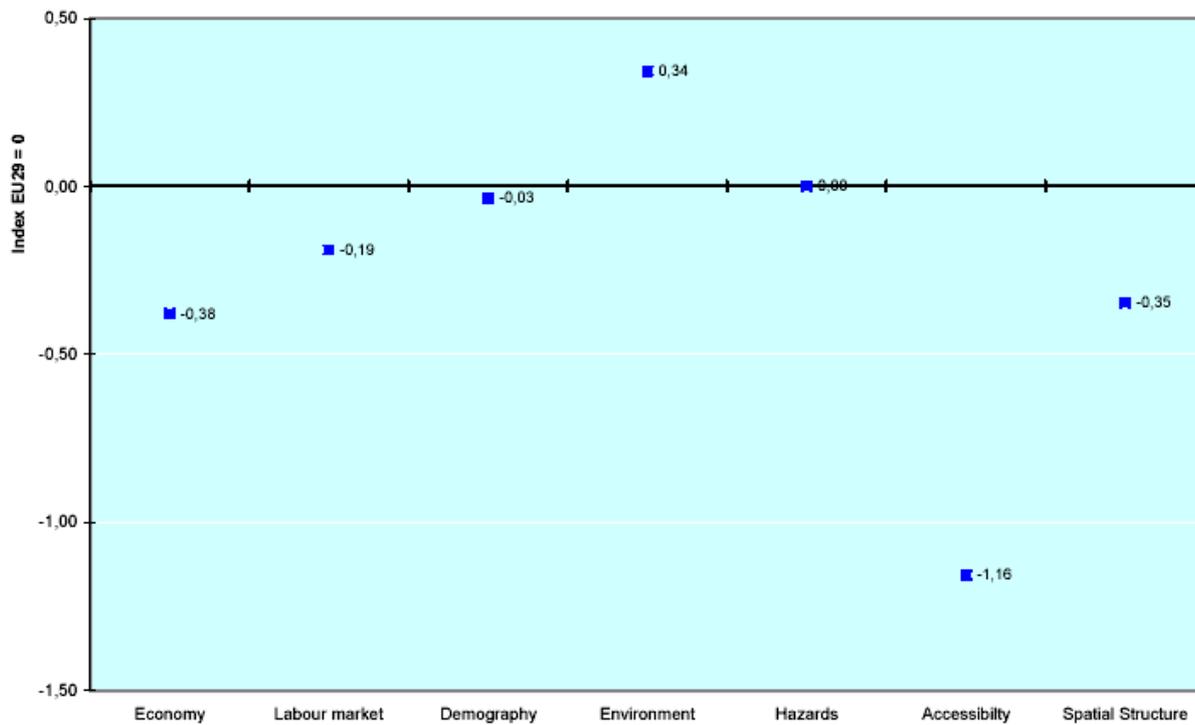
**Table 30 Lithuania: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	65.300		
<b>Economy</b>	GDP in PPS per capita, 2000	8.078		
	Research & Development expenditure, share of GDP (%), 2000	0,6		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	0,4		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	16,5		
	Change of unemployment rate in pp, 1998-2001	4,0		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	102,3		
	Research & Development personnel (total) per 1000 active persons, 2002	7,4		
	Population with high educational level, share of population total education (%), 2002	45,4		
<b>Demography</b>	Population in 1000, 2000	3.699		
	Population density, 2000	57		
	Population development in %, 1995-2000	-0,5		
	Population over 65 years, share of total population (%), 2000	13,4		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,4 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	48 <sup>1</sup>		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	41,3		

<sup>1</sup> Arithmetic mean from NUTS2-values

- Only in the field of environment Lithuania is better than the EU25+2+2 average.
- In regard to accessibility Lithuania has a low value.
- In hazards and demography Lithuania is within the average.

**Figure 73 Lithuania: Regional spread of RCE-indices by thematic field**



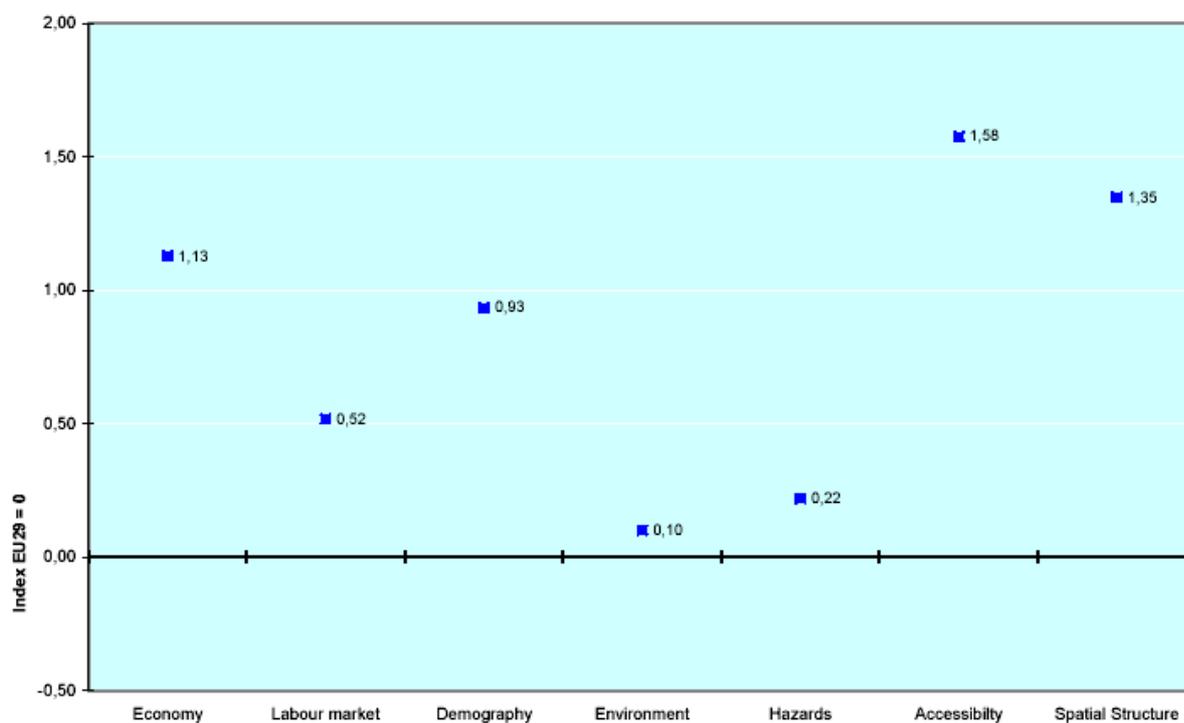
**Table 31 Luxembourg: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	2.586		
<b>Economy</b>	GDP in PPS per capita, 2000	43.804		
	Research & Development expenditure, share of GDP (%), 2000	1,8		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	12,5		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	2,4		
	Change of unemployment rate in pp, 1998-2001	-0,4		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	24,0		
	Research & Development personnel (total) per 1000 active persons, 2002	24,9		
	Population with high educational level, share of population total education (%), 2002	18,7		
<b>Demography</b>	Population in 1000, 2000	436		
	Population density, 2000	169		
	Population development in %, 1995-2000	7,2		
	Population over 65 years, share of total population (%), 2000	14,3		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,9 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,8 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	143 <sup>1</sup>		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	59,7		

<sup>1</sup> Arithmetic mean from NUTS2-values

- In every thematic field Luxembourg is situated totally above the EU25+2+2 average.
- In the field of economy Luxembourg has a high value. Even compared with the EU25+2+2 regions Luxembourg has one of the best values (rank 14).
- In the fields of environment and hazards Luxembourg is near the EU25+2+2 average.

**Figure 74 Luxembourg: Regional spread of RCE-indices by thematic field**



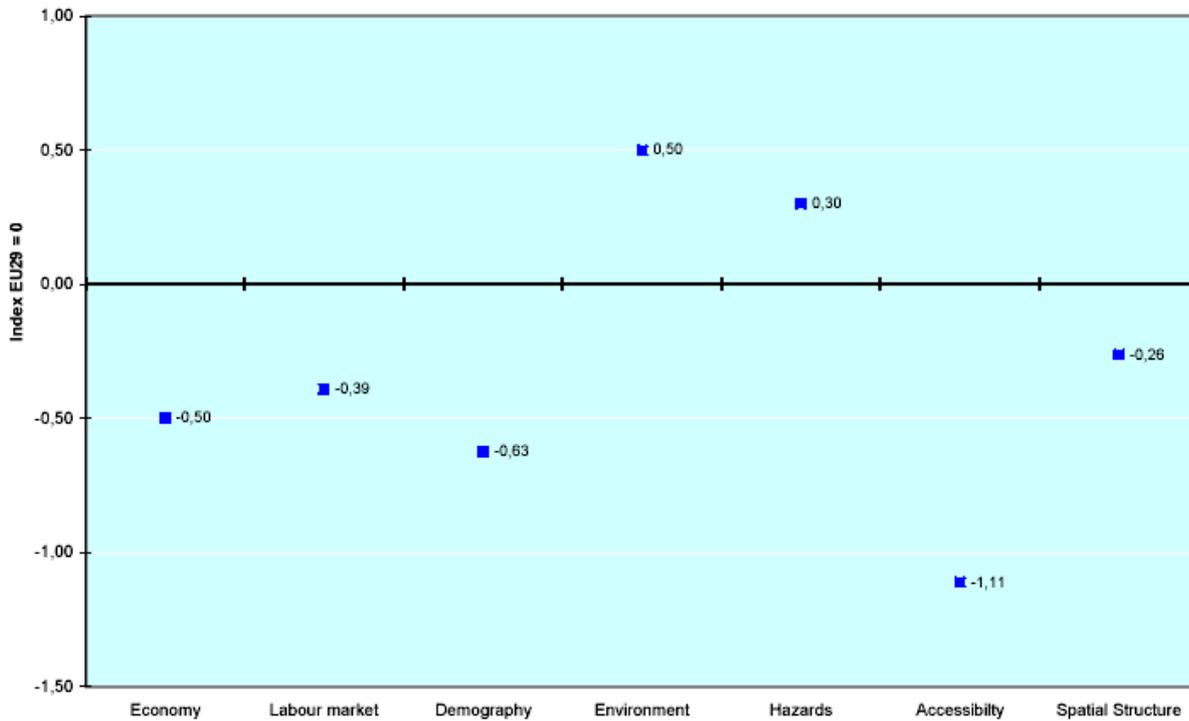
**Table 32 Latvia: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	64.589		
<b>Economy</b>	GDP in PPS per capita, 2000	6.992		
	Research & Development expenditure, share of GDP (%), 2000	0,5		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	1,2		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	13,1		
	Change of unemployment rate in pp, 1998-2001	-1,4		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	86,2		
	Research & Development personnel (total) per 1000 active persons, 2002	4,9		
	Population with high educational level, share of population total education (%), 2002	20,1		
<b>Demography</b>	Population in 1000, 2000	2.424		
	Population density, 2000	37		
	Population development in %, 1995-2000	-4,2		
	Population over 65 years, share of total population (%), 2000	14,7		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,9		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	53 <sup>1</sup>		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	70,9 <sup>1</sup>		

<sup>1</sup> Arithmetic mean from NUTS2-values

- In the European comparison Latvia is above average with regard to environment and in hazards.
- In the fields of economy, labour market, demography, accessibility and spatial structure Latvia is below average.
- Latvia has a comparatively bad value in demography.

**Figure 75 Latvia: Regional spread of RCE-indices by thematic field**



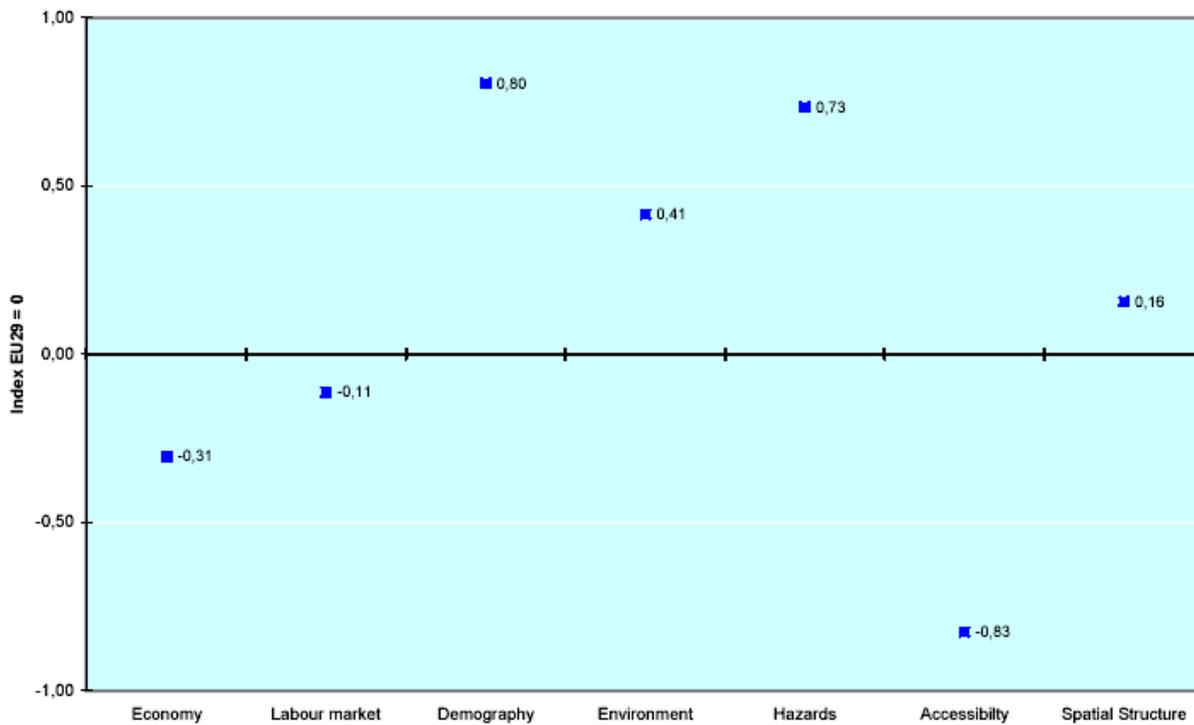
**Table 33 Malta: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	316		
<b>Economy</b>	GDP in PPS per capita, 2000	11.735		
	Research & Development expenditure, share of GDP (%), 2000	1,4		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	0,4		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	6,1		
	Change of unemployment rate in pp, 1998-2001	1,0		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	56,9		
	Research & Development personnel (total) per 1000 active persons, 2002	0,6		
	Population with high educational level, share of population total education (%), 2002	18,4		
<b>Demography</b>	Population in 1000, 2000	380		
	Population density, 2000	1.203		
	Population development in %, 1995-2000	2,9		
	Population over 65 years, share of total population (%), 2000	12,3		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	2,0 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	77 <sup>1</sup>		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	102,2		

<sup>1</sup> Arithmetic mean from NUTS2-values

- With regard to demography, environment and hazards Malta is clearly above the EU25+2+2 average while in accessibility and economy it is below the average.
- In the field of hazards Malta belongs to the top-10 regions in the EU25+2+2 area.

**Figure 76 Malta: Regional spread of RCE-indices by thematic field**



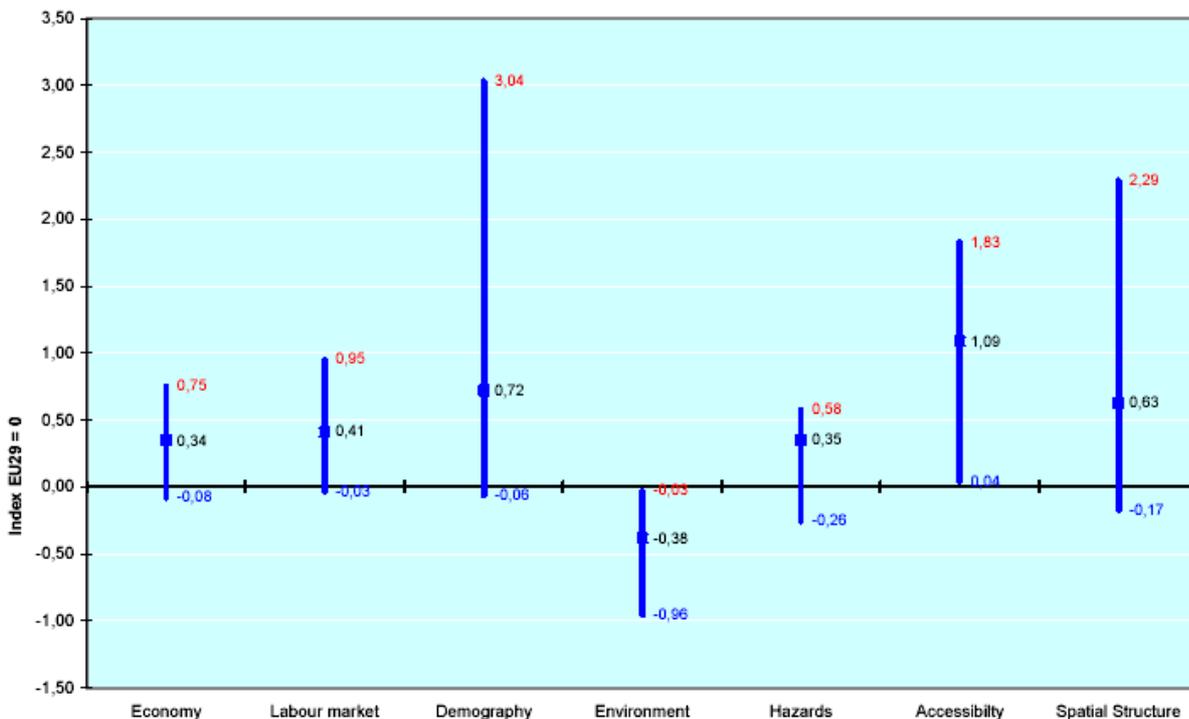
**Table 34 Netherlands: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	33.883	1.364	4.989
<b>Economy</b>	GDP in PPS per capita, 2000	25.473	18.829	32.186
	Research & Development expenditure, share of GDP (%), 2000	2,0	0,7	3,4
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	5,8		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	2,3	1,2	4,3
	Change of unemployment rate in pp, 1998-2001	-1,6	-2,4	-1,0
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	37,2	16,2	68,4
	Research & Development personnel (total) per 1000 active persons, 2002	10,7	3,6	13,6
	Population with high educational level, share of population total education (%), 2002	25,4	16,8	34,8
<b>Demography</b>	Population in 1000, 2000	15.864	317	3.398
	Population density, 2000	470	177	1.185
	Population development in %, 1995-2000	2,9	0,8	20,9
	Population over 65 years, share of total population (%), 2000	13,6	8,9	16,4
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,9 <sup>1</sup>	1,5	2,3
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,0 <sup>1</sup>	0,0	2,0
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	122 <sup>1</sup>	77	156
<b>Spatial structure</b>	FUA-Population, share of total population (%)	63,8	0,0	84,9

<sup>1</sup> Arithmetic mean from NUTS2-values

- Apart from the field of environment, Dutch regions are situated throughout above the EU25+2+2 average.
- The regional variation in the Netherlands is most distinctive in the fields of demography and spatial structure. In the field of demography the special situation of Flevoland gets visible, which, as a statistical outlier, has the highest value in the European regions behind Inner London.
- Apart from the statistical outlier Flevoland, Utrecht is the Dutch region with the highest value in demography as well as in economy, labour market and accessibility.
- In the field of spatial structure the Netherlands also have a high regional variation. This is again caused by Flevoland as a statistical outlier.

**Figure 77 Netherlands: Regional spread of RCE-indices by thematic field**





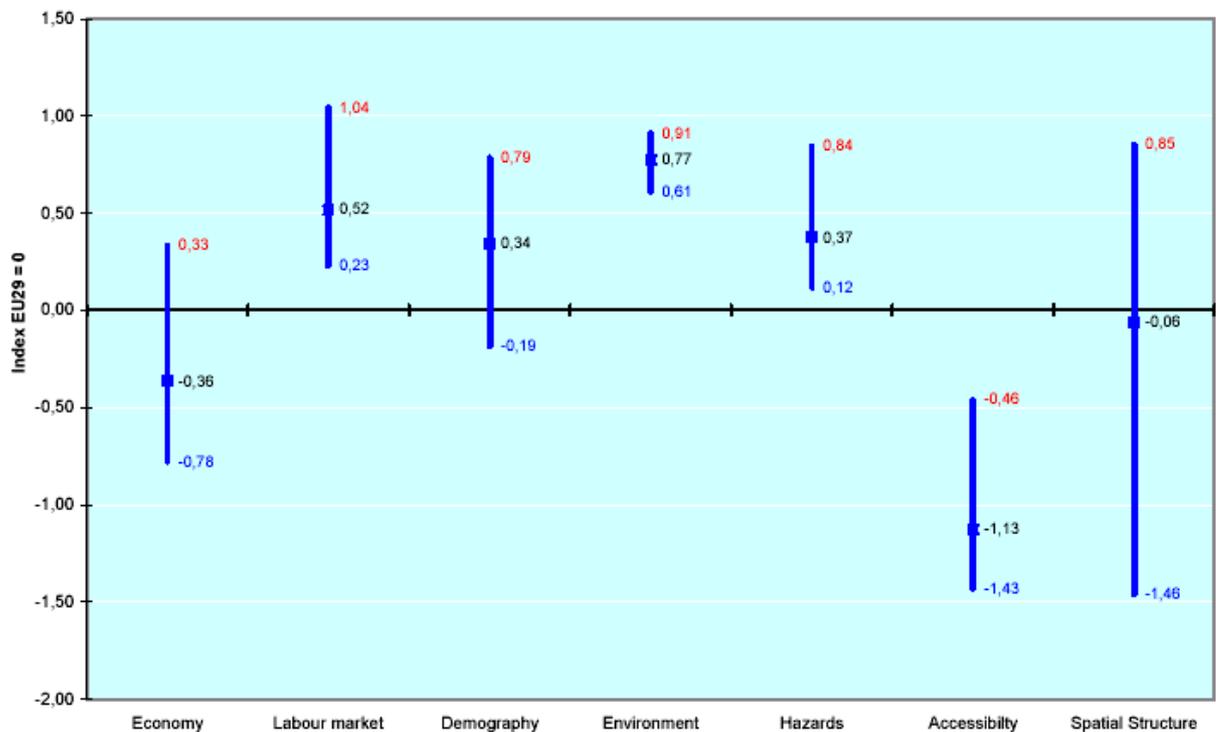
**Table 35 Norway: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	323.758	5.371	112.948
<b>Economy</b>	GDP in PPS per capita, 2000	23.866	18.953	36.727
	Research & Development expenditure, share of GDP (%), 2000	2,2	0,8	4,1
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	6,1	1,0	10,7
<b>Labour market</b>	Unemployment rate (second quarter), 2001	2,7	2,2	3,4
	Change of unemployment rate in pp, 1998-2001	0,2	-0,3	0,9
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	25,8	20,3	32,1
	Research & Development personnel (total) per 1000 active persons, 2002	11,3	3,5	21,7
	Population with high educational level, share of population total education (%), 2002	35,2	26,1	45,8
<b>Demography</b>	Population in 1000, 2000	4.475	369	974
	Population density, 2000	14	4	181
	Population development in %, 1995-2000	2,9	-1,0	6,1
	Population over 65 years, share of total population (%), 2000	15,2	13,5	18,5
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,5 <sup>1</sup>	1,4	1,6
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,0 <sup>1</sup>		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	59 <sup>1</sup>	41	97
<b>Spatial structure</b>	FUA-Population, share of total population (%)	82,4	46,9	106,5

<sup>1</sup> Arithmetic mean from NUTS2-values

- Norway has high regional disparities in some fields, while in other fields the regional variations are low.
- The variation of the Norway regions is most distinctive in the field of spatial structure. While Oslo has a high value in this field, Nord-Norge has one of the lowest values of ESPON regions behind remote areas and Cyprus. This looks similar in the field of accessibility.
- In the fields of labour market, demography, environment and hazards Norwegian regions are above average.
- The Norwegian capital region of Oslo has the highest values in economy, labour market, environment, accessibility and spatial structure .
- However, Oslo cannot reach a good rank in economy in the European comparison but it is only in the upper third (rank 87).

**Figure 78 Norway: Regional spread of RCE-indices by thematic fields**



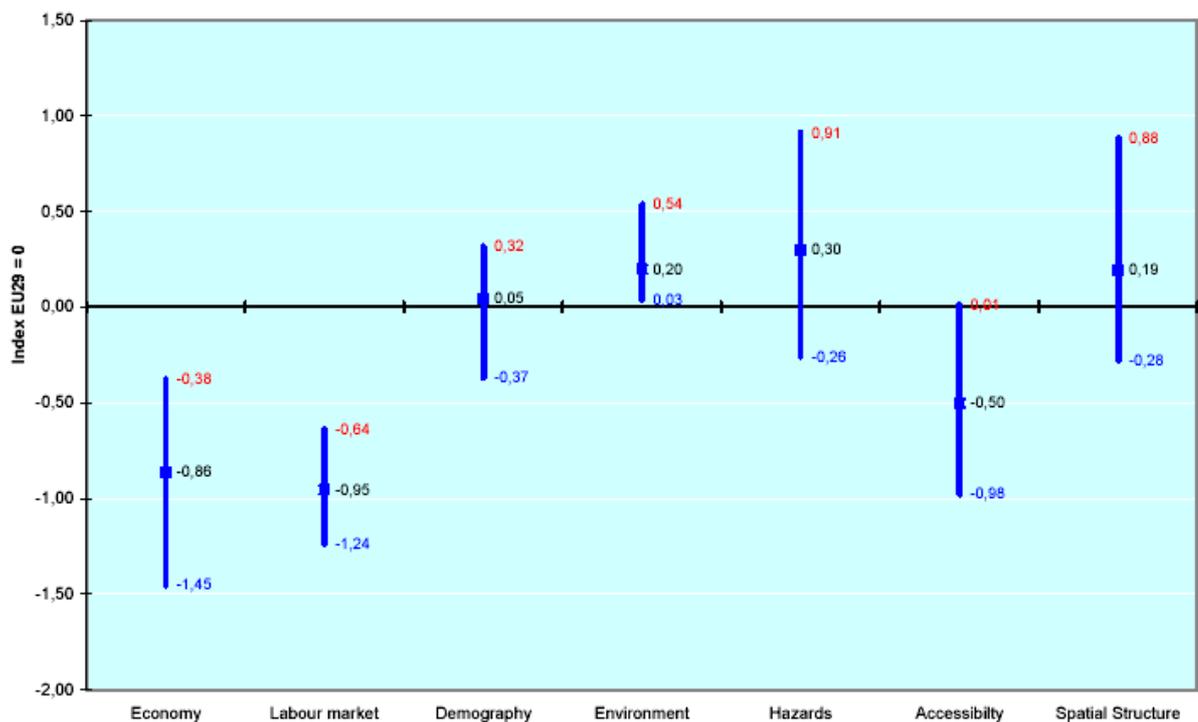
**Table 36 Poland: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	312.685	9.412	35.598
<b>Economy</b>	GDP in PPS per capita, 2000	8.951	6.261	13.352
	Research & Development expenditure, share of GDP (%), 2000	0,7	0,1	1,5
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	0,5	0,1	1,2
<b>Labour market</b>	Unemployment rate (second quarter), 2001	18,4	12,8	24,1
	Change of unemployment rate in pp, 1998-2001	8,5	4,2	13,6
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	152,2	105,3	181,2
	Research & Development personnel (total) per 1000 active persons, 2002	4,4	1,3	10,7
	Population with high educational level, share of population total education (%), 2002	12,4	8,9	16,5
<b>Demography</b>	Population in 1000, 2000	38.644	1.024	5.072
	Population density, 2000	124	61	394
	Population development in %, 1995-2000	0,1	-1,7	1,5
	Population over 65 years, share of total population (%), 2000	12,3	10,4	14,3
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,7 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,1 <sup>1</sup>	0,0	2,2
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	66 <sup>1</sup>	49	99
<b>Spatial structure</b>	FUA-Population, share of total population (%)	50,5	24,7	76,8

<sup>1</sup> Arithmetic mean from NUTS2-values

- The Polish regions have high regional variations in the fields of economy, hazards and spatial structure.
- In three of the seven thematic fields the average value for Poland is slightly better than the EU25+2+2 average. These are the fields of hazards, spatial structure and environment.
- In hazards the northern region Warminsko-Mazurskie has the highest value of ESPON regions at all.
- In economy and labour market the regional values for Poland are completely below the EU25+2+2 average. The region of Mazowieckie (Warszawa) has the highest value in economy, accessibility and spatial structure and also one of the highest values in labour market behind Lubelskie.
- In the field of accessibility the region of Mazowieckie (Warszawa) is the only Polish region above the EU25+2+2 average.

**Figure 79 Poland: Regional spread of RCE-indices by thematic fields**



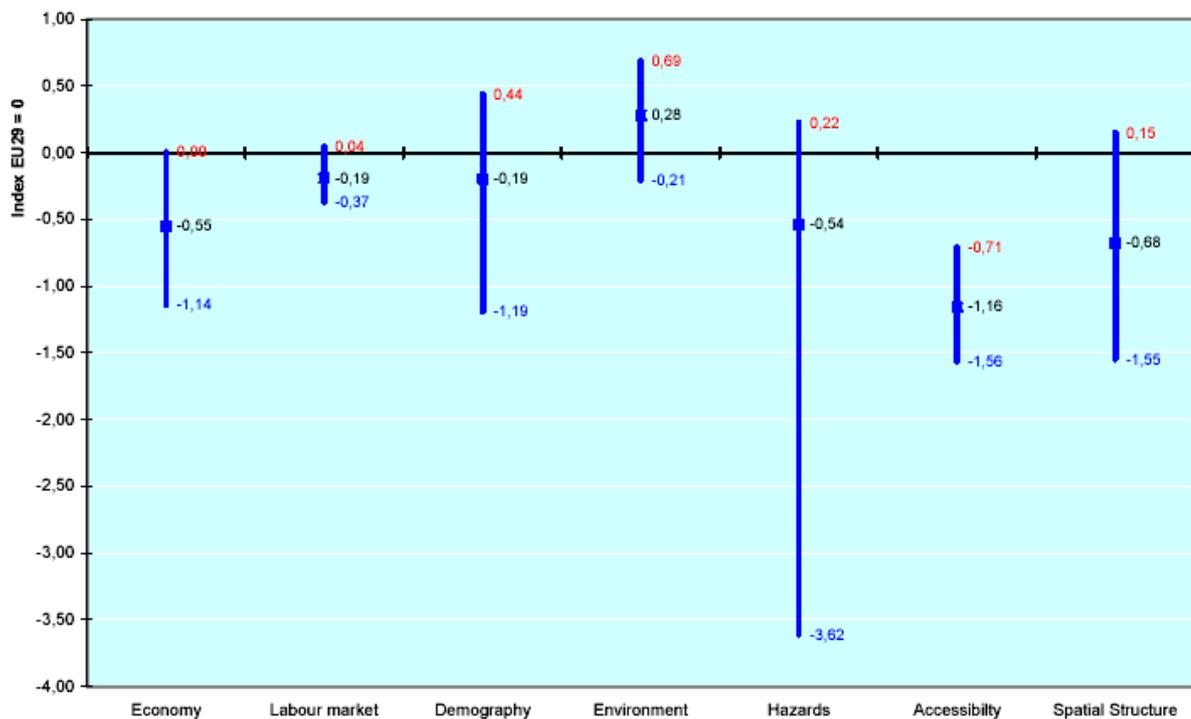
**Table 37 Portugal: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	91.906	779	26.931
<b>Economy</b>	GDP in PPS per capita, 2000	16.550	12.006	22.524
	Research & Development expenditure, share of GDP (%), 2000	0,7	0,3	2,4
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	0,7	0,1	0,7
<b>Labour market</b>	Unemployment rate (second quarter), 2001	4,0	2,2	5,7
	Change of unemployment rate in pp, 1998-2001	-1,3	-3,2	-0,1
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	43,4	19,4	68,6
	Research & Development personnel (total) per 1000 active persons, 2002	4,3	2,4	4,3
	Population with high educational level, share of population total education (%), 2002	10,0	5,0	13,2
<b>Demography</b>	Population in 1000, 2000	10.263	238	3.638
	Population density, 2000	111	20	314
	Population development in %, 1995-2000	2,2	-1,5	9,1
	Population over 65 years, share of total population (%), 2000	16,3	12,3	23,5
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	2,2 <sup>1</sup>	1,8	3,3
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,9 <sup>1</sup>	0,0	1,0
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	52 <sup>1</sup>	37	79
<b>Spatial structure</b>	FUA-Population, share of total population (%)	59,0	13,0	81,4

<sup>1</sup> Arithmetic mean from NUTS2-values

- The highest regional variations in Portugal can be found in the field of hazards. As a statistic outlier the Açores region has the lowest value of regions of the ESPON area.
- Labour market is the field with the lowest variation. The highest value in this field also has the Açores region.
- The region of Lisboa e Vale do Tejo has the highest value in economy, which is exactly the EU25+2+2 average.
- Only in environment the Portuguese average value is above the EU25+2+2 average.
- In the field of demography high regional disparities can be found. The Portuguese regions with the highest and the lowest value in this field are directly situated next to each other. These are the regions of Alentejo and Algarve in the south of Portugal.

**Figure 80 Portugal: Regional spread of RCE-indices by thematic fields**



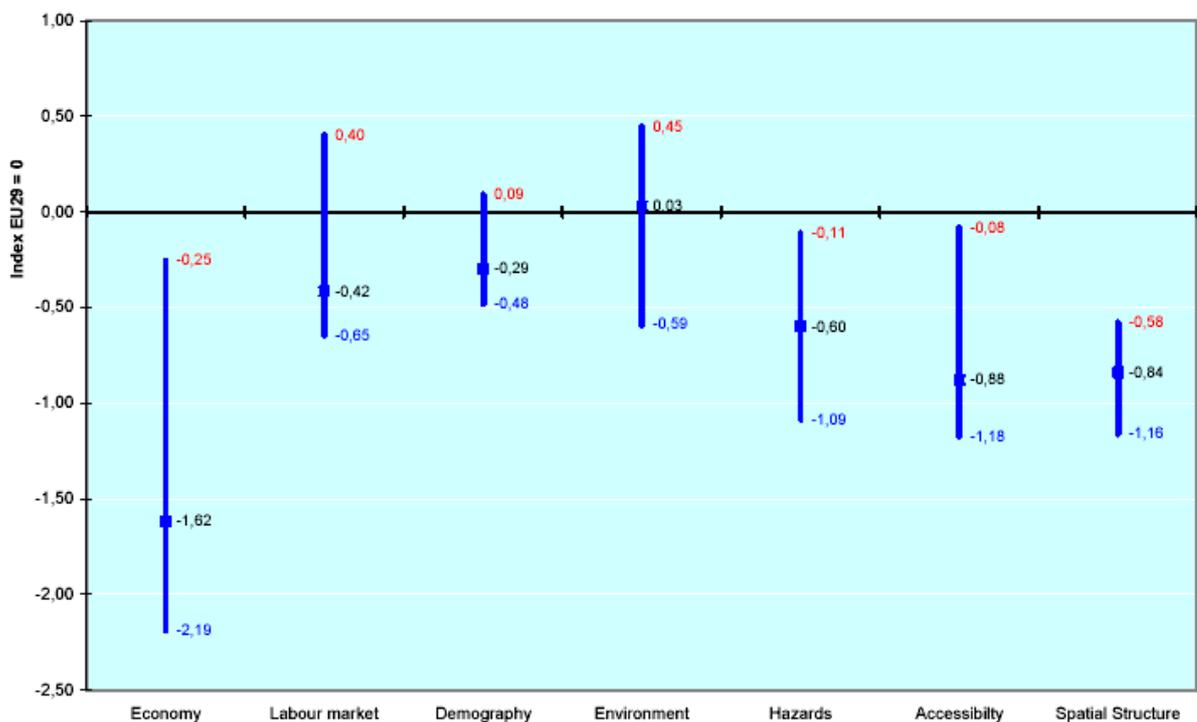
**Table 38 Romania: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	238.391	1.821	36.850
<b>Economy</b>	GDP in PPS per capita, 2000	5.463	4.175	7.732
	Research & Development expenditure, share of GDP (%), 2000	0,7		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	1,8	0,8	7,8
<b>Labour market</b>	Unemployment rate (second quarter), 2001	6,6	4,1	8,0
	Change of unemployment rate in pp, 1998-2001	1,0	0,1	1,4
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	69,9	27,5	92,0
	Research & Development personnel (total) per 1000 active persons, 2002	2,9	1,0	15,9
	Population with high educational level, share of population total education (%), 2002	10,3	7,2	23,1
<b>Demography</b>	Population in 1000, 2000	22.455	2.045	3.820
	Population density, 2000	94	64	1.255
	Population development in %, 1995-2000	-1,1	-2,2	1,0
	Population over 65 years, share of total population (%), 2000	13,2	12,3	14,7
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	2,1 <sup>1</sup>		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	2,0 <sup>1</sup>	1,0	3,9
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	56 <sup>1</sup>	37	103
<b>Spatial structure</b>	FUA-Population, share of total population (%)	37,9	24,4	85,4

<sup>1</sup> Arithmetic mean from NUTS2-values

- The national values for Romania are in all thematic fields below the EU25+2+2 average. Only in environment the national value is less above average.
- Economy is the field with the highest variation of regions in Romania. In this field the region Bucuresti has the highest value. The same goes for the field of labour market.
- From the European perspective, the Romanian regions are on the last position. The Romanian regions are the six regions with the lowest values among the EU25+2+2 regions .
- Regarding environment Bucuresti has the lowest value, regarding accessibility and spatial structure the highest.

**Figure 81 Romania: Regional spread of RCE-indices by thematic fields**



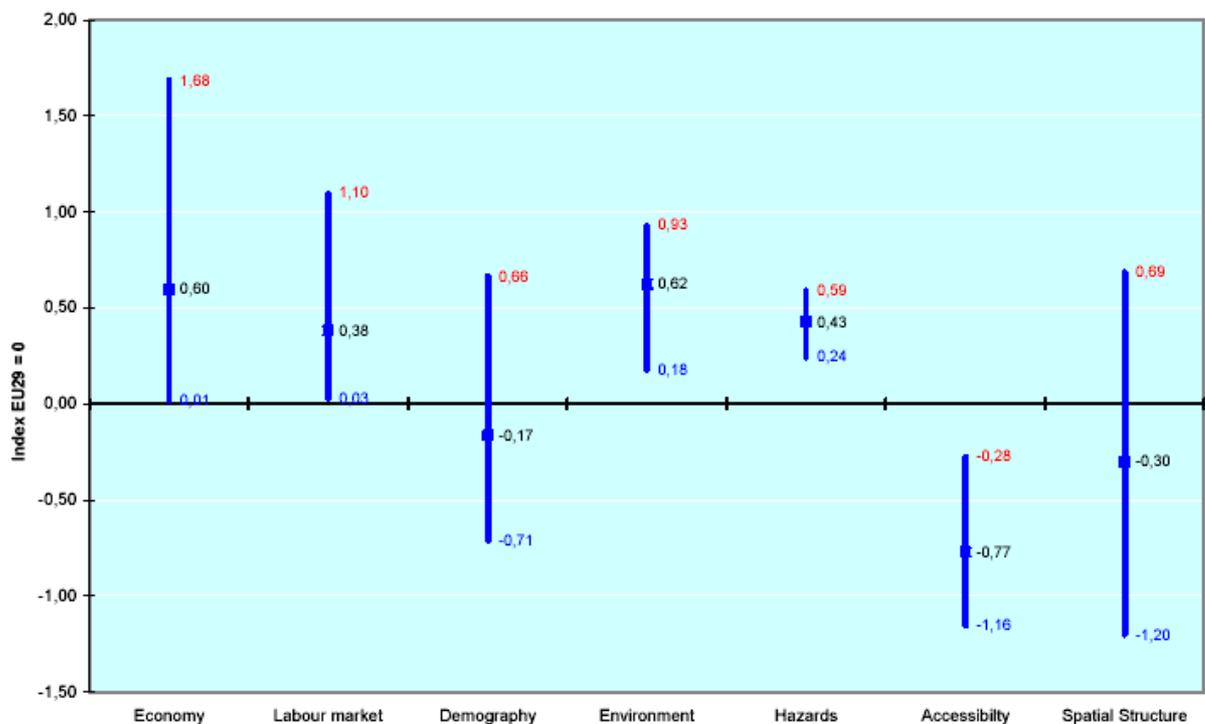
**Table 39 Sweden: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	410.934	6.490	154.312
<b>Economy</b>	GDP in PPS per capita, 2000	22.796	20.116	30.336
	Research & Development expenditure, share of GDP (%), 2000	3,2	0,3	5,2
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	10,9	1,6	15,9
<b>Labour market</b>	Unemployment rate (second quarter), 2001	5,1	2,7	7,3
	Change of unemployment rate in pp, 1998-2001	-3,4	-4,7	-2,5
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	50,9	23,8	79,1
	Research & Development personnel (total) per 1000 active persons, 2002	15,8	2,7	22,9
	Population with high educational level, share of population total education (%), 2002	26,9	20,6	34,9
<b>Demography</b>	Population in 1000, 2000	8.861	380	1.803
	Population density, 2000	22	3	278
	Population development in %, 1995-2000	0,5	-4,2	5,6
	Population over 65 years, share of total population (%), 2000	17,3	14,3	20,0
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,6 <sup>1</sup>	1,4	1,8
<b>Hazards</b>	Regional average number of flood events, 1987-2002	0,1 <sup>1</sup>	0,0	1,0
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	75 <sup>1</sup>	55	96
<b>Spatial structure</b>	FUA-Population, share of total population (%)	89,5	55,8	104,8

<sup>1</sup> Arithmetic mean from NUTS2-values

- In Sweden we can only find regional values below the EU25+2+2 average in the fields of spatial structure, accessibility and demography.
- In the field of economy Stockholm has the highest value of all ESPON regions. In addition Stockholm has the highest values of Swedish regions in labour market, which is rank 4 in the fields of demography and in spatial structure compared with the ESPON regions,.
- Hazards is the field with the less regional variation in Sweden.
- In regard to spatial structure and accessibility the northern Swedish regions get the lowest values.

**Figure 82 Sweden: Regional spread of RCE-indices by thematic fields**



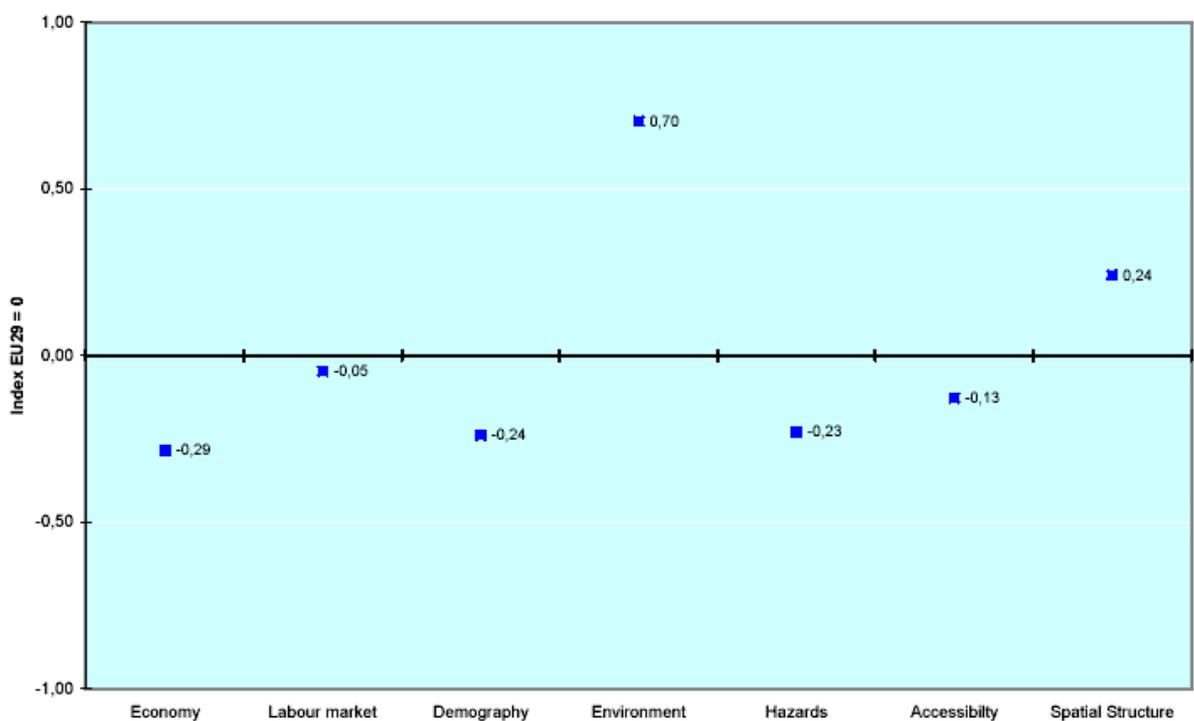
**Table 40 Slovenia: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	20.273		
<b>Economy</b>	GDP in PPS per capita, 2000	15.255		
	Research & Development expenditure, share of GDP (%), 2000	1,6		
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	4,2		
<b>Labour market</b>	Unemployment rate (second quarter), 2001	5,7		
	Change of unemployment rate in pp, 1998-2001	-1,7		
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	56,5		
	Research & Development personnel (total) per 1000 active persons, 2002	8,8		
	Population with high educational level, share of population total education (%), 2002	14,8		
<b>Demography</b>	Population in 1000, 2000	1.988		
	Population density, 2000	98		
	Population development in %, 1995-2000	-0,1		
	Population over 65 years, share of total population (%), 2000	13,9		
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,7		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,0		
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	86		
<b>Spatial structure</b>	FUA-Population, share of total population (%)	55,1		

<sup>1</sup> Arithmetic mean from NUTS2-values

- In the fields of environment and spatial structure Slovenia better is than the EU25+2+2 average.
- In regard to the field of environment Slovenia is under the top-25 regions within the ESPON area.
- In economy, labour market, demography, hazards and accessibility Slovenia is in the normal range but below the EU25+2+2 average.

**Figure 83 Slovenia: Regional spread of RCE-indices by thematic fields**



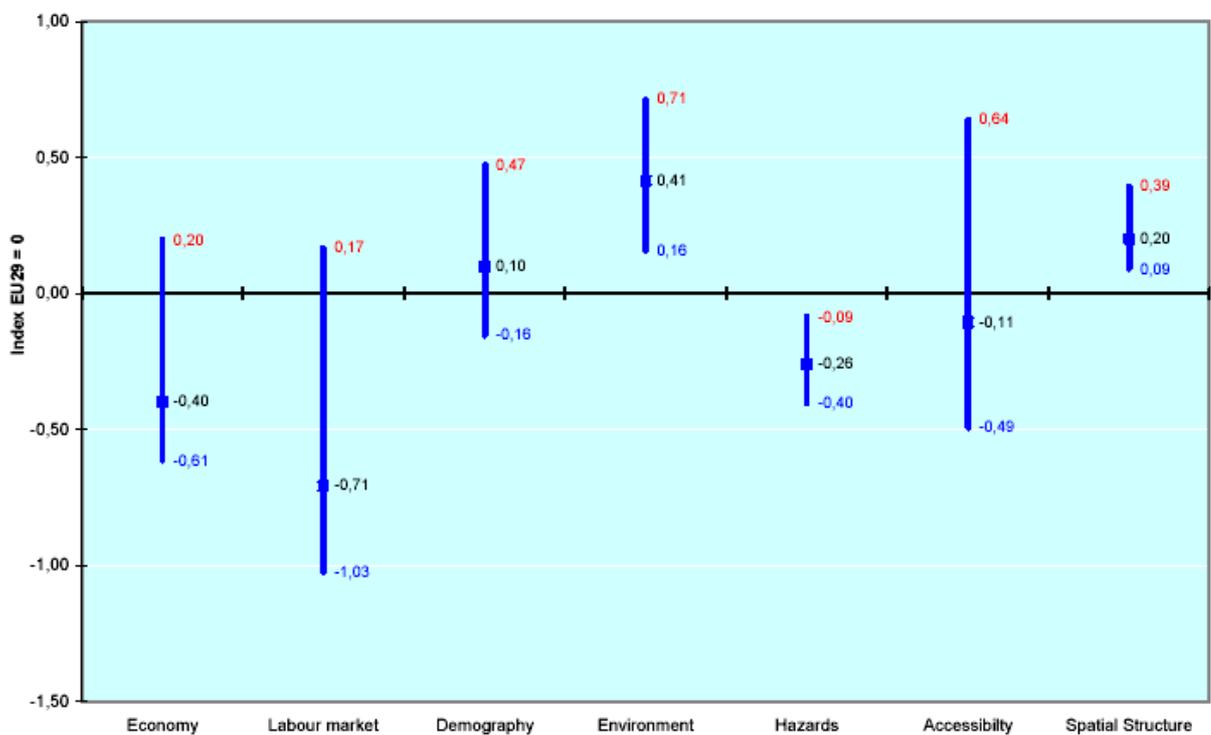
**Table 41 Slovakia: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	49.035	2.053	16.243
<b>Economy</b>	GDP in PPS per capita, 2000	10.478	8.505	20.785
	Research & Development expenditure, share of GDP (%), 2000	0,7	0,3	1,2
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	1,8	0,7	4,4
<b>Labour market</b>	Unemployment rate (second quarter), 2001	19,4	8,4	23,9
	Change of unemployment rate in pp, 1998-2001	5,5	3,3	6,5
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	176,2	90,4	210,4
	Research & Development personnel (total) per 1000 active persons, 2002	5,5	3,0	21,3
	Population with high educational level, share of population total education (%), 2002	11,1	8,2	25,2
<b>Demography</b>	Population in 1000, 2000	5.399	617	1.876
	Population density, 2000	110	83	301
	Population development in %, 1995-2000	0,3	-0,5	1,4
	Population over 65 years, share of total population (%), 2000	11,4	10,4	12,0
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,4		
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,2	1,0	1,7
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	85	63	124
<b>Spatial structure</b>	FUA-Population, share of total population (%)	64,6	59,4	97,1

<sup>1</sup> Arithmetic mean from NUTS2-values

- In Slovakia the most regions are below the EU25+2+2-average in the fields of economy and labour market. Only the region of Bratislavský has values above the average.
- In the field of labour market we find the highest variation of regions. While three of the four Slovak regions belong to the lowest twenty regions in ESPON area, Bratislavský stands outside above the EU25+2+2 average.
- Furthermore, Bratislavský has the highest values in hazards, accessibility and spatial structure.

**Figure 84 Slovakia: Regional spread of RCE-indices by thematic fields**



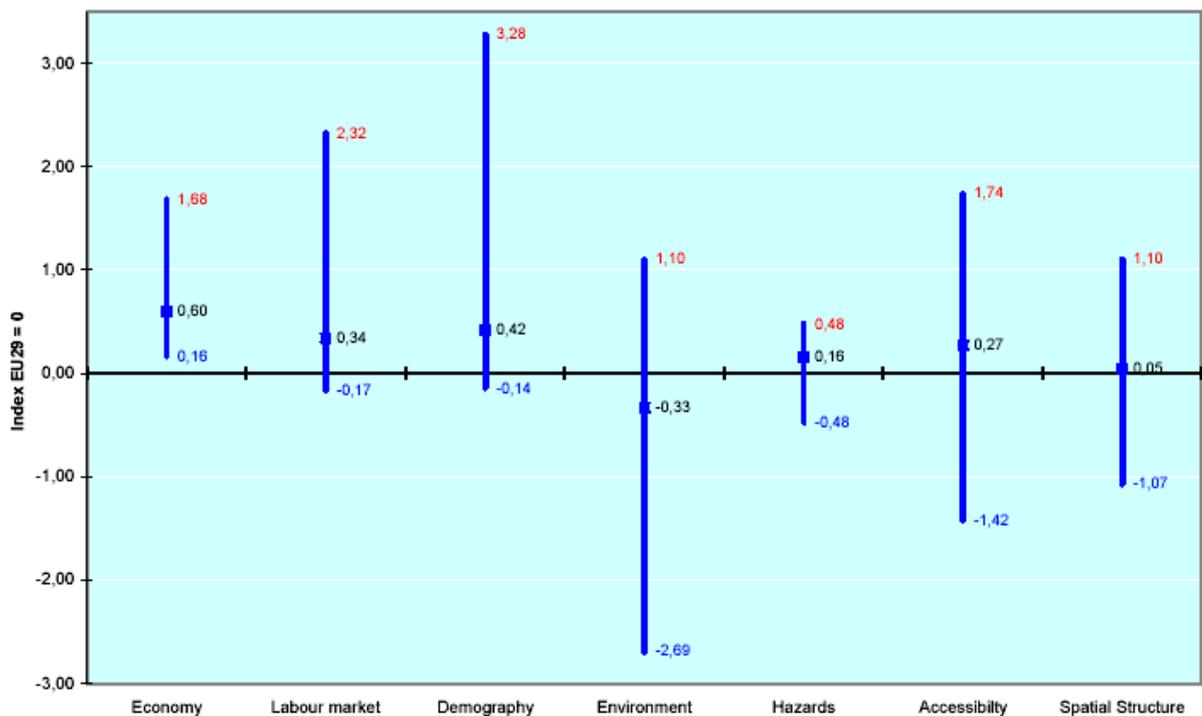
**Table 42 United Kingdom: Basic indicators**

<b>Category</b>	<b>Indicator</b>	<b>absolute</b>	<b>min</b>	<b>max</b>
	Area in km <sup>2</sup>	243.820	321	39.777
<b>Economy</b>	GDP in PPS per capita, 2000	22.543	14.608	54.151
	Research & Development expenditure, share of GDP (%), 2000	1,8	0,9	3,6
	Research & Development, Business Enterprise Sector (personnel per 1000 active persons), 2002	5,1	1,9	10,0
<b>Labour market</b>	Unemployment rate (second quarter), 2001	4,8	1,6	9,8
	Change of unemployment rate in pp, 1998-2001	-1,4	-3,7	-0,1
	Youth unemployment (unemployed under 25 / 1.000 inhabitants 15 -< 25 years), 2001	73,3	24,4	134,0
	Research & Development personnel (total) per 1000 active persons, 2002	8,1	3,0	15,5
	Population with high educational level, share of population total education (%), 2002	27,0	19,1	40,4
<b>Demography</b>	Population in 1000, 2000	5.399	367	4.477
	Population density, 2000	110	9	8.805
	Population development in %, 1995-2000	0,3	-0,5	1,4
	Population over 65 years, share of total population (%), 2000	15,6	10,9	20,7
<b>Environment</b>	Agriculture intensity, output/input-ratio, 2001	1,7 <sup>1</sup>	1,5	1,8
<b>Hazards</b>	Regional average number of flood events, 1987-2002	1,3 <sup>1</sup>	0,0	2,5
<b>Accessibility</b>	Potential accessibility multimodal (ESPON space = 100), 2001	102 <sup>1</sup>	39	162
<b>Spatial structure</b>	FUA-Population, share of total population (%)	50,9	9,9	104,8

<sup>1</sup> Arithmetic mean from NUTS2-values

- In the United Kingdom there are high regional variations in the fields of demography, environment and accessibility.
- In the United Kingdom the special role of Inner London is to attend. Here are the highest values in economy (rank 2 of ESPON regions), labour market (rank 1), demography (rank 1), spatial structure (rank 3) and accessibility (rank 10).
- Besides the Inner London region has the lowest value with regard to environment in the whole EU25+2+2 area.
- In the fields of economy, labour market and demography almost all regions in the United Kingdom reach values above the EU25+2+2 average.

**Figure 85 United Kingdom: Regional spread of RCE-indices by thematic fields**



### **7.3.2 ESPON regional typologies**

With the specific indicators of the Core indicators and especially with the selection of attributes within the RCE it will be possible to investigate potential patterns of values of the typologies and to explore the differences between groups created by values of the indicators of the RCE.

By this the main indicators describing selected spatial territories and making them different from others will be identified. Searching for thematic orientated spatial pattern or spatial homogeneity according a given spatial example this indicator could be used.

This analysis will be done with a discriminant analysis, which in one respect identifies those indicators and variables (as independent or grouping variables.) by which the given spatial scheme (as dependent variables) could be significantly differentiated, respectively is explained by the differences between the groups.

Furthermore the discriminant analysis is a second field of application. Of special interest and of special importance the discriminant analysis classifies regions of a not known group membership according to their characteristic values. That means, an existing regional classification will be examined according the indicator values and regrouped if not belonging into the regional spectrum that they represent. Vice versa regions not belonging to the group yet will be included due to their indicator attribute.

This will be done in this phase as a first step for selected typologies like the Functional Urban Areas of project 1.1.1, the Urban-Rural Typology of 1.1.2 and the overall typology of telecommunication of project 1.2.2. Furthermore differences between new and old member states of the European Union will be examined as well as border regions. A special attention will be given to transnational cooperation areas.

As mentioned at this moment three selected ESPON typologies will be examined with the help of the discriminant analysis. Regional aggregation are necessary for the FUA typology and the urban-rural typology, because those have been elaborated on NUTS 3, whereas the regional coverage of the RCE indicators relates due to their spatial orientation to NUTS 2.

#### **7.3.2.1 Functional Urban Areas**

The Functional Urban Areas (FUA's) asset has been used in this analysis related to the aspect of polycentrism. In the process of aggregation of the original Polycentricity Typology of six types (1+= Monocentric NUTS 3 (FUA exceed NUTS 3 boundaries); 0+=NUTS 3 region neighbouring 1+ NUTS 3 region; 1=monocentric NUTS 3 (only 1 FUA); 2= bipolar NUTS 3 (Two

FUA's); 3= polycentric NUTS 3 (Three or more FUA's); 0=no FUA) has been reduced to 3 types according the FUA situation:

- No FUA: None of the NUTS 3 regions of the NUTS 2 area includes a FUA
- Monocentric: Only one NUTS 3 region of the NUTS 2 area has or is a FUA
- Polycentric: Two or more NUTS 3 regions of a NUTS 2 area have at least one FUA or more.

Almost all included variables divide the spatial categories significantly. Best separating indicators with the highest F-Ratios are artificial surface (F-Ratio: 20,4), Labour Force replacement ratio (20,2), employment density (18,2), population density (17,2). Employment in the service sector (12,6) leads to another group of indicators with less separative quality. The high discriminating importance has the Labour Force replacement value followed by the share of artificial land. Not significant separating for are instance indicators like the development of GDP and of the unemployment rate or the share of R&D expenditures in GDP.

**Table 43 Highest and lowest F-Ratios separating groups of polycentrism**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
ARTIFICIAL SURFACE	20,40
LABOUR FORCE REPLACEMENT RATIO	20,17
EMPLOYMENT DENSITY	18,19
POPULATION DENSITY	17,21
EMPLOYMENT IN TERTIARY SECTOR	12,55
	<b>5 lowest F-Ratios</b>
GDP PER CAPITA	1,02
EXPENDITURE ON R&D	0,45
EARTHQUAKE HAZARD POTENTIAL	0,20
DEVELOPMENT OF UNEMPLOYMENT	0,19
OIL HAZARDS	0,15

Source: ESPON project 3.1

Being polycentric but having the spatial characteristics of monocentric regions according their indicator profile and therefore regrouped within the discriminant analysis are regions like Liège and Düsseldorf in Belgium and Germany and Greater Manchester, the West Midlands or Kent in the United Kingdom. Monocentric by FUA definition, the regions Saarland, Leipzig, Navarra, Stockholm, Latvia or Gronningen are seen to be polycentric due to

their indicator based profile. Some of them really are in respect to their structure.

A view on the regional mean value of the indicators with almost highest values in the categories of the monocentric regions, e.g. GDP per capita of 23339 PPS compared to 18356 PPS in polycentric regions or 19111 PPS in the EU27+2 area indicate the high degree of concentration in these areas (see Table 15). But the answer to this question lies in the numerous number of FUA's assigned in several countries, emphasising a kind of polycentricity of a local and subregional level and raising this to a regional level.

Furthermore different scales in different countries seem to enhance national differences instead of harmonising the approach. By this, the number of cases in the category of polycentric regions rises to 227 regions, the group of polycentric regions counts 45 regions, mainly dominant city regions often being NUTS 3 and NUTS 2 in one, and leaving 8 regions without FUA.

Additional work to adjust the valuable and essential approach should overcome this situation.

### **7.3.2.2 Urban Rural**

The NUTS 3 typology of urban-rural has been shifted to NUTS 2 according the dominantly determining groups. Therefore the six existing groups have to be kept indicated that the NUTS 2 regions are seen dominantly urban or rural according their NUTS 3 composition. The degree of human intervention remains unaffected.

The main discriminating indicators of the categories related to urban rural spatial types are the accessibility indicators. All four included indicators, road, rail air and multimodal accessibility determinate the highest F-ratio value, the latter with the highest score (F-ratio: 62,3). A second group of indicators with a lower level of F-ratios is introduced by the share of internet users per 1000 inhabitants (15,8) and the GDP in PPS per capita.

It has to be pointed out, that the two indicators basically used for the elaboration of the typology, the shares of artificial and natural surface have been excluded in this analysis.

Obviously no discriminative relevance have hazard indicators like volcanic activity and oil hazards, as well as change of unemployment rates and older population, the latter surprisingly, but potentially to explain in the land use orientation of the typology not including urban rural dependencies or functional interrelations and completion. Maybe this result may indicate, that the classical urban -rural dichotomy is no longer a relevant typology in the present modern European context.

This tendencies are emphasised by a percentage of 66,1 % correct classified cases of the original groups, which is statistically beyond random grouping, but nevertheless represent the heterogeneity of the grouping.

**Table 44 Highest and lowest F-Ratios in separating urban rural regional types**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
POTENTIAL ACCESSIBILITY MULTIMODAL	62,34
POTENTIAL ACCESSIBILITY AIR	54,89
POTENTIAL ACCESSIBILITY RAIL	49,87
POTENTIAL ACCESSIBILITY ROAD	42,87
INTERNET USERS	15,77
	<b>5 lowest F-Ratios</b>
REPRODUCTION POTENTIAL	2,75
AGEING	2,34
DEVELOPMENT OF UNEMPLOYMENT	2,25
VOLCANOES HAZARDS	2,19
OIL HAZARDS	1,60

Source: ESPON project 3.1

### **7.3.2.3 Combined typology of telecommunication development**

This typology elaborated on NUTS 2 level distinguishing the regional development in telecom in 6 classes between highly advanced and advanced over moderate down to lagging telecom regions can be significantly separated by a lot of indicators. The most important indicators with the highest F-Ratio are GDP in PPS per capita (F-Ratio: 62,4), employment in the tertiary sector (43,6) as well as vice versa in the Primary Sector (30,7). Furthermore the accessibility related to air traffic and modal use belong to the variables with the highest discriminative relevance (26,8 receptive 24,99: These indicators are followed by the development of GDP (21,3) and the unemployment rate (19,1).

Of minor influence on the separation of the telecom typology is the elder population (6,4), the hazard indicators (floods, oil, volcanoes) and the share of natural surface, without evidence to urban rural differences.

**Table 45 Highest and lowest F-Ratios separating groups of telecom development**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
GDP PER CAPITA	62,43
EMPLOYMENT IN TERTIARY SECTOR	43,64
EMPLOYMENT IN PRIMARY SECTOR	30,70
POTENTIAL ACCESSIBILITY AIR	26,84
POTENTIAL ACCESSIBILITY MULTIMODAL	24,93
<b>5 lowest F-Ratios</b>	
AGEING	6,40
FLOOD EVENTS	4,59
NATURAL SURFACE	4,58
OIL HAZARDS	1,21
VOLCANOES HAZARDS	1,21

Source: ESPON project 3.1

With a percentage of grouped cases originally correctly classified of 71 % the classification seems reasonable beyond random grouping (16,66 %).

Only a few regions will be regrouped due to their indicator characteristics. So Berlin and Luxembourg would be grouped highly advanced telecom region instead of advanced only and Wien, Bremen and Île de France would be also expected highly advanced instead of moderate advanced. In these cases the reality seems to follow the statistical expectations a bit delayed, they perform in telecom respect less then expected. On the other side, there are regions like Overijssel, Gelderland or Östra Mellansverige belong to the highly advanced telecom regions, but this indicator profile will regroup them to advanced telecom regions.

### **7.3.3 The 'Old' and new European Union and transnational cooperation**

#### **7.3.3.1 The new Member States**

What is the difference between the new Member States and the rest of the ESPON countries. The discriminant analysis separate the new 10 member states significantly with the highest F-Ratios being GDP per capita (F-Ratio: 27,8), proportion of firms with own website (22.2), Internet users (21,8), development of population (18,3) and the proportion of elder population

over 65 year (17,6). The changes in natural growth potential of the population, development of GDP, Input-Output Ratio in agricultural production, R&D personnel and share of high educated population are the following indicators, separation significant with slightly lower F-Ratio. No discriminative importance have indicators like Employment density, artificial and natural surface, youth unemployment or the earthquake possibility.

Evident is the importance of the telecom sector explaining the differences between the new Member States and the other countries underlining the need for improvement in this sector. In the development of GDP, the relative increase above average, even starting from a low base might point to a future improvement.

The quite homogenous spatial unity of the new member states, 94,6 % of the grouped regions have been classified corrected (random: 50%), does not mean, that all regions would be strictly 'old' versus new organised. The estimation of grouping of the bases of the indicators identifies only two wanderers moving to the others group: Eesti and Východné Slovensko in Slovakia.

According to the variable values regrouped into the new Member States will be regions Yugozapaden and Yuzhen Tsentralen of Bulgaria and the central and south west region of Romania, as best performing regions of the next round of enlargement. But also regions of the EU 15 are regrouped to the new Member States according the indicator performance: Norte, Acores and Madeira in Portugal.

**Table 46 Highest and lowest F-Ratios separating the new Member States**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
GDP PER CAPITA	62,43
EMPLOYMENT IN TERTIARY SECTOR	43,64
EMPLOYMENT IN PRIMARY SECTOR	30,70
POTENTIAL ACCESSIBILITY AIR	26,84
POTENTIAL ACCESSIBILITY MULTIMODAL	24,93
	<b>5 lowest F-Ratios</b>
AGEING	6,40
FLOOD EVENTS	4,59
NATURAL SURFACE	4,58
OIL HAZARDS	1,21
VOLCANOES HAZARDS	1,21

Source: ESPON project 3.1

### 7.3.3.2 Transnational cooperation areas

The potential differences and the homogeneity of transnational cooperation areas of Interreg IIIB will be examined in the same way searching for indicators by which the areas differ from the specific rest of the regions or which regions will belong to the estimated cooperation area according their characteristic values.

The indicators with the highest F-Ratio vary in their composition in a high extent between the different areas.

#### 7.3.3.2.1 The North Sea area

The North Sea area separate the most in respect to changes of the natural growth potential of the population (F-Ratio: 38,5), earth quake risk (26,2), internet use (23,3) and internet presence of firms (20,4), the unemployment rate (20,5) being below average and the educational level (14,9) with above average values.

Regions outside the North Sea area, but estimated area member due to the indicator performance are regions like Niederösterreich and Wien, Vlaams Brabant, Niederbayern und Berlin, Itä and Väli Suomi, as well as some Dutch, British and Swedish regions not belonging to the area. Vice versa some British regions of the area like North and South Yorkshire, Eastern Scotland and the Highlands and Islands does not fit according their values and are grouped out of the area.

**Table 47 Highest F-Ratios separating the North Sea Area**

Indicator	5 highest F-Ratios
REPRODUCTION POTENTIAL	38,48
EARTHQUAKE HAZARD POTENTIAL	26,22
INTERNET USERS	23,34
UNEMPLOYMENT	20,50
FIRMS WITH OWN WEBSITE	20,44

Source: ESPON project 3.1

#### 7.3.3.2.2 The Cadses area

The CADSES area is separated by the share of employment in the service sector (F-Ratio 126,6), the natural growth potential telecom use and performance and educational level as well as the development of unemployment with rising unemployment rates.

In respect to their indicator performance, Austrian regions like Wien, Nieder- and Oberösterreich , almost all of the German regions, Voreio Aigaio in Greece ant Trentino-Alto Adige in Italy will be estimated outside the area. Regions like Valencia and Murcia in Spain, Piemonte and Valle d’Aosta, Basilicat, Calabria and Sicilia and the Portuguese regions will be estimated to CADSES according their regional profile.

**Table 48 Highest F-Ratios separating the CADSES area**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
EMPLOYMENT IN TERTIARY SECTOR	126,69
REPRODUCTION POTENTIAL	104,18
FIRMS WITH OWN WEBSITE	88,71
HIGH EDUCATED POPULATION	83,98
INTERNET USERS	82,66

Source: ESPON project 3.1

### **7.3.3.2.3 The Atlantiv Arc**

The Atlantic Arc is separated by it’s peripheral location. The accessibility indicators are those with the highest F-Ratios. Supplemented by the development of unemployment and GDP the areas separate significantly in this respect.

Explained by the indicator spectrum region like Cheshire, Herfordshire and Shropshire in the United Kingdom and Galicia and Andalucia in Spain will be estimated outside the atlantic arc.

Indicating and emphasising the fringe situation of the original classification are those regions which will belong into the classification due to the value characteristics. Those are Scottish regions and regions in South West England, almost all Swedish Regions and Hedmark og Oppland in Norway, the Aegean Islands of Greece as well as Umbria and Marche in Italy and finally the region Eszak Alföld in Hungaria.

**Table 49 Highest F-Ratios separating the Atlantic Arc Area**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
POTENTIAL ACCESSIBILITY ROAD	14,63
DEVELOPMENT OF UNEMPLOYMENT	14,45
POTENTIAL ACCESSIBILITY MULTIMODAL	12,36
POTENTIAL ACCESSIBILITY AIR	11,66
POTENTIAL ACCESSIBILITY RAIL	11,50

Source: ESPON project 3.1

### **7.3.3.2.4 The Northern Periphery**

The Northern Periphery is comparable to the Atlantic Arc to be separated by the accessibility indicators, the road accessibility with the highest F-Ratio of 25,0. Here the natural surface has the second highest F-Ratio measuring the strength of the discrimination. An important value is given by flood hazards, the Northern Periphery comparable less effected and by the natural growth potential of the population which is above average.

With a percentage of grouped regions correctly classified of 94,3 % the original setting is stable and remains unaffected of a regional grouping out of the estimation. Not belonging to this spatial category but estimated member will be regions in the South of Finland, Norway and Sweden, Latvia, but also Cumbria and additionally South Eastern Scotland in the United Kingdom as well Corse and Guyane in France.

**Table 50 Highest F-Ratios separating the Northern Periphery Area**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
POTENTIAL ACCESSIBILITY ROAD	24,99
NATURAL SURFACE	21,95
POTENTIAL ACCESSIBILITY RAIL	21,24
FLOOD EVENTS	17,66
REPRODUCTION POTENTIAL	15,15

Source: ESPON project 3.1

### 7.3.3.2.5 Alpine Space

The Alpine Space will be separated with the highest F-Ratio in Flood Hazards (34,9) and the natural surface (32,4), followed by the employment in the Production sector (32,2) and the GDP per capita in PPS (27,3). Of further discriminative importance is the youth unemployment which is low compared to the average.

With 93,2 % of correct classified regions (cases) in the original classification the regional setting of the Alpine Space can be seen as solid. Only a few regions are estimated as not belonging to this space. These are Burgenland, Wien und Oberösterreich, and the included parts of the Toscana. According to their indicator values will be included the regions of Stuttgart and Karlsruhe, Mittel- und Unterfranken, und Karlsruhe in Germany, Canarias in Spain, Rhone-Alpes in France, Attiki in Greece, Småland med Öarna in Sweden and the Highlands and Islands in Scotland.

**Table 51 Highest F-Ratios separating the Alpine Space**

Indicator	5 highest F-Ratios
FLOOD EVENTS	34,94
NATURAL SURFACE	32,44
R&D PERSONNEL IN BUSINESS SECTOR	32,19
GDP PER CAPITA	27,26
YOUTH UNEMPLOYMENT	25,57

Source: ESPON project 3.1

### 7.3.3.2.6 Archimed area

The most relevant indicators separating the Archimed Area with the highest F-Ratios are the Input-Output Ratio in Agriculture (177,7) and the earth quake hazard potential (132,4). Those are followed by the importance of the primary sector in employment (34,0) and the telecom deficits related to business internet presence (26,1) and internet use (25,4).

With a percentage of originally correct classified cases of 97,1 % this area is the most homogeneous cooperation area. Only one region is estimated not to fit into the area due to indicator values, which is Attiki. Regions estimated as new cases in the classification round up the area with Liguria in Italy, widen the area to the regions of South East and Sud in Romania and enclose new regional perspectives with Guyane and Guadeloupe.

**Table 52 Highest F-Ratios separating the Archimed Area**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
OUTPUT/INPUT RATIO AGRICULTURE	177,69
EARTHQUAKE HAZARD POTENTIAL	132,43
EMPLOYMENT IN PRIMARY SECTOR	33,97
FIRMS WITH OWN WEBSITE	26,06
INTERNET USERS	25,55

Source: ESPON project 3.1

### **7.3.3.2.7 The Baltic Sea area**

The Baltic Sea area is defined as a separate space by the flood hazard potential and the development of unemployment with a high increase compared to the average development. Furthermore, low accessibility value related to road and rail are highly discriminative factors in this cooperation area.

Four regions are regrouped outside the area, those are Brandenburg, Hamburg, Mecklenburg-Vorpommern and the region Lüneburg all in Germany. To the Baltic Sea area will belong in respect to their spatial characteristics regions like Severozapaden and Severen Tsentralen in Bulgaria, Réunion and Sardegna in France respective Italy, Malta, the southern regions of Romania large parts of Slovakia and North Eastern Scotland.

**Table 53 Highest F-Ratios separating the Baltic Sea Area**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
FLOOD EVENTS	44,46
DEVELOPMENT OF UNEMPLOYMENT	43,33
EARTHQUAKE HAZARD POTENTIAL	37,99
POTENTIAL ACCESSIBILITY ROAD	29,07
OUTPUT/INPUT RATIO AGRICULTURE	22,76

Source: ESPON project 3.1

### 7.3.3.2.8 The Western Mediterranean area

The Western Mediterranean area distinguish in like the Archimed area in the Input-Output Ratio in Agriculture at the first place with a f-Ration of 158,5. On a lower level the earthquake hazard potential (91,7) and the natural surface (30,5) are main discriminating factors. The low value of the change in natural growth potential of the population and the above average share of elder population are further indicator which discriminate significant.

The correct classification of 92 % of the cases indicate a strong homogeneity. Regions being estimated as new parts of the area enlarge the extent with neighbouring regions in Spain, France, and Italy and include Madeira as well as the region of Bucuresti.

**Table 54 Highest F-Ratios separating the Western Mediterranean Area**

Indicator	5 highest F-Ratios
OUTPUT/INPUT RATIO AGRICULTURE	158,52
EARTHQUAKE HAZARD POTENTIAL	91,75
NATURAL SURFACE	30,46
REPRODUCTION POTENTIAL	18,06
AGEING	17,53

Source: ESPON project 3.1

### 7.3.3.2.9 The South West area

The South West cooperation area is dominantly determined by the natural Growth potential (F-Ratio: 31,7) and the development of unemployment (30,6), the latter by above average decrease. Almost with the same discriminative power the under average accessibility values explain the spatial.separation.

According to their indicator structure, the Portuguese regions Notre, Lisboa e Vale do Tejo and Madeira will be grouped out. Classified and included due to comparable value structure will be the regions of Eastern Germany like Brandenburg, Mecklenburg-Vorpommern, Chemnitz, Dresden and Thüringen. In France the Bretagne and Pays de la Loire having comparable structures, as well as regions of central Italy like Toscana and Liguria and Ireland.

**Table 55 Highest F-Ratios separating the South West Area**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
REPRODUCTION POTENTIAL	31,74
DEVELOPMENT OF UNEMPLOYMENT	30,64
POTENTIAL ACCESSIBILITY RAIL	29,47
POTENTIAL ACCESSIBILITY ROAD	29,36
POTENTIAL ACCESSIBILITY MULTIMODAL	23,80

Source: ESPON project 3.1

### **7.3.3.2.10 North West Europe**

North West Europe is defined by it's central position, the four accessibility indicators used have the highest discriminatory importance with rail and air accessibility the highest F-Ratios with 225,2 and 199,8. Beside accessibility the share of employment in Industry and the flood hazard potential separate the regions of North Wets Europe from the other regions.

The estimated regional shape leads related to the dominance of accessibility to a modified regional shape in a more South and South East direction , excluding the regions of Ireland, Northern England and Scotland and Basse Normandie in France and including in the estimation Western parts of Austria, parts of Switzerland until the Région Lémanique and Rhone-Alpes in France. In the North the remaining parts of the Netherlands will be included and via the region of Oberpfalz the regions of Sachsen-Anhalt and the region of Leipzig will be included. The North West Europe area is moving interconnected with the determination to accessibility with the new geographic situation of the enlarged Europe.

**Table 56 Highest F-Ratios separating the North West Europe Area**

<b>Indicator</b>	<b>5 highest F-Ratios</b>
POTENTIAL ACCESSIBILITY RAIL	225,23
POTENTIAL ACCESSIBILITY ROAD	193,79
POTENTIAL ACCESSIBILITY MULTIMODAL	116,34
POTENTIAL ACCESSIBILITY AIR	78,42
R&D PERSONNEL IN BUSINESS SECTOR	51,44

Source: ESPON project 3.1



**Table 57 Regional mean values of RCE indicators by polycentrism and urban-rural relation**

	Total	Polycentricity			Urban - Rural					
		No FUA	Monocentric	Polycentric	Urban with high human intervention	Urban with moderate human intervention	Urban with low human intervention	Rural with high human intervention	Rural with moderate human intervention	Rural with low human intervention
GDP PER CAPITA	19111	16744	23339	18356	23168	19001	18871	12864	16224	18797
EXPENDITURE ON R&D	0,01	0,02	0,02	0,01	0,02	0,01	0,01	0,01	0,01	0,01
R&D PERSONNEL IN BUISNESS SECTOR	4,26	2,11	4,70	4,25	6,49	3,22	5,16	2,60	2,71	2,79
GDP PER CAPITA	33,54	17,48	35,06	33,81	33,81	41,33	25,11	43,91	44,19	17,41
FIRMS WITH OWN WEBSITE	47,24	48,48	51,90	46,27	55,87	47,79	48,54	37,16	39,62	43,40
EMPLOYMENT IN TERTIARY SECTOR	63,34	75,76	68,19	61,94	68,53	62,85	62,95	56,69	59,33	62,36
EMPLOYMENT IN PRIMARY SECTOR	7,70	5,13	5,38	8,25	2,70	5,93	8,73	12,25	11,36	11,47
DEVELOPMENT OF UNEMPLOYMENT	-0,96	-1,51	-1,13	-0,91	-1,05	-0,61	-1,78	0,45	-1,38	-1,43
YOUTH UNEMPLOYMENT	77,27	152,34	61,89	77,67	60,18	80,88	75,55	93,24	86,78	87,61
UNEMPLOYMENT	8,58	15,84	6,80	8,68	6,40	9,40	8,73	10,81	10,22	9,01
LABOUR FORCE REPLACEMENT RATIO	1,24	2,05	1,18	1,22	1,14	1,16	1,22	1,39	1,30	1,33
R&D PERSONNEL	7,95	5,02	8,96	7,86	11,28	6,05	8,85	5,10	6,15	6,26
HIGH EDUCATED POPULATION	20,71	26,73	23,31	19,98	23,89	17,88	20,71	17,16	19,55	20,61
EMPLOYMENT DENSITY	149,17	128,18	427,83	94,67	350,55	72,37	123,01	35,18	26,87	26,60
INTERNET USERS	27,38	26,21	33,04	26,30	35,96	26,65	29,95	18,07	19,55	23,33
POPULATION DENSITY	343,90	311,98	976,66	219,58	783,89	172,97	323,65	87,72	65,94	69,63
AGEING	15,79	11,34	15,42	16,02	15,48	15,99	15,48	15,06	17,14	16,09
REPRODUCTION POTENTIAL	7,80	1,06	0,81	0,82	0,87	0,79	0,81	0,79	0,76	0,84
POPULATION GROWTH	37,03	2,23	0,73	0,92	1,41	1,01	1,48	-0,33	0,53	0,95
ARTIFICIAL SURFACE	2,10	7,31	18,41	5,71	17,90	5,08	3,61	3,75	1,71	1,12
NATURAL SURFACE	1,15	53,20	36,22	36,62	21,95	30,50	44,94	35,80	40,45	62,99
OUTPUT/INPUT RATIO AGRICULTURE	7,97	2,78	2,04	2,08	1,84	2,11	2,22	1,86	2,32	2,52
FLOOD EVENTS	0,13	0,69	1,11	1,17	1,41	1,30	1,34	1,34	0,89	0,49
EARTHQUAKE HAZARD POTENTIAL	-0,11	9,53	7,97	7,91	5,61	7,82	8,53	9,20	7,83	11,10
VOLCANOES HAZARDS	91,01	0,38	0,24	0,10	0,01	0,27	0,10	0,00	0,06	0,39
OIL HAZARDS	89,20	-0,13	-0,18	-0,10	-0,24	0,03	0,10	0,08	-0,25	-0,18
POTENTIAL ACCESSIBILITY ROAD	89,34	78,04	105,37	88,62	137,20	101,33	91,52	71,06	60,67	35,51
POTENTIAL ACCESSIBILITY RAIL	89,59	77,91	105,08	86,45	140,29	96,39	88,41	66,80	55,65	31,88
POTENTIAL ACCESSIBILITY AIR	0,82	83,15	105,01	86,45	118,72	92,62	88,59	72,77	65,53	62,90
POTENTIAL ACCESSIBILITY MULTIMODAL	0,93	83,71	104,54	86,84	120,47	93,63	88,88	72,07	65,85	60,62

Source: ESPON project 3.1

**Table 58 Regional mean values of RCE indicators by telecommunication development and European integration**

	Total	Regions by telecommunication development						European Integration		
		Highly advanced	Advanced	Moderately advanced	Moderate	Lagging	Highly lagging	EU 15	ACC 10	EU 25
GDP PER CAPITA	19111	28071	22741	22521	17785	12751	6581	21282	11727	19510
EXPENDITURE ON R&D	0,01	0,02	0,02	0,02	0,01	0,01	0,01	0,02	0,01	0,01
R&D PERSONNEL IN BUSINESS SECTOR	4,26	7,00	6,73	4,94	3,06	1,61	1,10	4,61	1,73	4,06
GDP PER CAPITA	33,54	24,86	49,76	24,48	30,25	42,77	59,94	32,02	55,37	36,80
FIRMS WITH OWN WEBSITE	47,24	63,24	56,57	53,52	42,97	36,22	19,71	51,36	34,40	48,00
EMPLOYMENT IN TERTIARY SECTOR	63,34	74,45	70,91	65,57	62,57	56,55	44,90	66,30	57,16	64,34
EMPLOYMENT IN PRIMARY SECTOR	7,70	2,91	2,29	4,48	8,74	10,65	25,01	5,58	6,32	6,53
DEVELOPMENT OF UNEMPLOYMENT	-0,96	-2,44	-1,45	-1,57	-1,86	0,72	2,93	-2,13	0,72	-1,19
YOUTH UNEMPLOYMENT	77,27	46,90	63,62	58,38	87,07	101,96	109,63	72,81	75,88	78,46
UNEMPLOYMENT	8,58	4,46	5,07	6,22	10,60	11,77	13,42	7,74	9,58	8,64
LABOUR FORCE REPLACEMENT RATIO	1,24	1,18	1,18	1,06	1,22	1,47	1,47	1,16	1,36	1,23
R&D PERSONNEL	7,95	12,39	10,65	8,19	7,46	4,38	3,57	8,34	5,22	7,72
HIGH EDUCATED POPULATION	20,71	28,89	23,78	22,07	20,15	14,17	15,21	21,75	15,97	20,57
EMPLOYMENT DENSITY	149,17	531,50	286,05	131,95	91,91	39,07	54,65	171,15	111,49	157,39
INTERNET USERS	27,38	45,96	35,64	32,85	21,83	15,37	6,27	30,42	14,88	27,41
POPULATION DENSITY	343,90	1189,27	641,27	293,19	243,33	99,10	135,03	395,33	254,89	364,63
AGEING	15,79	15,02	15,53	16,72	16,60	14,95	14,22	16,43	13,52	15,87
REPRODUCTION POTENTIAL	7,80	0,93	0,95	0,88	0,73	0,73	0,68	0,85	0,69	0,83
POPULATION GROWTH	37,03	2,86	1,43	1,29	0,72	0,32	-1,70	1,37	-1,16	1,04
ARTIFICIAL SURFACE	2,10	20,67	17,05	7,78	4,02	3,15	4,82	8,69	6,66	8,15
NATURAL SURFACE	1,15	28,28	23,10	35,42	42,30	38,58	37,08	36,07	35,48	35,68
OUTPUT/INPUT RATIO AGRICULTURE	7,97	1,74	1,72	1,98	2,59	2,01	1,91	2,21	1,60	2,12
FLOOD EVENTS	0,13	0,54	1,17	1,31	1,06	1,04	1,39	1,15	0,95	1,13
EARTHQUAKE HAZARD POTENTIAL	-0,11	2,83	4,68	6,70	10,74	7,84	13,61	7,76	7,92	7,47
VOLCANOES HAZARDS	91,01	0,00	0,00	0,04	0,21	0,16	0,41	0,17	0,00	0,14
OIL HAZARDS	89,20	0,18	-0,31	-0,12	0,02	-0,20	-0,18	-0,11	0,04	-0,11
POTENTIAL ACCESSIBILITY ROAD	89,34	99,10	120,43	109,75	75,53	73,07	49,51	98,37	76,25	94,56
POTENTIAL ACCESSIBILITY RAIL	89,59	107,94	123,54	106,67	72,55	66,88	44,35	97,15	66,93	92,71
POTENTIAL ACCESSIBILITY AIR	0,82	119,33	113,33	97,90	79,68	69,23	57,58	93,57	82,36	90,69
POTENTIAL ACCESSIBILITY MULTIMODAL	0,93	116,74	113,45	99,49	79,94	69,54	56,05	94,58	79,70	91,30

Source: ESPON project 3.1

**Table 59 Regional mean values of RCE indicators by transnational cooperation area**

	Total	North Sea	CADSES	Atlantic Arc	Northern Periphery	Alpine Space	Archimed	Baltic Sea	Mediterran ean Area	South West	North West Europe
GDP PER CAPITA	19111	22953	15065	18751	20693	25486	14595	17363	19711	17617	24092
EXPENDITURE ON R&D	0,01	0,02	0,01	0,01	0,02	0,02	0,01	0,02	0,01	0,01	0,02
R&D PERSONNEL	4,26	5,75	2,74	3,29	6,91	8,06	0,61	4,27	3,96	2,20	7,44
GDP PER CAPITA	33,54	20,52	37,18	47,71	9,68	17,28	38,61	29,97	30,20	30,96	15,88
FIRMS WITH OWN WEBSITE	47,24	56,34	37,70	47,98	53,04	58,53	30,71	43,04	45,44	42,20	57,20
EMPLOYMENT IN TERTIARY SECTOR	63,34	68,77	55,38	64,78	68,44	63,92	57,80	61,94	63,77	61,88	66,49
EMPLOYMENT IN PRIMARY SECTOR	7,70	4,07	12,46	6,41	7,69	4,90	19,69	11,26	10,74	8,77	3,36
DEVELOPMENT OF UNEMPLOYMENT	-0,96	-1,35	0,93	-2,66	-2,50	-1,57	-0,59	1,70	-1,76	-3,91	-2,01
YOUTH UNEMPLOYMENT	77,27	56,09	86,17	72,68	73,15	36,25	118,19	94,26	90,60	81,61	46,20
UNEMPLOYMENT	8,58	4,73	10,61	7,03	6,88	4,00	12,62	11,24	9,53	9,96	5,50
LABOUR FORCE REPLACEMENT RATIO	1,24	1,14	1,25	1,27	1,19	1,02	1,16	1,41	1,09	1,22	1,20
R&D PERSONNEL	7,95	9,48	6,00	6,28	12,93	12,04	3,98	8,71	8,24	5,99	11,57
HIGH EDUCATED POPULATION	20,71	24,95	15,66	22,13	28,31	18,73	13,15	22,93	17,16	20,80	23,43
EMPLOYMENT DENSITY	149,17	159,05	104,27	126,41	18,32	137,82	51,28	103,83	99,99	100,91	179,33
INTERNET USERS	27,38	36,86	18,27	26,29	33,85	38,78	11,32	25,54	25,74	20,21	36,89
POPULATION DENSITY	343,90	342,49	239,98	290,20	35,62	288,15	144,85	239,76	254,66	266,16	410,01
AGEING	15,79	16,01	15,36	17,01	16,57	16,26	17,66	14,67	17,39	17,61	15,53
REPRODUCTION POTENTIAL	0,82	0,97	0,70	0,84	1,02	0,84	0,68	0,86	0,73	0,67	0,94
POPULATION GROWTH	0,93	1,88	-0,03	1,41	-0,85	1,35	1,21	0,40	1,55	1,70	2,04
ARTIFICIAL SURFACE	7,80	10,14	6,12	6,97	1,28	5,61	1,96	6,08	2,69	1,78	11,35
NATURAL SURFACE	37,03	26,24	38,71	33,86	65,41	56,12	47,34	42,74	52,07	48,01	27,17
OUTPUT/INPUT RATIO AGRICULTURE	2,10	1,73	2,15	2,07	1,55	2,21	3,94	1,63	3,15	2,63	1,86
FLOOD EVENTS	1,15	0,83	1,29	0,98	0,20	1,88	0,46	0,51	1,15	0,88	1,72
EARTHQUAKE HAZARD POTENTIAL	7,97	3,14	11,31	6,86	2,67	10,53	23,16	2,63	15,84	8,77	5,66
VOLCANOES HAZARDS	0,13	0,00	0,03	0,34	0,00	0,00	0,61	0,00	0,35	0,55	0,02
OIL HAZARDS	-0,11	0,12	-0,15	-0,05	0,18	0,22	-0,11	0,15	0,02	-0,16	-0,41
POTENTIAL ACCESSIBILITY ROAD	91,01	96,03	88,16	61,45	9,94	126,54	29,30	52,39	63,13	41,00	160,34
POTENTIAL ACCESSIBILITY RAIL	89,20	99,70	80,40	62,00	11,58	120,18	25,37	53,94	60,00	37,50	163,88
POTENTIAL ACCESSIBILITY AIR	89,34	98,47	82,66	74,46	59,28	108,33	69,06	75,14	85,23	65,31	117,81
POTENTIAL ACCESSIBILITY MULTIMODAL	89,59	98,71	82,41	73,91	54,56	108,88	65,00	72,89	82,49	63,48	123,37

Source: ESPON project 3.1

## **Dictionary of spatial analysis tools**

- 8.1 General objective : bridging the gap between scientists and policymakers**
- 8.2 Multiscalar Territorial Analysis (MTA)**
- 8.3 Homogeneity and Discontinuity Analysis (HDA)**
- 8.4 Modifiable Area Unit Problem (MAUP)**
- 8.5 Multiscalar Smoothing Methods (MSM)**



## 8 Dictionary of spatial analysis tools

(by Claude Grasland and Liliane Lizzi; UMR Géographie-Cités and UMS-RIATE)

According to the general objectives of TPG ESPON 3.1, a specific work package has been established for the elaboration of new innovative cartographic and spatial analysis tools which could be used by all other TPG's of the ESPON Program.

In each of the interim report of the TPG ESPON 3.1 (FIR, SIR and TIR) specific results has been provided and discussed during the ESPON seminars in order to gain feed backs at scientific and political levels. A *general methodology for the elaboration of spatial analysis tools* of common interest has therefore been elaborated which can be of interest for further development of common tools in the ESPON program. This general methodology has been fully achieved in the case of a specific group of tools called *Multiscalar Territorial Analysis* for which a specific computer software has been elaborated called ESPON Hyperatlas. In the case of a second group of tools called *Homogeneity and Discontinuity analysis*, the methodology has been fully validated from scientific and political points of view but it was not possible to realise the last step of elaboration of a specific software. A third group of methodological problem has been revealed by previous analysis, which is related to the biases introduced by territorial divisions of NUTS 2 and NUTS 3 levels. This *Modifiable Area Unit Problem* was particularly discussed at the ESPON meeting of Matera in the workshop on polycentrism and it was suggested to explore it in more detail the feasibility of a NUTS 2-3 division in the future of the ESPON Program. Therefore, we propose preliminary results on this question in order to provide guidelines for further research on this topic (. Finally, we have explored innovative spatial analysis tools of borderless representation of spatial phenomena based on *Multiscalar Smoothing Methods* which are actually in the early stage of scientific and political validation in the framework of the ESPON program. These methods could provide interesting solutions for the measure and representation of polycentrism and for the elaboration of long term series of maps when territorial divisions are changing.

## 8.1 General objective: bridging the gap between scientists and policymakers

The aim of the research on spatial analysis tools developed by the TPG ESPON 3.1 is to define coherent “packages” of indexes and maps which could be easily computed and applied to a wide range of variables of the ESPON database. Those packages are not selected on a pure scientific basis (the most sophisticated and recent index of heterogeneity is derived from entropy) neither on pure criteria of political acceptability or spatial planning tradition (like the Gini coefficient or the coefficient of variation which are very poor measures of disparity). They are in fact an attempt to transform into objective measure the rather fuzzy concepts which are involved in the ESDP. In the present report, we propose to examine in more details the contribution of spatial analysis tools to the clarification of four major problems of European policymakers working on spatial planning and regional development (0).

**Table 60 Political concepts and spatial analysis tools**

Political concept	Spatial Analysis Tool
<i>Subsidiarity &amp; Legitimacy of Regional Policy:</i> According to this principle <sup>1</sup> , the regional policy of EU should not duplicate the action of member states and should avoid contradictions between levels of intervention.	<i>Multiscalar Territorial Analysis (MTA):</i> The fact to compute the relative deviation of a region at European, National or local level help to measure the potential contradiction between levels of action.
<i>Territorial Cohesion &amp; Integration of Sectoral Policies:</i> The originality of this new concept lies in taking into account the spatial dimension of the sectoral policies developed by EU.	<i>Homogeneity and Discontinuity Analysis (HAD):</i> Those tools are precisely dedicated to the analysis and the measure of spatial heterogeneity, which is not the case of classical econometric indexes.
<i>Gerrymandering and manipulation of territorial divisions :</i> The allocation of structural funds is related to official Nuts divisions which can be intentionally manipulated by states in order to “maximize their benefit”.	<i>Modifiable Area Unit Problem (MAUP):</i> The effect of changing territorial divisions on statistical and cartographic results is well known. But the best division from scientific point of view can be politically not correct (NUTS 2-3)
<i>Polycentrism &amp; Accessibility:</i> The connexion of a territory to the rest of Europe or to the rest of the World should be organised around selected nodes or networks which can be defined at different scales.	<i>Multiscalar Smoothing Methods (MSM):</i> It is possible to derive multivariate maps of potential economic and demographic flows induced by the unequal repartition of population and wealth.

<sup>1</sup> “In areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community”.

## 8.2 Multiscalar Territorial Analysis (MTA)

Multiscalar Territorial Analysis is based on the assumption that it is not possible to evaluate the situation of a given territorial unit without taking into account values for neighbouring units, for the various regional entities it belongs to. Indeed, both from a policy point of view and in a social science perspective, contrasts and gradients are of much more interest than absolute values. Furthermore, aggregating and disaggregating territorial units makes it possible to see how local values add up to form territorial contexts and regional positions. Whatever the index used for political decisions, it should never be evaluated in absolute but in relative terms, according to various scales of territorial neighbourhood.

### 8.2.1 Three-level analysis of deviations

To explain the methodology of multiscalar territorial deviation, we take the example of GDP/inh. 1999 in euros which is presented in more details in the Annex A of the TIR of ESPON 3.1

#### 8.2.1.1 Deviation to global level

The deviation of a given region (i) to the global level is defined by the equation (1) where  $Eur_j$  is a boolean variable which define the reference area. In present case the reference area is equal to EU-15 which means than  $Eur_j$  take the value 1 for regions of EU-15 and the value 0 for regions of the candidate countries. But it is possible to produce alternative maps with EU-15 or EU-27 as reference.

$$I_i^{Eur} = 100 \times \frac{\frac{GDP_i}{POP_i}}{\frac{\sum_j Eur_j \times GDP_j}{\sum_j Eur_j \times POP_j}} \quad (1)$$

*Example of GDP/inh. 1999 (euros)*

The Map 20 is very classical but it is interesting to observe how the choice of the statistical divisions and the patterns can modify the perception of the results. Usually, the maps use the index 100 as limit of classes, displaying an opposition between regions located above/under the European mean. Here, we have decided to introduce a medium class 90-110 in order to identify (in light yellow) the regions which are around the European mean. We decided also to introduce a limit of class at the index 10 in order to underline the

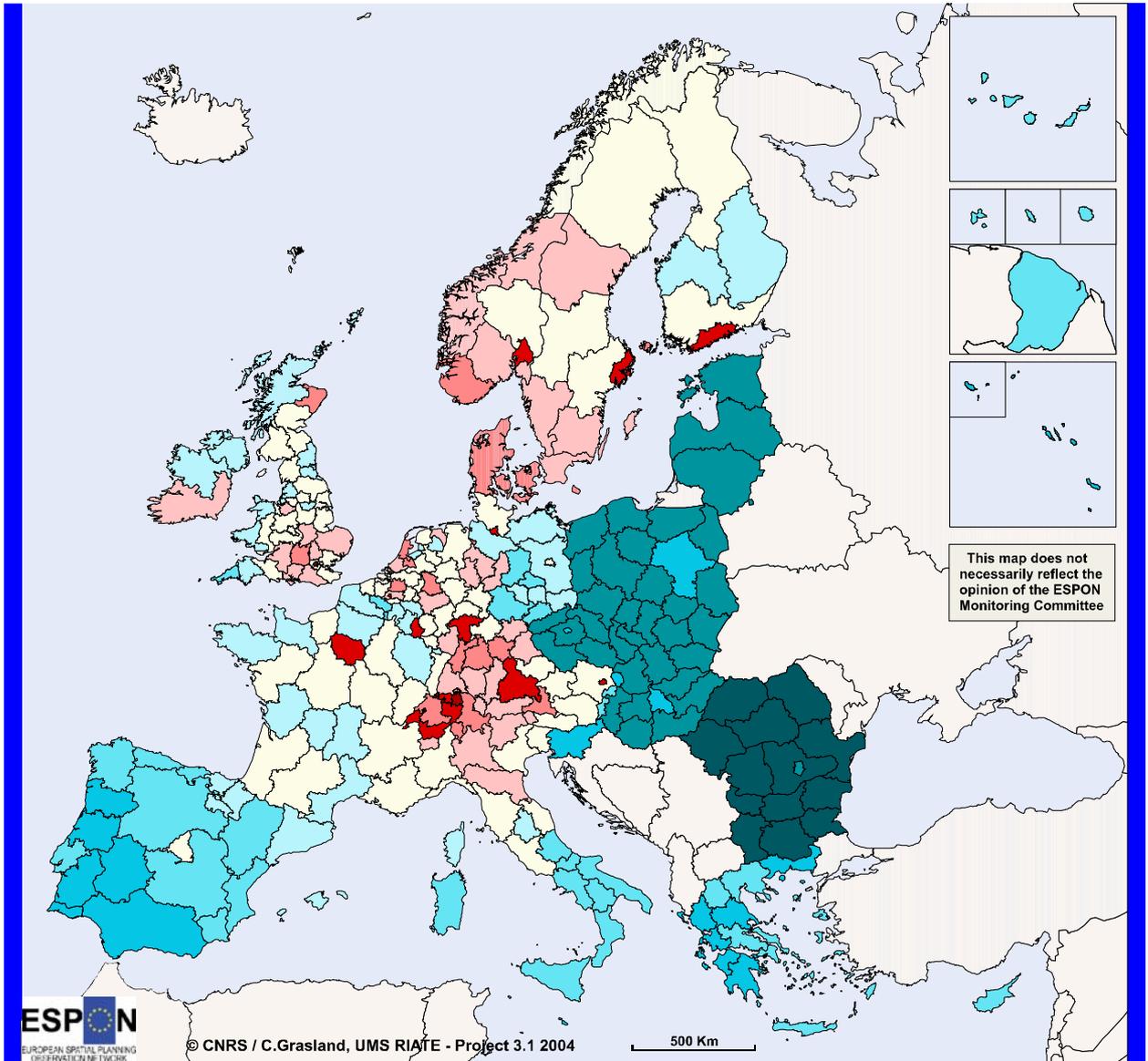
relative differences between the candidate countries of the 1<sup>st</sup> round (Slovenia, Poland, Hungary, Czech republic, ..) and the ones of the 2<sup>nd</sup> round (Bulgaria, Romania). The most favoured regions of European Union for this criterion are metropolitan areas from Western Europe (London, Brussels, Hamburg, Paris...) and Luxembourg. The lowest indexes are related to the very specific situation of Bulgarian and Romanian regions (Table 61).

**Table 61 GDP per capita 1999 (euro): deviation to global level (EU 15)**

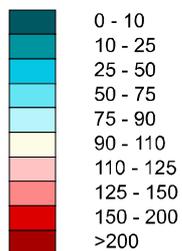
The ten lower The ten higher

Code	Region	GDP/inh	Index	Code	Region	GDP/inh	Index
RO01	Nord-Est	1134.7	5.3	UKI1	Inner London	55307.2	260.1
BG05	Yuzhen Tsentralen	1243.2	5.8	NO01	Oslo Og Akershus	53019.8	249.3
BG02	Severen Tsentralen	1257.8	5.9	BE1	Brussel	47025.2	221.1
BG01	Severoiztochen	1269.0	6.0	CH04	Zuerich	43144.1	202.9
BG03	Severozapaden	1288.4	6.1	LU	Luxembourg	42514.2	199.9
RO03	Sud	1334.1	6.3	DE6	Hamburg	41084.3	193.2
RO06	Nord-Vest	1369.8	6.4	CH03	Suisse Du Nord-Est	37693.4	177.2
RO04	Sud-Vest	1398.3	6.6	FR1	Ile De France	34852.9	163.9
RO02	Sud-Est	1497.0	7.0	DE21	Oberbayern	34517.7	162.3
BG06	Yugozapaden	1536.4	7.2	CH01	Region Lemanique	34389.3	161.7

**Map 20 GDP per capita 1999 (euro) : deviation to global level (EU 15)**



**Index EU-15=100**



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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

**Source: Espon Database**

### 8.2.1.2 Deviation to medium level (e.g. National)

The deviation of a given region (i) to the medium level is defined by the equation (2) where  $Nat_{ij}$  is a boolean variable which define the *common territorial belonging* of two regions i and j to the same area. In present case the territorial belonging is defined by the state level which means than  $Nat_{ij}$  take the value 1 for regions belonging to the same state and the value 0 for regions belonging to different states. Following the same principles, it is possible to produce alternative maps where the belonging is related to any other partition of the reference area into territorial areas of interest (e.g. Urban/rural ; Central/Semi-Peripheral/Peripheral) .

$$I_i^{Nat} = 100 \times \frac{GDP_i / POP_i}{\sum_j Nat_{ij} \times GDP_j / \sum_j Nat_{ij} \times POP_j} \quad (2)$$

#### *Example of GDP/inh. 1999 (euros)*

The Map 21 highlights the importance of economical differences inside each state of the European Union and the candidate countries. In many states, the metropolitan region is characterised by a very high level (> 150) and all other regions are around or under the national mean (France, Sweden, Finland, Bulgaria, Slovakia, Hungary, Norway, UK...). In other cases, we can observe a global opposition between two groups of regions with different levels of wealth (Italy, Spain, Germany, Belgium...). Very high positive deviations to national level can be observed in all European territory, with comparable values in EU15 and candidate countries. For example, the metropolitan region of Warsaw (*Mazowieckie*) has a level of GDP/inh. which is 50% higher than the mean value of Poland, which is exactly comparable to the deviation between the region of Budapest (*Közèp-Magyarorsz*) and Hungary, the region of Paris (*Ile de France*) and France, the region of *Oslo og Akershus* and Norway, or the region of München (*Oberbayern*) and Germany. The highest negative deviations to national level are related to the specific situation of French DOM (Guadeloupe, Guyana, Reunion) or peripheral regions of Italy, Germany and Spain. High negative deviations can also be observed in candidate countries, for example in NE part of Hungary or eastern part of Poland (Table 62)

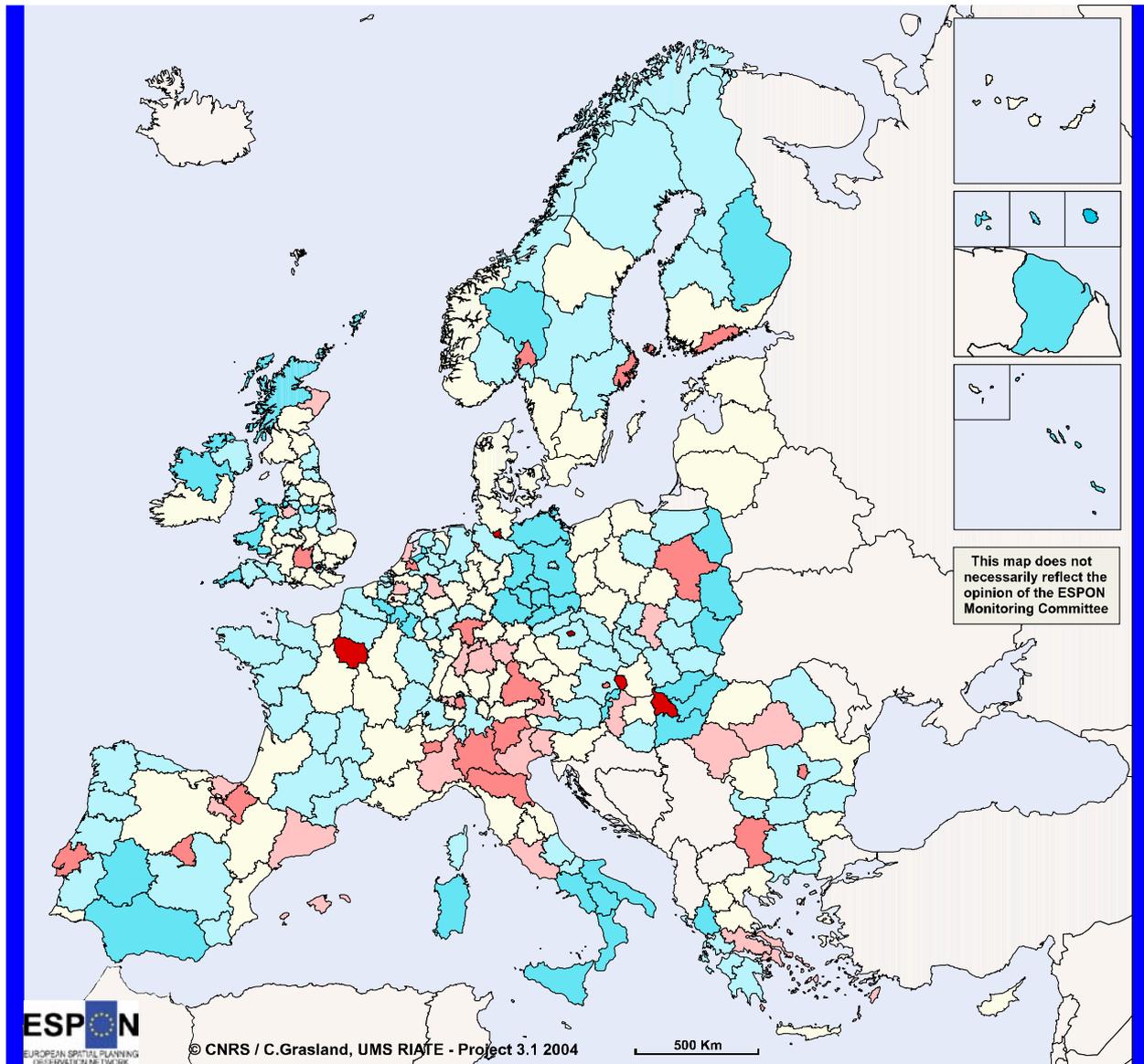
**Table 62 GDP per capita 1999 (euro) : deviation to medium level (national)**

The ten lower

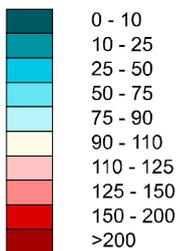
The ten higher

Code	Region	GDP/inh	Index	Code	Region	GDP/inh	Index
FR94	Reunion	10904.2	48.5	UKI1	Inner London	55307.2	240.2
FR93	Guyane	11755.7	52.3	CZ01	Praha	10628.2	211.9
FR91	Guadeloupe	12669.8	56.4	BE1	Brussel	47025.2	203.9
DEE1	Dessau	14481.7	60.1	SK01	Bratislavský	6959.3	198.2
IT93	Calabria	11728.5	61.0	NO01	Oslo Og Akershus	53019.8	177.9
DED1	Chemnitz	15245.1	63.3	DE6	Hamburg	41084.3	170.5
ITA	Sicilia	12302.2	64.0	FR1	Ile De France	34852.9	155.1
ES43	Extremadura	9131.6	64.0	HU01	Koezep-Magyarország	6767.8	151.1
IT8	Campania	12316.2	64.0	PL07	Mazowieckie	5620.3	149.3
HU06	Eszak-Alföld	2870.3	64.1	DE21	Oberbayern	34517.7	143.2

**Map 21 GDP per capita 1999 (euro) : deviation to medium level (national)**



Index national level=100



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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

**Source: Espo Database**

### 8.2.1.3 Deviation to local level (e.g. contiguous regions)

The deviation of a given region (i) to the local level is defined by the equation (3) where  $Loc_{ij}$  is variable which define *the potential level of local interactions* between two regions I and j. In present case this level of local interactions is defined by a boolean variable which takes the value 1 for contiguous regions and the value 0 for non contiguous regions. Many alternative solutions are possible according for the definition of the criterium of neighbourhood (kilometers, time, cost, length of common boundary, ...) and the measure of the potential level of interaction (not necessary boolean but eventually related to a continuous probabilistic function comprise between 0 and 1).

$$I_i^{Loc} = 100 \times \frac{GDP_i / POP_i}{\sum_j Loc_{ij} \times GDP_j / \sum_j Loc_{ij} \times POP_j} \quad (3)$$

*Example of GDP/inh. 1999 (euros)*

When analysing regional economic performance at the European scale, national contexts usually account for a major part of the observed differences. Indeed, well implemented national mechanisms for redistribution of wealth in most cases compensate for local variations in economic potential. Analysing variations within the national context neutralises the effect of these redistribution mechanisms, but gives no indication of relative situations across national borders. Regions characterised by high negative local deviation are mainly located on the border between EU-15 and candidate countries. The former "iron curtain" can now from an East-European perspective be seen as a "golden curtain" with very important differentials of wealth between each side. The highest positive deviation at local level ( Map 22 and Table 63) is obtained by the Greek region of Anatoliki Makedonia, despite its very moderate wealth from European standard (9300 euros/inh). Indeed, this region is surrounded by regions of Bulgaria and Turkey where the levels GDP/inh are more than 3 times lower. Does it means that this region could be locally very attractive in the framework of a new enlargement of the EU ?

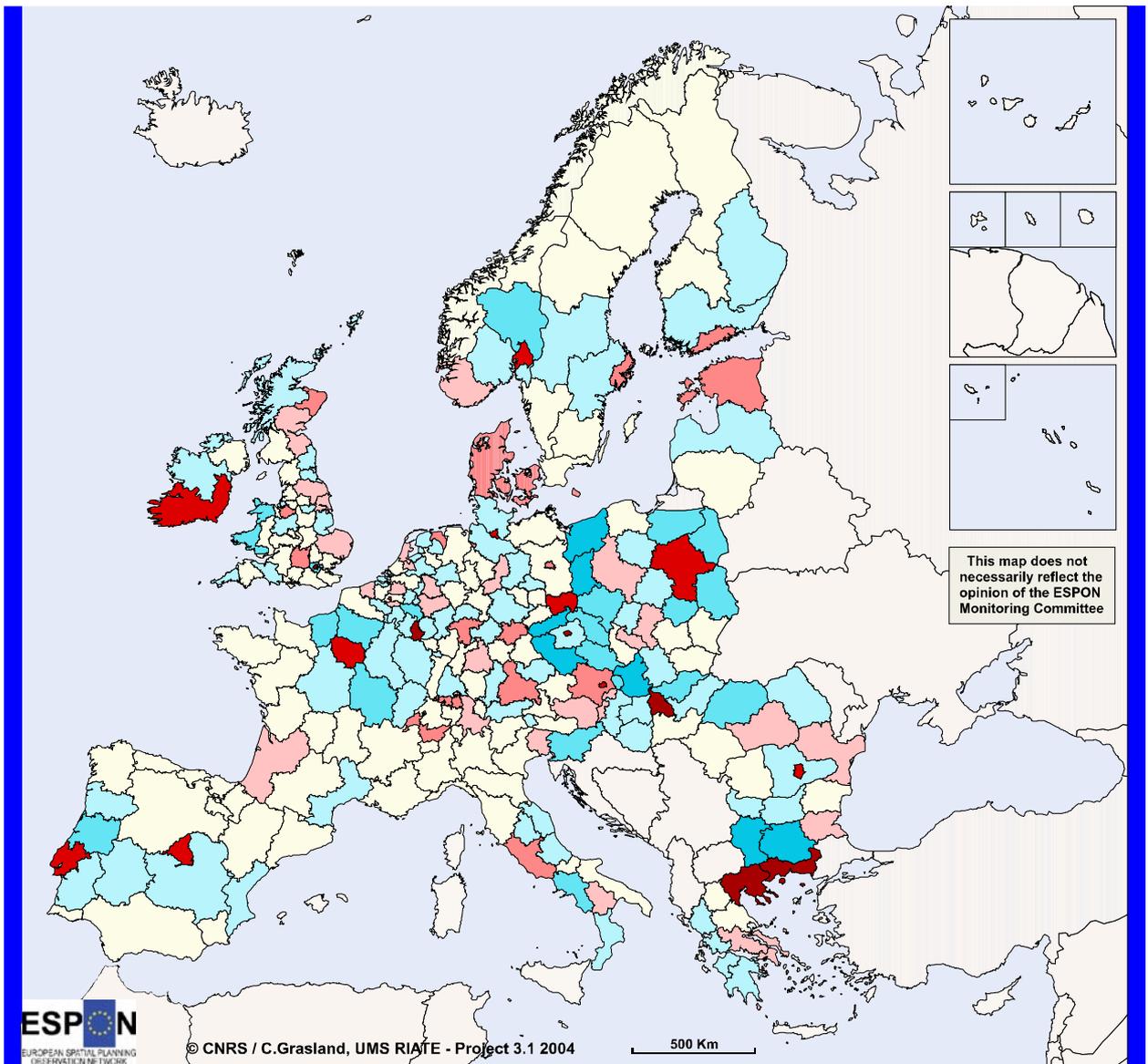
**Table 63 GDP per capita 1999 (euro) : deviation to local level (contiguity)**

The ten lower

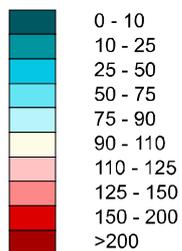
The ten higher

Code	Region	GDP/inh	Index	Code	Region	GDP/inh	Index
CZ03	Jihozápad	4641.4	31.9	UKI1	Inner London	55307.2	275.8
CZ04	Severozápad	4190.3	32.1	CZ01	Praha	10628.2	256.4
BG04	Yugoiztochen	2000.0	41.1	NO01	Oslo Og Akershus	53019.8	231.5
PL04	Lubuskie	3416.5	41.7	LU	Luxembourg	42514.2	221.0
PL0G	Zachodniopomorskie	3767.1	43.1	GR12	Kentriki Makedonia	11314.4	208.1
BG05	Yuzhen Tsentralen	1243.2	48.2	HU01	Koezep-Magyarország	6767.8	205.9
SK02	Zapadne Slovensko	3267.0	48.6	GR11	Anatoliki Makedonia	9209.1	203.1
SI	Slovenija	9451.1	55.7	DE6	Hamburg	41084.3	197.6
PL03	Lubelskie	2629.0	61.6	BE1	Brussel	47025.2	195.8
CZ06	Jihovýchod	4356.7	62.3	PL07	Mazowieckie	5620.3	184.5

**Map 22 GDP per capita 1999 (euro) : deviation to local level (contiguity)**



**Index local level=100**



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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

**Source: Espon Database**

## 8.2.2 Combination of two deviations

In order to produce well-informed and efficient policy options, the various multiscale deviations described above (European, National, Local) must be examined in combination. Separate analyses, as they are frequently presented in current European policy documents, lead to a partial and incomplete territorial vision. An important challenge of the ESPON Programme is to remedy this situation and to propose efficient synthesis of these different relative positions because they are related to potential political contradictions. We present first the case of combination of two deviations (European/national and European/local) and, in next section, the the elaboration of global typologies of the three deviations for the definition of lagging/winning regions.

### 8.2.2.1 European / National levels

If we take the example of GDP/inh., we can first analyse how of the economic situation of a given region is different according to the choice of a European or National reference value. With a GDP of 2100 €/inh., the Romanian region of Bucuresti will be at index 10 according to the mean value of UE15 but at index 140 according to the mean value of Romania. Reversely the swiss region of Ticino with a GDP of 28 000 €/inh. will be at index 132 at European level but at index 83 at national level. In each case, there is a clear contradiction between the appreciation of European and national situations which has important consequences for allocation or redistribution of public funds between regions at different levels. For Bucuresti, the adhesion or Romania to European Union is very positive because it will provide eligibility to European structural funds, despite the fact that it is one of the most advantaged regions at national level. For Ticino, it is the contrary: adhesion of Switzerland to European Union would not provide any allocation of structural funds (according to the criteria of GDP/inh.) despite the fact that Ticino is one of the poorer region at national level.

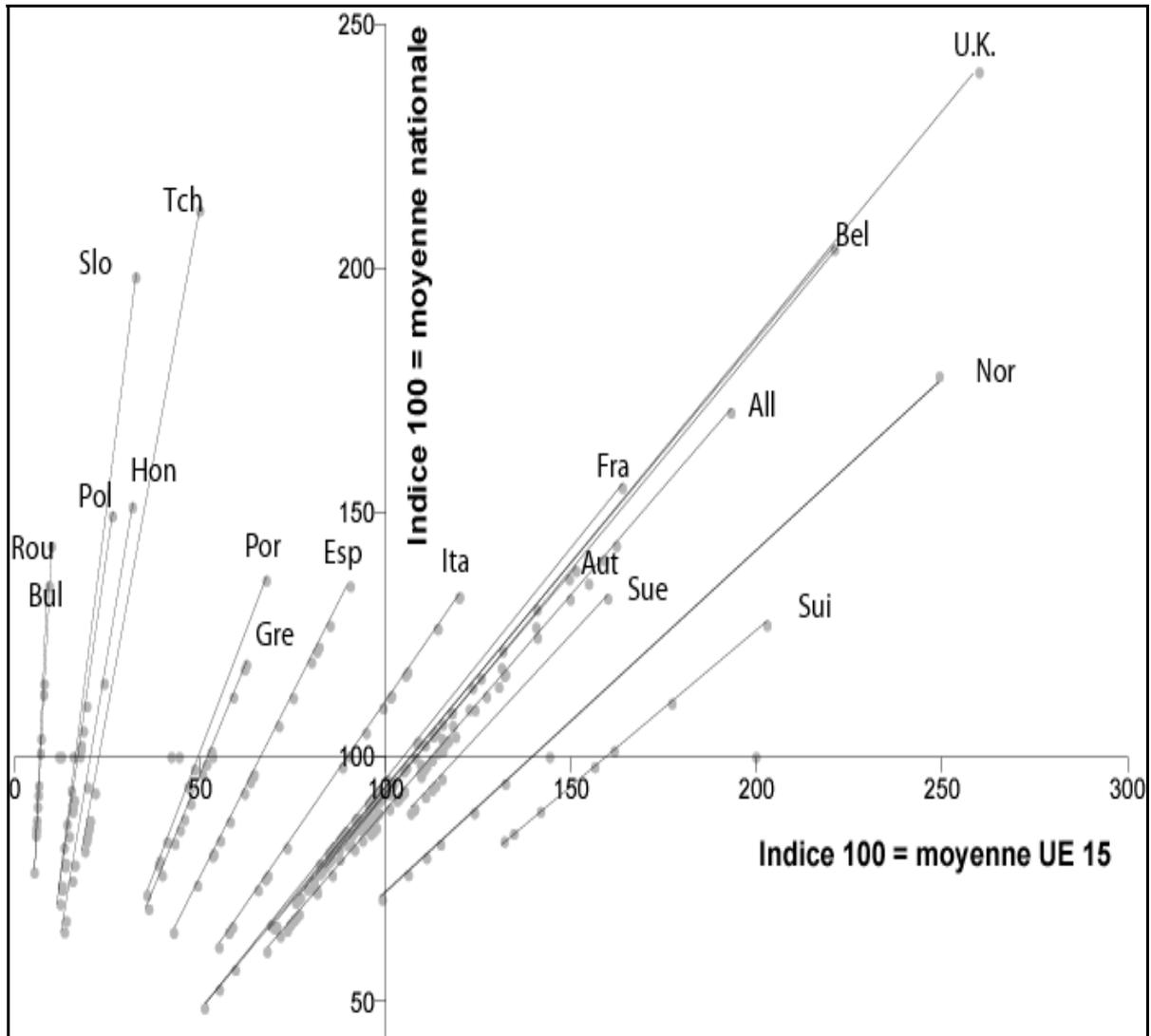
To explain this contradiction between European and National levels, we can propose a graphic representation (Figure 86) where the European and National deviation of each state of the ESPON area are represented in the same graphic<sup>2</sup>. The regions of each state are distributed on a line where the

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<sup>2</sup> GRASLAND C., 2004, « Les inégalités régionales dans une Europe élargie », In. Bernard Chavance (coord.), *L'Europe centrale face au grand élargissement : L'Europe centrale et balte dans l'intégration européenne*, L'Harmattan (collection « Pays de l'Est »), Paris, pp. 181-214

length is a measure of territorial heterogeneity and the slope a measure of the difference between European and National averages.

**Figure 86** Combination of deviation to European and National levels of GDP/inh. 1999 (euros)



Source : Grasland, 2004

This figure reveals three different patterns which can explain the attitude of states toward the European regional policy :

- *Neutral attitude (National mean  $\approx$  European mean)* : in this situation, the European and national deviation are more or less equal (France, Germany, Belgium, ...) which means that the criteria for eligibility are probably the same at both levels. The line which represent the regional distribution as a slope equal to 1 and cross the center of the Figure 86.

For policymakers, it is thus equivalent to provide funds through national or international mechanisms of redistribution.

- *Positive attitude (National mean < European mean)*: In this situation the slope of the line which represents regional distribution is greater than 1, which means that most regions of the state could benefit from allocation of European funds, even if they are located above the national average (Romania, Bulgaria, Hungary, Spain, Poland, Portugal, ...). The location of region in upper-left corner of the graphic introduces a contradiction (we propose to call it the "**Catalunan paradox**") which is that some regions can benefit from European structural funds but, at the same time, are obliged to redistributed funds to most remote regions of the state they are located.
- *Negative attitude (National mean > European mean)*: In this situation the slope of the line which represents regional distribution is lower than 1, which means that most regions of the state could not benefit from allocation of European funds, even if they are located under the national average (Norway, Switzerland). The location of region in lower-right corner of the graphic introduces a contradiction (we propose to call it the "**Ticino paradox**") which is that some regions could not benefit from European structural funds despite the fact that they are located under the mean of their state and can benefit from international transfers of regional funds.

For the cartographic representation of the two criteria of European and national deviations (Map 23) , we have explored many solutions and finally proposed a chromatic system inspired by a solution first introduced by ÖIR in the Study Programme, but with some adaptations. The system is based on the two following principles: the colour defines the qualitative situation of a region under/above the mean for both criteria and the intensity (saturation) of the colour defines the quantitative situation of a region according to the criterion of common/exceptional values of deviation on both criteria.

- **Regions in white (or in light colours)** are around the European and national means. It is for example the case of all Swedish regions, except Stockholm.
- **Regions in red** are characterised by positive deviations at both European and national levels. It is the case of most metropolitan regions of north-western Europe (Paris, London, Helsinki, Brussels...).

- **Regions in blue** are characterised by the reverse situation of negative deviations at both national and European levels. This is the most critical situation where both national and European policies should be combined to ensure a favourable spatial development.
- **Regions in orange** are characterised by a contradiction between a negative deviation at the European level and a positive deviation at the national level. The paradox of this situation is well known in Western Europe (cf. the research on the emblematic case of Catalonia) but the maps display that such cases are likely to be found mainly in Eastern Central Europe in the future.
- **Regions in green**, characterised by the reverse situation (above European & under national levels) are typical from peripheral regions of Norway and Switzerland which are “rich” according to the European standards but “poor” according to their national context.

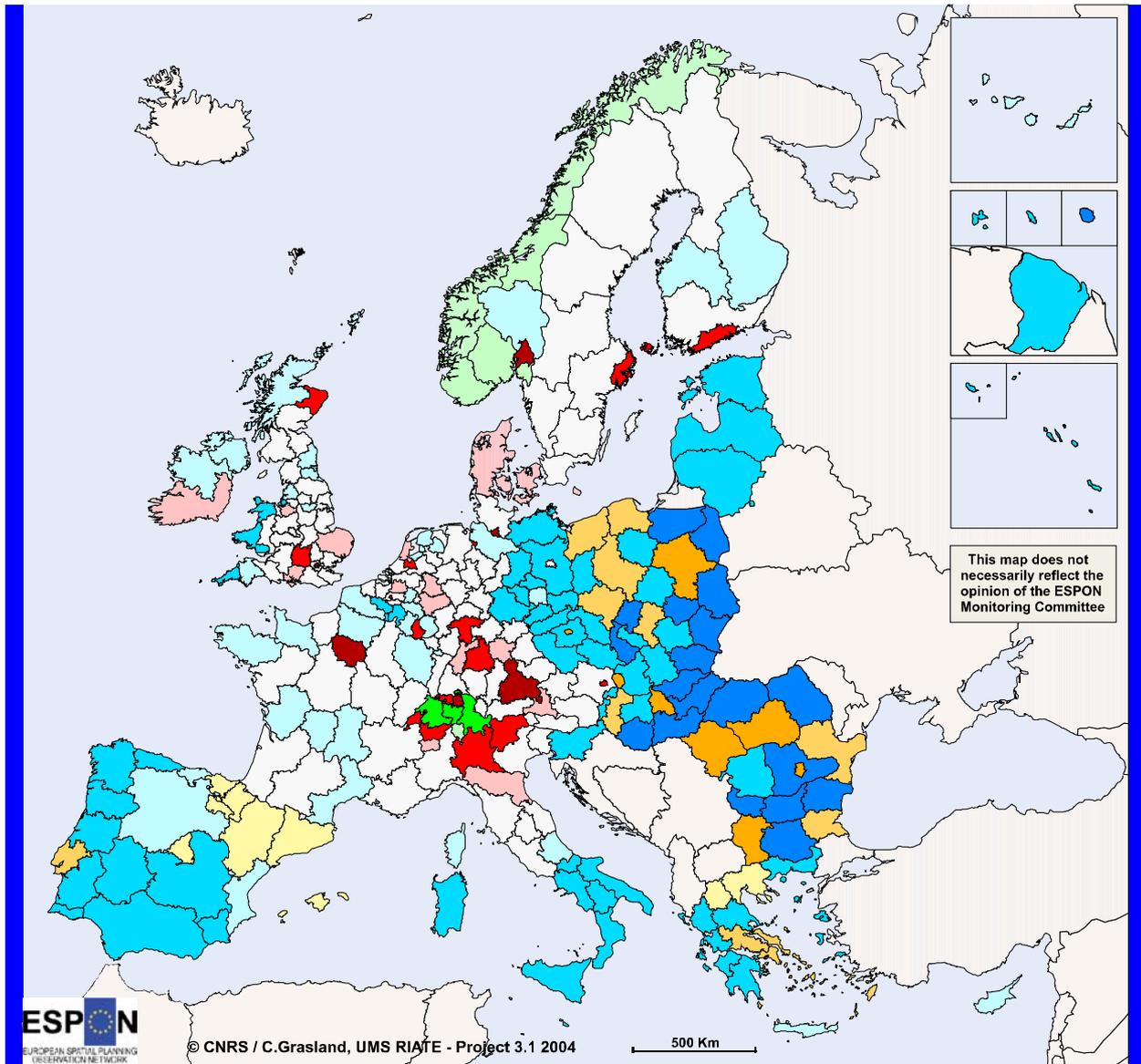
From mathematical point of view, the definition of the intensity of colours is based on the sum of deviations on both criteria in absolute values, which is the “Manathan distance” to the center of the Figure 86.

$$\text{Dev}(\text{Eur}+\text{Nat}) = |\text{Dev}(\text{Eur})| + |\text{Dev}(\text{Nat})| \quad (4)$$

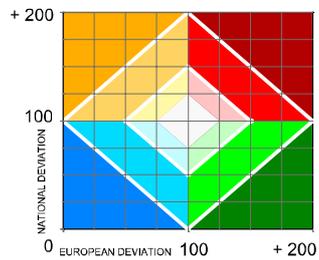
the threshold used for the definition of colour intensity are :

White	$\text{Dev}(\text{Eur}+\text{Nat}) < 25$
Light	$25 < \text{Dev}(\text{Eur}+\text{Nat}) < 100$
Medium	$50 < \text{Dev}(\text{Eur}+\text{Nat}) < 100$
Dark	$\text{Dev}(\text{Eur}+\text{Nat}) > 100$

**Map 23 Combination of deviation to European and National levels of GDP/inh. 1999 (euros)**



**Combination of UE 15 and national deviations**



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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espo Database

### 8.2.2.2 Global/Local levels

The combination of European and National deviations focused mainly on the potential contradictions between regional policies developed by public actors (states, EU). The combination of Global and Local deviations will rather focus on the mechanism of convergence related to the action of public and private actors which developed strategies at different scales.

In a recent synthesis published by OECD<sup>3</sup>, R. Camagni propose a state of the art of the theories of regional convergence and underlines that most authors does not support anymore the original neo-classical framework of spontaneous equilibrium between labour and capital allocation. These original theory would imply a very high level of mobility of production factors which is not realised in practice. The new theories of regional development try to take into account the spatial dimension and demonstrate the existence of "convergence clubs", i.e. of regions which are following different paths of economic development, with emergency of non-global equilibrium<sup>4</sup>. Some authors try to identify convergence club based on the initial advantage of regions (i.e. their GDP/inh. at time t<sub>0</sub>) without considering their geographical location. But most empirical results insists on the fact that these convergence clubs are not randomly distributed in space and that the distribution of economic growth is generally subject to important effects of spatial autocorrelation.

Actually, the most important theoretical and practical debate for spatial planners is to determine if these spatial autocorrelation of economic growth is positive and negative. For some authors<sup>5</sup>, the spatial autocorrelation of economic growth is positive, which means that, according to Perroux's theory of growth pole, we can observe regional "spillover effects" with diffusion of growth from most advanced regions to the neighbouring ones. The optimistic view is not shared by other authors which has predicted and observe negative spatial autocorrelation of regional growth, i.e. competition and concurrence between neighbouring regions, producing regional "backwash effects" where the apparition of a growth pole in a given region is related to a reduction of growth in less developed neighbouring regions which are losing their most qualified labour force and do not attract invests which tend to concentrate in the growth area.

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<sup>3</sup> OCDE, 2001, *Perspectives territoriales de l'OCDE – Economie territoriale*, Publications de l'OCDE, Paris. <http://www.oecd.org>

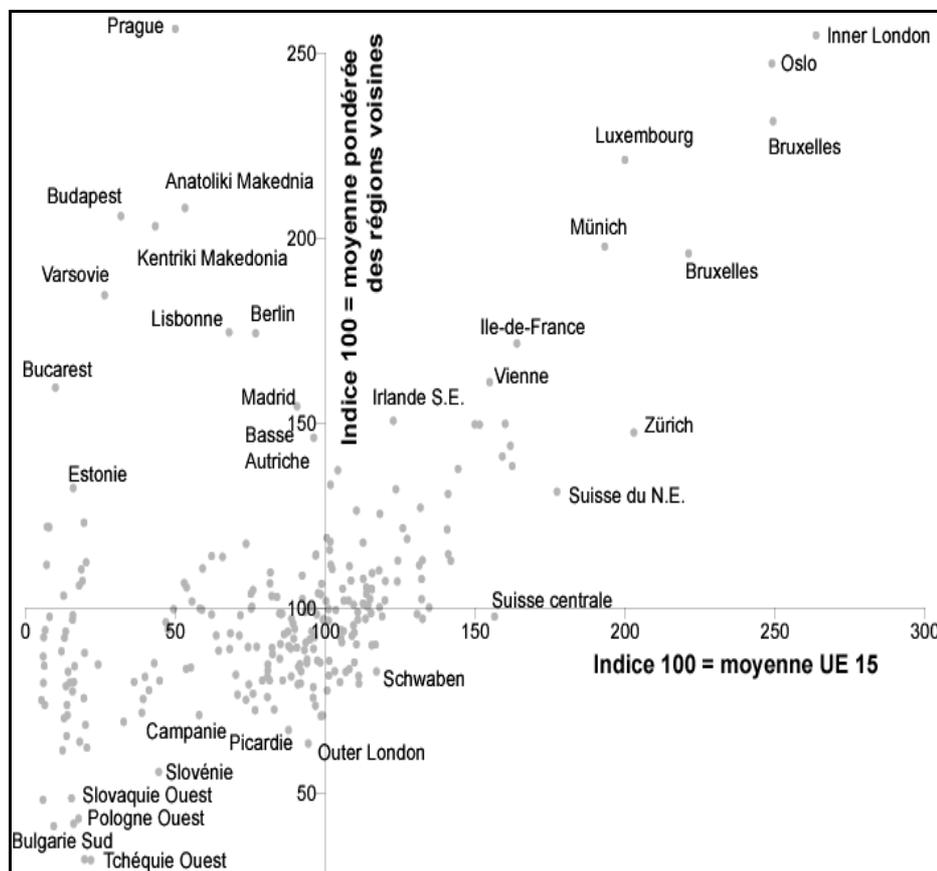
<sup>4</sup> e.g. Beine M., Docquier F., Hecq A., 1999, « Convergence des groupes en Europe : une analyse sur données régionales », *Revue d'Economie Régionale et Urbaine*, 1, pp. 45-62.

<sup>5</sup> e.g. Chua H., 1993, *Regional spillovers and economic growth*, Center Discussion Paper 700, Economic Growth Center, Yale University.

As this debate on “spillover/backwash” effects is of crucial importance for European policymakers, we have try to elaborate an efficient statistical and cartographical tool for the visualisation of regional situations at global/local levels, in order to provide empirical typologies of regional development which will provide the basis for empirical observation of the dynamic economic growth and the monitoring of industrial relocalisations after EU enlargement.

The Global/Local situation of European regions can firstly be evaluated in graphic form in order to point the most extreme situations according to both criteria (Figure 87).

**Figure 87    Combination of deviation to Global and Local levels of GDP/inh. 1999 (euros)**



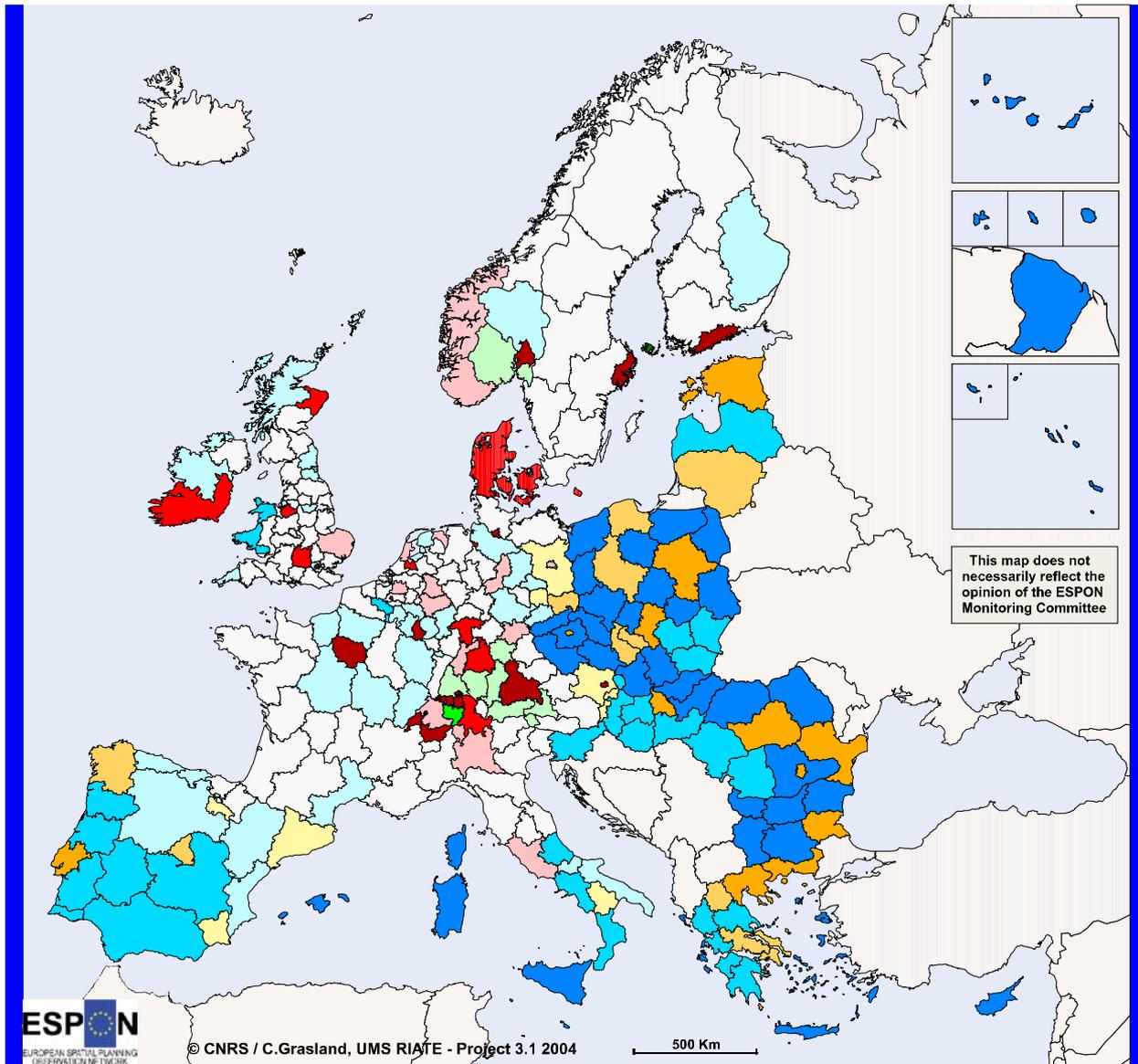
In the case of GDP/inh. 1999 (in euros) we can observe on Map 24 the well-known very specific situation of metropolitan areas of new members and Mediterranean countries which are at the same time located under the European mean but above the mean of neighbouring regions which could be a very important advantage for the attraction of new invests and relocation

of industrial plants. But we can observe on the graphic that this situation occurs also in other regions like north-eastern Greece which has a low level of economic development at European or national level but is more developed than neighbouring regions of Bulgaria or Turkey. The same situation can be observed, at a less degree, in eastern regions of Germany, Austria and Italy which are in contact with new members countries. It would be therefore of high interest to develop specific case studies on the recent evolution of those regions in order to determine if the main economic growth is observed on the more developed side (backwash effect) or less developed side (spillover effects) of economic discontinuities. Or if new divisions of labours take place in these areas.

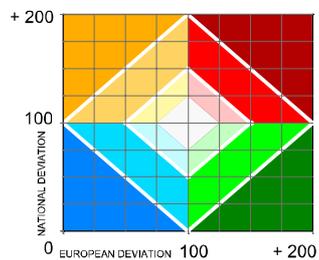
We have focus on the case of regions with low-global/high-local levels of economic development but the reverse case are obviously also of high interest. For example, the regions of Bavaria located in the neighbourhood of München and Zürich are at the same time more developed than European Union but less developed than the neighbouring metropolitan regions which concentrate employment and services. Is it an advantage for economic development ? One more time it is crucial to realise case studies on the recent evolution of those regions with high level of specificity according to global/local levels.

Following the same methodology than for the analysis of European/National deviations, we can propose a synthetic solution for the cartography and the visualisation of the regional distribution of the Global/local levels, which is illustrated by the example of GDP/inh. 1999 (in euros).

**Map 24 Combination of deviation to Global and Local levels of GDP/inh. 1999 (euros)**



**Combination of local and national deviations**



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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espo Database

### 8.2.3 Combination of three deviations

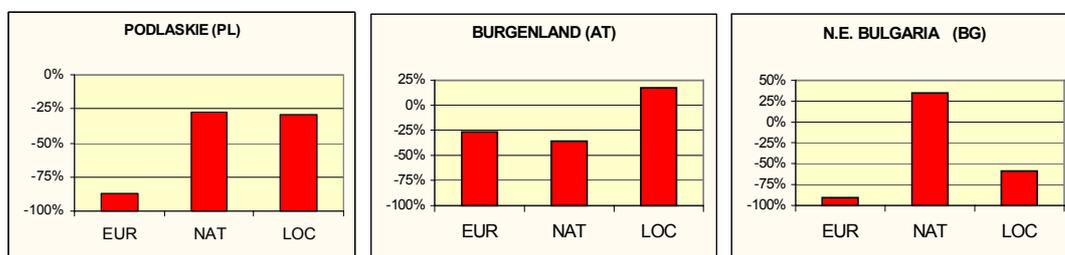
We do not develop the cartography of national/local levels which is interesting in a national perspective but is of less interest in a European perspective. We focus now on the way to integrate all levels in a joint analysis of regional situations.

Obviously, the most important criteria for European policymakers is the deviation to EU mean, because it is at this level that European Union has the legitimacy to take the decision to help some regions with structural funds or other tools. But European policy makers can not ignore the situations of regions of other levels if they want to avoid contradiction with national policies or local regulations. The most simple tool to be elaborated is therefore the realisation of multiscalar analysis diagram for each region and each criteria of interest.

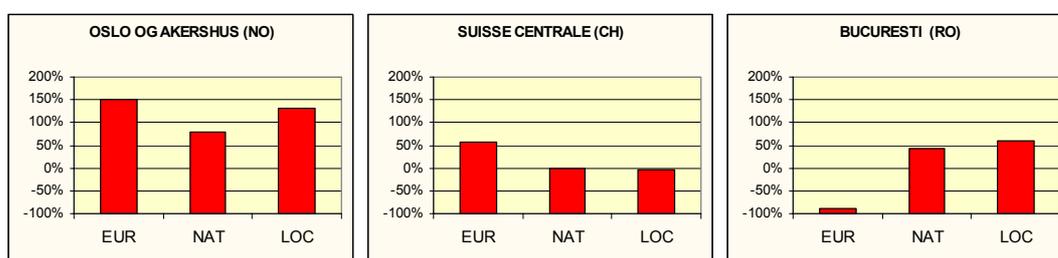
The Figure 88 present the interest of those diagrams through the example of multiscalar deviation of six European regions for the criteria of GDP/inh in 1999.

**Figure 88 Selected examples of multiscalar deviations for GDP/inh 1999 (euros)**

*Examples of negative deviations to EU level*



*Example of positive deviations to EU level*



But diagrams are only a preliminary step of the analysis which should be completed by more integrate typologies of "advanced" and "lagging" regions.

### 8.2.3.1 Multiscalar typology of “lagging” regions

The definition of “lagging” regions is very important for spatial planners and policymakers which try to develop social and territorial cohesion. But it becomes very often based on over simplistic criteria like the fact to be under a given value for a single criteria. The very emblematic value of 75% of the mean of GDP per capita of the EU is the emblematic example of such simplistic definition of lagging region. It is of course easy to criticize but how is it possible to improve the usual criteria without proposing too complex criteria which could produce confusion and doubts in the spirit of the citizens ?

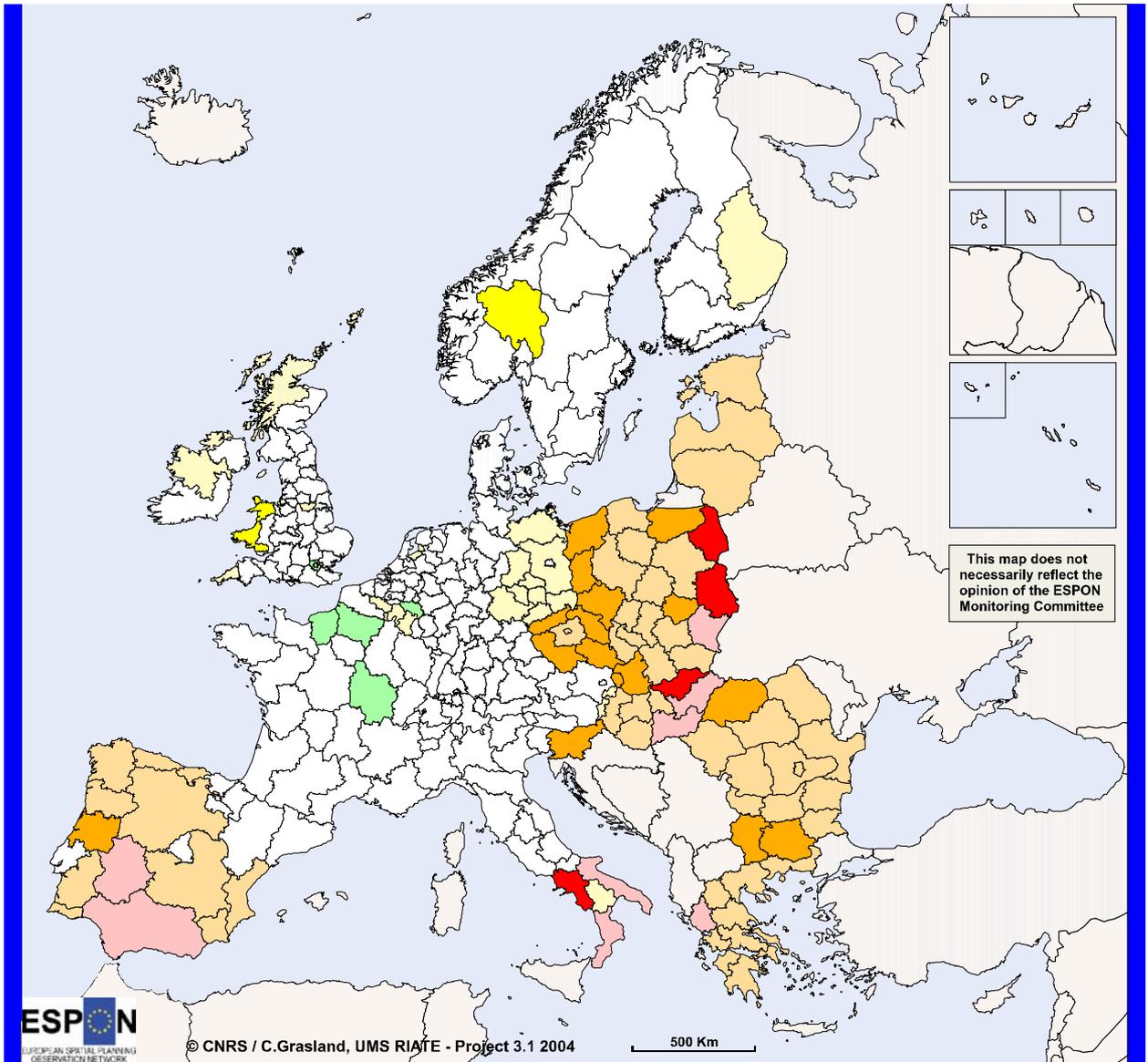
One possible solution is the construction of synthetic indexes derived from political objectives, like the Human Development Index which is the statistical translation of the Universal Declaration of Human Rights. It is certainly a good way to explore in the future, especially when European Union will approved a constitutional document which will provide the basis for a European Index of Social Development.

Another solution (which complete the previous one) is the introduction of a multiscalar approach of the target index at various scales. In terms of territorial cohesion, it is indeed very important to evaluate the level of development of a region according to at least three levels : european, national and local. If we use the famous criteria of 75% (Map 25), we will find only four regions which can be considered as “lagging” for all criteria : *Eszak-Magyarország (HU)* , *Campania (IT)*, *Lubelskie (PL)* and *Podlaskie (PL)*.

Many other regions are “lagging” for only one or two criteria which implies specific actions at various levels. For example, the Austrian region of *Burgenland* can be considered as “lagging” at European and national level but is specifically “advantaged” at local level because of its common border with poorest regions of Hungary and Slovakia. This situation is very different from the region of *NE Bulgaria* which is “lagging” at European and local level (because of a common border with richest regions of Greece) but can rely on specific advantages at national level (capital region with Sofia).

The typology presented on could be a powerful tool for the improvement of regional policies ... if it was applied to better indicators than GDP/inh.

**Map 25 Multiscalar typology of "lagging" regions for the criteria of GDP/inh. 1999 (euros)**



**Under 75%**

*European deviation    national deviation    local deviation*

	<i>European deviation</i>	<i>national deviation</i>	<i>local deviation</i>
			X
		X	
		X	X
	X		
	X		X
	X	X	
	X	X	X

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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

**Source: Espon Database**

### 8.2.3.2 Multiscalar typology of “advanced” regions

As a symmetric to the concept of “lagging” regions, we can propose a multiscalar approach of the so-called “advanced” regions. As in previous case (see. p.46), the concept of “advanced” regions appears very criticable because it is too often based on few criteria defined at only one geographical scale of analysis. If we admit that the symmetric value of 75% (3/4) is 133% (4/3), we can propose a multiscalar typology of economic advanced regions through the classifications of regions which are 33% above the European, national or local mean of GDP/inh.(euro) in 1999 (Map 26).

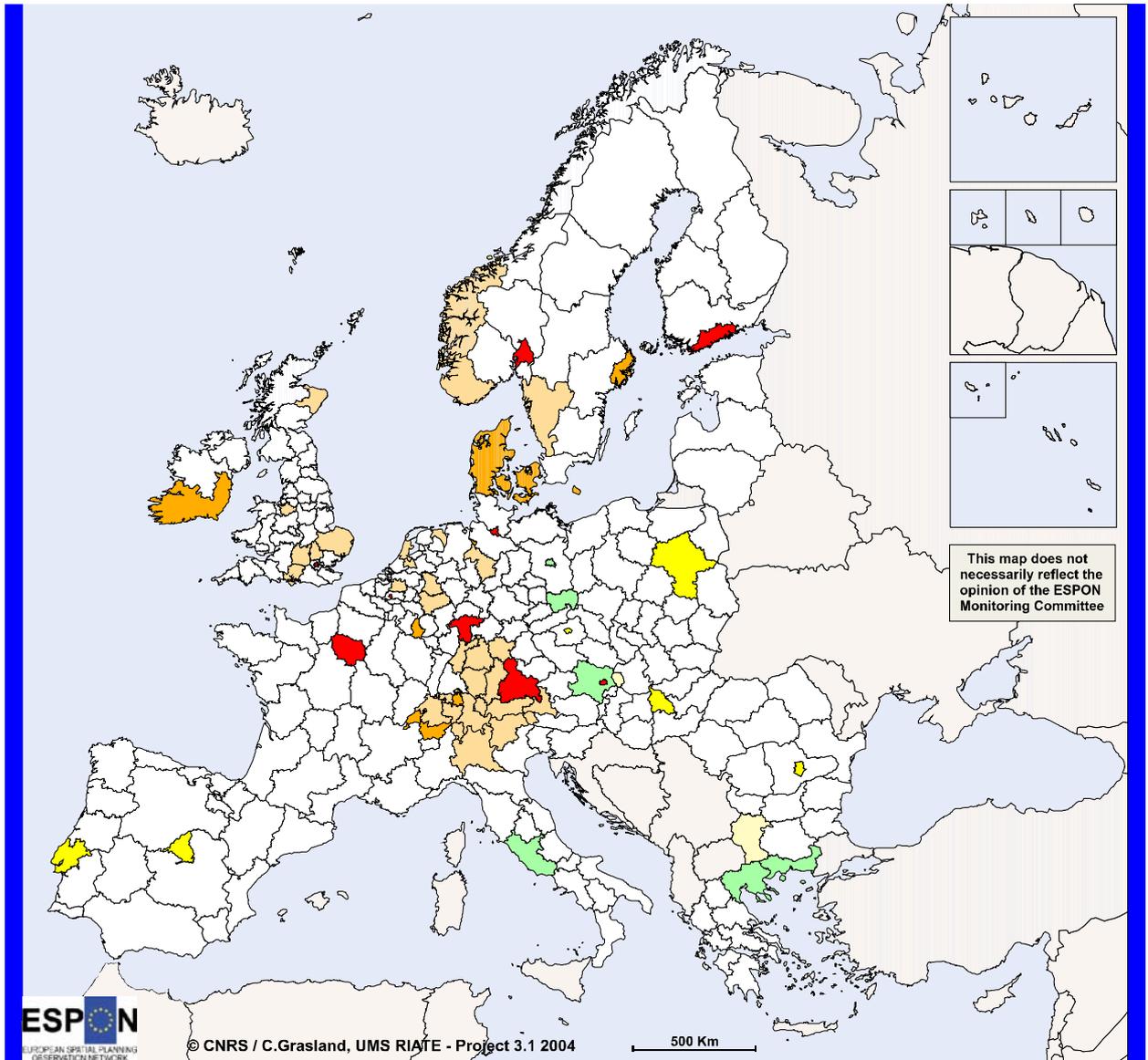
According to this criterion, only 9 regions can be considered as “fully advanced” whatever the geographical context. These are all metropolitan regions localised in North-Western part of Europe: *Wien, Bruxelles, Oberbayern (München), Hamburg, Darmstadt (Frankfurt), Uusimaa, Ile de France (Paris), Oslo og Akershus, Inner London.*

The regions of Switzerland are not in this category of “fully advanced” because of the relative equality of level of GDP/inh at national level (differences between Swiss regions are generally less than 33% ). Luxembourg and Denmark are not placed in this category of “fully advanced” regions for a technical reason which is the fact that those states are composed of only one NUTS2 region, which make impossible the apparition of a positive deviation at national level. It is the same problem that the lack of local deviations for regions without neighbours like islands.

The most remarkable result of the typology is the apparition of a class of “capital of the periphery” which are characterised by very positive deviations at national and local level. *Budapest, Warsaw, Bratislava, Praha, Sofia, Bucuresti, Madrid and Lisboa* are very specific regions with common potentialities of economic development in the future.

- **N.B. Multiscalar typologies of “advanced” or “lagging” regions can be very easily computed for all criteria in the form of ratio (numerator/denominator) and for all scales of territorial division (NUTS 2, NUTS 3, NUTS 2-3) with the ESPON Hyperatlas developed by TPG ESPON 3.1.**

**Map 26 Multiscalar typology of "advanced" regions for the criteria of GDP/inh. 1999 (euros)**



**Above 133%**

	<i>European deviation</i>	<i>national deviation</i>	<i>local deviation</i>
			X
		X	
		X	X
	X		
	X		X
	X	X	
	X	X	X

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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espon Database

### **8.3 Homogeneity and Discontinuity Analysis (HDA)**

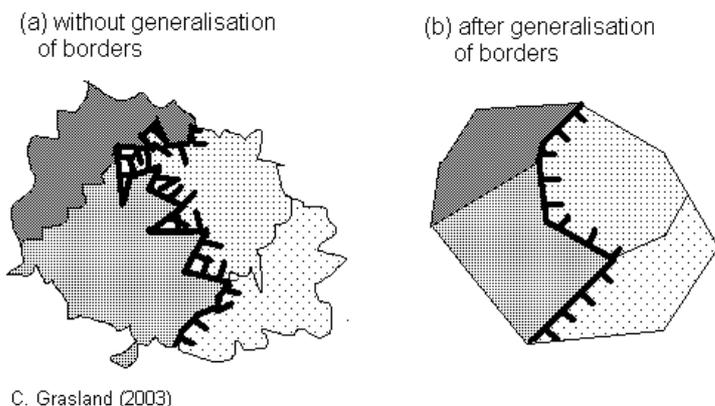
Maps of discontinuities describe the contrasts between contiguous territorial entities. They can be defined in absolute and relative terms, according to the assumptions of the observer or the problem to be analysed. The analysis of discontinuities is more than a complement to the multiscalar evaluation of regional situations. Indices which describe the limits between regions would provide a valuable scientific input to the politically crucial issue of border effects, especially in the framework of the INTERREG Programme. Indeed, substantial differences between contiguous regions create distortions which are generally considered detrimental from the cohesion point of view ("territorial gaps"). But those discontinuities can also reveal opportunities of cooperation and exchange in a framework of local partnership for development. Differentiating these different types of local contrasts, with both detrimental and favourable effects, would provide a major criterion for the SWOT analysis developed in ESPON 3.1 of cross-regional dynamics in an enlarged Europe as analysed by ESPON TPG 1.1.3

#### **8.3.1 Statistical and cartographical preparation**

The database necessary for the computation of discontinuities should be structured in a specific way, taking into account the various nature of the geographical objects which will be stored. This will include:

*GIS files describing the geometry of regional boundaries at NUTS2 level.* Concerning this point, it is necessary to observe that the current regional boundaries are not sufficiently generalised for an efficient cartography of regional discontinuities. It should be necessary to prepare a new generalised map of regions at Nuts 2 and Nuts 3 level if we want to produce good maps of discontinuities, especially if we introduce the direction of gradient between neighbouring regions (Figure 89). It is interesting to draw maps of discontinuities where the gradient of change is indicated by an oriented line. But this cartographic solution is possible only after an important generalisation of the regional borders. It is not possible to draw this kind of maps in the frame of the NUTS 2 or NUTS 3 regions from the GISCO files.

**Figure 89 Cartography or oriented discontinuities**



*A table on the general properties of regional boundaries:* their approximated length (km), their political meaning (external border of EU25, limit between EU15 and Accessing Countries, international boundary inside EU15, intranational limit, ...), the presence/absence of a common language, the potential social interaction (product of the populations of the two regions in contact), etc. Those reference indexes will be very useful when analysing discontinuities measured on specific criteria. For example, if we decide to compute differences according to a typology of boundaries (do the international boundaries produce higher differences than intranational ones?) or if we decide to produce weighted means of differences between contiguous regions (weighted by length of boundaries, or by potential social interaction)

*Several tables describing the specific differences between regions for a specific group of indicators.* For example, the differences related to GDP/inh will be stored in a single table containing 4 measures according to the choice of absolute/relative and euro/pps criteria. But the differences related to age structure are much more complex and it is not interesting to analyse the differences in a too analytical way (differences for % of 0-9 year, 10-19 year, etc.). It is much more interesting to propose some global indexes of differences of age structure, with the opportunity to examine in more detail the content of the global index (see example on Table 64)

**Table 64 Example of database for the analysis of discontinuities of age structure (2000) between contiguous regions at NUTS 2 level**

NUTS2i	p00_09i	p10_19i	p20_29i	p30_39i	p40_49i	p50_59i	p60_xxi	NUTS2j	p00_09j	p10_19j	p20_29j	p30_39j	p40_49j	p50_59j	p60_xxj	j	rank	inter	long_ij
BG04	9	13	16	14	15	13	21	GR11	20	19	17	16	12	7	9	<b>39.6</b>	1	O	65
BG05	10	14	15	14	14	12	21	GR11	20	19	17	16	12	7	9	<b>38.5</b>	2	O	273
GR11	20	19	17	16	12	7	9	GR12	10	12	16	16	13	12	22	<b>37.4</b>	3	N	108
DED2	7	14	12	15	15	12	25	PL04	12	17	16	13	17	11	15	<b>29.1</b>	4	O	35
ES61	11	14	17	16	12	10	19	PT14	9	11	14	13	13	11	30	<b>26.1</b>	5	O	110
DE4	7	15	11	17	16	12	22	PL04	12	17	16	13	17	11	15	<b>25.8</b>	6	O	136
DE4	7	15	11	17	16	12	22	PL0G	11	16	16	13	17	11	15	<b>24.7</b>	7	O	106
DED2	7	14	12	15	15	12	25	PL01	10	16	16	13	18	11	17	<b>24.2</b>	8	O	61
CZ04	11	13	17	13	15	14	16	ED1	7	13	11	14	16	13	27	<b>24.1</b>	9	O	185
IT33	7	8	13	16	14	14	28	SI	10	13	15	15	16	12	19	<b>24.0</b>	10	O	184
FR82	12	12	12	14	14	12	23	IT13	7	7	12	15	13	14	32	<b>22.8</b>	11	O	39
NO01	13	11	15	18	14	12	18	SE06	11	12	11	13	13	14	25	<b>22.5</b>	12	O	9
CZ04	11	13	17	13	15	14	16	DE24	10	11	12	17	14	12	24	<b>22.5</b>	13	O	37
CZ04	11	13	17	13	15	14	16	DED2	7	14	12	15	15	12	25	<b>21.7</b>	14	O	142
FR71	13	14	14	15	14	12	19	IT11	8	8	13	16	14	14	27	<b>21.5</b>	15	O	76

Each neighbouring regions i and j are identified by their code (Nuts2i, Nuts2j) and characterised by the variables describing their age structure (p00\_09i ...p60\_xxi , p00\_09j...p60\_xxj). In the following example the difference between age structure are defined by a Mahnattan distance between the vector of variables :

$$DS\_Ageij = \sum_{k=1}^K |Age_i^k - Age_j^k| \quad (5)$$

The rank of discontinuities for this criterium is indicated (rank), in order to make more easy the realisation of maps of the top 20, top 50 or top 100 differences between neighbouring regions.

### 8.3.2 Analysis of gradients (univariate analysis)

When the analysis of discontinuities is based on a single indicator with strictly positive values (e.g. GDP/inh. 1999 in euros), it is better to speak from "gradient" rather than "discontinuities". The term discontinuities should be only employed for the transition between two different social and spatial systems, which suppose in practice the use of various criteria. Gradient analysis should normally be realised both in absolute and relative terms, because results are very different, as can be seen in the following example.

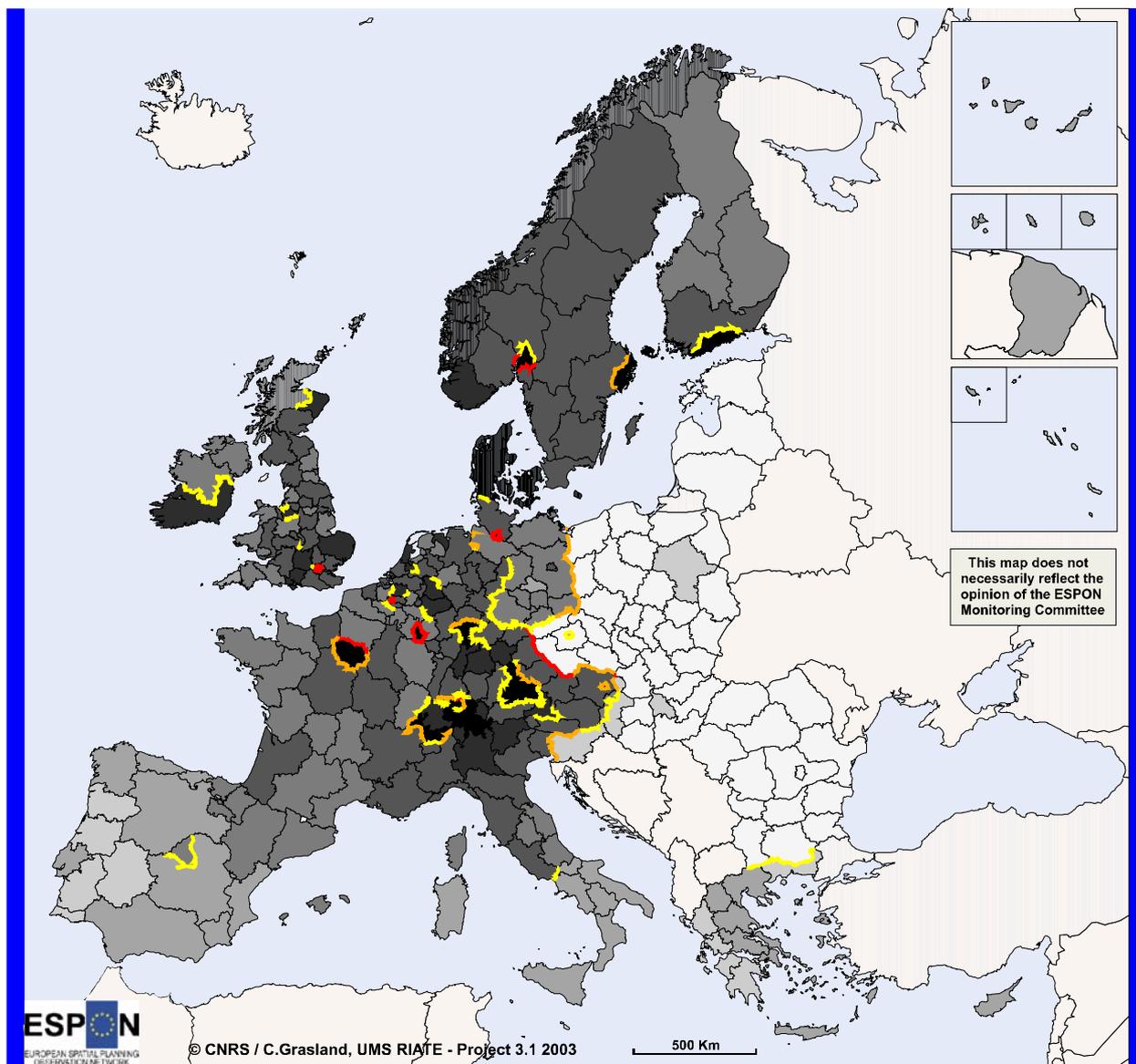
#### 8.3.2.1 Analysis of absolute inter-regional gradients

When considering the map of absolute inter-regional gradient of GDP/inh (Map 27 and Table 65) we observe major impacts of regional policy related artefacts and fiscal measures. In this respect, the highest level of discontinuity is obtained in the UK, due to a well lead and highly efficient "gerrymandering" in the London Region. The region of Oslo appears also with exceptional differences with neighbouring regions of Norway and Sweden. The following top discontinuities are related to the exceptional fiscal advantages of Luxembourg which produce very high differences with neighbouring regions of France, Belgium or Germany. Some important discontinuities can be locally observed between regions of Switzerland and regions of France and Italy. But also inside Switzerland, between the French and German speaking area.

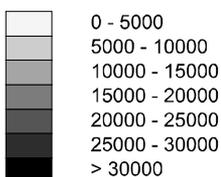
**Table 65 The ten highest absolute gradients of GDP/inh. 1999 (in euros)**

i	j	Region i	Region j	GDP i	GDP j	Difference
UKI1	UKI2	Inner London	Outer London	55307	20055	35252
NO01	NO02	Oslo Og Akershus	Hedmark Og Oppland	53020	21088	31932
NO01	SE06	Oslo Og Akershus	Norra Mellansverige	53020	22964	30055
NO01	NO03	Oslo Og Akershus	Sor-Ostlandet	53020	23630	29390
LU	BE34	Luxembourg	Luxembourg	42514	16801	25713
LU	BE33	Luxembourg	Liege	42514	17639	24875
LU	FR41	Luxembourg	Lorraine	42514	18850	23664
LU	DEB2	Luxembourg	Trier	42514	19510	23004
BE1	BE24	Brussel	Vlaams Brabant	47025	24022	23003
DE6	DE93	Hamburg	Lueneburg	41084	18242	22842

**Map 27 Highest absolute gradients of GDP/inh. 1999 (in euros)**



**GDP in euros by average population**



**Highest differences**

	<i>rank</i>	<i>absolute difference</i>
<span style="color: red;">—</span>	1 - 20	36000 - 16100
<span style="color: orange;">—</span>	21 - 50	16100 - 11180
<span style="color: yellow;">—</span>	51 - 100	11180 - 6480

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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

**Source: Espo Database**

### 8.3.2.2 Analysis of relative inter-regional gradients

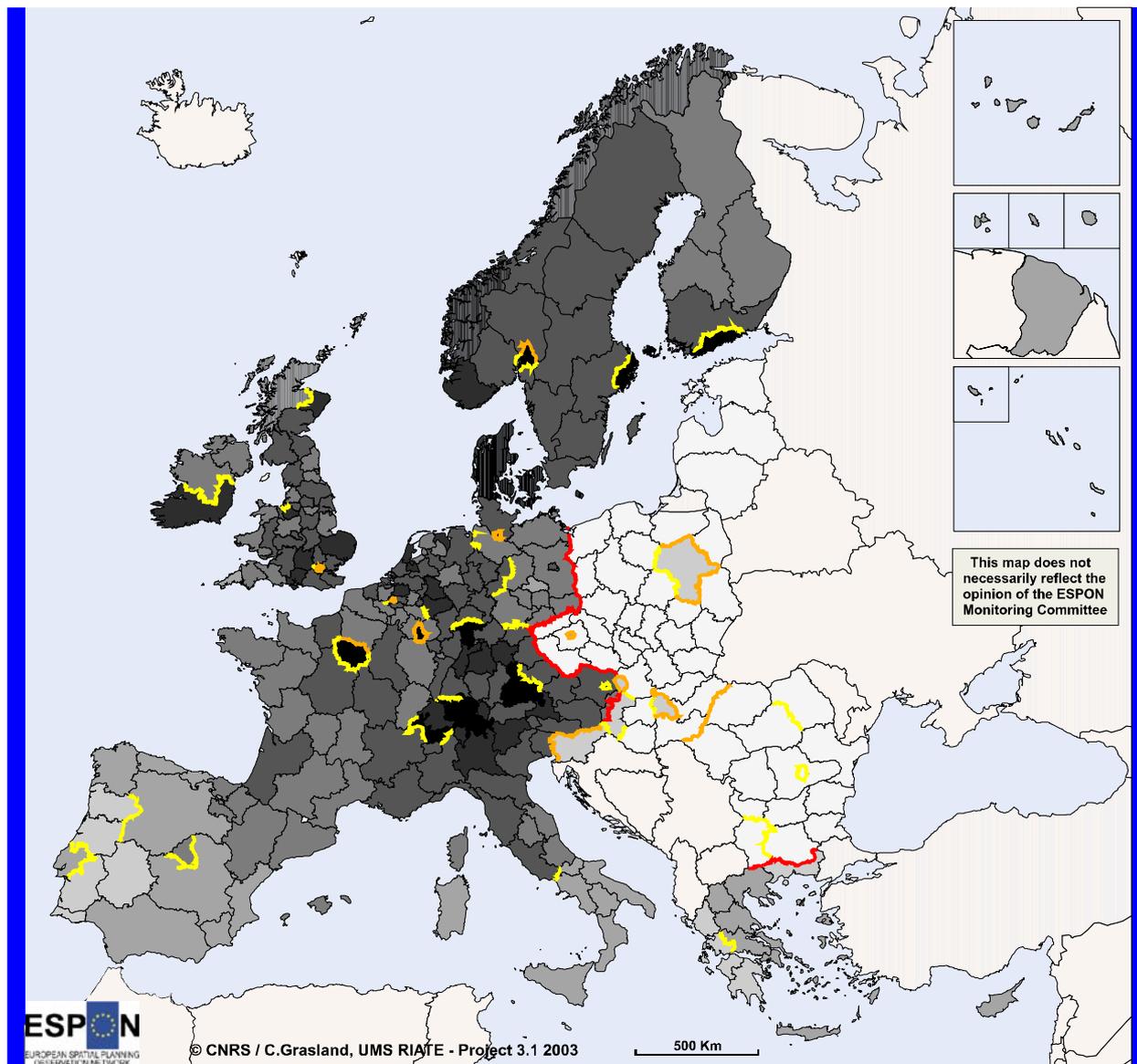
It is interesting to consider interregional gradient not only as an absolute differential but also as a relative one (Map 28 and Table 66). As an example, we can compare GDP/inh differential between Brussels (47000) / Vlaams Brabant (24 000 euros) and Praha (10600) / Stredny Cechy (4200). In absolute terms, we would conclude that the differences between each capital region and its surroundings are much more important in Belgium (23000) than in the Czech Republic (6400). However, in relative terms, the ratio between the centre and the periphery is higher in the case of the Czech Republic (2.6) than in the case of Belgium (2.0). Relative differences may reveal as well potential complementarities that could induce flows, and should therefore not be neglected. The map of main relative gradients shows a different pattern of inter-regional contrasts than what has previously been observed. The most important ones are much more clearly located along the former "iron curtain", and more specifically in border areas between Greece and Bulgaria, Germany and Poland, Germany or Austria and Czech Republic.

The highest relative gradient can be observed between the Greek region of Anatoliki Makedonia and its Bulgarian neighbours: the GDP of Anatoliki Makedonia & Thraki is not very high at European or national level (9200 euros/in.) but it is 7.5 time the level of the region of Yuzhen tsentralen (1242 euros/inh.) and 3.5 times the level of Turkey (2636 euros/inh). Concerning Switzerland and Norway, it is interesting to observe that the differences between UE and AELE appears not so important in relative terms as they were with the criteria of absolute differences.

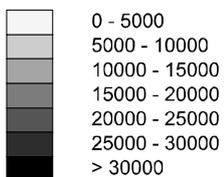
**Table 66 The ten highest relative gradients of GDP/inh. 1999 (in euros)**

i	j	Region i	Region j	GDP i	GDP j	Ratio
GR11	BG05	Anatoliki Makedonia	Yuzhen Tsentralen	9209	1243	7.4
AT12	SK02	Nideroesterreich	Zapadne Slovensko	20447	3267	6.3
DE23	CZ04	Oberpfalz	Severozapad	24303	4190	5.8
GR12	BG04	Kentriki Makedonia	Yugoiztochen	11314	2000	5.7
DE24	CZ04	Oberfranken	Severozapad	23470	4190	5.6
DE23	CZ03	Oberpfalz	Jihozapad	24303	4641	5.2
AT31	CZ03	Oberoesterreich	Jihozapad	23320	4641	5.0
DED2	PL04	Dresden	Lubuskie	16325	3417	4.8
DE22	CZ03	Niederbayern	Jihozapad	21935	4641	4.7
DE4	PL04	Brandenburg	Lubuskie	16146	3417	4.7

**Map 28 Highest relative gradients of GDP/inh. 1999 (in euros)**



**GDP in euros by average population**



**Highest differences**

	<i>rank</i>	<i>relative difference</i>
	1 - 20	7.5 - 3
	21 - 50	3 - 1.83
	51 - 100	1.83 - 1.47

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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

**Source: Espo Database**

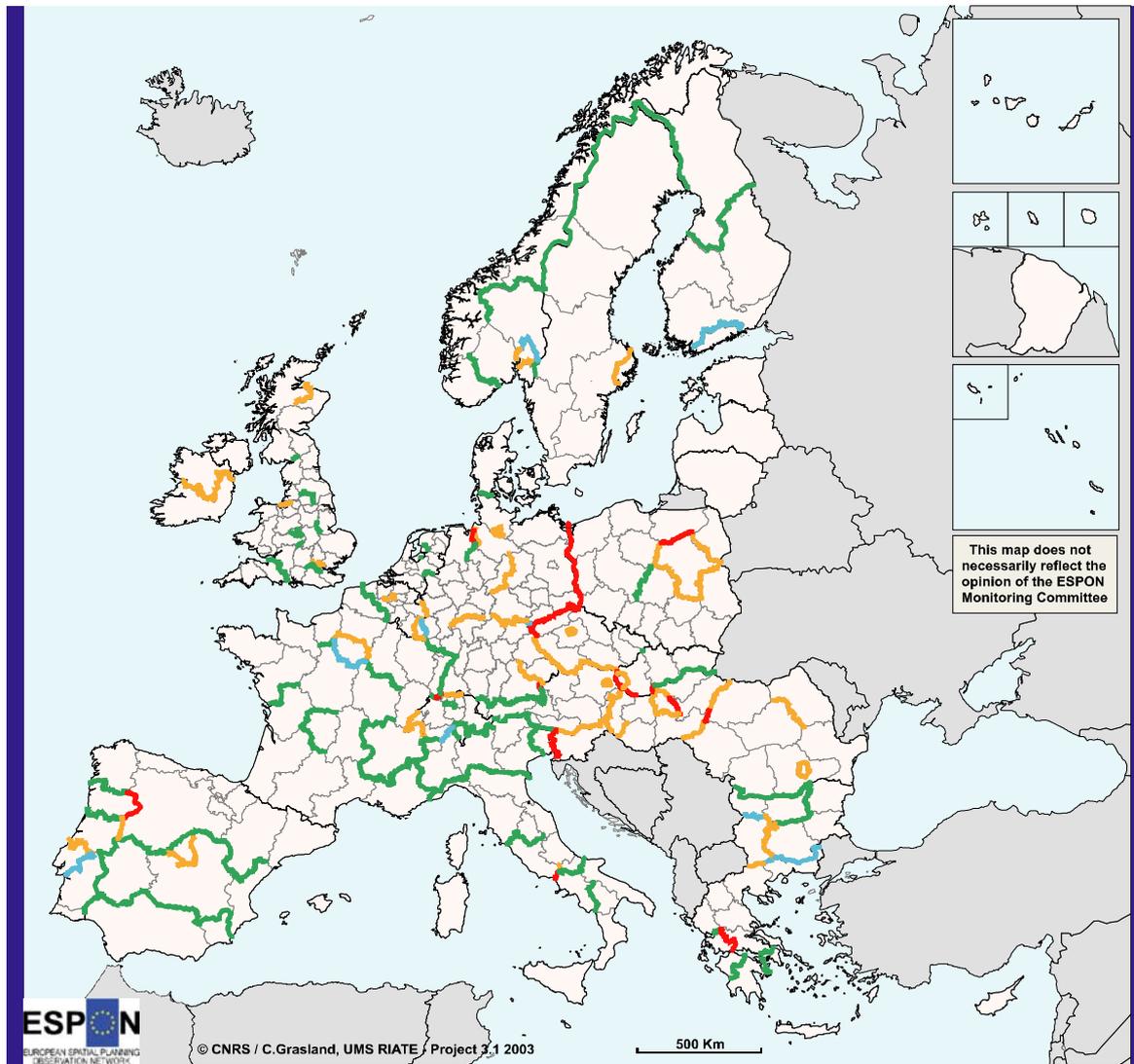
### **8.3.3 Analysis of discontinuities (multivariate analysis)**

The great weakness of most econometric approaches of territorial cohesion is to propose synthetic indexes of convergence which do absolutely not take into account the spatial autocorrelation . In the report on "Multiscalar Territorial Analysis" (provided in an annex of this report), we have delivered maps of discontinuities of GDP/inh between NUTS 2 regions which demonstrate clearly the interest of a spatialisation of economic disparities. At present time, some new economic approaches of regional convergence try to integrate this spatial dimension by means of new indexes taking into account the spillover effects (correlation between the growth of a region and the growth of the neighbouring regions) or the club effects (existence of group of regions following the same path of convergence). The TPG 3.1 has developed a partnership with the TPG. 1.1.3 in order to propose a detailed analysis of the dynamic of economic discontinuities based on GDP/inh .

But a pure economic approach is not sufficient and it is not correct to base the definition of territorial discontinuities on a single parameter. The evaluation of the potential flows between neighbouring regions depends also from the amount of population located on each side, from the presence of a common language, from the demographic complementarities, etc. As an example, the next figure proposes a cross-combination of major economic gradient (relative difference of GDP/inh. > 50%) and demographic complementarities (difference of mean age of population > 2 years) which help to precise different situations where the demographic and economic gradients can produce cumulative or contradictory effects (Map 29).

In the future of the ESPON program (and in particular in the research about European Territorial Cohesion Index – ETCI- in the framework of ESPON 3.2) multivariate analysis of regional discontinuities will be developed, taking into account many criteria (economy, demography, language, accessibility ...). Multivariate statistical analysis of discontinuities should be also completed by some case-studies on the area where those discontinuities produce the most important social and economic effects (of particular interest could be : the region of Vienna-Bratislava-Győr ; the border between Greece, Bulgaria, Albania and Turkey ; the Luxembourg and neighbouring regions ; the limit between northern France and Belgium, including the linguistic border between Flanders and Wallonia).

**Map 29 A cross-analysis of the distribution of economic and demographic discontinuities in 1999-2000**



This map does not necessarily reflect the opinion of the ESPON Monitoring Committee

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- **GDP + Age + / GDP - Age -** *Cumulative effects of economic & demographic gradients*
  - **GDP + / GDP -** *Economic gradient only*
  - **Age + / Age -** *Demographic gradient only*
  - **GDP + Age - / GDP - Age +** *Contradictory effects of economic and demographic gradients*
- Origin of data: EU15 and CC's, Eurostat Regio  
Norway and Switzerland, National Statistical Offices  
**Source: Espon Database**

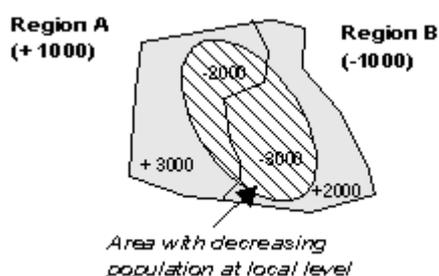
## 8.4 Modifiable Area Unit Problem (MAUP)

### 8.4.1 Historical background

The Modifiable Area Unit Problem (MAUP) has been recognized since the 1970's as one of the most difficult challenge for geographers, cartographers and spatial analyst. As recognize early by many authors , the cartographical pattern of the spatial distribution of variable or the level of correlation between two variables distributed in space can be completely modified according to the level of aggregation of spatial units or more generally the spatial grid used for the collect of spatial information. The MAUP has very deep consequences, from theoretical, methodological and practical points of view and is a major challenge for all researchers or planners using spatial information for statistical or cartographical purposes.

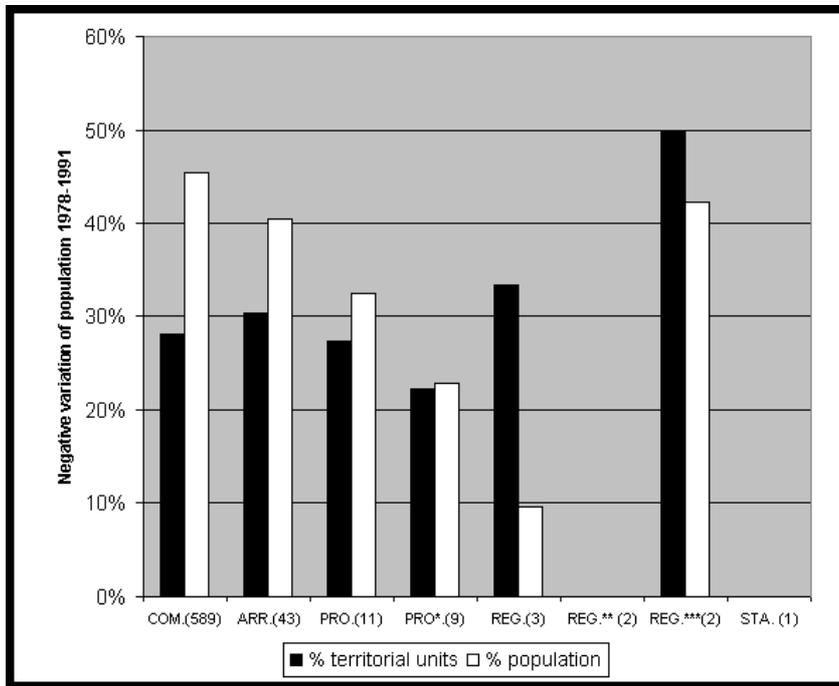
In the framework of the working group 1.4 (spatial integration) of study program on european spatial planning, C. Grasland discussed the problem in a working paper entitled "Objective 13-bis" where he examines the different solution for the delineation of area with decreasing population in Belgium . From theoretical point of view, the problem is related to the fact that the real location of area with problem can be heavily modified by the introduction of administrative divisions. In the example presented on Figure 90, the area with problem of decreasing population is located between two regions A and B but, because of aggregation of results, only one of the two regions will be declared eligible to the objective and receive funds.

**Figure 90 Administrative divisions and spatial planning objectives**



This theoretical example has been transposed to the case of evolution of population in Belgium and demonstrates that the amount of population or administrative units which fulfil the condition of eligibility is completely modified according to the NUTS level of administrative divisions (communes, arrondissements, provinces, regions). The optimal solution in terms of maximisation of funds received by Belgium is not necessary the highest or the lowest level of aggregation as can be seen on Figure 91.

**Figure 91 Variations of funds allocation according to territorial divisions**



Source : Grasland C., Objective 13-bis, Hypercarte working paper

<http://www.parisgeo.cnrs.fr/cg/hyperc/wp2/wp2.htm>

#### **8.4.2 Application to the ESPON results**

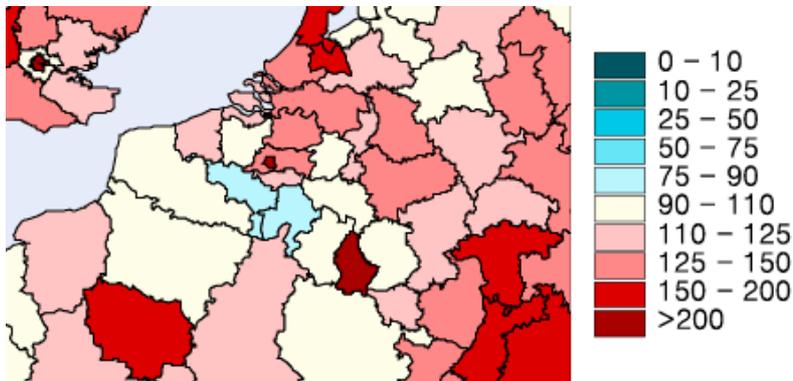
The Modifiable Area Unit Problem which was pointed in the SPESP (1998-1999) remains a crucial challenge for the ESPON 2006 program and was particularly discussed during the Lillehammer meeting in may 2004 in a workshop on polycentrism. It was suggested by P. Mehlbye to explore the question of a possible mixture of NUTS 2 and NUTS 3 levels which could be more accurate from scientific point of view but introduce a political debate as it is no more an official level of elaboration of regional policies. To introduce the debate and provide guidelines for future research on this subject, the TPG ESPON 3.1 has analysed three typical example of existing research developed in he ESPON program and compared the results according to NUTS 2, NUTS 3 and NUTS 2-3 territorial divisions :

- The cartography of regional levels (Map 30)
- The cartography of discontinuities (Map 31)
- The realisation of a typology of regions (Map 32)

In each case (see. comments on the figures), we have observed very strong modifications of the results when territorial divisions are modified, which means that ESPON faces a real problem and is obliged to introduce an in depth analysis on this subject in the near future. Apparently, the use of a mixture of NUTS 2 and NUTS 3 level is a good compromise between precision of results and elimination of the biases related to the separation of urban, periurban and rural areas. But some problems remain in the case of isolated metropolitan areas at upper scale of territorial division (like Hamburg, Bremen or Brussels-Capital which are NUTS 1 units). Policymakers could agree to the choice of different NUTS level according to the different states (e.g. maps combining NUTS 2 in Germany and NUTS 3 in France) but they would certainly not easily agree to the modification of official NUTS level inside a given state (e.g. aggregation of Brussels with the two regions of North and South Brabant).

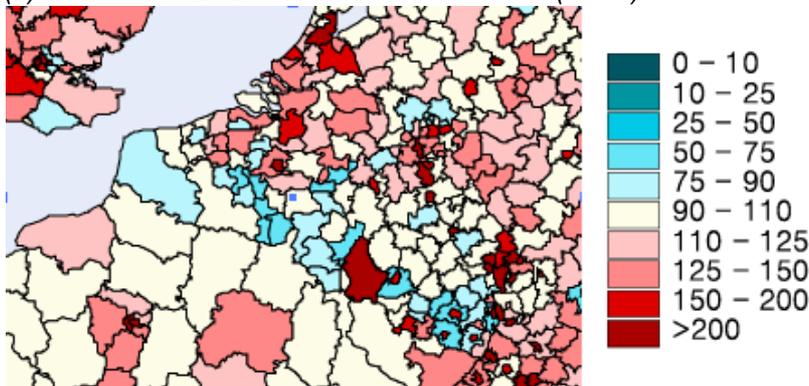
### Map 30 The influence of NUTS divisions on the definition of regional levels

(a) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 2



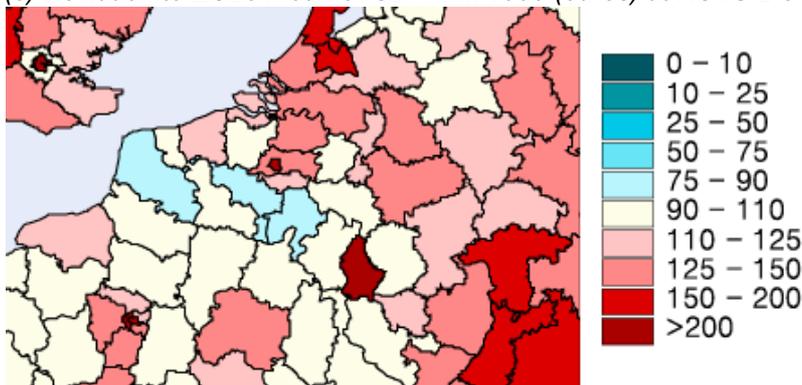
Index 100 =  
EU 25

(b) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 3



Index 100 =  
EU 25

(c) Deviation to EU25 mean of GDP/inh. 1999 (euros) at NUTS 2-3



Index 100 =  
EU 25

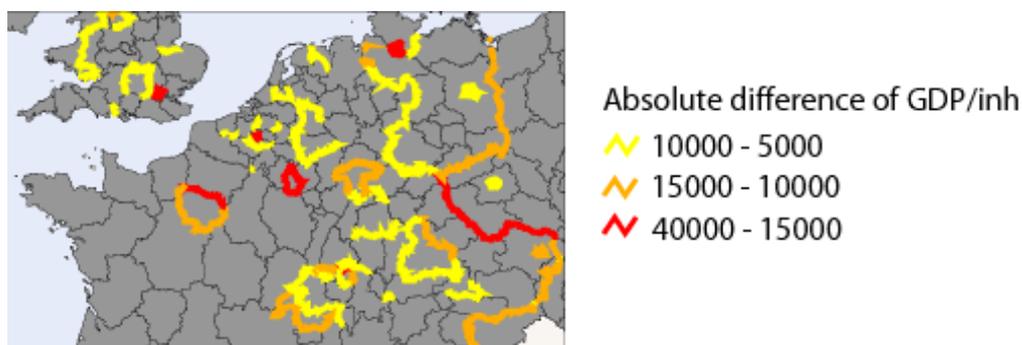
**Analysis :** The simple definition of regions with high and low level is completely modified by the change of territorial divisions, with huge consequence for the elaboration of policy recommendations

- At nuts 2 levels, only two regions of the sample area located under the mean value of UE25, both located in Belgium. None of them is located under the index 75.
- At Nuts 3 levels, many regions of Belgium, Germany and UK are located under the mean value of UE25 and even under the fatidic threshold of 75, simply because urban, peri-urban and rural areas are separated and because added value which is the base of GDP is allocated to the location of enterprise (located in towns) and not inhabitants (located in all types of area).
- NUTS 2-3 could be a good compromise from scientific point of view. But with deep political consequences for the allocation of structural funds.

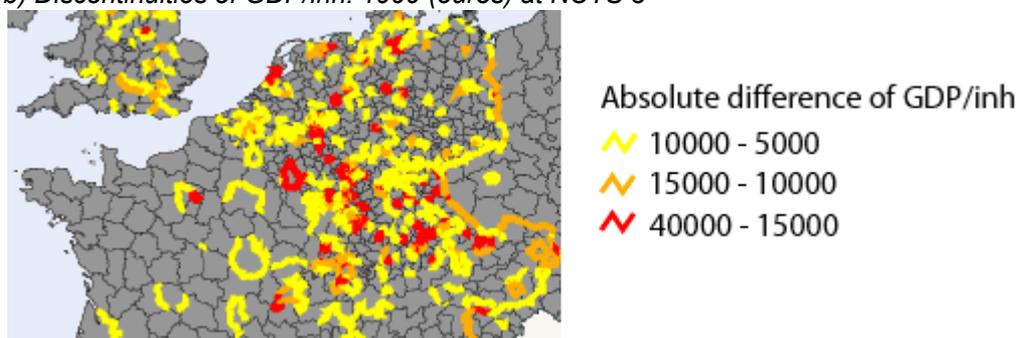
© Grasland C., Lizzi L., UMS RIATE, 2004

### Map 31 Influence of NUTS divisions on maps of discontinuities

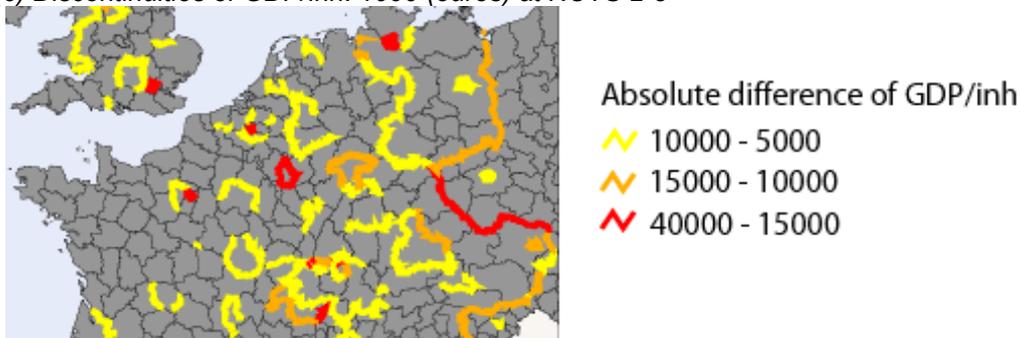
(a) Discontinuities of GDP/inh. 1999 (euros) at NUTS 2



(b) Discontinuities of GDP/inh. 1999 (euros) at NUTS 3



(c) Discontinuities of GDP/inh. 1999 (euros) at NUTS 2-3

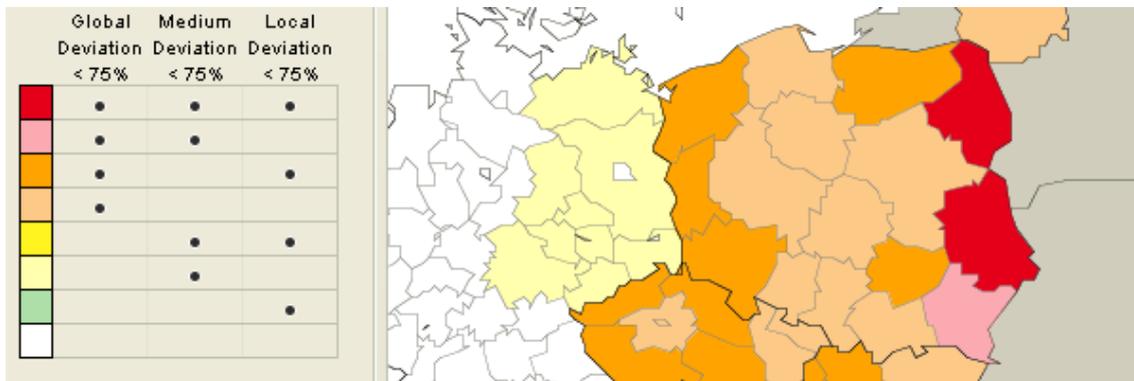


**Analysis :** The political message delivered by the maps of discontinuities is very different.

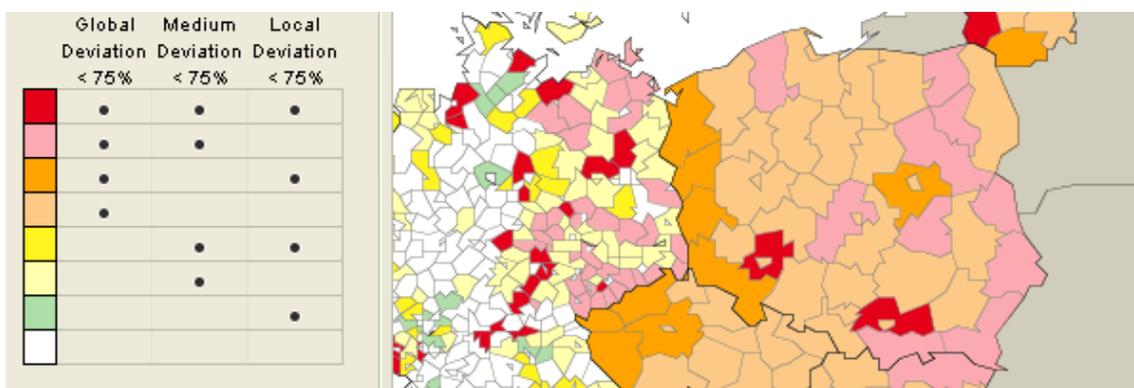
- On the map established at NUTS 2 level, the main message is the relation between the location of main discontinuities of wealth and political or historical borders. Some discontinuities are also related to cities, but only in the case of the main metropolitan regions of each state (Paris, London, Frankfurt, Wien, ...). This map give also the feeling that states with smaller territorial divisions (Germany) are more heterogeneous than states with larger regions (France).
- On the map established at NUTS 3 level, the main message is the strong urban-rural opposition, at least in all states where the territorial units are smaller enough to separate urban and rural territories. Germany appears fully covered by discontinuities of GDP/inh which is not the case for France where each NUTS 3 division (department) is still a mixture of urban and rural territories (except in the case of the agglomeration of Paris).
- On the map established at NUTS 2-3 level, a relative homogeneity of size of territorial units is obtained, which provide a more accurate map of discontinuities. But some problems remain for isolated urban areas not associated to their local neighbourhood (Bruxelles, London, Paris, ...).

### Map 32 Influence of NUTS divisions on the elaboration of regional typologies

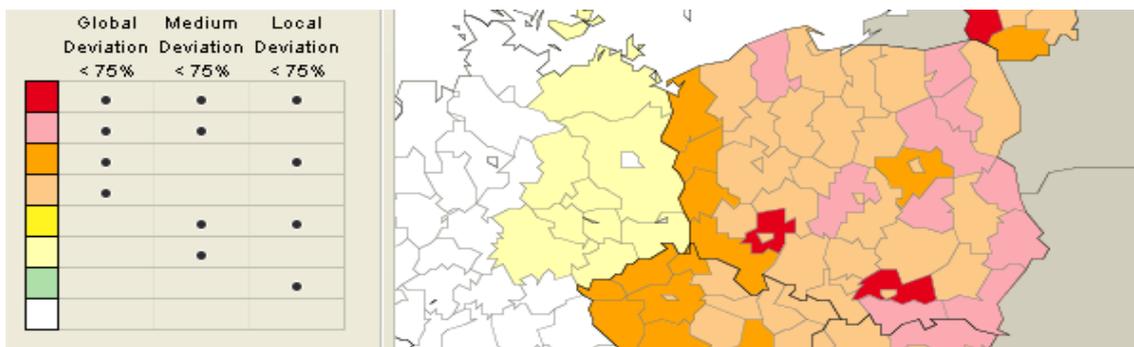
(a) Multiscalar typology of lowest levels of GDP/inh. 1999 (euros) at NUTS 2



(b) Multiscalar typology of lowest levels of GDP/inh. 1999 (euros) at NUTS 3



(c) Multiscalar typology of lowest levels of GDP/inh. 1999 at NUTS 2-3



**Analysis :** The elaboration of regional typologies, which is a main objective of the ESPON program is very influenced by the choice of territorial breakdowns.

- The typology established at NUTS2 level indicate that only 2 regions of the sample area are considered as “lagging” (<75) at all levels of deviation of GDP/inh. (european, national and local).
- The typology established at NUTS 3 level is completely different with many regions of Germany (not only in eastern part) included now in the red class of “lagging for all criteria of deviation”. But more surprisingly, the location of lagging regions of Poland has changed because the table of contiguity (which define the local deviation) is not the same.
- The typology established at NUTS 2-3 level remains criticable from scientific point of view, because of the separation of urban and rural areas in the NUTS 3 regional division of Poland.

© Grasland C., UMS RIATE, 2004 – map realised with the ESPON Hyperatlas

### **8.4.3 Recommendations for further ESPON research on MAUP**

According to these preliminary analysis of the question of the MAUP, we suggest the following recommendation for further research of the ESPON program :

1. Launch a specific study on the question of MAUP and its consequence for the elaboration of future research on spatial planning. This study should not be limited to the question of NUTS 2/ NUTS 3 level and should cover also the problem of other NUTS level, especially the NUTS 5 which is the basis for delimitation of functional urban areas and the measure of polycentrism . Such a study should be realised before the end of the ESPON 2006 program in order to provide precise solutions at the very beginning of the future ESPON II.
2. Develop multiscalar analysis statistic and cartographic tools which are able to produce quickly and interactively maps at all different official or not official levels of aggregation The ESPON Hyperatlas is an example of such interactive tools but it is actually limited to the cartography of simple ratio and it should be extended to all type of indexes used in the ESPON program. It should also involved new functionalities as realisation of maps of discontinuities or cluster analysis with contiguity constraint.
3. Explore borderless methods of spatial analysis which fully eliminate the initial territorial division and propose smoothed distribution of the target phenomena. These methods are not necessary relevant in all situations (in many case, political decision should be based on specific territories with precise limits) but they can give interesting complements to usual territorial approach, in particular when the problem is to combine environmental data (CLC) and socio-economic data (Regio, Sire) or when the problem is to realise maps of evolution for territories with changing administrative units.
4. In any case, the research on the MAUP problem should not be conducted by ESPON program isolated but should be based on a strong partnership with EUROSTAT, EEA and JRC and with the INSPIRE program.

## **8.5 Multiscalar Smoothing Methods (MSM)**

Those methods which are actually developed in scientific research papers has not been fully validates in the framework of operational research like the ESPON program. They are therefore at an early stage of implementation and results should be very carefully interpreted.

### **8.5.1 Multiscalar smoothing metods based on Gaussian neighbourhood**

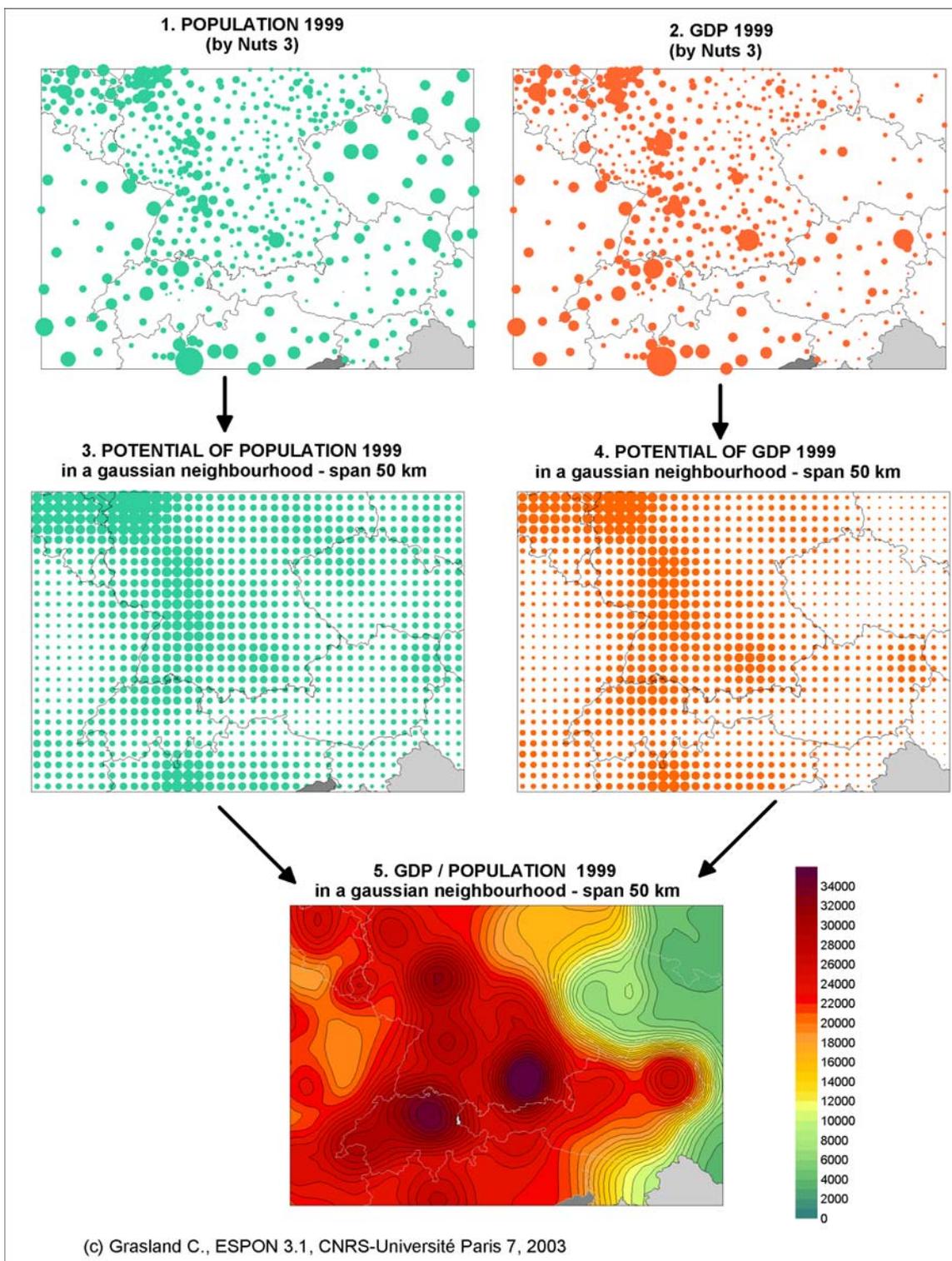
The Gaussian smoothing method of discrete phenomena developed by the Hypercarte Project (Grasland, Mathian, Vincent, 2000) has been applied to the distribution of population and GDP in 1999 in order to produce a map of GDP/inhabitant in a neighbourhood of 50 kilometers, independent from the original territorial divisions. The gerrymandering (like inner/outer London) are fully removed by the smoothing method which provide an harmonised picture view of the distribution of the phenomena at the chosen scale A continuous colour gradation has been introduced in the same spirit to avoid visual biases introduced by the limit of cartographic classes (Figure 92)

A very important property of the smoothing method is the fact that it makes possible the comparison of maps derived from different initial territorial divisions (Corine Landcover grid and a Nuts 5 division) and the combination of indexes derived from heterogeneous sources. Furthermore, the smoothing method can help to solve the major challenge of realisation of harmonised series of map at different period of time, whatever the dramatic changes than can occur in basic territorial units.

The smoothing method proposed by the Hypercarte Project introduce a variable parameter ("span of neighbourhood") which can be modified in order to propose more and more generalised pictures of the target phenomena. This property is crucial because it gives the opportunity to remove the biases introduced by territorial divisions without losing too much information on the spatial distribution of the phenomena of interest. It is thus possible to define "optimal" parameters according to information theory. In the case of data at Nuts 3 level, it is probably around a span of 50 km that we can obtain the optimal smoothed map (Map 33). But it is also possible to consider the variation of the spatial distribution according to scale as a major tool for the exploration of social consequences of spatial heterogeneities. As the situation of a place is not the same according to local, regional national or European contexts, we can propose an equivalent model for the situation of a place according to neighbourhoods of 50, 100, 200 or 400 kilometres (Map 33) . An island of prosperity surrounded by poor region will have a decreasing level of GDP/inh when the scale of

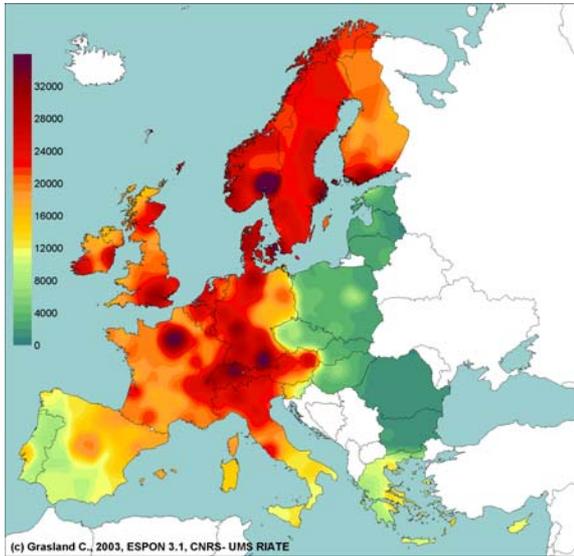
neighbourhood increase. Reversly, some poor areas located near richer regions will have increasing levels of GDP/inh. when the span of neighbourhood increases.

**Figure 92 Principle of Gaussian smoothing method (simplified)**

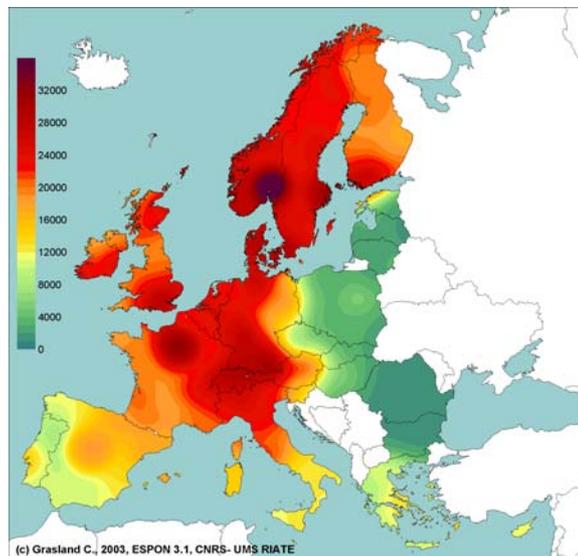


**Map 33 Smoothed distribution of GDP/inh. 1999 at various scales of Gaussian neighbourhood**

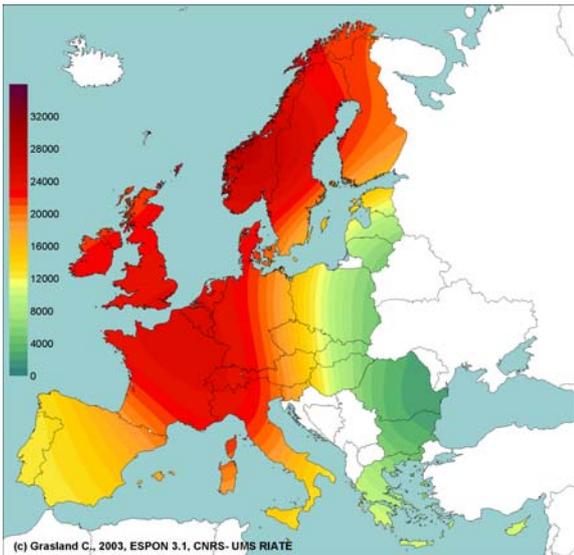
*Span 50 km*



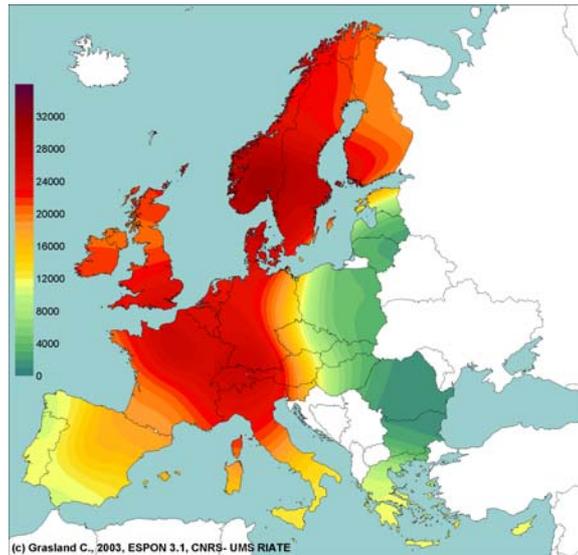
*Span 100 km*



*Span 200 km*



*Span 400 km*



### 8.5.2 Application to econometric models of convergence

The unequal repartition of population and wealth can produce various consequences. In a neoclassical framework, the regional economic disparities are supposed to be reduced by the mobility of people (from poor regions to rich regions) or by the mobility of capital (from rich regions to poor regions). This neoclassical framework has been criticised by many authors, especially in the case of conditional convergence with apparition of "clubs", but it remains an interesting basis for the simulation of potential consequences of economic disparities in Europe.

In recent research papers<sup>6</sup>, the members of the Hypercarte Project have proposed various modelling of potential flows induced by the unequal repartition of population and wealth at world scale. A preliminary application of this model to the GDP/inh. of European regions in 1999 has been realised and the results are interesting, even if it is necessary to check it very carefully and discuss on possible improvements with other TPGs of the ESPON Programme .

The basic idea of this econometric model of local convergence is to compare the distribution of population (P) and wealth (W) for any location  $i$  of a given territory according to two levels of neighbourhood. The first neighbourhood define the local situation (V1),the second neighbourhood define the global situation (V2). The neighbourhood V1 is fully included in neighbourhood V2 which means that any amount of population or wealth which account for V1 account also for V2. The most simple example of neighbourhood following these conditions are two circles based on euclidean distance (Figure 92).

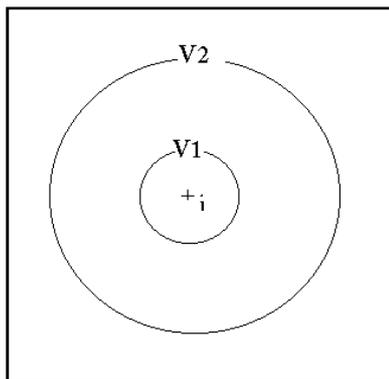
But circular neighbourhood (Figure 94-a) assume that interaction are maximum (prob=1) until a given threshold (radius of the circle) and then is null (prob=0) which is certainly not consistent with empirical observations. Therefore it is much more interesting to use other mathematical functions of neighbourhood which introduce a smooth decrease of the probability of interaction with distance. Classically, those functions can be based on a power or exponential function with negative exponent of distance and some adaptations in order to fulfil the condition of maximum interaction (prob=1) for a distance equal to 0. Good solutions from empirical and theoretical points of view are the modified Pareto function (Figure 94-b) and the Gaussian function (Figure 94-c) which introduce parameters for the control of the span and the shape of neighbourhood. The span of neighbourhood (which is equivalent to the radius of the circular neighbourhood) is defined

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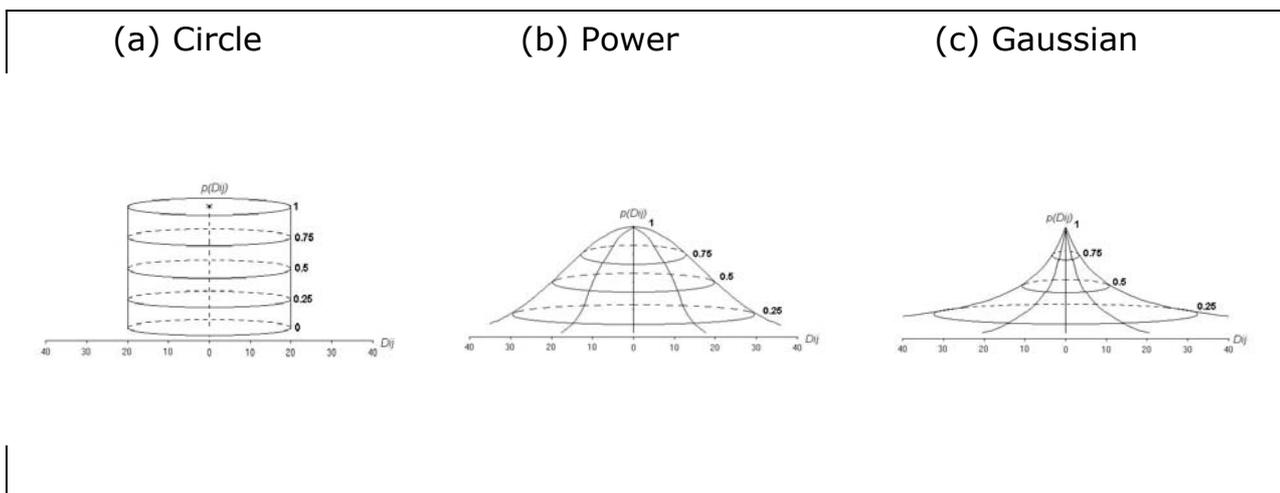
<sup>6</sup> See in particular the discussion of the methodology with an application at world scale in : **Grasland C., 2003** , Richesse et population dans le monde: une représentation multiscalaire des inégalités, *Mappemonde*, n°69, p20-25

as the distance where the probability of interaction is reduced by half (prob=0.5). In the following application, we have used Gaussian neighbourhoods with spans equal to 100, 200, 500 and 1000 km. It is not possible to use smaller spans of neighbourhood (like 20 or 50 km) because the initial information used for computation (data at level NUTS 3) does not allow a too much detailed description of spatial structures without biases.

**Figure 93 Example of nested neighbourhoods**

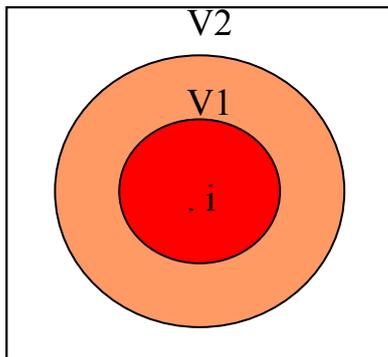


**Figure 94 Mathematical forms of neighbourhoods**



Comparing the distribution of GDP/inh. at two different scales of Gaussian neighbourhood, it is possible to propose a model of potential flows of population and GDP between locations which are locally richer/poorer than their global neighbourhood.

**Figure 95 Computation of local potential of wealth and population redistribution**



$P1 = 1000 \text{ inh.}$   
 $W1 = 20\,000\,000 \text{ €}$   
 $Z1 = 20\,000 \text{ € / inh.}$   
 $P2 = 5000 \text{ inh.}$   
 $W2 = 50\,000\,000 \text{ €}$   
 $Z2 = 10\,000 \text{ € /inh.}$

As an example (Figure 95), consider the situation of a place *i* where the local level of GDP/inh. is equal to 20 000 €/inh. and the global level of GDP/inh. equal to 10 000 €/inh. It is clear that this place is a local peak of wealth (difference between local and global level is positive) but we will not use the simple difference of ratio (+10 000 €/inh.) is not a very interesting index because it gives no indication of the raw amount of wealth or population which could be subject to move from V1 to V2 or to V2 to V1 in the process of local convergence. It is therefore much more interesting to evaluate the raw amount of population which could migrate from V2 to V1 (1000 inh.) or the raw amount of wealth which could be invest from V1 to V2 (10 000 000 €) in order to achieve equilibrium. From mathematical point of view, the model indicates that 20% of wealth or population should be moved between the two neighbourhoods in order to obtain equilibrium, whatever the direction of flows (we can imagine mixed solutions for equilibrium like moving simultaneously 500 inh from V2 to V1 and 5 000 000 € from V1 to V2 ...). It means that, **according to the assumption made by the observer, the resulting map can be expressed either in population terms (potential flows of migration= +1000) or in wealth terms (potential flows of invests= - 10 000 000) or as an abstract index of local redistribution (index = 20%, whatever the direction).**

This model appears very powerful and interesting for spatial planners as it helps to define the potential economic and demographic effects of inequalities in the distribution of population and wealth in european territory. But it should be used very carefully because many parameters depends on external expert knowledge on the behaviour of workers and economic actors. More precisely, a good use of such a model implies clarification of assumptions on the following topics :

- ◆ What is the good measure of distance for actors (kilometres, time, costs) and is it possible to obtain such a measure on all the target area ?
- ◆ Are there barriers effects (related to borders, language, level of education, level of economic complementarity ...) which should be taken into account in the neighbourhood functions ?
- ◆ What is the empirical span of neighbourhood which describe the best the behaviour of actors (maximum or mean distance of migration of labour workers ? maximum and mean distance of industrial relocation ?)
- ◆ Is it possible to fit the model on empirical informations related to flows ?
- ◆ Does the model try to simulate existing flows or to estimate scenarios on future flows under various assumptions ?

As the aim of project ESPON 3.1 is not to answer immediately to the following questions (which has been explored by various ESPON project like 1.2.1 for accessibility of 1.1.3 for borders effects), the first simulations of the model are only very preliminary results which just intend to explore the possibilities but can not be used immediately in an operational way. The maps presented here are just preliminary assumptions based on simplistic assumptions which will be improved by further ESPON TPG's, in particular the project ESPON 3.2 on scenarios (econometric model developed by R. Camagni).

The comparison of the levels 50 and 100 km produce a picture of local economic polarisation which is clearly related to the European urban network (Map 34). With increasing spans of neighbourhood (100 to 200 km), most local peaks of polarisation are removed and only very important urban area remains visible on the map. Wien which is surrounded by poorer regions appears also very attractive (Map 35). Finally, with spans of neighbourhood defined at upper scale (200 to 400 km), the pattern become very simple and is mainly based on the opposition between EU-15 and candidate countries. But this final map is partly uncorrect because at those scales it is difficult to neglect the effect of territories located out of the ESPON space like Balkanic countries, Ukraina, Turkey, Maghreb... As a complement, it would be necessary to propose a world view of the same differentials of population and GDP, established with UNEP GRID and Wolrdbank databases (Grasland 2003).

These multiscalar approach (which is the spatially "continuous" version of the multiscalar territorial analysis) could be very interesting for further research on the question of polycentrism in the framework of the ESPON

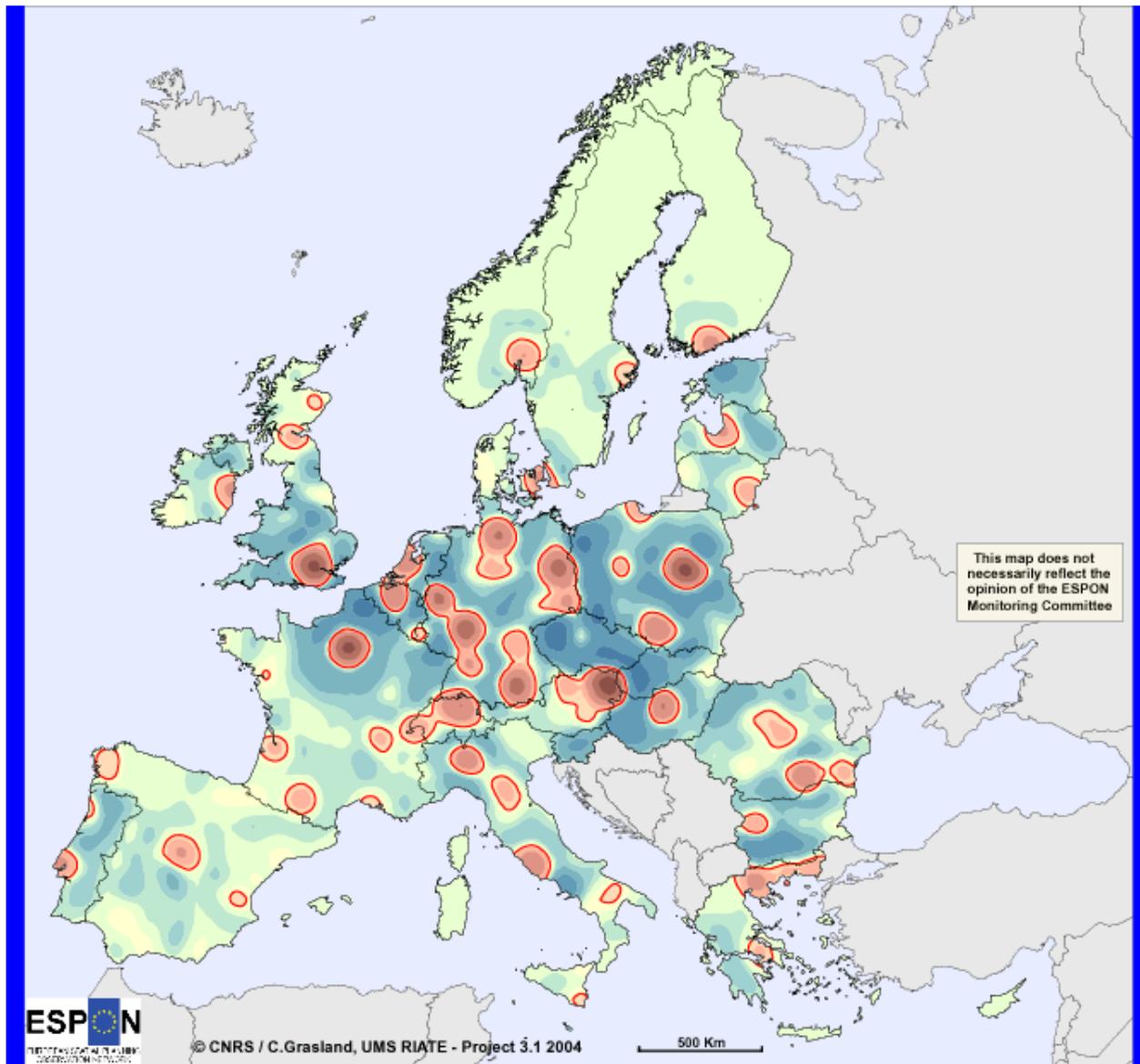
program, because it reveals very different patterns of polycentricity according to the spans of neighbourhood which are chosen by the observer of economic convergence.

- The potential economic polarisation at local scale (50-100 km) presented on Map 34 indicates the existence of a very polycentric pattern, related to the distribution of a regular pattern of metropolitan areas richer than their neighbourhood.
- The potential economic polarisation at medium scale (100-200 km) presented on Map 35 indicates how the initial poles are joined together in most important areas of high or low level of GDP/inh. as compared to neighbouring territories.
- The potential economic polarisation at global scale (200-400km) presented on Map 31 presents an upper level of polarisation with a dramatic reduction of the economic polarisation around selected macro-regions. At this scale the map is not correct because of border effects (territories located out of the ESPON research area should be taken into account).

Keeping in mind that these tools focus on potential flows (structural polycentrism) and not on effective flows (functional polycentrism), it will be necessary to introduce empirical verifications for the choice of the best scales of neighbourhood before to use these methods in an operational framework. In concrete terms, it is necessary to realise case-studies on the distance (or barriers effects) which are relevant for industrial relocations, public or private invests, travel-to-work, etc. before to choose the good parameters.

In the same time, the elaboration of a software equivalent to the ESPON Hyperatlas for the realisation of those smoothed maps could be of interest for the future.

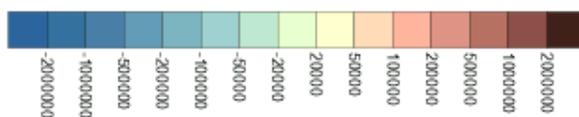
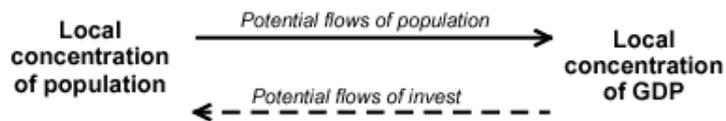
**Map 34 Potential economic polarisation at local scale in 1999 (50-100 km)**



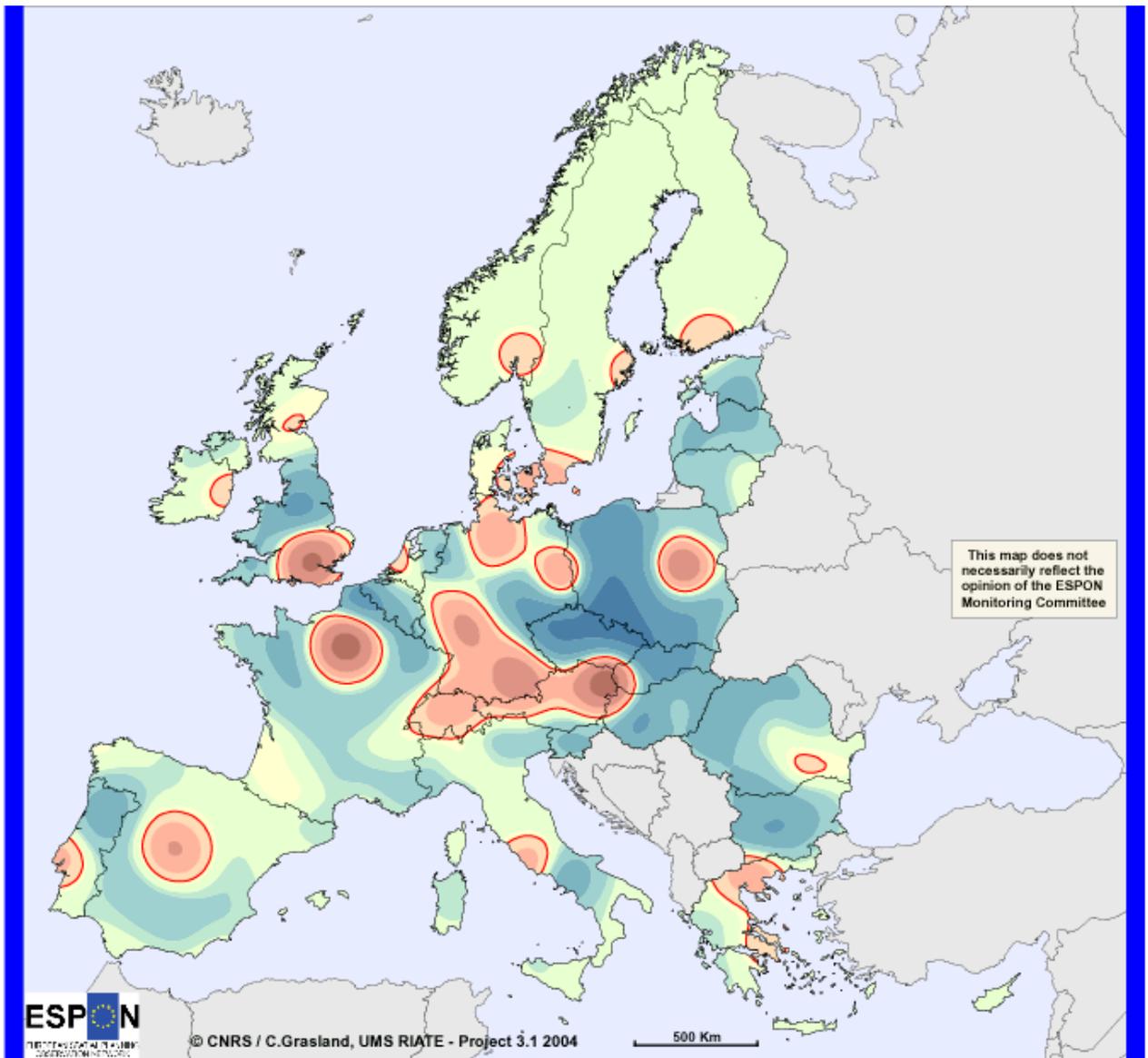
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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espon Database



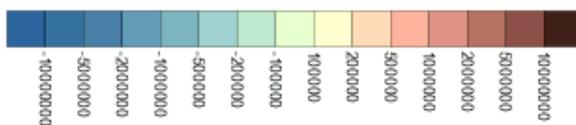
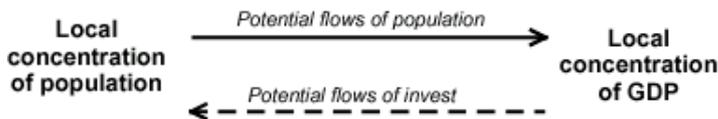
**Map 35 Potential economic polarisation at medium scale in 1999 (100-200 km)**



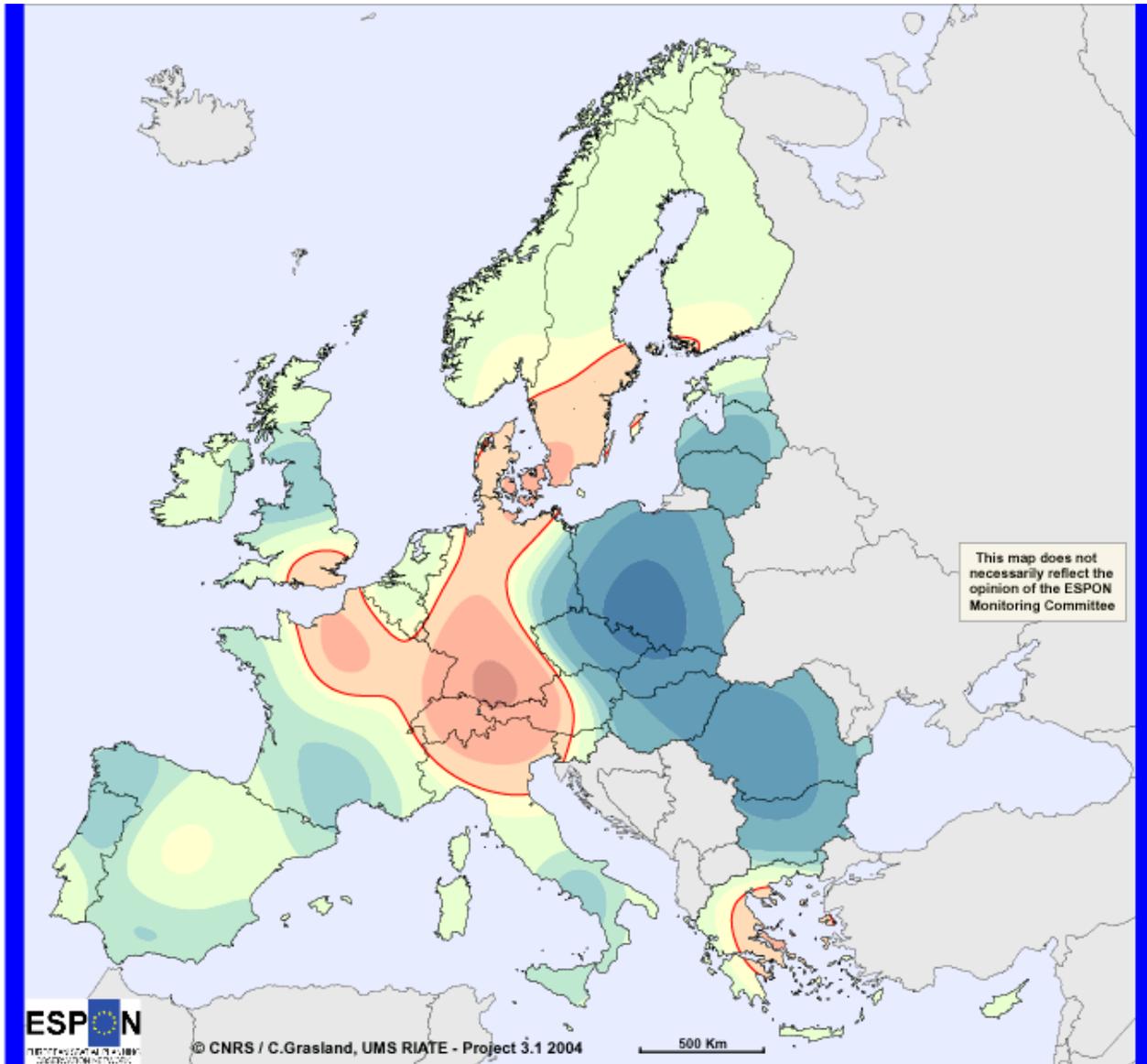
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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

Source: Espon Database



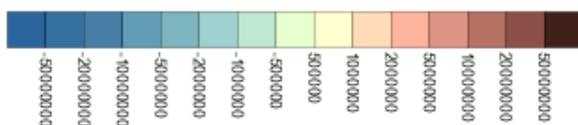
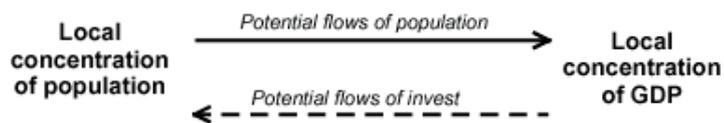
**Map 36 Potential economic polarisation at global scale in 1999 (200-400 km)**



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Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

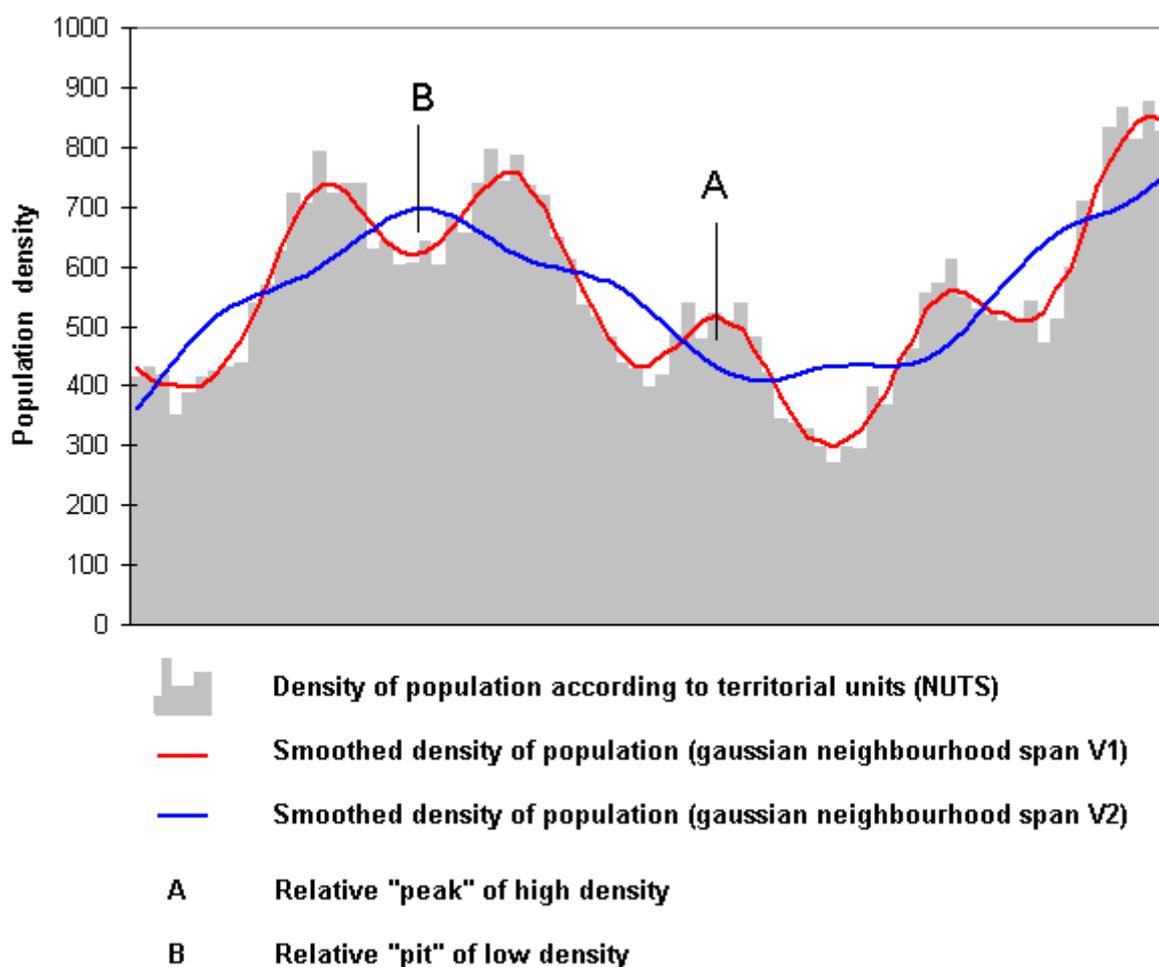
Source: Espon Database



## Application to morphological analysis of polycentrism

The methodology of Multiscalar Smoothing Methods (MSM) can also be applied to the objective definition of concentrations of population which is a major challenge for the research on polycentrism developed in the framework of the ESPON program. Taking into account the fact that NUTS divisions are heterogeneous at all levels (NUTS3, NUTS 5) and can therefore introduce important biases in the delimitation of morphological urban areas, we propose to use MSM for the objective delimitation of "peaks" and "pits" of population density (Figure 96)

**Figure 96** Definition of relative "peaks" and "pits" of population density



The initial distribution of population density (by NUTS) is transformed into two generalised maps of population density according to two different levels of Gaussian neighbourhood (V1 and V2). The comparison of these two smoothed surfaces of population density provide a definition of the relative

“peaks” and “pits” of population density. As an example (Figure 96) the location A appears as a relative “peak” of density because its local density according to V1 (500 hab./km<sup>2</sup>) is higher than its global density according to V2 (400 hab./km<sup>2</sup>). On the contrary, the location B appears has a relative “pit” of density because its local density (600 hab./km<sup>2</sup>) is lower than its global density (700 hab./km<sup>2</sup>).

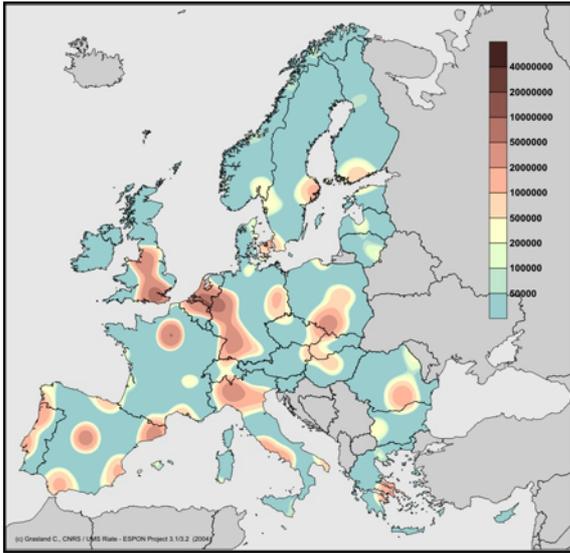
The great interest of this method is to compare the density of locations in relative terms and not in absolute ones. The same level of density does not has the same meaning according to the situation of places in Europe : 100 hab./ km<sup>2</sup> is a low level of density for places located inside the “blue banana” but a very high level for places located in northern peripheral regions of Scandinavia.

It is important to notice that the aim of the method is not to define directly “towns” or “Functional urban area” but simply to provide an objective criteria for the identification of local peaks (or pits) of density. According to the scale of smoothing (span parameters), these peaks can be identified at various scales which means that the same location can be a “peak” at a given scale of analysis and a “pit” or a “flat land area” at another scale (Map 37) :

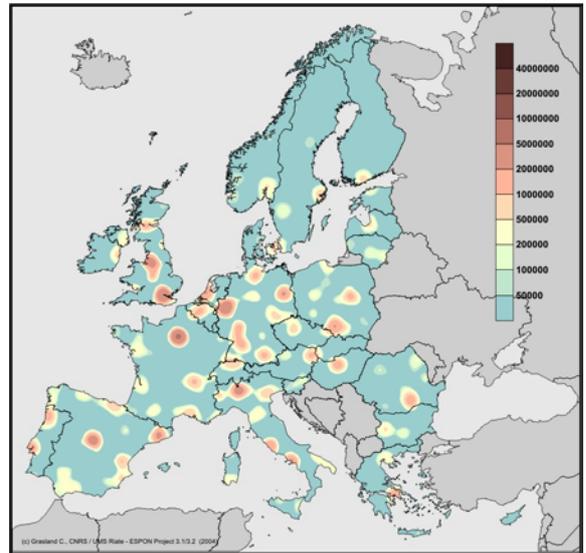
- ◆ At scale 50-100 km, the picture of relative peaks of high density is strongly related with the location of individual towns or old industrial basin like Silesia. More or less 100 peaks can be identified.
- ◆ At scale 100-200 km, the previous towns are mixed into aggregates of higher level which define axis (Rhine Valley) or global concentration (Paris region). The number of peaks is reduced to 20-30.
- ◆ At scale 200-400 km, a dramatic simplification of the map take place. The major concentration of population density is related to the “blue banana” (extended to whole Italia in southern direction) but secondary peaks can be observed in Baltic sea, Silesia, Romania and coastal regions of Spain, Portugal and Greece).
- ◆ At scale 400-800 km, only one peak remains which is organised around the so-called “Pentagon”.

It is important to keep in mind that the pictures would have been slightly different if territories located outside the ESPON space had been taken into account (Russia, Ukrainia, Turkey, Maghreb, ...). But the general results would be the same, especially at lowest scales.

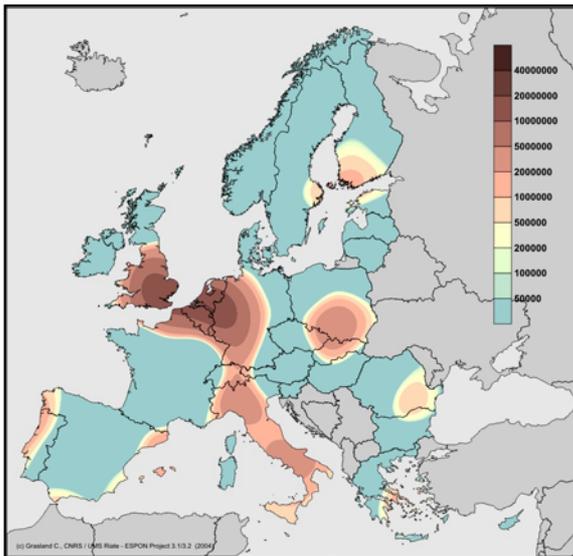
**Map 37 Four pictures of the relative concentrations of population in Europe**



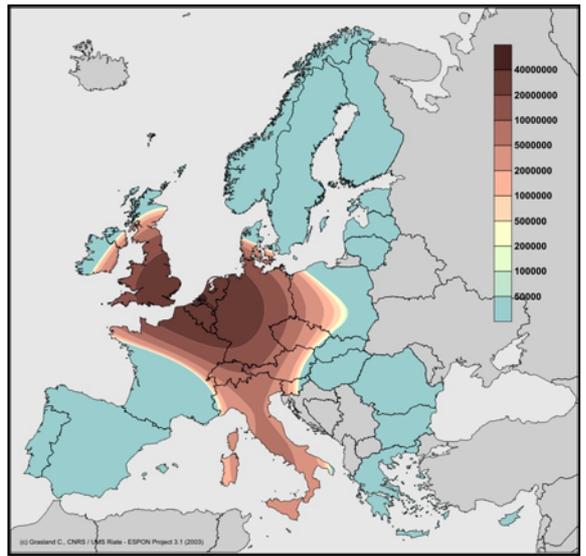
(a) Scale 50-100 km



(b) Scale 100-200 km



(c) Scale 200-400 km



(d) Scale 400-800 km

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## **Elements of co-ordination and guidance**

- 9.1 Guidance Papers**
- 9.2 The ESPON European META SWOT**
- 9.3 Territorial Impact Analysis (TIA)  
and its implementation**
- 9.4 Approaches for synthesising overall  
findings**



## **9 Elements of Guidance**

### **9.1 Guidance Papers**

(by BBR)

As mentioned in former chapters the Project 3.1 has gained added values for the ESPON programme by the deliverance of products which support the programme on different levels, like the so called guidance papers. Mentioned guidance papers are the focus of this chapter.

To understand the background of the idea on the guidance papers once again reference points of the tasks of the project by different partitions are mentioned below:

- thematic structures and reference points deriving from the input provided by other projects and by own additional efforts
- territorial structure reference points such as countries, spatial integration zones, etc.
- data base development and cartography
- policy impact methodologies
- policy development

With the 2nd ESPON Seminar in Panormo, Crete, Greece, a new element has come into the arena. A serial of guidance papers were developed related to the conclusions and agreements made during the corresponding seminars.

#### **Idea**

The first step to get good results is to create a fundamental common ground. For the ESPON Programme 2006 this means to get a common understanding about ESPON and a common "ESPON thinking". In this regard it was necessary to establish a good networking using effective tools. One of this tools was the establishment of so called guidance papers.

The intention was to create/ establish the above mentioned common platform and to give the TPGs guidance with regard to their work and next reports. Also the intention was to secure integrated approaches and results of the whole ESPON programme.

## The "Crete Guidance Paper"

The so called 'Crete guidance paper'<sup>1</sup> was the first guidance paper developed and sent to the TPGs. The guidance paper together with the standard layout for ESPON maps and the "3-level-approach" has laid down a concerted action and common platform of all TPGs.

### The Crete Guidance Paper

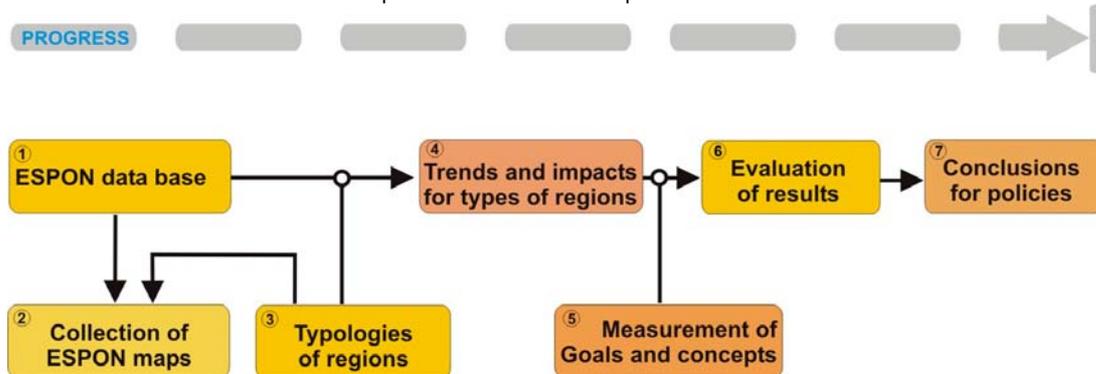
In Crete all TPGs agreed that common elements are needed that can be used by different TPGs. These common elements are necessary

- (1) to make things simple and efficient by using results from other TPGs and
- (2) to achieve coherent ESPON results.

The most important elements of the common platform are:

1. the ESPON data base (core indicators) including
2. a collection of ESPON maps (visualising the ESPON data base)
3. typologies of regions;
4. the analysis of trends and policy impacts related to different types of regions;
5. the operational definition and measurement of policy goals and concepts as a base for
6. the assessment and evaluation of results (trends and policy impacts) with reference to these policy goals and concepts;
7. conclusions for policies.

The structure of the Crete Guidance Paper follows these main topics



Source: ESPON Project 3.1

The structure shows also the main elements and steps for the lifetime of an ESPON Project.

Most important was and still is for all ESPON Projects the so called '3-level-approach', which defines the levels for research and analysis. Mentioned approach was discussed and agreed during a TPG-lead partner meeting in Brussels, 26.02.2003, as well as during the ESPON Seminar in Crete. The final agreement was for all ongoing projects of that time as well as for all later projects to concentrate on the three-level-approach concerning the policy contexts:

<sup>1</sup> Send out on 02.06.2003 by the 3.1 Project  
416

- macro scale - European level
- meso scale - trans-national/ national level
- micro scale - regional/local level.

### **The “Matera Guidance Paper”**

The ‘Matera Guidance Paper’<sup>2</sup> (MGP) started from the ground laid with the ‘Crete Guidance Paper’. The Matera paper mainly has focused on the analysis of trends and policy impacts and the evaluation of trends and sector politics against territorial goals to come to spatial policy recommendations.

#### The Matera Guidance Paper

In Matera all TPGs agreed that further common elements are needed that can be used by different TPGs. Acting in the spirit of Crete, these common elements are necessary

- to make things simple and efficient by using results from other TPGs and
- to achieve coherent ESPON results

In Matera these elements were further developed as follows

- the ESPON data base (core indicators) including
- some (core) typologies of regions;
- a collection of ESPON maps (visualising the core indicators and typologies);

The most important elements of the “Matera Guidance Paper” are:

- the ESPON co-ordination towards the next round of reports – May 2004/ October 2004
- the ESPON Data Base and technical support
- typologies of regions and their interpretation
- common ESPON Glossary
- self-evaluation of TPGs
- structure of the final reports

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<sup>2</sup> the Matera Guidance Paper sent out on 20.02.2004

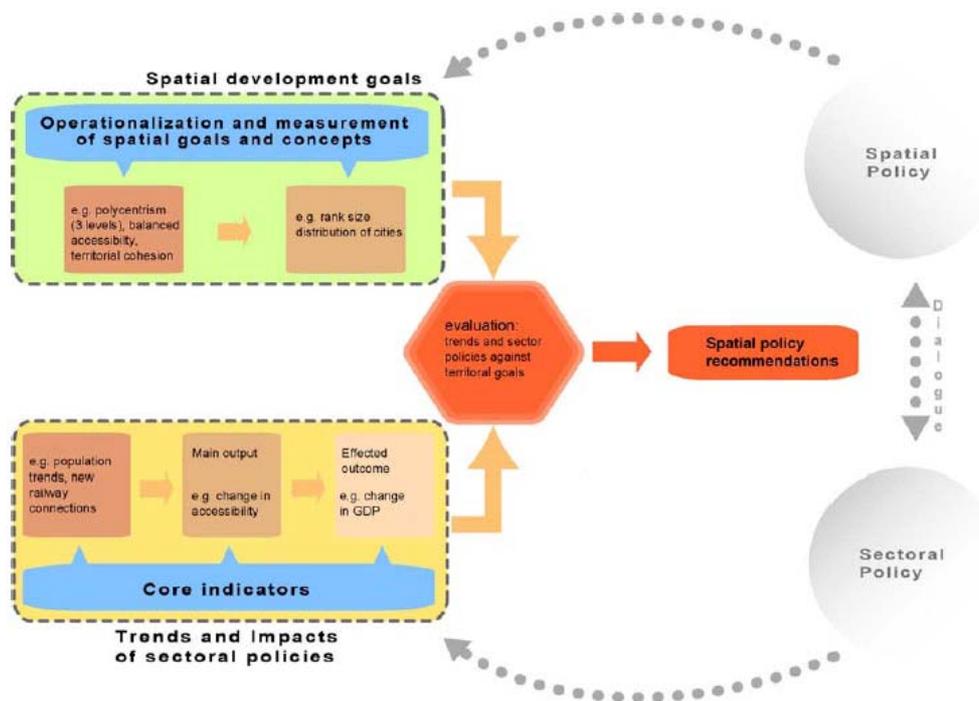
Central part of the paper as well as of the “Matera Guidance Paper Figure” is the methodology used by the TPGs (cf the hexagon in the graph). Main focus is set on how to define operational models of policy goals and to confront statistical data about the real world with these models of the reference model world.

For the further work basic elements were agreed:

- the analysis of trends and policy impacts related to different types of regions;
- the operational definition and measurement of policy goals and concepts as a base for
- the assessment and evaluation of results (trends and policy impacts) with reference to these policy goals and concepts;
- conclusions for policies (policy recommendations).

Crucial for the paper and the work of the programme was the ‘Matera Guidance Paper Figure’, see below.

### The Matera Guidance Paper Figure



Source: ESPON Project 3.1

The guidance paper strengthened the common platform of the whole ESPON exercise. It has given all participants guidelines that helped to navigate to project and common programme results.

Especially for the content related work on the final reports the Matera Guidance Paper has been an important milestone.

## The "Lillehammer Paper"

In contrast to the two former guidance papers the Lillehammer Paper concentrated on orientations and a check list for the writing of the final reports. Basis for the development of the paper were important discussions which took place during the Lillehammer Seminar. These were based on a number of questions relevant for orienting final results as well as policy recommendations. The more technical and formal aspects related structure is visible by having a look on the content.

The Lillehammer Paper

The Lillehammer Guidance Paper is structured as follows:

Part 1: General orientations and inputs to project 3.1

Part 2: Check lists for Final ESPON Reports

- Check list on points of general expectations for the Final Report
  - Compliance with the Addendum and latest CU response
  - Policy recommendations
  - Methodology
  - Data
  - Indicators and typologies
  - Maps
  - Use of models
  - Indication of ESPON performance indicators
- Check list on points of expectations for the thematic content and policy recommendations in the Final Report
  - Identification of the main territorial trends and structures, including core indicators
  - Empirical findings in the light of European territorial goals and derived policy recommendations

Part 3: Structure of the Final Report

Part 4: Design issues for Final Reports

Annex 1: Indication of ESPON performance indicators achieved

**Annex 2: Template for ESPON cover page**

## Conclusion on "guidance papers"

A lot of progress has been made in the field of networking in different ways like the ESPON Seminars, the corresponding 3.1 interim reports, the guidance papers or bilateral contact. But the very positive effect of the guidance papers has to be accentuated. The 'Crete Guidance Paper', 'Matera Guidance paper' and the 'Lillehammer Paper' strengthened the work in a cross-project manner and let a significant surplus value arise. After the establishing of this tool and the development of the three above mentioned guidance papers the resume is very positive. For the first round projects the guidance papers have been like positive companions on their way to successful project results and the final reports. For the projects of the following rounds the existing papers are

known. Therefore the papers can give these projects guidance at an earlier stage. Sure that that is a big advantage.

The suggestion by the 3.1 team is that the ESPON programme should go on with this serial. A sound basis exist on which new guidance papers can be build up.

## 9.2 The ESPON European META - SWOT / RCE process

(by Christian Muschwitz, Simone Reinhart, Lutz Benson (TAURUS))

The major aim of the ESPON- programme is to provide an overview of the actual spatial situation of Europe including the identification of the actual trends, constraints and of course to give political relevant guidance. It is obvious that such an ambitious aim is hard to achieve with a broad range of thematic projects each working with a strong focus on their field of research. Therefore the need for an instrument or procedure which fits the different parts of the thematic puzzle together in order to draw the all European spatial picture is apparent. This ambitious aim requires a special procedure developed by the ESPON project 3.1. The original interactive approach was implemented in order to reach a synoptic perspective by carrying out a cross thematic SWOT-Analysis<sup>3</sup>.

*The roots of SWOT-Analysis can be easily traced back to business management literature and business practice where it is widely used as an instrument for strategic planning. SWOT-analysis basically consists of two elements, the first being an **internal**, more static analysis of the companies' **strengths and weaknesses**. The second and more dynamic part of the analysis is concentrating on the **external surrounding** of the companies possibly affecting the companies' well being in the sense of **future opportunities and threats**. On a general basis the SWOT-analysis postulates (i) to build on and stabilize strengths, (ii) to eliminate weaknesses, (iii) to exploit future opportunities and (iv) to repel threats. Against this background SWOT-analysis can be classified as an instrument that stands at the interface of analysis on the one hand and strategic planning on the other hand.*

*Not only recently SWOT-analysis has been adapted to other fields of interests and institutions. Prominent examples in the field of spatial and regional policy are SWOT-analyses of structural funds programmes where the instrument has been successfully used to summarize results of socio economic analysis and to build the link to the policy part. There can be found global SWOT-analyses for the whole programme region as well as sectoral/thematic differentiated SWOT-analyses.*

*As highlighted by Karppi et al. (2001) and Bergs (2002) there are a number of qualitative criteria an elaborated SWOT-analysis should fulfill:*

- **consistency and coherence** in the sense that logical inconsistencies between S, W, O and T as well as with the underlying analysis should be avoided
- **balance** between SW and OT
- concentration on **factors that can be influenced**
- **measurability and operability** of the factors
- clearing **interdependencies** when doing several thematic SWOT-analyses

<sup>3</sup> The SWOT description mainly relies on European Commission (1999), Bergs (2000), Schmid (2000) and Karppi et al. (2001).

The idea of project 3.1 was to base this SWOT-analysis on descriptive results of all thematic TPGs, as a second step it so called "Regional Classification of Europe (RCE)" should be done. The main aims of this step are:

- a harmonized operationalisation of territorial concepts,
- the identification of indicators,
- collection of data and integration into the ESPON database,
- statistical analysis of these data with reference to strengths, weaknesses, opportunities and threats of the development of European regions and
- the evaluation of matching the overall goals of European spatial development.

In spring 2003 the ESPON project 3.1 introduced a stepwise approach to create this comprehensive SWOT. It was foreseen to take into account the results of all the different ESPON TPGs. The procedure was introduced via a guideline disseminated in February 2003 and explained at the ESPON lead partner meeting in Bruxelles on the 25<sup>th</sup> of February 2003.

The ESPON project 3.1 asked TPGs to start the SWOT process immediately, so that first preliminary results could be visible for the Second Interim Report (SIR) regarding the ESPON first round projects. The first step of the procedure included the completion of a questionnaire by all TPGs. The second step was intended to be carried out by ESPON project 3.1. A synoptic analysis of the TPGs input should be given.

In detail the TPGs were asked to follow the guidelines as set out below:

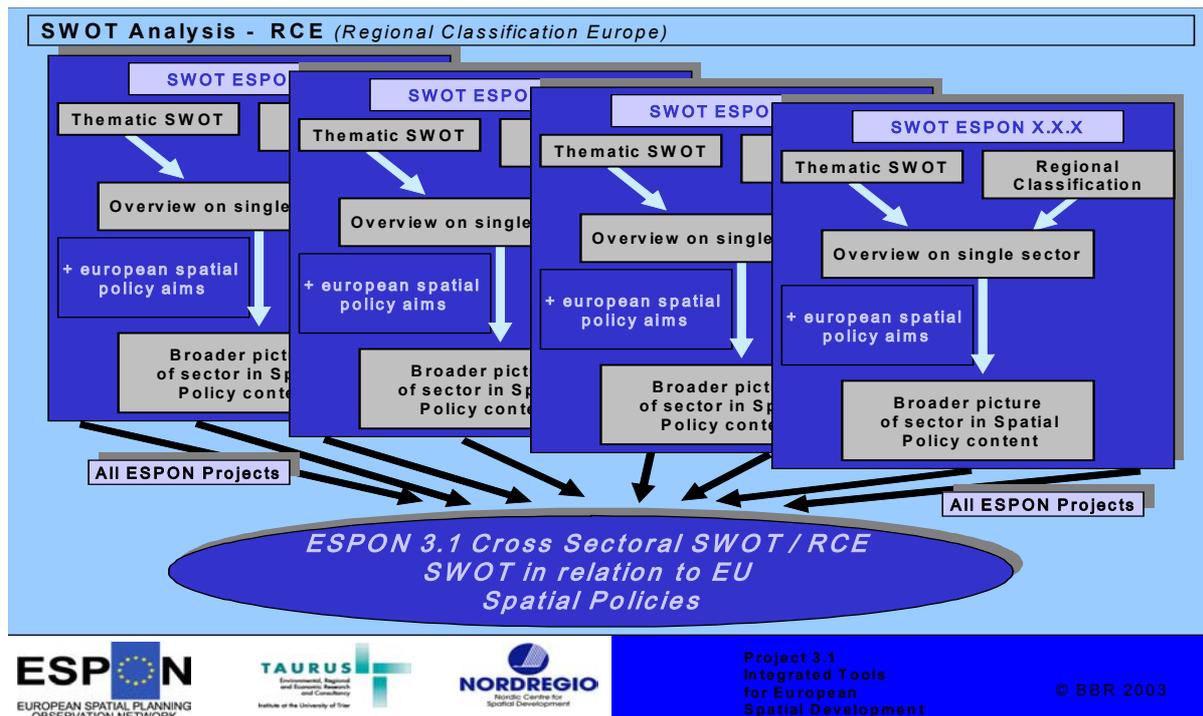
## The procedure and the interrelated guidelines were accepted by the

- 1.) All thematic TPGs (no matter if they belong to priority 1 or 2) summarize their descriptive results in a short thematic SWOT, following the questionnaire introduced in this paper. Furthermore the main data used have to be prepared and made available for project 3.1.
- 2.) This questionnaire is obligatory for the TPGs which started in summer 2002 (first round), but it addresses also the TPGs of the second round. They should fill in the form as far as it is possible right now. They will be asked to carry out this SWOT for the Third Interim Report (TIR) completely. The TPGs which belong to round three of the tendering procedure should take notice of the SWOT, they will be asked to start with first results for the TIR and for them the procedure is obligatory for the Final Report.
- 3.) The filled in questionnaires should be delivered parallel to the contribution of the particular report. So the first deadline for the TPGs of first round is the deadline for the SIR (31st March 2003) and so on.
- 4.) The SWOT aims at the 'EU 27+2 pan- European perspective', the level of detail are the European regions (NUTS III) at least for the Regional Classification, all TPGs should regard to this.
- 5.) The SWOT questions 1- 4 of the questionnaire are aiming at the overall thematic perspective, to highlight indicators is possible but not compulsive. Question 5 is the linkage between SWOT and the RCE (Regional Classification Europe). The RCE questions 6- 8 than require thematic statements including concrete indicators on a NUTS III level. The questions 9 – 10 are focussing on the major policy concepts and are referring to the ESDP.
- 6.) On that basis the TPG under measure 3.1 will elaborate a SWOT-analysis on the meta-level by synthesizing the thematic results, working out analogies and differences as well as crossthematic trends and interdependencies between the themes. 3.1 will report the results during the ESPON- Seminars and on a more detailed level within their SIR, TIR and FR.

For the first deadline (SIR) the SWOT form should be filled in the projects as far as possible. The META SWOT process is an open and iterative one. That means also interim results and conclusions at the moment are very much welcomed! While the ESPON process continues, these interim inputs of the TPGs can be revised or updated within the ESPON process (TIR / FR).

TPGs. The hereby implemented ESPON META SWOT was meant to function as sketched below:

**Figure 97 SWOT and RCE scheme**



### Changing the SWOT – procedure

Both instruments SWOT and RCE were new and especially invented for the ESPON programme. This SWOT/RCE procedure should deliver a European cross -sectoral – analysis. As a result of this analysis a picture of multi- dimensional spatial trends and impacts should be provided which was thought to be compared with the eligible EU- spatial policies. But the procedure required inputs from the TPGs on a very high and concrete level. The SWOT part should back the next step, the RCE, so the whole exercise is a stepwise approach, which comes from the broad spatial dimension ( whole of Europe) down to the regions (NUTS II) and at the same expands from a single theme to a multiple thematic view.

For the Second Interim Report and the ESPON Seminar in May on Crete nearly all first round projects delivered a first SWOT. Project 3.1 then examined all the SWOT Inputs provided so far and gave a specific feedback to all TPGs by the beginning of June 2003. All TPGs were asked to carefully reflect the remarks and notes given within their specific feedback. All TPGs then had the chance to renew resp. actualise their SWOTs.

The second deadline for the delivery of the actualised SWOTs was also the deadline of the Third Interim Reports TIRs.

The incoming SWOTs were examined briefly. Unfortunately the Inputs by the TPGs were not of the quality that the process of SWOT/ RCE could be carried out as foreseen. Most of the TPGs were not able to define a concrete set of indicators which measured the S, W, O and Ts

in their thematic field, either / or the indicators which were mentioned could not be filled with data on an adequate level (EU 27+2). Some of the TPGs just repeated methodologies which they invented in their original thematic work, but did not fit into the SWOT frame. The reasons for the failure of this process may be versatile; for sure the TPGs had to follow very tight time frames and fulfil ambitious work packages, therefore the SWOT/RCE which of course was some "extra work" on top, was not welcomed so much.

Anyway, the whole exercise had to be modified, in order to sketch the cross- sectoral- picture of ESPON.

ESPON 3.1 was forced to search for a solution to carry out the RCE resp. the cross-sectoral analysis on its own, without the reliance and the backing of the TPGs.

The modified procedure is in detail described in the Chapter that deals with the RCE and is therefore not given here.

Nevertheless the method, although new and never used in this broad context, can be considered an ambitious approach, which, when carried out with a good set of indicators, is able to produce good results. At least this is still the opinion of project 3.1.

### **9.3 Territorial Impact Analysis (TIA) and its implementation**

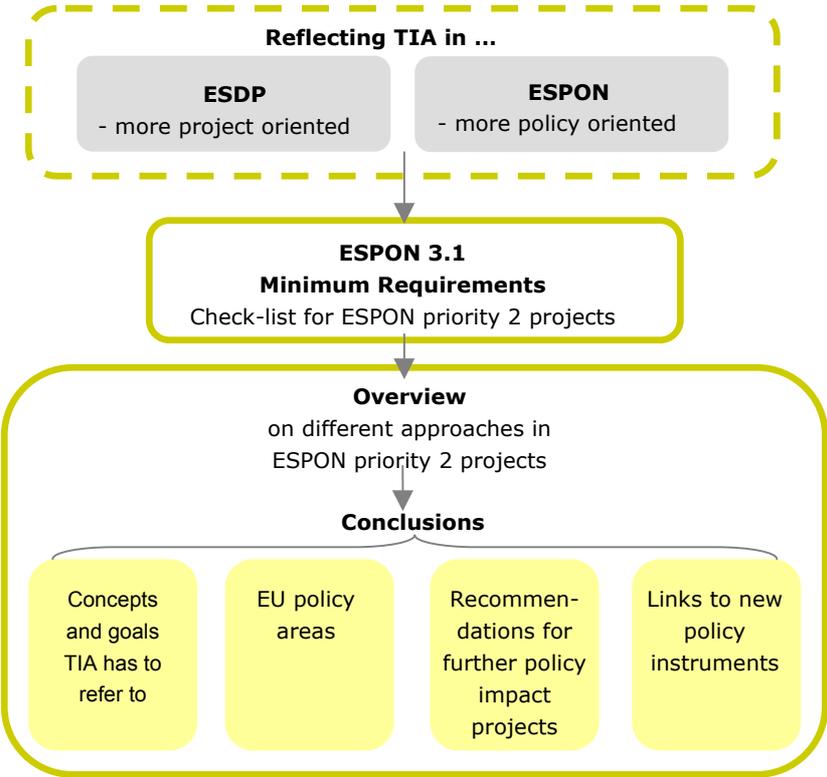
(by Friedrich Schindegger, Gabi Tatzberger (ÖIR))

#### **9.3.1 Introduction**

Originally, territorial *Impact Assessment* has been used in some European countries as a tool for analysing, assessing and evaluating the impacts of certain projects on the spatial development of the surrounding territory. This project-related assessment tool may be considered similar to the Environmental Impact Assessment (introduced in the mean time by EU-regulation), although with a wider range of criteria derived from territorial (spatial) planning documents. Also in this sense the ESDP suggests the application of the tool TIA to 'transnational' projects, e.g. in the area of transport infrastructure. However, the ESPON programme asked for applying the instrument also to EU policies and programmes – that are originally not being committed to the goals of territorial development but actually influencing it considerably – in order to assess how and to what degree they are effecting the territorial development. (Due to this rather dissimilar application it is recommended to prefer here the term *Territorial Impact Analysis*).

Thus, the work on the topic TIA within the ESPON 3.1 project had to start by clarifying the term and meaning of it. Furthermore a set of criteria was developed in order to analyse and illustrate in a comparable way how the different ESPON policy impact projects (Priority 2) are dealing with the territorial impact issue. A guidance concerning 'TIA minimum requirements' was submitted to the Transnational Project Groups of the policy impact projects in order to reveal in a comparable way, how the different Community policy areas are actually dealing with the territorial impact issue.

**Figure 98** ESPON 3.1 work steps concerning the TIA concept



However, it has been necessary to draw attention to a basic constraint for the whole exercise. It is in the context of this project an unavoidable fact that any application of TIA at the programme/policy level suffers by a methodological dilemma: the influence of the selected Community policy intervention cannot or can only roughly be isolated from effects of other measures or influences.

Thus, the analysis is restricted to

- a compilation of the policy measures in certain regions (input side, e.g. financial interventions), recording what spatial development goals they follow and
- the structural status/changes in these regions (output side) evaluated against the chosen spatial development goals.

The analysis of the reports of the ESPON policy impact projects shows a considerable diversity of features which led to the conclusion that it seems hardly possible to cover the whole range of sectoral EU policy issues by one assessment methodology. The conditions for such a 'general model' are lacking at least due to two reasons:

- the very different character of the spatial dimension and implications of the policy areas concerned (in particular the different affinity to spatial goals) and
- the rather different theoretical state of the art of applied research and planning in the different areas

Thus, the final recommendations are referring to primarily ensure the conditions for elaborating TIA in the future on a more sound basis than it seems feasible now by

- the actual orientation of EU policy programmes concerned
- the lack of territorial differentiation of policy implementation data (due to that) and
- the fact that spatial development goals and concepts are still not operational for assessment application

### **9.3.2 TIA in ESPON**

#### **9.3.2.1 Reflection on transferring TIA to the European level**

Territorial Impact Assessment has a rather long national tradition mainly in Germany (under the legal procedure called Raumordnungsverfahren) and in Austria (as a tool applied without legal framework under the term Raumverträglichkeitsprüfung). In addition it can be recognised in similar procedures under different names in Portugal, Walloon region of Belgium and in the way Environmental Impact Assessments are used in Finland as well, by considering broader social and economic impacts as well.<sup>4</sup>

All this practice has in common applying the tool TIA for different kinds of projects and sometimes certain kinds of plans. TIA in the national tradition is assessing the impact of proposed single spatial development measures against the integrated spatial policy objectives or prospects for an area. In principle, TIA includes all aspects of spatial planning whether they are environmental, social, economic or cultural in their impact. In this respect it reflects clearly the 'double approach' of spatial planning in general which is on the one hand the prospective and

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<sup>4</sup> CREUE, ECOTEC (2001) Territorial Impact Assessment, Draft submission on TIA to the CSD, not yet published.

comprehensive shaping of a certain area by plans and on the other hand the ad-hoc judging of project-related effects on spatial structure.<sup>5</sup>

The first time the **European Spatial Development Perspective** (ESDP) puts the tool TIA into a European context. It addresses TIA at several territorial contexts and recommends application

- as an instrument for spatial assessment of large infrastructure projects (Option 29)
- coastal areas, mountain areas and wetlands ... (Option 42)
- water management projects (Option 52)
- cross-border TIAs (rec. after para 178)
- and in particular the use of cross-border territorial impact assessments (rec. after para. 178<sup>6</sup>)

However, it should be stressed here that these recommended applications are still concerning projects, although newly for cross-border and transnational ones.

Later on TIA had become a topic of the **ESDP Action Programme**. In the course of implementing this programme the UK delegation had taken responsibility for the topic and organised a **Conference on Territorial Impact Assessment** in late October of 2001 in Louvain-la-Neuve (Belgium).

Main results were

(1) an overview on the variety of features and applications of relevant assessment procedures at local, regional and national level. In particular, the close relationship to the Environmental Impact Assessment (EIA) and the Strategic Environmental Assessment (SEA) was revealed. As one first step for implementation of the ESDP recommendations mentioned above also a specific application of TIA to transnational projects under the term Transnational Territorial Impact Analysis<sup>7</sup> (without a new legal regulation, neither at the European nor at the national level) was suggested.

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<sup>5</sup> Schindegger, F. (2001): Prospects for further work on TIA, report to the Conference on TIA, 26 October 2001, Louvain-la-Neuve, not yet published

<sup>6</sup> see European Spatial Development Perspective (ESDP), 1999 Ed.: European Commission

<sup>7</sup> the corresponding German term is *Raumwirksamkeitsanalyse*

**Table 67 Comparative review of assessment**

	<b>Topic of assessment</b>	<b>Spatial level</b>	<b>Fields of discipline and politics</b>	<b>Subject of assessment</b>	<b>Function referring planning process</b>	<b>Participants</b>	<b>Legal frame</b>	<b>Obligation</b>
<b>TIA (so far)</b>	Impacts on spatial structures	local, regional, transnational, recommended by ESDP	infrastructure, settlement expansion, tourism/leisure	projects	project evaluation	responsible companies, public authorities, experts, (public)	no European regulation, partly national regulations	not directly (only in permission procedure)
<b>EIA</b>	Environmental impacts	local, regional	waste, energy, infrastructure, tourism/leisure, economy	projects	evaluating individual projects	responsible companies, public authorities, experts, public	EU-directive	yes
<b>SEA</b>	Environmental impacts	regional, national, transnational	waste, energy, infrastructure, water management	plans, programme, policies	project development	responsible companies, public authorities, experts, (qualified) public	EU-directive	yes

Source: F. Schindegger (2001): Prospects for further work on TIA, report to the Conference on TIA, 26 October 2001, Louvain-la-Neuve, not published

(2) Concerning the future application at the European level the analysis of the different practices using TIA so far was concluded as follows:<sup>8</sup>

- Implicitly the ESDP uses TIA as a tool for assessing the impact of projects but there is no reason why suitable approaches should not be developed for assessing the impact of plans and programmes and even, potentially, policies – such as the impacts arising from the accession process
- Current techniques are not sufficient to meet the challenge presented by the desire to consider the spatial implications of different policy interactions.
- Any discussion of TIA should differentiate between the TIA of projects and TIA of plans and programmes
- Whilst it would be possible to advocate a TIA procedure in addition to existing EIA and SEA procedures it may be more fruitful to consider extending the existing procedures to cover social and economic impacts
- A common framework ... may result in a sustainability assessment process that covers programmes and projects, all effects

<sup>8</sup> see footnote 1

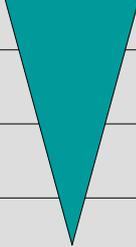
(environmental, social and economic) and the interactions between activities and space over specified time periods. Sustainability Assessment would be explicitly considered as a planning and management tool.

- This might be taken forward through EU regulation but it would be simpler to extend existing good practice and develop more robust approaches through partnership and co-operation. One mechanism for this could be, for example, through the INTERREG III B Community initiative

(A. Healy, ECOTEC, Author of a submission on TIA to the CSD, not yet published)

(3) Another main input – which obviously is closest to the topical context here – was given at that conference with special reference to the **ESPON programme**. An outlook to the programme showed where different measures refer to “TIA” and drew attention to the different coverages of ESPON and TIA.

**Figure 99 Coverages of TIA and ESPON**

Subject to assessment	TIA	ESPON
Policies		
Programmes		
Plans		
Projects		

Source: T. ESER (2001): Territorial Impact Assessment – the view from the ESPON, report to the Conference on TIA, 26 October 2001, Louvain-la-Neuve, not yet published

Looking now closer to the ESPON 2006 Programme concerning references to the assessment issue shows rather implicit ones within some activities of Priority 1 (dealing with “spatial effects of ... demographic trends and migration”, “networks, transport and telecommunication services”, “technical and natural hazards”, “cultural heritage and identity”). It goes without saying that analysing this variety of “spatial effects” is far beyond what is understood by an assessment procedure judging the impacts of defined policy interventions against certain goals.

Rather explicitly TIA – but in a rather mixed (not to say confusing) way – the terms assessment and analysis are mentioned within some activities of policy impact projects: “The core task of this priority will comprise to find a common approach on why the spatial and territorial

dimension matters to all policies.” The programme defines as objectives (among others)

- to show the influence of sector policies on spatial development at the relevant EU scale ...
- to develop methods for the territorial impact assessment of sectoral policies primarily at EU level, but also at the national level such as transport, CAP, R&D, and major infrastructure development, and find appropriate instruments to improve the spatial co-ordination of EU sector policies”.

### Defining elements of assessment tools

**Table 68** defining elements of assessment tools – GOALS

**Goals** (achievement of which is to be assessed)

Economic – Social – Cohesion Territorial – (new)	aims
Economic – Social – Integration Territorial –	(= processes towards aims)

**Table 69** defining elements of assessment tools – CRITERIA

**Criteria** (for measuring goals’ achievement, examples)

GDP per capita	(> cohesion)
Employment	(> economic/social cohesion)
Income	
Male/female employment	
Population change	
Educational level	
Specific relations/exchanges between territories, e.g. commuting, household splitting, commercial links, cultural relationships, institutional links, accessibility of services	(> territorial cohesion)

### **Subject matters** (to be assessed)

Policies (abstract)

Programmes ↓

Projects (concrete)

### **Modes of treatment**

Analysis ↓ ↓ observing/detecting

Assessment estimating/measuring

Evaluation valuing/judging

### **... concerning territorial development policy interventions**

Analysis: examining implementation (input)

Assessment: " impact (output and result)

Evaluation: " achievement of goals

### **Different assessment models**

The 'application for Europe' of the tool TIA by the ESDP and the Action programme as well, is addressing projects, including transnational projects. The extension of the meaning of the term 'Territorial Impact Assessment' to be applied to programmes and policies happened only later on within the ESPON 2006 Programme.

**Table 70 Different subject matters – different modes of treatment**

	Projects	Programmes	Policies
Analysis		<b>ESPON 2006</b>	
Assessment	<b>ESDP</b>		
Evaluation			

**Table 71 Important differences between TIA applications**

<b>Projects</b>	<b>Programmes/Policies</b>
Area of concern due to the area of effects (local, regional, transnational)	Area of concern defined by territorial responsibility (national, transnational)
Physical subject matters in detail as: power stations national parks transportation links/networks cable cars and ski-stations dumps shopping centres	Conceptual subject matters as Structural Funds Objective 2 – programmes CAP Rural Area Programmes
Different alternatives (e.g. in locations) to be compared (at least with the 'zero-option': no intervention)	One policy/programme being executed
Direct interventions into the spatial system by a certain location	Indirectly influencing a whole spatial system by several interventions in the total area (e.g. by subsidising)
Impacts to be analysed comprehensively incl. such as on land use accessibility environment employment economic outcome etc	Impacts concerning respective policy and programme goals declared
Usually strong knowledge about direct cause-effect-relations between intervention and impacts, and inter-relationships between different areas of concern as well, comparatively more easily measurable, more likely by quantitative indicators	Usually weak knowledge about indirect relations between input, output/result and impact, within a complex system sometimes difficult to explore (lacking experience and theory), more likely by qualitative indicators  <i>take into consideration:</i> actually needed is a forecast of the area affected with and without intervention.
Public participation	No public participation

### **9.3.2.2 Reviewing the ESPON policy impact projects' profile concerning TIA**

The original idea of reviewing the Interim reports of the policy impact projects as regards their statements concerning TIA has been

- to develop the concept of the tool by applying it at the same time and
- to give addressees the possibility to take part in the development of the methodology

A set of criteria was developed in order to analyse and illustrate in a comparable way how the different policy impact projects (ESPON priority 2 projects) are dealing with the territorial impact issue. A guidance concerning 'TIA minimum requirements' was submitted to the Transnational Project Groups (TPGs) of the policy impact projects in

order to reveal in a comparable way how the different Community policy areas actually deal with the territorial impact issue.

It turned out that there are considerable constraints against a quick progress (within this ESPON project) due to

- the actual orientation of EU policy programmes analysed that is still far away from actually taking into account spatial development goals and concepts (including Regional Policy, so far).
- Hence, as a direct consequence of that orientation, there is a dramatic lack of territorial differentiation of policy implementation data.
- Finally, the elaboration of spatial development goals and concepts in the wake of the ESDP has hardly achieved operational results appropriate for assessment, so far.

The following table gives an overview about the characteristics of the statements of the available reports of the policy impact projects according the developed set of TIA minimum requirements. It has to be mentioned that not all TPGs have referred to the Guidance paper of the 3.1 project describing the TIA minimum requirements. The following description of TIA application is a synthesis out of the individual project reports: a considerably varying perception and application of Territorial Impact Analysis becomes visible.

**Table 72 Overview (FR = final report; TIR = third interim report)**

<b>TIA Minimum requirements</b>	<b>2.1.1 Transport &amp; TEN (FR)</b>	<b>2.1.2 R&amp;D (FR)</b>	<b>2.1.3 CAP &amp; RD (FR)</b>	<b>2.1.4 Energy (TIR)</b>	<b>2.2.1 SF (TIR)</b>	<b>2.2.2 PreAc. (TIR)</b>	<b>2.2.3 SF urban areas (FR)</b>
<b>Reference to causing policy interventions</b>	no reference to interventions (highly aggregated)	financial actions (RTD Frame, ERDF, ESF)	CAP expenditures	investments, energy infrastructure & energy relations (in 5 'blocks')	EU-funding incl. national co-financing	Phare and pre-accession aid measures	ERDF, ESF, CI Urban (30 interventions)
<b>Hypothesis on cause-effect-relations</b>	several existing complex models	speculations only	- 'direct' regional income - income multiplier	5 types of energy territorial impacts	economic disparities	Economic and social performance	Positive impacts on urban areas
<b>Regional scale (min. NUTS 2)</b>	NUTS 3	NUTS 2 (NUTS 1 for some)	NUTS 2/3 (estimations)	NUTS 2	NUTS 2/3	NUTS 3 (NUTS 2 for some)	NUTS 3/5 for observation NUTS 2/3/5 for analysis
<b>Reference to past &amp; future interventions</b>	reference to past (1981-2001) hypothesis about future impacts (2001-2021)	primarily backwards	only ex-post analysis	review 'way forward'	Meta-evaluation of previous SF interventions	Analysis of past interventions, ex-post analysis	1994-1999 2000-2006
<b>Interventions/ effects registered</b>	accessibility regional welfare	input and context variables	subsidies farm income	energy - investment - production, - consumption,	SF at regional level, regional development trends and changing disparities	Economic and social performance	structure of interventions

<b>TIA Minimum requirements</b>	<b>2.1.1 Transport &amp; TEN (FR)</b>	<b>2.1.2 R&amp;D (FR)</b>	<b>2.1.3 CAP &amp; RD (FR)</b>	<b>2.1.4 Energy (TIR)</b>	<b>2.2.1 SF (TIR)</b>	<b>2.2.2 PreAc. (TIR)</b>	<b>2.2.3 SF urban areas (FR)</b>
				- service in 5 'domains'			
<b>Quantitative/ qualitative appraisal</b>	Quantitative Scenario analysis	mainly quantitative	mainly quantitative	mainly quantitative	mainly quantitative	Quantitative and qualitative analysis; test of working hypothesis	mainly quantitative
<b>Concepts/ goals referred to</b>	Cohesion, polycentricity efficiency v. equity	balanced development polycentric development competitiveness	cohesion environmental protection, polycentricity	Three ESDP guidelines	territorial cohesion, polycentric development; balanced development,	Balanced spatial competition and equity of economic and social cohesion	missing
<b>Technique of analysis</b>	simulation models classification of regions case studies	aggregate statistical analysis case studies	aggregate statistical analysis case studies	Input-Output model; aggregate statistical analysis case studies	comparing maps of regional distribution case studies	Cluster analysis, gini-coefficient, regression analysis	aggregate statistical analysis of 25 urban areas case studies
<b>Applied understanding of 'territorial'</b>	regional disparities	'Islands of R&D' (regions)	regional disparities	regional disparities	cross-sectoral approach to space	regional disparities	declining industrial urban areas
<b>Territorial reference of outcome</b>	several typologies of regions	typology of regions	typologies of regions	typologies of regions	typologies of regions	Typologies of all regions	typologies of regions

## Summarising comments

Following comments should be read as a reflection focusing on the demands formulated in the TIA minimum requirements and its application within the ESPON policy impact projects.

### ▪ **Project 2.1.1: Territorial Impacts of EU Transport and TEN Policies**

The methodology offered is based on highly sophisticated and proved quantitative models, producing considerably complex results. However, there seems a main dimension lacking to be considered crucial regarding policy relevance. Some of the hypothesis mentioned above refer, of course, to the transport policy level, although on a considerable high level of aggregation resp. abstraction appropriate to the European level. It seems rather difficult to recognise which kind of political action (in terms of transport network and service investments projects) at national and regional scale (to which most of the EU Transport and TEN Policy decisions belong<sup>9</sup>) should correspond to it. In this respect, improvement of accessibility without reference to the political actors responsible and measures topical seems to be an 'approach' too abstract to the policy level, or in other words rather far from the perspective of actual policy requirements. Therefore the project group tried to further investigate on the interaction between the EU and national transport policies through a quantitative approach.

### ▪ **Project 2.1.2 The Territorial Impact of EU Research and Development Policy**

The information provided by this project is more about the regional incidence of the EU R&D Policy area (input side) rather than about their territorial impacts (caused by their outputs).

### ▪ **Project 2.1.3 The Territorial Impact of Common Agriculture Policy (CAP) and Rural Development Policy (RDP)**

The approach of this project is a purely ex-post perspective and the information provided is more about the regional incidence of the CAP/RDP area (input side) rather than about its territorial impacts (caused by their outputs). The project mainly relates the CAP to the goals of territorial cohesion and polycentric development.

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<sup>9</sup>the assumption is that different from CAP/RDP and R&D Policy areas as well as from Structural Funds programmes political decisions in the Transport & TEN Policy area reach 'down' to the level of single linkages, nodes or even projects (bridges, tunnels)

- **Project 2.1.4 Territorial Trends of Energy Services and Networks and Territorial Impact of EU Energy Policy Funds**<sup>10</sup>

The project reports reveal very clearly that it will be difficult to establish a cause-effect relationship between energy and territorial development. Behind that, the responsible easy transportability and non-coincidence of production and consumption are more crucial than the relative big scale (NUTS 2) of analysis. Reference to spatial goals is made in general but missing in the results of the analysis.

- **Project 2.2.1 Territorial Effects of Structural Funds**<sup>11</sup>

The project analyses the regional incidence of SF interventions and confronts them with economic performance of the regions. Furthermore the project also pays attention to national policies.

- **Project 2.2.2 Territorial effects of pre-accession aid programmes**

The project analyses the distribution of pre-accession aid funds in the new member states and the candidate countries to which aim the funds were dedicated. The information about the regional incidence of pre-accession funds does not show any correlation between pre-accession aid spending and regional development in terms of GDP.

- **Project 2.2.3 Territorial Effects of the Structural Funds in Urban Areas**

The project starts from the assumption of "positive impacts on the objectives of actions undertaken". The study shows information about the incidence of the SF interventions (input side) in declining industrial urban areas in relation to context indicators. The analysis is based on a sample of 25 areas.

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<sup>10</sup> Comments are referring to the Second Interim Report (Final not yet available)

<sup>5</sup> see footnote 4

### **9.3.2.3 Problems and limitations experienced within ESPON**

It has been mentioned already that the conditions within the ESPON programme in general, and within the ESPON project 3.1 in particular, represented considerable constraints for developing the concept of the tool TIA at the European level by applying it at the same time.

One basic challenge within the ESPON 3.1 project has been that the Guidance paper ('TIA minimum requirements') only could be elaborated when most of the projects already were approved and starting parallel to the TPG 3.1. Therefore, the Guidance paper was regarded much more as a check-list than a means to influence analysis that were already defined by the ToRs and by the tenders. Feed-back from the individual TPGs was very different. This may be understandable taking into account that the 'TIA minimum requirements' have been an additional challenge and work load in a phase of extreme time pressure.

However, there have been not only procedural problems of co-ordination under extremely difficult conditions. In addition, TIA of EU policies and programmes has to deal with considerable substantial deficiencies both at the sphere of subject matter to be assessed and also at the sphere of assessment criteria:

- The subject matter of the exercise, the EU policy programmes concerned, are still far away from actually taking into account territorial objectives despite they have clear potential territorial impacts (e.g. CAP, Common Transport Policy)
- Therefore, they show a dramatic lack of territorial differentiation of data on policy implementation.
- At the same time, the elaboration of spatial development goals in the wake of the ESDP is still going on and has hardly achieved results operational for assessment application so far.

### 9.3.3 Conclusions

#### 9.3.3.1 Concepts and goals TIA has to refer to

Any kind of territorial impact assessment has to refer to criteria derived from chosen spatial development goals. The only two key concepts with genuine territorial dimension are 'territorial cohesion' and 'polycentric development'. Actually territorial cohesion and polycentric development are often associated in documents relating to territorial development. Most of the time polycentrism is justified by the dual need to improve global competitiveness of the European continent and to correct imbalances and disparities generated by the centre-periphery scheme. Polycentrism is seen as a way to concretise 'higher' policy aims, and notably to remove obstacles to cohesion such as growing territorial disparities. In this perspective, polycentric development appears as a 'spatialised' expression of territorial cohesion. In other terms, polycentrism is viewed as the operational concept – or development / spatial model - corresponding, in terms of spatial planning, to the "abstract" concept of territorial cohesion, as the way chosen to concretise it.

**Territorial cohesion**, meaning the balanced distribution of human activities across the Union, is complementary to economic and social cohesion. Hence it translates the goal of sustainable and balanced development assigned to the Union (Article 2 of the Treaty) into territorial terms. Territorial cohesion includes fair access for citizens and economic operators to Services of general economic interest (SGEI), irrespective of the territory to which they belong (Article 16 of the Treaty)<sup>12</sup>.

Operationalisation<sup>13</sup> of territorial cohesion is based on the different and complementary conditions that should allow to develop cohesion on a territory. For territorial cohesion following dimensions are described as relevant:

- domains ("thematic layers"): there may be such a number of different domains that we need to summarise them in a meaningful way, e.g. space / society, or – probably more significant for the ESPON - the three dimensions of sustainable development, referred to in the ESDP as the "triangle of sustainability": economy, environment, and society;
- components of territory, i.e. its own features (potential), its features with regard to those of other territories (position) which enables potential interactions with them,

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<sup>12</sup> DG Regional Policy: Interim Territorial Cohesion Report

<sup>13</sup> see ESPON 3.1 SIR

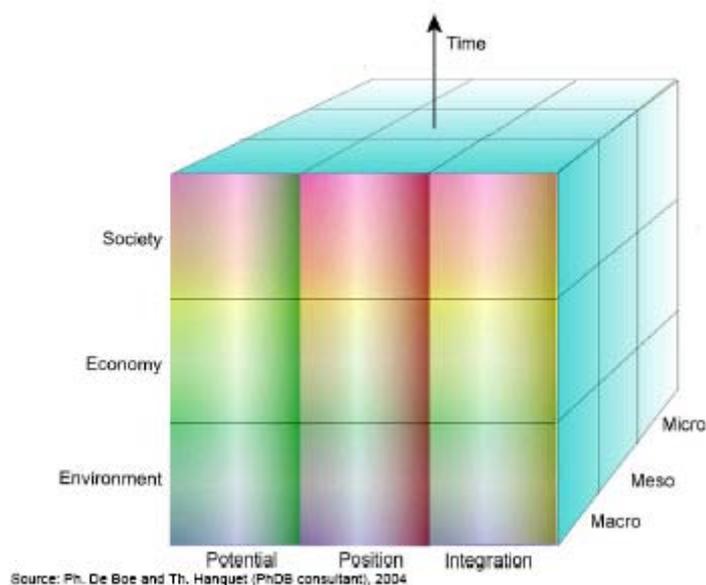
and its effective interactions (exchanges, cooperation) with other territories (integration);

- scale(s): while many different sets of scale may be considered, particularly when distinguishing scale of the territory and scale of the context, it helps to define a reference set. For the ESPON research a three-level set of scales has been adopted according to the First Guidance paper: macro (European level), meso (transnational / national level), and micro (regional / local level).

Time enters in most territorial issues, either directly (when considering past evolutions, or scenarios and policies for the future), either indirectly (through the notion of "fixed assets", "permanent geographical handicaps", etc.). Time may be considered on long / medium / short ranges, and with different starting points (in the past, in the present).

These three dimensions of territory can be represented with a cube, which becomes a "hypercube" if the time dimension, as a fourth one, is added.

**Figure 3: Components of territorial cohesion**



The concept of **polycentric spatial development** can be described as a 'bridging concept' as it merges the two policy aims encompassed in the ESDP, namely, the aims of 'economic growth' and 'balanced development'. Polycentricity has two complementary aspects<sup>14</sup>:

- *Morphological*, laying on the distribution of urban areas in a given territory (hierarchy, distribution, number of cities).
- *Relational*, based on the networks of flows and co-operation between urban areas at different

<sup>14</sup> ESPON 1.1.1 TIR

scales. These flows are generally related to proximity, especially at the regional and national levels, but network relations can also be independent of distance.

A polycentric situation occurs when two or more cities have functions that complement each other and have links with each other. Normally, we would identify three prerequisites for polycentricity: functions (often but not always depending on size), flows (often but not always depending on proximity) and co-operation (depending on mutual understanding, strategic interests and dependencies).

Polycentricity results from two main processes:

- *Structural* (economic, functional), resulting from 'spontaneous' spatial development.
- *Institutional* (political), based on voluntary co-operation.

Following the ESDP, polycentric development implies encouraging settlement patterns at all geographical levels (European to local) that enhance competitiveness, regional balance and new urban rural relations. This implies an understanding of regional development more sensitive to the need of focusing more on potentials (e.g. possible specialisation's in the world market) and less on problems.

Furthermore, it implies an integrated territorial approach, where small and medium sized cities are considered as being the motors of regional development.

Given that settlement patterns generally change only slowly over a long period of time, the application of this concept has thus far tended to focus on re-examining functions and networks and associated joint action. Accordingly, the focus is on the scope for specialisation and complementarities/competition of centres (e.g. functional urban areas) in a polycentric system. Thus, the challenging aspect of polycentrism is that it is not primarily about morphology, i.e. the distribution of centres in a territory, but about functions and relations within urban systems.

According to the ESDP the concept of polycentric spatial development refers to at least three spatial levels<sup>15</sup>:

- **Polycentricity at the regional / local level**

The aim is to move from one or few dominating regional centres to several centres providing regional services. Key aspects are economic integration and specialisation. This may also involve strategic alliances between cities in areas where critical mass is problematic. Despite the morphological and proximity aspects, the division of labour and

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<sup>15</sup> ESPON 2.2.1 SIR

functional specialisation within the regional urban system are important indicators.

▪ **Polycentricity at the trans-national / national level**

The aim is to go from dominating major cities to a more balanced tissue of cities, improving economic performance and services through clusters and networks of neighbouring cities. The mixture of functions performed in a functional urban area often depends on its size. Thus one option of improving the balance of a national urban system is seen in forming a national centre by bringing together several local or regional centres. In addition to the mass a national urban centre must also show a sufficient specialisation within the national urban system, and thus integration into the national urban system.

▪ **Polycentricity at the global / European level**

The aim is to support a more balanced territorial structure at the European level by encouraging the development of functional urban areas (or clusters of cities) of global importance outside the 'pentagon', which is currently seen as the only important global zone within the enlarged EU. This can be achieved by strategic alliances (networking, combining strategic strength) between functional urban areas and by strengthening the international competitiveness of a functional urban area. In both cases the focus is on the strengthening of the global position by strengthening the (endogenous) potentials of European or global importance. These potentials can be of varying nature, such as certain economic specialisation or cultural international peak-competence.

Keeping in mind the relational approach to polycentrism, it can however be argued that cities of all categories/sizes can be part of trans-national co-operation networks and thus can play a role in functional polycentrism and in the division of labour. However, in some respects the smaller rather than the larger cities have become global, because of a specific specialisation, which allows them to act as partner or sub-contractor and become integrated into international business. Thus all cities independent of their size can become nodes in a European wide functional network, i.e. a step towards relational polycentrism.

However, it has to be mentioned in this context, that the examinations of ESPON projects concerned revealed that availability of data about functions and in particular about spatial relations between centres is very weak. Thus, for the time being recording the topical situation as well as deriving detailed criteria for assessment more or less may be considered to be restricted to the morphological dimension.

### **9.3.3.2 Recommendations concerning monitoring and documentation of EU policy areas (addressee EC)**

On the basis of the work done so far the task of policy recommendations may be defined as follows. For applying the tool TIA in a more co-ordinated and effective way it should be made clear

- (1) which policies/programmes have to be assessed<sup>16</sup>, against which spatial/territorial goals
- (2) the addressees of the recommendations have to be defined
- (3) recommendations have to make clear first of all the basic requirements for any kind of application and have to be distinguished according to different subjects

(ad 1) Policy areas for which TIA application at least is needed primarily:

- Transport and TEN Policy
- Research and Development Policy
- Common Agriculture Policy
- Regional Policy

In principle, TIA application is to be considered including not only Community policies rather than also the corresponding policies at the 'lower levels' implemented by the individual member states.

(ad 2) In any case it is necessary to define the authorities/institutions which are addressed. Recommendations concerning European spatial development policies in principal have to deal with

- Community policy areas relevant for spatial development (the most important ones are mentioned above)
- corresponding policy areas implemented by the member states at the national, regional and local level

Therefore, the major addressees are the concerned DGs of the EC and the national governments. However, the different requirements due to

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<sup>16</sup> Not all Community policies with possible territorial implications are considered by the ESPON. Social policies are not covered as such, although most of social issues present a territorial dimension. Competition policy is considered in the ESDP but no ESPON project is centred on it. Two ESPON projects are devoted to aspects of environmental policy but it is not wholly covered. On the other hand, some project topics do not correspond to a single Community policy but rather to a domain where important issues are identified. The selection of instruments and structure of their approach by TPGs reflect concern for efficiency with regard to prospects for implementation. Priorities are reflected in the time schedule of projects as well. ESPON work is not a one-pass work. It implies iteration and refinement of the approach in the course of time. (ESPON 3.1 TIR)

varying spatial scales and, in particular due to the considerable different systems of governance, require efforts that would go far beyond the framework of the given ESPON programme. Therefore, application for the time being should be restricted to Community policies. The 'lower levels' should be subject of further research work.

(ad 3) The basic requirement for any kind of assessment is an appropriate information about the character of the policy intervention on the one hand and about relevant characteristics of the impacted territory on the other hand – in an adequate scale in terms of territorial units.

Applying this to areas relevant for European spatial development policies means the availability of a minimum set of relevant socio-economic and environmental indicators at least at the NUTS 3 level. Without that kind of information there is hardly a basis for any comprehensible assessment.

The specific methodological shape of the TIA would have to vary along the different information bases and subjects. It is related to

- territorial data characteristics: relevance, reliability, quantitative/qualitative, time reference, status, changes, availability
- subject matter data characteristics: policy with or without endogenous territorial intentions (the latter applies to all EU policy areas without Regional Policy), certain programmes, single interventions/projects

The reports of the ESPON policy impact projects confirm the considerable difficulties caused by the information basis given so far, and underline the statement concerning the limitations for a common and co-ordinated TIA approach (see above). Therefore, a major recommendation to the EC is to guarantee by guidelines for the

- Transport and TEN Policy
- Research and Development Policy
- Common Agriculture Policy
- Regional Policy

that their programmes provide a monitoring and documentation system encompassing an appropriate regionalisation of policy implementation data. This is a basic prerequisite in order to being able in further research work to improve the analysis of territorial impacts of EU sectoral policies.

This recommendation is based on the assumption that within the policy contest of competing goals the analysis and assessment of territorial side effects of significant policy interventions – that are associated primarily with other than territorial goals – may be more convincing and

thus effective than the attempt to construct a sophisticated overall commitment of sectoral policies to detailed goals of territorial development.

### **9.3.3.3 Recommendations concerning further work on policy impact projects**

On the basis of the analysis of the ESPON policy impact project reports (see 2.2) some preliminary specific recommendations may be given.

#### **Transport and TEN Policy**

As regards accessibility in terms of means of transport, substantial gaps have been found between the centre and the periphery as regards both road and rail transport. Transport and TEN Policy are key components of any strategic spatial development policy. European policy measures of TEN, especially transport, have direct spatial effects down to regional and local level and have considerable influence on the economic performance of regions.

From a spatial development point of view – the aim is to guarantee parity of access to infrastructure and an efficient and sustainable use of infrastructure. There exist very different kinds of measures – from general measures like road pricing to individual projects like Øresund-bridge. The different subjects and scales mean rather different demands on TIA.

In order to achieve a more common and more co-ordinated approach concerning territorial impacts efforts of applying TIA in the near future should be focussed on:

- providing information about the linkage between measured effects (changes of accessibility) and the causing interventions from the European level (guidelines, priority lists, budgets, grants, loans)
- providing information about concrete interventions (investments) not only for the future but also for expenditures already put into effect (effects of previous policies)
- providing information about actual reference to the concept of polycentric spatial development

#### **Research and Development**

In the policy field of research and development a direct spatial impact hardly can be recognised so far. On the other hand the spatial distribution of R&D activities give hints to the actual economic performance and territorial competitiveness within EU and to the corresponding potentials as well.

In the last years within the EU a polarisation of R&D activities can be observed. In future, networking and co-operation activities as well as specialisation will play a main

role and are a big potential also for peripheral regions (nevertheless dependent on a basic infrastructure).

In order to achieve a more common and more co-ordinated approach concerning territorial impacts the efforts of applying TIA in the near future should be focussed on:

- providing information about the expenditures on the level of NUTS 3
- providing information about actual reference to the concept of polycentric spatial development

### **CAP and Rural Development Policy**

CAP is far from taking into account spatial development goals. It is still focussed on sectoral goals and favours the preservation of given structures. The spatial incidence of its expenditures is more or less determined yet by the general regulations in a direct top-down relation. In addition it strikes that the whole approach is a purely ex-post perspective so far. With the growing importance of the 'pillar' Rural Development Policy chances for an enhancement of the linkage to spatial development policies may increase.

In order to achieve a more common and more co-ordinated approach concerning territorial impacts the efforts of applying TIA in the near future should be focussed on:

- providing information about territorial impacts of possible future scenarios of CAP & Rural Development Policies
- providing information about impacts on land use and environmental situation
- providing information about actual reference to the concept of polycentric spatial development

### **Regional Policy**

Regional Policy is aiming to reduce spatial disparities within the EU. Along the discussions about the future of Regional Policy there can be recognised a shift from mainly supporting regions lagging behind to foster potentials of regions.

Regional Policy can be regarded as the key policy for spatial development aiming to strengthening economic and social cohesion – nevertheless the main operational geographical dimension of Regional Policy at present is restrained to the definition of objective areas and not so much on certain spatial developments. So far, GDP is the only indicator for the allocation of expenditures in the Cohesion Fund and in Objective 1 (also including extremely peripheral regions). Objective 2 has more differentiated indicators (dividing between rural and urban areas), but objective 3 has no territorial dimension at all.

Already the First Cohesion report told that economic disparities between the member states have diminished substantially. A reduction is continuing also in regional (intra-national) disparities, although to a lesser extent than at national level. Indeed, they have grown within some member states. The Third Cohesion report<sup>17</sup> gives a rather diversified picture:

There are a number of aspects of territorial balance in the EU, which threaten the harmonious development of the Union economy in future years:

- "at EU level, a high concentration of economic activity and population in the central area or pentagon. ... Enlargement will only increase this degree of concentration by adding to the EU land area and population but increasing GDP relatively little;
- at national level, a persistence of pronounced imbalances between the main metropolitan areas and the rest of the country in terms of economic development, which is a particular feature of the accession countries;
- at regional level, a widening or, at least, the persistence of a number of territorial disparities beyond those measured by GDP or unemployment. ...;
- within regions and cities, the development of pockets of poverty and social exclusion in areas with often only limited availability of essential services;
- in a number of specific areas constrained by their geographical features (islands, sparsely populated areas in the far north, and certain mountain areas), population is declining and ageing, while accessibility continues to be a problem and the environment remains fragile, threatened, for example, by regular fires, droughts and floods;
- in outermost areas, with a cumulation of natural and geographical handicaps, the continuation of severe social and economic problems which are difficult to tackle because of their remoteness, isolation, topological features, climate, small size of market and dependence on a small number of products."

In this context it may be interesting that already in 1998 an internal report<sup>18</sup> of the EC states that „neither the regional development plans, nor the resulting Community Support Frameworks (CSFs), nor individual

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<sup>17</sup> Third Report on Economic and Social Cohesion  
[http://europa.eu.int/comm/regional\\_policy/sources/docoffic/official/reports/cohesion3/cohesion3\\_en.htm](http://europa.eu.int/comm/regional_policy/sources/docoffic/official/reports/cohesion3/cohesion3_en.htm)

<sup>18</sup> EC (1998): "Report on community policies and spatial development"  
[http://europa.eu.int/comm/regional\\_policy/sources/docoffic/official/reports/pdf/coorpdfon/bericht\\_de.pdf](http://europa.eu.int/comm/regional_policy/sources/docoffic/official/reports/pdf/coorpdfon/bericht_de.pdf)

operational programmes to implement them normally contain spatial objectives for the region concerned. Spatial co-ordination of measures, whether with a view to ensure mutual reinforcement or to avoid incompatibility, is neither required nor forms part of the procedures of appraisal, approval and practical implementation."

However, now there is a debate about a new strategy for the SF's period beyond 2006 outside of Objective 1 areas. There a development model could be established which gives the member states greater autonomy and will deal with geographical priorities, including:

- the least developed regions; the urban question
- the diversification of rural areas
- cross-border, transnational and interregional co-operation
- areas undergoing industrial restructuring and
- areas with severe geographical or natural handicaps

Thus, it is obvious that therefore adequate territorialisation of information is an urgent key issue. In order to achieve a more common and more co-ordinated approach concerning territorial impacts the efforts of applying TIA in the near future should be focussed on:

- providing information about the expenditures on the level of NUTS 3
- providing information about actual reference to the concept of polycentric spatial development
- providing information about the probable share of EU Regional Policy impacts on total economic performance changes

The further elaboration of specific recommendations needs

- determination of the subject to be treated (specific policy area, certain programme or guideline, project)
- determination of the responsible authority/actor to be addressed
- further elaboration of concepts and goals employed

While the latter is considered mainly a research issue the first two items are rather subject to political responsibility.

#### **9.3.3.4 Recommendations considering new policy instruments under discussion**

Finally, the future potential roles of Territorial Impact Analysis in the context of the new policy instruments '**Impact assessment**' and '**Open method of co-ordination**' should be addressed here.

Already the 'White paper of governance of the European Commission' (2001) mentioned to improve overall policy coherence whereby also "the territorial impact of EU policies in areas such as transport, energy

or environment should be addressed. These policies should form part of a coherent whole as stated in the EU's second cohesion report; there is a need to avoid a logic which is too sector-specific. In the same way, decisions taken at regional and local levels should be coherent with a broader set of principles that would underpin more sustainable and balanced territorial development within the Union"

"The **new impact assessment method** integrates all sectoral assessments concerning direct and indirect impacts of a proposed measure into one global instrument, hence moving away from the existing situation of a number of partial and sectoral assessments. It provides a common set of basic questions, minimum analytical standards and a common reporting format. The impact assessment will replace existing requirements for business impact assessment, gender assessment, environmental assessment, small and medium enterprises assessment, trade impact assessment, regulatory impact assessment etc. Indeed, the new integrated Impact Assessment tool builds on these existing practices and incorporates them into the new tool. It is clear that the scope and methodology of impact assessment will vary according to the negotiating guidelines for international agreements and white papers will require an adjustment of the approach used for impact assessment of regulatory initiatives." <sup>19</sup>

In June 2002 the Commission published a 'Communication'<sup>20</sup> on the Impact assessment procedure. This new procedure was introduced for all major initiatives of the European Commission. According to that, the impact assessment runs in two phases: The Preliminary assessment gives a first overview of the problem identified, possible options and sectors affected and serve as a filter to identify the proposals that will be subject to an Extended impact assessment. The Extended impact assessment is a more in-depth analysis of the potential impacts on the economy, society and environment, impacts of a regulatory initiatives, analysis of subsidiarity and proportionality and includes consultations with interested parties and relevant experts. The year 2004 marks the first year of full implementation for the new impact assessment procedure which is an aid to decision-making – therefore more advanced experience with the tool is missing, so far.

In the Preliminary as well as in the Extended impact assessment an impact analysis on environmental, economic and social dimensions should be examined in two stages: identification of the relevant impacts and assessment in qualitative, quantitative and/or monetary terms. The components of Preliminary and Extended impact assessment both

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<sup>19</sup> CEC (2001) European Governance; White Paper, Brussels, 25-7-2001, COM(2001) 428 def. Luxembourg: Office for Official publications of the European Commission

<sup>20</sup> CEC (2002) Communication from the Commission on Impact Assessment, COM(2002) 276 final, Brussels, 5.6.2002

include a point 'impacts' where all relevant positive and negative impacts should be examined and reported on with a specific emphasis on their environmental, economic and social dimension.

Hence, it is a rather obvious recommendation that TIA has to be established as one of the dimensions of the impact assessment. Therefore, the recommendation here is to introduce the territorial impact dimension – by using e.g. the ESPON 3.1 'TIA Manual' – into the Annex of the communication mentioned above which consists of three parts:

- (1) Format for the preliminary assessment statement
- (2) Components of impact assessment
- (3) Indicative reporting format for the extended impact assessment

The '**Open method of co-ordination (OMC)**' "is designed to help Member States to progressively develop their own policies involved"<sup>21</sup>. It was established by the European Council held in Lisbon in March 2000 and is considered a new form of co-ordination of national policies consisting of the member states, at their own initiative or at the initiative of the Commission, defining collectively, within the respect of national and regional diversities, objectives and indicators in a specific area, and allowing those member states, on the basis of national reports, to improve their knowledge, to develop exchanges of information, views, expertise and practices, and to promote, further to agreed objectives and innovative approaches which could possibly lead to guidelines or recommendations.

The Open Method of Co-ordination (OMC) "is designed to help Member States to progressively develop their own policies involved

- fixing guidelines for the Union with specific timetables for achieving the goals which they set in the short, medium and long terms
- establishing, where appropriate, quantitative and qualitative indicators and benchmarks against the best in the world and tailored to the needs of different Member States and sectors as a means of comparing best practice
- translating these European guidelines into national and regional policies by setting specific targets and adopting measures, taking into account national and regional differences
- periodic monitoring, evaluation and peer review organised as mutual learning processes. (par. 37, Lisbon European Council conclusions, 2000)."

As far as co-ordination concerns spatial development issues, it is obvious that using the tool TIA can offer appropriate material for

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<sup>21</sup> see footnote 14

accomplishing the objectives mentioned above. In particular this seems to be true for the relation between European and national level. However, there is to expect not only a “translating these European guidelines into national and regional policies” – only in some policy areas the relation is a hierarchical one! – rather than also a contradiction between European and national policy goals. Such a situation needs kind of political bargaining but on a more sophisticated basis than usually. TIA could offer the appropriate material for negotiation.

Therefore, the recommendation here is to consider and to use TIA for mutual exchange of policy reflecting within processes of Open Method of Co-ordination and to take it on board in further promotion documents concerned.

### **9.3.4 Summary**

Regarding TIA in the ESDP and ESPON context main differences were pointed out. In the ESDP TIA was related to transnational projects and plans whereby the ESPON programme puts TIA (the first time) into the context of assessing policies and programmes. The ESPON 3.1 minimum requirements were elaborated as check-lists for the ESPON priority two projects which showed very different approaches and methods to analyse impacts of policies and programmes. Finally four main conclusions were drawn from the ESPON experiences concerning TIA:

- Need for better definition of spatial development goals which any kind of TIA has to refer to – focusing on territorial cohesion and polycentric development
- Recommendations concerning monitoring and documentation of EU policy areas
- on the basis of the ESPON policy impact projects recommendations are given to the different EU policies focusing on Transport and TEN policy, Research and Development, CAP and Rural Development Policy and Regional Policy
- Finally the link to other new policy instruments like impact assessment or open method of co-ordination is discussed.

## 9.3.5 TIA Manual

### Preliminary remark

The examination within the ESPON project 3.1 proved that the diversity of features and manners of effects do not admit to cover the whole range of EU policy issues by one common assessment methodology. However, what turned out feasible is a common methodological approach to be applied to the different areas of concern in specific ways. This is considered the objective of the following manual to be applied as kind of check-list.

Elements constituting the analysis/assessment of territorial impacts of EU policies and programmes:

### Scoping

**(1) Reference to policy interventions**

Designation of the causing interventions assignable to EU budget lines  
e.g. EIB grants for rail network element development  
R&D support grant  
direct income payment for farmers  
ERDF expenditures co-financing government aids or public investments

*Question to be answered: What is causing the impacts?*

**(2) Hypothesis on cause-effect-relations**

Basis: hypothesis concerning cause-effect-relations (with varying empirical proof),  
e.g. economic growth caused by improved accessibility,  
increased innovation capacity by new R&D jobs,  
lower unemployment by subsidising farms,  
increasing GDP per capita by ERDF expenditures

*Question to be answered: What is changed by the intervention(s)?*

**(3) Regional scale of observation**

Designation of geographic reference to be used: regions concerned by intervention/effect; territorial level(s) of observation; covering all or selected (by what criteria) regions cause-effect-relations  
e.g. NUTS 5, 4, 3, 2 regions  
types of regions

*Question to be answered: Level of observation and analysis?*

**(4) Reference to past and future**

Cause-effect relations in the past as the basis for predicting the effects of future interventions; empirical experiences as well as outlooks to the future crucial for analytic treatment and political perception  
e.g. past transport infrastructure investments (improvement of accessibility) and economic performance of regions; future scenarios of agriculture

*Questions to be answered: What has happened, what may happen in future?*

## **Analysing**

### **(5) Interventions and effects measured**

Implementation of the hypothesis concerning cause-effect-relations  
e.g. relationship development investment amount – accessibility changes,  
R&D expenditures – employment growth,  
indirect payments – changes of average farm income,  
ERDF expenditures – increasing GDP per capita

*Question to be answered: What is registered, measured, appraised?*

### **(6) Quantitative/qualitative appraisal**

Designation of type of indicators selected  
e.g. statistical variables  
survey data  
qualitative appraisals (ranking)

*Question to be answered: By what kind of indicators the topic is described?*

### **(7) Technique of analysis**

Designation of type of analysis used  
e.g. correlation analysis  
simulation model  
case studies  
classifying regions

*Question to be answered: How is the analysis performed?*

## **Assessing**

### **(8) Goals referred to**

Designation of criteria for evaluation derived from the two ESPON key concepts focusing on the spatial dimension

#### **Polycentric spatial development**

- at European level: several metropolitan regions as global integration zones instead of only one
- at transnational level: enforcement of a polycentric system of metropolitan regions, city clusters and city networks
- at national level: systems of cities including the corresponding rural areas and towns
- open for application at lower levels, e.g. for the development within city regions (intra-regional)
- (polycentric development at one level does not necessarily go along with the same at the other levels)

#### **Cohesion**

- Economic: balanced territorial development concerning economic performance
- Social: balanced territorial development concerning employment, income, education, population change
- **Territorial**: fair access for citizens and economic operators to services of general economic interest; balanced distribution of human activities

Other goals derived from official documents may also be taken into account if they are related to types of regions or particular spatial entities mentioned below (9)

*Question to be answered: What goals are referred to?*

**(9) Applied meaning of 'spatial/territorial'**

Designation of the concept of 'spatial/territorial'<sup>22</sup> used according to the policy area concerned

- e.g. referring to affected type(s) of regions (central, peripheral; metropolitan, urban, rural; industrial, mountainous, coastal)
- or to occurring particular spatial figures ('islands', 'patches', 'zones', 'belts', 'corridors')

*Question to be answered: What concept of 'spatial/territorial' applied?*

**(10) Territorial coverage of outcome**

Designation of the general format of results

- covering the whole territory (referring to each region) or
- a selected sample of regions (case studies)
  - e.g. classification/typology of regions covering the whole territory
  - tables, diagrams, maps

*Question to be answered: What do the results look like?*

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<sup>22</sup> Frequently the terms 'spatial' and 'territorial' are used synonymously. Here it is recommended to prefer the term

- 'spatial' when referring to spatial entities, the common characteristics of which are considered rather independent from government and administration (e.g. 'islands', 'patches', 'zones', 'belts', 'corridors', 'pentagon', triangle) and to prefer
- 'territorial' when referring to spatial entities, that are considered rather related to the system of governance at different tiers (administrative and statistical units)

## **9.4 Approaches for synthesising overall findings**

Integrating the results from various ESPON projects into one report is a difficult task. The Regional Classification of Europe (RCE) is an approach to work towards a quantitative integration (cf. elsewhere in this report). In addition to this ESPON 3.1 has also used qualitative approaches for the integration ESPON results, especially when it comes to policy recommendations.

Special attention has been paid to the diversity of Europe (in terms of geography, policy making and culture) and the interdisciplinary of spatial policies. Synthesising the findings of other ESPON projects these aspects have been a main challenge.

Two methods have been employed explicitly in order to avoid one-eyed conclusions and improve the robustness of the results, i.e. the World Café and the Wild Card seminar.

### **9.4.1 World Café**

The World Café is a process often used for conflict identification and solving in larger groups. This builds on the advantage that this technique makes it possible to voice aspects (ideas or critics) which would not be aired in a situation where the "authorship" is recognisable. Thus the World Café has a potential to set free ideas and thoughts which do not come up in usual group discussions etc. At the same time the World Café allows to see whether there is any consensus around impressions aired.

In the context of ESPON 3.1 the World Café technique has been used to filter what the main/outstanding results from ESPON are and where there is room for improvement.

#### **9.4.1.1 The World Café technique**

The World Café builds on the idea of groups sitting in a café debating intensively and using the tablecloth for illustrating aspects in their debate and underlining their statements. As time goes by people leave and new people join in the ongoing the discussion. By the end of the day, the tablecloth is the only witness and piece of evidence on what has been discussed around the table.

In terms of a technique for group discussions, this means that (a) the main topic of the discussion is to be defined. After that (b) the group is split into sub-groups of four to six persons. Ideally, there should be as many people in a group as there are sub-groups, i.e. there is a limit as for how big groups this technique is sensible to use. The optimal group would be around 16 or maybe 25 persons, which are then split into 4 respectively 5 sub-groups distributed over equally many tables. For

each table (c) a host is to be decided how is being with the table over the entire exercise and who will report back to the plenary about the discussions at this table afterwards. Each of the groups will then (d) have a table with a paper tablecloth to draw and write on. There will be certain time (approx 15 to 20 minutes) for the group to discuss the topic of the day and note their main points, ideas or questions on the tablecloth. After the set time (e) the discussion will stop and each member of the sub-group will go to another table (i.e. none of the present sub-group members will sit at the same table afterwards) and only the host will stay with the present table. Having welcomed the new guests from the other sub-groups (preferably one from each) at the table, the host (f) will briefly report about the discussions at the table so far. Thereafter the discussion will continue another 15 to 20 minutes with the new guests at the table. After the set time, the group will split again and each one will go to a new table and only the host will stay and introduce the new guests to the discussion at the table. The procedures (d) to (f) will be repeated a number of times – preferably until everyone has been guest at all tables.

All this can be accompanied by drinking coffee, tea, beer or even eating small snacks creating a relaxed atmosphere for open and good discussions.

Once all the World Café has closed, each host will summarize the main points from the discussion at the table on a napkin or small piece of paper.

The summaries will then be presented to the plenary. Some discussions points will be similar for each table, others might be very specific for a certain table.

#### **9.4.1.2 The Results of the ESPON 3.1 World Café**

During the ESPON 3.1 TPG meeting in Barcelona, 24-25 May 2004, some time of the afternoon session had been devoted to a World Café. The questions at stake were the main findings produced by ESPON project and ESPON policy recommendations. The focus of the discussion was on filtering the main aspects out of the broad ESPON material. Thus, the World Café was mainly a gathering of ideas and impressions utilising the diversity of backgrounds and insights of members of the ESPON 3.1 team.

The discussions touched upon a range of projects – however not all projects – and went in some cases rather deep into methodologies, findings and recommendations drawn etc. The main project related findings have been documented in the conclusion paper from the ESPON 3.1 World Café.

More generally, one can conclude that during the discussions only a limited number of projects have been mentioned explicitly. Altogether four projects have been addressed in terms of findings and three or four with relation to policy recommendations. In two cases the focus was on missing aspects and further research and in three cases on innovative ideas and approaches. Seven projects have not at all been mentioned. This reflects mainly the awareness of the participants in the discussion and not necessarily the work carried out by the projects. Indeed, had the World Café been preceded by single project presentations the result might have been different.

Findings	Policy Remedy	Further Research	Innovative Approach	Not Mentioned
1.1.1		1.1.2		1.1.3
1.1.4	1.1.4 1.2.1 / 2.1.1	1.1.4		1.2.2
			1.3.1	1.3.2
2.1.2 2.1.3	2.1.1 / 1.2.1 2.1.3		2.1.3	2.1.4 2.2.1 2.2.2 2.2.3

Summing up what has been said on the outcome of ESPON and possible (policy) recommendations, following aspects can be highlighted:

- Mental Maps*  
 The studies carried out under ESPON and maps provided are the first consistent work on EU 27+2 and contribute to disseminating knowledge on how this new Europe looks like and change the mental maps (of academics as well as policymakers). However, so far these maps are mainly produced with the “old” mental maps in mind, an aspect that will gradually change over time.  
 RESULT: Towards a new spatial view on Europe (cf. all maps)  
 RECOMMENDATION: Do not limit this discussion to 29 countries
- Discontinuities and different levels*  
 The three levels approach as well as the work on discontinuities are refreshing and provide new insights on spatial dynamics. In particular on how spatial development (and their discontinuities) differ when changing the geographical level. Selected parts of this would deserve further highlighting.  
 RESULT: New insights on differences of levels as regards spatial discontinuities

RECOMMENDATION: Further work on this as well as policy suited to address the shifting views and challenges when shifting levels

- *Trans-national and cross-border co-operation*

More focus should be put on trans-national co-operation. As for cross-border cooperation reconsiderations on the actual focus of co-operation and the value added of European Funding for it should be carried out. Cross-border strategies on waste and river basins can be considered as good examples. On the other side, maybe there should be more regional diversification concerning this co-operation programmes: trans-national and cross-border co-operation programmes perhaps must not exist everywhere – maybe in some regions there should be focus on cross-border co-operation and in others more focus on trans-national co-operation – need for further investigations

RESULT: Insights on current Interreg IIIA & B co-operations

RECOMMENDATION: More strategic and properly thought-through delimitation of areas for EU-funded trans-national and cross-border co-operation with respective foci emerging from the potentials of the areas.

- *Do not forget the citizens*

Parts of the discussion centred on European citizenship and integration. This involved emphasis on the link between European citizenship and local government as well as ideas increased support for mobility of EU citizens.

RESULT: Local governments and citizens are cornerstones of spatial development

RECOMMENDATION: Develop policy recommendations addressing the strengthening of EU citizenship, integration and local government in this context

- *Structural Funds*

A number of aspects in the discussion addressed the issue of Structural Funds. Partly this was related to the relation of spatial policies and Structural Funds versus CAP or TEN. More generally, there were remarks on the SF as agenda behind the ESPON work and some consideration for the future of SF.

RESULT: SF and their relation to other EU policies do not necessarily support the aims set out for European spatial development

RECOMMENDATION: Re-arrangement of SF focus on 3rd countries, neighbouring, middle East and Mediterranean

- *Geographically handicapped areas*

Some ESPON findings illustrate the geographically handicapped areas (mountain, islands, borders and there so called lacking behind regions) are partly not as challenged as often imagined

and often even holders of great potentials. Thus there should be shift in perspective from challenges to opportunities. RESULT: More insights on spatial opportunities (instead of challenges) RECOMMENDATION: Focus policy making on opportunities instead of handicaps

- *Interdisciplinary & spatial approach*

Interdisciplinary and spatial approach are important elements for ESPON. Going beyond traditional sector borders and insights is one of the core aspects where ESPON provides new knowledge and added value. However, so far only a few projects take a genuine spatial approach and most projects are rather sector oriented. This reflects in particular the sector orientation of EU policies. RESULT: New knowledge in terms of spatial and interdisciplinary European views (cf. 1.2.3 or 1.3.1) RECOMMENDATION: Foster research on territorial dimension, e.g. design future ESPON projects/topics in a more spatial and interdisciplinary manner and improve interrelation between TPGs. The same is true for EU Policies, strengthen the territorial element of EU policies

- *European diversity*

On the one side European diversity is considered as one of the main assets of Europe, while on the other hand, there are demands for harmonisation in terms of concepts, definitions and policies. The diversity in culture and policy-making styles as well as spatial developments, does however suggest an openness and diversity also for EU analysis and policies which could rather be framework oriented than "one size fits all approaches". RESULT: Diversity is an asset also when it comes to the understanding of concepts and profiling of analysis RECOMMENDATION: Awareness raising for this aspect

- *Dynamics, flows and interaction*

Time perspectives, including information on spatial development dynamics, flows and interaction, be in the field of transportation, migration or rural-urban interaction, need to be addressed more thoroughly by ESPON. However, the lack of data on these issues, prevents broader studies on these issues. RESULT: Dynamics, flows and interaction are only covered partially and insufficiently RECOMMENDATION: More concrete action in these fields and demands for EU-wide data gathering on selected issues – outside the scope of ESPON

- *Constant lack of data*

Missing data and lack of data are frequent hinder for spatial analysis of EU 27+2. This regards flows, coverage and a number

of issues/fields. Increasingly, the gathering and availability of data is related to discussions on actual power. This needs to be taken into account for future studies.

RESULT: Problems in data collections results often in the use of the same old data in all projects – and thus limited innovation and value added of ESPON work

RECOMMENDATION: More concrete action in these fields and demands for EU-wide data gathering on selected issues – outside the scope of ESPON

- *Communication between policy-makers, scientists, practitioners and civil servants*

There seems to be a need for mutual understanding and learning between policymakers and academics to improve communication and balancing between scientific methods and rigour and political challenges.

RESULT: ESPON has contributed to first steps in this mutual learning

RECOMMENDATION: Support this form of dialogue and mutual learning. Within the framework of ESPON the regular seminars could gain from a more process and dialogue oriented organisation

- *Polity*

With regard to the organisation settings of policy making aspects such as the removal of the nation state, i.e. more power to the regions and direct links between regions and European level, and more focus on modern administration and emphasis on evaluations have been mentioned.

RESULT: There are hinder in the given system for policy implementation

RECOMMENDATION: Review of the policy-making environment

#### **9.4.1.3 Reflections for future use**

Given the diversity regarding specialised knowledge, policy making and culture in Europe, the World Café has been an useful approach for drawing on the diversity of the team – and their understanding of the projects and of ESPON – when trying to narrow down ESPON results towards a few aspects to be presented as overall ESPON findings.

The exercise has mainly been based on the pre-existing knowledge the participants had when coming to the meeting. Probably the results would have been to a certain degree more detailed if presentation of the main findings, policy recommendations or methodologies had preceded the World Café.

The ESPON 3.1 TPG did only one World Café, it might have been interesting to carry out one before each report to be drafted and maybe then even to focus on more specific question for each World Café.

In any case it has been useful for integrating the broad diversity of the team into the process of narrowing down ESPON results towards main aspects.

#### **9.4.2 Wild Card Seminar**

Not at least events such as 9.11 teach us that there is always a chance that dramatic events change the whole image of the future, the way we think about it, the concepts we use and even the aims we try to achieve. Therefore, complex tasks such as the ESPON 3.1 project, gain from techniques allowing to identify the often implicit premises/ideas we base our work on and to test the robustness of the work, i.e. to see whether the findings are only valid in a world responding exactly to our premises and basically developing in terms of trend continuation or whether they are still valid when some more or less fundamental changes occur.

The discussion of Wild Cards and their implications on the findings provided help to do that. Generally speaking a wild card is a future development or event with a relatively low probability of occurrence but a high likely impact (BIPE et al 1992). Thus Wild Cards are in principle discontinuities in trends or structures.

There are different types of wild cards, such as (a) futurequakes, i.e. sudden events, accidents or catastrophes, or (b) creeping catastrophes which results from the interplay of various causes which are mostly unknown, since their causalities are complicated and interrelated, and their effects delayed. Thus creeping catastrophes culminate in events which are apparently indeterminate, unpredictable and confusing.

“Wild cards very often evolve in just the same way. For a while, they gestate in a hidden, latent form. Then, suddenly, they become manifest. Therefore wild cards are characterized by the fact that they take decision-makers in government or business by surprise [...]” (Steinmüller 2004:198)

The idea of Wild Cards has been used by ESPON 3.1 for discussing the implicit premises on which the TPG has based its work and for testing the robustness of the findings in the light of discontinuities in current developments.

### **9.4.2.1 The Wild Card technique**

The development and discussion of Wild Cards can be done according to a number of approaches. In the following we describe the approach followed by the ESPON 3.1 TPG which basically consists in 5 steps and is mainly drawing on two methods for structuring thoughts and discussion.

#### *(a) Identification of tacit premises*

Before entering the discussion of wild cards, the premises on which the current work is based need to be mapped. A general brainstorming can be used to analyse the hidden as well as the more obvious assumptions. The results of the brainstorming are then to be grouped according to different categories. For this the STEEP approach can be used, i.e. grouping the brainstorming results according to Society, Technology, Economy, Environment and Politics. This covers broadly the various fields later to be discussed in the Wild Cards.

The brainstorming should be summed up with a general discussion on the results, which STEEP sectors are mainly represented and which are underrepresented, which results of the brainstorming are expected and which more surprising etc.

#### *(b) Identification of Wild Cards*

The second step regards the identification of possible Wild Cards. For this the group is to be split in working groups of approx four persons each. Preferably there should be at least one working group for each of the STEEP sectors so that all fields are covered. This implies that one working group would focus on finding wild cards in the field of society, one on the field of technology, one on environment, one on economy and one on politics.

For the development of Wild Cards, the 4-3-5 (or "brainwriting") method can be used, i.e. 4 persons (in each working group) note down 3 ideas each within 5 minutes. Each member of the group does it on a separate sheet of paper. After five minutes the papers are circulated and again everyone has 5 minutes to note down 3 ideas or to enlarge on the ideas already written. This process is repeated until every sheet has passed each of the members of the working group. Thereafter the working group will discuss the results. Each mentioned Wild Card is to be discussed according to its impact and its probability. In the so called Probability-Impact Analysis each Wild Card is located in a matrix showing qualitative probability estimates in the x-axis and impact estimates on the y-axis.

Generally, it is not to be recommended to elaborate Wild Cards which "kill" the client, i.e. Wild Cards which erase the actor or policy field for which the work to be discussed is developed are not helpful for

improving the robustness or quality of the work - basically they make the entire work unnecessary and futile.

The results of the working groups are then to be presented to the plenary and discussed.

#### *(c) Selection of Wild Cards*

Based on the results from the various working groups, a limited number of Wild Cards for the continued work needs to be identified. This can be done in form of a broad discussion or by each member identifying the Wild Cards most interesting for him/her. Putting together the individual decisions, a raking of all Wild Cards can be made and those being of interest for most people can be identified. Depending on the size of the group 10 to 20 Wild Cards are to be selected for further discussion.

Ideally the selection of Wild Cards is preceded by a discussion of each Wild Card regarding its impact on STEEP sectors, relevant actors, relevant policy goals and policy efficiency.

Preferably the final portfolio of Wild Cards should cover all STEEP sectors, i.e. society, technology, environment, economy and politics.

#### *(d) Discussion of Impacts of Wild Cards*

In the next step, the Wild Cards are divided over several working groups, each of which consisting in 4 to 5 persons. The working group will discuss the impacts. The discussion of impacts needs to address three aspects.

- Identification of impacts of the Wild Card – this is a more elaborated discussion on probability, and impacts on STEEP sectors, relevant actors, relevant policy goals and policy efficiency.
- Identification of implications for findings/policy recommendations – this is a detailed discussion on the implications of each Wild Card on the actually work on which they are to be applied, i.e. research findings, policy recommendations or business strategies. A matrix of the main points of the work versus the wild cards will help to discuss whether the work is affected by the Wild Card, and if yes to which degree and whether it needs to be modified in light of the Wild Card.
- Synopsis focusing on the work to which Wild Cards are applied – Based in the first to steps, a final discussion will focus on the overall effects Wild Cards have on the work, whether there is need for revision or whether there are blind spots in the work.

The results of each working group are to be summarised on a flipchart and to be presented to the plenary.

#### *(e) Final discussion*

Based on the results of the various working groups there will be a final discussion on the robustness of the work discussed. The focus will be on which parts of the work are robust and which are affected by Wild Cards and which types of Wild Cards are the most threatening to the work. Based on this discussion recommendations for possible changes can be drawn up. If the results of the work are heavily affected by certain Wild Cards, the need for establishing "early warning systems" is to be discussed. The idea of such systems is to identify "weak signals" which hint to the emergence of Wild Cards. As Wild Cards are by definition of low probability it might not be necessary to change recommendations or strategies because they are not withstanding certain types of Wild Cards, but it is advised to guard oneself by setting up a monitoring system that will give an early warning when such a Wild Card is occurring.

For the discussion, a facilitator standing outside from outside the group is to be recommended. The facilitator should have a general knowledge on the field discussed and a broad knowledge on current trends and possible future developments including wild cards. Needless to say that the facilitator needs to be a good process moderator.

#### **9.4.2.2 Results of the ESPON 3.1 Wild Card seminar**

Based on the overall policy recommendations presented in the draft Final Report the ESPON 3.1 TPG has conducted a Wild Card seminar. The seminar has been organised and facilitated by Karlheinz Steinmüller of Z-punkt and took place at 8 November 2004 in Essen. In addition to members of the ESPON 3.1 TPG also members from ESPON 3.2 have been invited. The seminar was organised along the points outlined above.

##### *Premises on which ESPON 3.1 results are based*

The tacit premises regard mainly the field of policy-making and the polity. Firstly, there is a number of premises regarding EU policies in general. To these belong esp. a growing "Europeanization" of politics, and a "determining" influence of European policies, Member States which will remain as they are and retain their power as well as a continued manageability of an enlarged EU.

Secondly, there are premises dealing with European regional policies. This regards in particular the aims and values behind it, i.e. assumptions that European integration, territorial cohesion, and polycentric development are aims to be sought after. More particular the tacit assumptions regard the Structural Funds, such as that a fair

distribution of Structural Funds is possible or that Structural Funds really do affect territorial development in Europe.

With regard to the spatial policy aims generally advocated in the wake of the ESPD, tacit premises concern the fact that spatial impacts of different policies should be taken into account for developing more efficient policies and to make use of synergy effects.

With regard to the economic development, the main premises concern the possible convergence of old and new Member States at slow pace, but also the idea that "economic development motors" have a positive effect on surrounding areas for economic growth. Furthermore, physical infrastructure is viewed as important premise for economic development. In general, there is an economic growth paradigm underlying the policy recommendations developed. Maybe more interesting is also that the policy recommendations largely are based on the assumption of the availability of (fossil) energy at modest prices.

Furthermore, the policy recommendations developed are based on a number of premises regarding the societal development in Europe, basically focusing on a stable society in Europe. Examples of these are the assumption that territorial equity serves individual equity, that everybody has similar ideas of a "good life", that ethnic and religious tensions do not take threatening dimensions or that demographic decline does not require mass immigration.

Interesting to note is that rarely any premises regarding the environmental dimension have been detected. The basic assumption seems to be that sustainable development does not require major changes. One could also argue that the economic and the social dimension of the sustainability triangle seem to be predominant when drawing policy recommendations in ESPON.

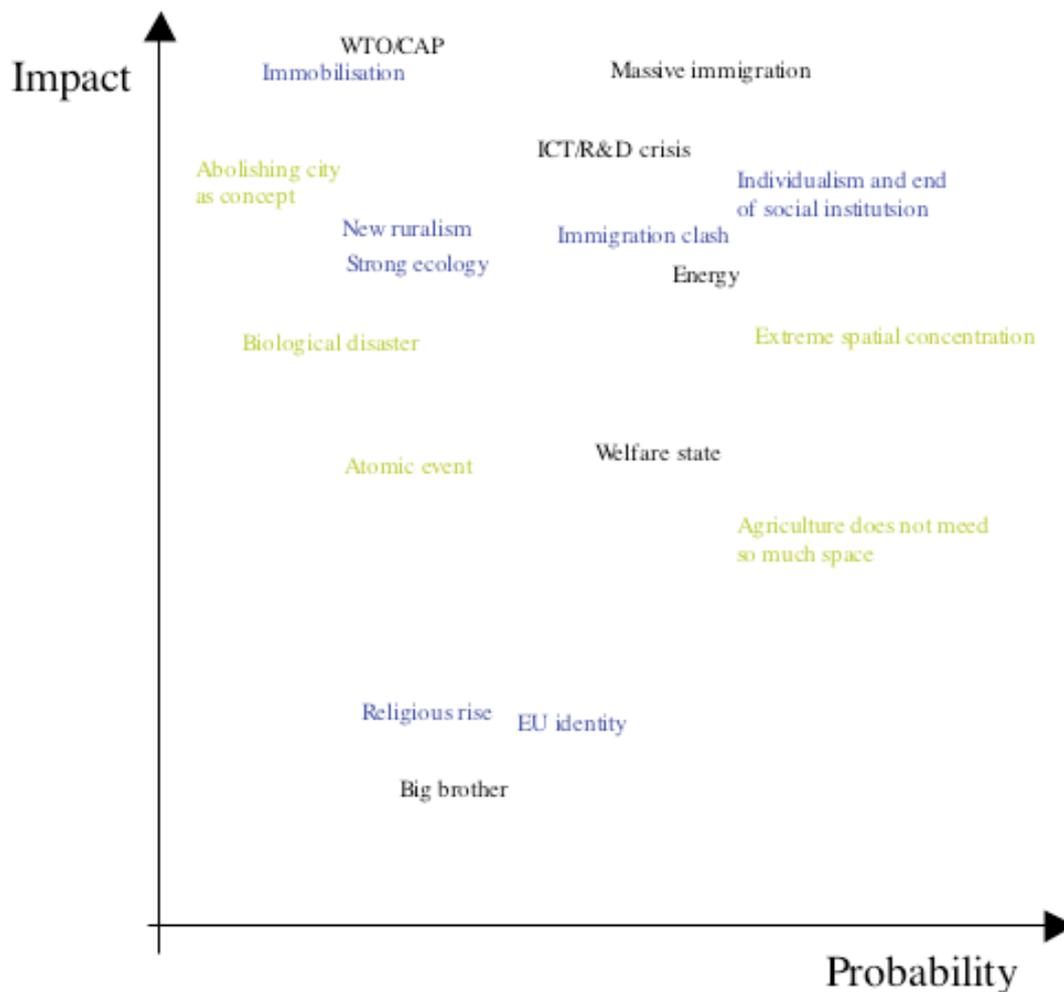
These premises indicate caveats when applying the policy recommendations in a world that is characterised by change rather than notorious continuation of current trends and developments.

### *Wild Cards*

The discussion on the premises focused mainly on the policy and polity side. As these aspects seemed to be immanent to almost all aspects discussed in the group, it has been decided to only develop Wild Cards for the other STEEP sectors and to leave the politics section aside.

The following graph of the overall probability-impact-analysis gives a brief overview on the fields in which wild cards have been discussed. The graph reflects mainly clusters of possible wild cards, and gives a qualitative estimation of their relative probabilities and impacts.

**Figure 100 Wild Card portfolio**



Based on the collection 14 Wild Cards have been selected which seemed to make a good portfolio, i.e. a good balance of Wild Cards from different sectors, inclusion of Wild Cards with relevant impacts on more than one sector, exclusion of too big wild cards (e.g. those leading to the collapse of the European Union), inclusion of Wild Cards which are of special interest for policy recommendations.

The finally selected Wild Cards are:

- WTO/CAP / real free trade, i.e. WTO rules supplant the CAP, real free trade is established in all policy fields / market areas
- Large immigration and integration problems
- Extreme spatial concentration / new immobilisation
- High energy prices – even compared to present price level
- Massive migration of industries (de-industrialisation / off-shoring)
- Strong ecological orientation of the European society
- Cities lose their role as organising concepts and new attractiveness of rural areas

- Segregation and spilt of society into special communities and interest groups
- Social intimacy and integration across border paired with more participation and democratisation
- Collapse of the welfare state, i.e. social inequalities, unemployment, social instabilities
- EU enlargement towards South and East
- Emergency of a European identity recognising diversity
- Disintegration of European policies and institutions
- United States of Europe, i.e. EU policy-making supplants member states policy-making

A rough graph illustrating the effects of each of the Wild Cards for each of the STEEP sectors is available in the documentation of the seminar results. However, these are very rough and rather unsurprising. Probably each reader can easily consider the consequences of each of the Wild Cards.

#### *Impacts on Policy Recommendations*

Finally the impacts of the Wild Cards on the policy recommendations have been discussed. For practical reasons, not each policy recommendation has been discussed in detail. The focus was more on the general picture for the different types of policy recommendations (cf. Part A of this reports).

As a result, most of the policy recommendations seem to be reasonable robust to changes in current developments. This is mainly because of the rather general nature of the policy recommendations provided in this report. As this reports is a synthesis document only the overall lines of the policy recommendations have been addressed and thus the recommendations are of rather comprehensive nature.

Still some possible developments will make it necessary to reconsider the recommendations provided. For instance, a WTO agreement on free trade would affect the policy recommendations provided in particular in relation to CAP and Structural Funds. Indeed, a free world market will not be reconcilable with the existence of structural aid and present forms of EU structural and agricultural policy. Other possible developments such as increased energy prices or new preferences in settlement patterns will cause considerable changes, but the policy recommendations are likely to be still pointing towards the "right" direction.

The discussion of the Wild Cards led finally to a more generally reflection on ESPON and the achievements so far.

The ESPON exercise and not at least the discussions during the ESPON seminar in Nijmegen have shown that researchers are not necessarily best skilled for drawing policy conclusions and recommendations from their research. This is in particular true when there are conflicting demands on the nature and level of detail of these recommendations and especially when the recommendations are to be drawn and presented before the actual research is finalised.

In the light of this, the policy recommendations deriving from ESPON are to be considered with serious "health warnings". As for the future more continues and in-depth dialogues with the projects about their findings might make it possible for policy makers to draw policy conclusions of the research and discuss these with the project groups.

Furthermore, a collaboration between DG Regio and DG Research might offer possibilities for designing projects that better suit their aims.

As regards the need for future research, ESPON results so far illustrate the lack of data covering the entire ESPON space but also allowing for building time series and thus analysing developments and trends. Here considerable additional research is necessary.

The conceptualisation of spatial policy aims into researchable questions, has been a challenge for most ESPON projects. ESPON has made considerable success when it comes to the translation of aims such as "territorial cohesion" or "polycentric development" etc. into measurable indicators. However, these are only first steps and more needs to be done.

The same is true when it comes to the analysis of territorial impacts of EU policies. ESPON has for the first time worked with the assessment of spatial effects of policies in a series of policy fields. For each of these approaches to territorial impact analysis have been developed. However, these are still only first products and more research is needed for developing research approaches in these fields.

Innovative tools have been employed for both describing the European territory and assessing spatial impacts. ESPON has facilitated the development of new analysis and mapping tools moving from sectoral or regional views towards more genuine spatial analysis and illustration. The research done is promising and requires more work on the development of the tools but also on regarding the education of the audience for understanding the new types of analysis and reading the more innovative maps.

In top of these more general fields of further research needed, there are various thematic issues that can be further deepened. These are

listed in the single ESPON studies. With regard to the overall ESPON set up, integrated analysis bringing the statistical information from various thematic studies together into one overall analysis seems to be a challenging task which deserves more attention. So do also aspects rarely touched up by ESPON so far, such as social and environmental issues or the economic role of various types of territories (major urban areas, medium sized cities, small towns, rural settlement etc.).

Further research is also needed for the identification of the spatial dimension and location of regional development potentials. So far a lot of research has centred on disparities and imbalances. Following current policy developments, more focus needs to be put on potentials and territorial capital.

Given this a lot remains to be done for understanding European spatial development and being able to draw conclusions suitable for future policy recommendations. Given all ambitions of understanding spatial development trends and where they take us, we may want to remind ourselves of Antoine de Saint-Exupéry: As for the future, your task is not to foresee, but to enable it.

#### **9.4.2.3 Reflections for future use**

The Wild Card workshop was in particular useful for two aspects.

Firstly, the discussion on the tacit premises on which ESPON findings are based has been an important input to mapping the context in which ESPON results and recommendations are to be seen and to formulate necessary "health warnings."

The discussion of Wild Cards and their impacts on ESPON policy recommendations, has shown that the policy recommendations are rather robust which is largely because of their rather global nature. Going deeper into single policy recommendations – and especially those developed by strand 1 or 2 ESPON projects – things are different. Therefore, similar exercises might be useful at a more detailed level than the overall ESPON 3.1 level.

Learning from experience, we would like to highlight some aspects which could do with further consideration in case one wants to conduct a Wild Card seminar under the framework of ESPON:

- One day is not enough for a seminar going in depth.
- ESPON is touching on rather complex issues, although all group members know what it is about, a Wild Card seminar should be preceded by or be embedded in an intense presentation and discussion of the specific ESPON findings or recommendations being subject to the Wild Card seminar.

- A Wild Card seminar should be led by someone having a wide range of experience in conducting such seminars and a reasonable knowledge on the ESPON subjects. Furthermore, this person should be given sufficient time to present the idea of Wild Cards and reflect on different types of Wild Cards and experience made in early Wild Card works. This is necessary to introduce members of the ESPON family to this kind of thinking.
- In the ESPON 3.1 Wild Card seminar, Wild Cards in the field of policy and politics have been excluded. It might be wise not to follow this example and to cover all STEEP sectors by Wild Cards, in particular when focusing on policy recommendations.



## **From Integrated Tools towards a Policy Support System**



## **10 Integrating ESPON information and knowledge tools into an ESPON Policy Support System.**

(by Andreu Ulled, MCRIT)

### **Introduction**

ESPON is a highly decentralised process, with many different networks of universities, research institutions, consultancies and independent experts working to provide sound scientific support to European policy makers at a critical moment in the construction of the European Union.

The initial goal of ESPON 3.1 was to propose and divulge basic common data sets and keys for harmonisation and standardisation within the ESPON Community and to deliver the harmonised material, maps and indicators to the Commission for consideration in the Third Cohesion Report.

The next phase of ESPON 3.1 after September 2003 was to move towards consolidating all existing material and facilitating means for this information to be accessible to the whole ESPON Community and the Commission services. The consolidation of information and knowledge generated by ESPON in such a service-oriented approach is what is known as a Policy Support System.

### **What is a Policy Support System?**

The need for a Policy Support System comes from two contradictory demands by policy makers: *more advanced* and yet *more user-friendly and just-in-time* decision-making support from experts and scientists.

On the one hand, as problems increase in complexity, policy questions have more difficult answers. Policy-makers require sound advice from scientists and experts: reliable and objective information and convincing evidence that can be submitted to citizens, interest groups and other institutions. Scientists then, have to assemble precise databases, use state-of-the-art theories and models, and take advantage of computers with faster calculation and larger memory capabilities to build up ever more information systems, forecast and impact models and evaluation methods. Even if scientists and experts cannot always reach conclusive answers, the use of advanced analysis certainly improves decision-making processes significantly.

On the other hand, as a result of the mass dissemination of friendly ICT, decision-makers and citizens are beginning to feel less intimidated by computers and sophisticated software that can run large databases or generate forecasts. Many decision-makers are already beginning to ask full disclosure of computer models and even friendly access to run the models themselves. Computer tools could then become learning

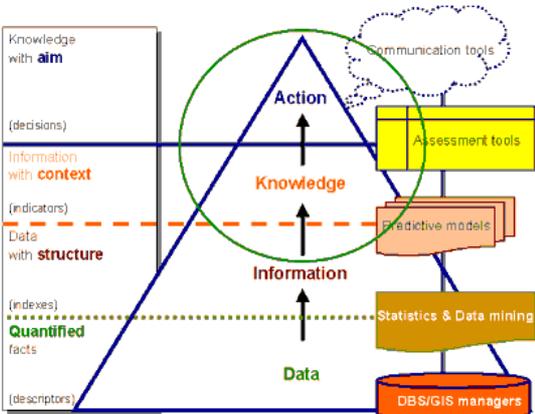
tools in the hands of policy-makers, who could then simulate interactively the impact of alternative policies.

One possible strategy for resolving the conflict between *more advanced* and *more friendly* and *just-in-time* support is developing *corporate intelligence* inside governmental institutions by introducing efficient management of information and knowledge. The first strategy to move in this direction is to continuously consolidate and formalise disperse information and knowledge generated internally. This can be done by creating virtual libraries with synthesis of studies, storing databases in compatible formats, creating intelligent search-engines, etc., and linking it all together into open systems, driven by user-friendly and customised interfaces and accessible to any interested policy-advisor or policy-maker from his/her computer desk. The open system should integrate interactive explanatory tools of use for communication and educational purposes, but should also provide access to multiple remote advanced information and knowledge systems developed and maintained by universities, research institutions and consulting firms that can answer a number of legitimate policy-questions.

However, clever computer systems that interface end-users and improving computer tools is not sufficient. The key to close the gap between policy makers and state-of-the-art scientific models is creating an environment where scientists, experts and policy makers interact personally and can understand each other.

The SPESP is a success story in which information and knowledge generated along the process was actually gathered, harmonised and distributed. Today, the project virtual library including databases of policy-indicators, reports, interactive mapping facilities etc. is still publicly available.

**Figure 101 Conceptual scheme of a Decision Support System**



Source: [www.mcrit.com/assembling/assemb\\_central/WhatESS.htm](http://www.mcrit.com/assembling/assemb_central/WhatESS.htm)  
 Example of a Policy Support System diagram, prototype from ASSEMBLING Research

## **Technical description of a Policy-Support System**

A Policy-Support System may consist of the following modules:

User interface: Web-browser technology with links to open multi-software systems on LAN/WAN and advanced transport-specialised Internet GIS/Mapping visualisation utilities, highly customised. The user-interface or communication module of the system has to be understood as an "Executive Information System" for top policy assessment and project appraisal.

Information base: Assembling existing information into a core harmonised database. A number of policy meaningful indicators (generated by forecasts or evaluation models) will be defined and included in the information system. The information base has to answer "What's up" questions and, together with the model base, "What if" questions (impacts of alternative policies into the policy indicators). Standard data formats are needed to integrate disperse databases.

Forecast base: Forecast models are computer programmes organised as a set of algorithms based on scientific theories able to predict the behaviour of the system under different exogenous scenarios and alternative policy decisions. Models can be developed sector by sector in a reductionist approach, but eventually need to be integrated to allow for interactions between different sectors and scales. Models must be transparent and interactive to serve as actual knowledge-tools and make users understand their system behaviour. Defining ontologic rules and quality control procedures will allow forecast tools to be in line with the system.

Evaluation base: Evaluation and backcasting models have to be integrated into the knowledge-base, and heuristics, rules of thumb, comparative case-studies, in-depth studies and other sources of knowledge need to be integrated into the final decision. Within a knowledge-base a directory of "hot policy issues" (e.g. derived from surveys, mass-media analysis and other monitoring exercises) can be included as a way to formalise the policy questions the systems must respond to.

The major risk of failure of any Policy-Support System would be to work from an abstract, top-down, idealistic or "scientifically-closed" approach, removed from real institutional, behavioural and organisational aspects. In the ESPON case this is not likely to happen since the PSS will mostly be based in a process of integration and communication of information and knowledge produced by multiple sources.

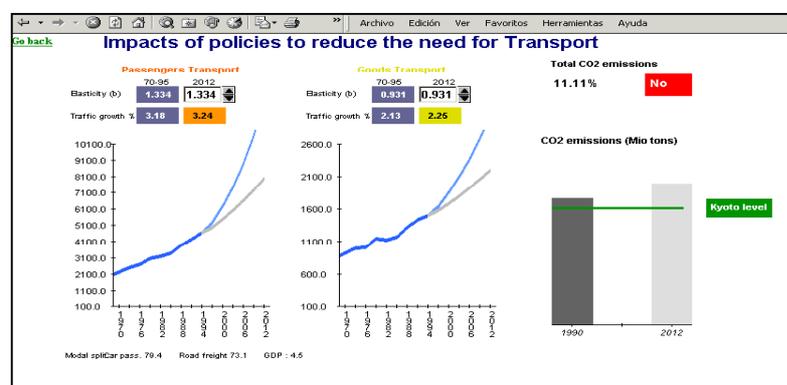
## First questions for the development and implementation of a European Spatial Development Support System

Finally a practical solution to start the development of a web-based PSS was adopted (see next chapter). This solutions provides for a useful first step in the PSS direction, but this is not ambitious enough. The ESPON project needs to set up a PSS that includes: a single repository with validated databases, a number of models to compute important indicators, mapping facilities, virtual libraries with studies, case-studies, reference documents, directories of experts and institutions, and a friendly web interface to allow remote users to take advantage of non confidential material.

The need and feasibility of a number of initiatives are worth considering:

- A portal website with links to other TPG webs with their own project material.
- In addition to policy indicators, TPG raw databases to be integrated into the system or become somehow available.
- Data storage and retrieval through the Internet and Internet mapping services.
- Availability after ESPON of computer models used by TPGs, and if so, for what type of analysis, and under what commercial conditions. Creation of a directory of models and modellers with the specific services they can provide.
- Interactive simulators available on the Internet focusing on key policy questions and scenarios, using the knowledge gathered.

**Figure 102 Sample of interactive simulator on the Internet; Are we going to comply with the Kyoto agreement on reduction of CO2 emissions?**



source: [www.mcrit.com/model\\_kyoto/](http://www.mcrit.com/model_kyoto/);

## **ESPON Policy Support System (initial proposal developed by ESPON 3.1)**

Official approved reports and other deliverables can currently be found in the [www.espon.lu](http://www.espon.lu) website maintained by the ESPON Co-ordinating Unit. Ideally, the ESPON-PSS should become accessible from there and include links to other project websites, where they exist, as well as to integrated material such as consolidated datasets for downloading, interactive tools for visualisation, geographic and spatial analysis, and other references such as standard data formats and map layouts, templates for reports and website developments, etc.

The central part of the ESPON-PSS website is to be composed of six modules:

- 1) Data Navigator: directory of data sources in Europe (under development)
- 2) Data sets to be downloaded
- 3) Gallery of maps to be downloaded
- 4) Tools for interactive desktop mapping (under development)
- 5) Tools for GIS (under development)
- 6) Tools for Spatial Analysis (and other elements)

The SPESP website (<http://www.nordregio.se/spespn/welcome.htm>) serves as reference for the modules 1,2,3. Modules 4,5,6, are all currently under development in ESPON 3.1, targeting three sets of potential users. Desktop mapping (4) targets novice users aiming to visualise data graphically before downloading data sets or produce images for presentations. GIS (5) includes all conventional GIS facilities and provides maps according to the ESPON layout design standards, ready to be included into ESPON official reports. Finally, Spatial Analytic tools go beyond regular GIS facilities by providing advanced tools to explore complex issues such as spatial discontinuities, grids and others. These three modules, together, will provide for comprehensive state-of-the-art tools for a variety of users and purposes.

In addition to these core elements, future ESPON projects should develop policy-simulators to help users simulate potential impacts of European policies, and forecast tools based on statistical or explanatory models. ESPON 3.2 will provide standards and recommendations for these knowledge-based tools.

### **ESPON-PSS: Current situation**

The ESPON Policy Support System is the latest tool developed by ESPON project 3.1 "Integrated Tools For European Spatial

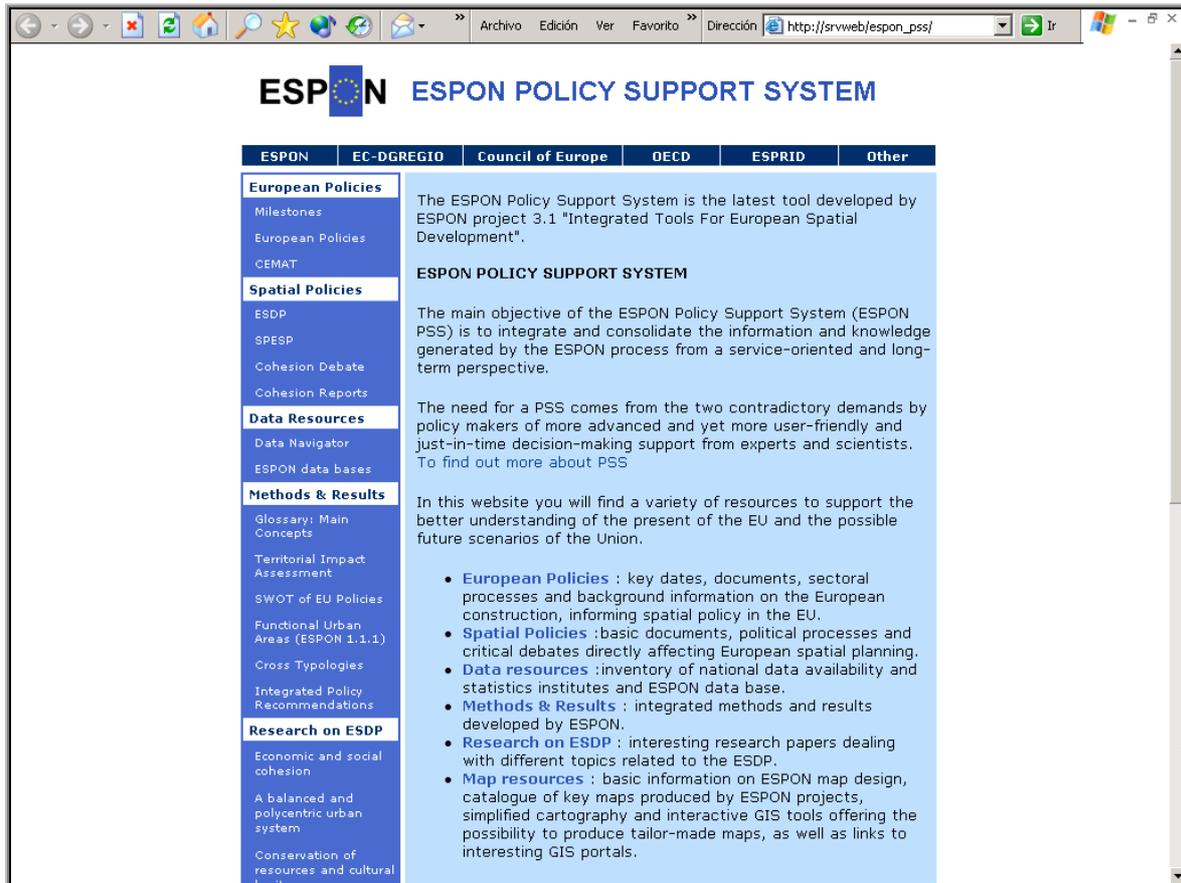
Development". In the current ESPON-PSS website visitors find a variety of resources to support the better understanding of the present of the EU and the possible future scenarios of the Union.

- **European Policies** : key dates, documents, sectoral processes and background information on the European construction, informing spatial policy in the EU.
- **Spatial Policies** : basic documents, political processes and critical debates directly affecting European spatial planning.
- **Data resources** : inventory of national data availability and statistics institutes and ESPON data base.
- **Methods & Results** : integrated methods and results developed by ESPON.
- **Research on ESDP** : interesting research papers dealing with different topics related to the ESDP.
- **Map resources** : basic information on ESPON map design, catalogue of key maps produced by ESPON projects, simplified cartography and interactive GIS tools offering the possibility to produce tailor-made maps, as well as links to interesting GIS portals.

**Figure 103 Content and links of the ESPON PSS webpage**

<b>European Policies</b>
<a href="#"><u>Milestones</u></a>
<a href="#"><u>European Policies</u></a>
<a href="#"><u>CEMAT</u></a>
<b>Spatial Policies</b>
<a href="#"><u>ESDP</u></a>
<a href="#"><u>SPESP</u></a>
<a href="#"><u>Cohesion Debate</u></a>
<a href="#"><u>Cohesion Reports</u></a>
<b>Data Resources</b>
<a href="#"><u>Data Navigator</u></a>
<a href="#"><u>ESPON data bases</u></a>
<b>Methods &amp; Results</b>
Glossary: Main Concepts
<a href="#"><u>Territorial Impact Assessment</u></a>
SWOT of EU Policies
Functional Urban Areas (ESPON 1.1.1)
Cross Typologies
Integrated Policy Recommendations
<b>Research on ESDP</b>
<a href="#"><u>Economic and social cohesion</u></a>
<a href="#"><u>A balanced and polycentric urban system</u></a>
<a href="#"><u>Conservation of resources and cultural heritage</u></a>
<a href="#"><u>Balanced competitiveness of the territory</u></a>
<a href="#"><u>Parity of access to infrastructure and knowledge</u></a>
<a href="#"><u>Sustainable development</u></a>
<b>Map Resources</b>
<a href="#"><u>ESPON Standard Design</u></a>
<a href="#"><u>Simplified Cartography</u></a>
<a href="#"><u>ESPON web GIS</u></a>
<a href="#"><u>ESPON Hyper-Atlas</u></a>
<a href="#"><u>Catalogue of ESPON maps</u></a>
<a href="#"><u>Links</u></a>

**Figure 104 Main menu of the ESPON-PSS portal**



Source: [http://www.mcrit.com/espone\\_pss/](http://www.mcrit.com/espone_pss/)

As a solution for the interactive GIS application developed on Java applets, a Map Collection was developed for free downloading, and transferred to the BBR server. Nowadays the ESPON-PSS is hosted by different ESPON 3.1 partners and has links to [www.espon.lu](http://www.espon.lu) and other ESPON related websites (i.e. to access Data Navigator). To complement ESPON original works with other useful material, links to ESPRID and other main sources are provided.

This website could serve as an advanced prototype for what could be a knowledge-based portal linked to [www.espon.lu](http://www.espon.lu), helping partners in different projects to get easy access to relevant information. In the long-run, specific interfaces including user-friendly simulations could be added to be used by policy-analysts and policy-makers.

**Exploratory and innovative research**  
towards  
**11.1 Europe in the World**  
**11.2 INTERREG III B**



## **11.1 Europe in the World**

(by Patricia Cicille, Claude Grasland and Christian Grataloup, from the teams UMR Géographie-Cités, UMR Espace and UMS RIATE)

The ESPON Programme 2006 focuses mainly on the European territory, but Europe is not a self contained system. It is important to have a look on external connections of the EU to get a complete picture of the status quo and possible future developments of the EU.

### **11.1.1 Objectives of the exploratory study realised by ESPON 3.1**

The ESPON Programme 2006 focuses mainly on the European territory, but Europe is not a self contained system. It is important to have a look on external connections of the EU to get a complete picture of the status quo and possible future developments of the EU. Most studies developed in the framework of the ESPON Programme are based on databases limited to the EU and the candidate and neighbouring countries (EU27+CH+N) and do not take into account the relations between European territories and the rest of the world. However, many aspects of the internal differentiation of Europe are related to existing and potential flows between Europe and the rest of the world. This is especially true for the identification of gateway cities, polycentrism, spatial and social integration, ...

According to its terms of reference, the TPG ESPON 3.1 was not in charge of the realisation of a complete study on "Europe in the world". But it has established a small work package on this subject because one of its mission is to "fill the gaps" of the ESPON program and to propose new directions for further research. In its comment to the Second Interim Report of ESPON 3.1., the coordination unit indicated that "The basic outcome [of the work package "Europe in the World of ESPON 3.1] should be the elaboration of a precise and thorough concept of the continuation of "Europe in the World" in the future ESPON work. With a very limited allocation of funds , it was not possible to explore all directions of the concept of "Europe in the World" and the author of this preliminary study decided to focus their research on the three topics : general problem related to the cartography of Europe in the world, proposal of world maps without boundaries, preliminary delimitation of European functional influence area through the example of air and trade flows. The results where presented in the form of a small report with 12 maps which is available as an annex of the Final Report on the CD-ROM of ESPON 3.1 (see Annex 14).

### **11.1.2 Toward an ESPON vision of Europe in the World :**

This part of the report is related to many technical questions (projection, framework, aggregation level, ...) which are of crucial importance from scientific and political points of view.

- The report discusses firstly the question of geographic projection and examines different possible solutions. It suggests that a polar projection could be the best representation of a polycentric Europe in a polycentric world.
- Then, the report analyses the question of aggregates of states or "world regions" which are necessary for the analysis of flows and structure at world scale (because of heterogeneity of sizes) but is a difficult problem from scientific and political points of view. A preliminary proposal of division of the world in 17 ESPON regions has been elaborated.
- The interest of a joint analysis of variables at European, pan-European and world scales is illustrated by the example of the distribution of the % of young (0-14) in 2000. As it can be seen on Map 38, the perception of the demographic differences is completely modified when the size of territorial units (European regions, states, "world regions") and the limits of the maps are modified.
- The realisation of typologies of territories at world level appears to provide very powerful inputs for political decision. This point is illustrated by the example of a typology of world demographic structures which makes possible a comparison of the situation of each global integration zone (Northern America, Europe, Eastern Asia) and demonstrates that South and East Mediterranean countries are peripheries of crucial strategic interest for Europe in a near future.

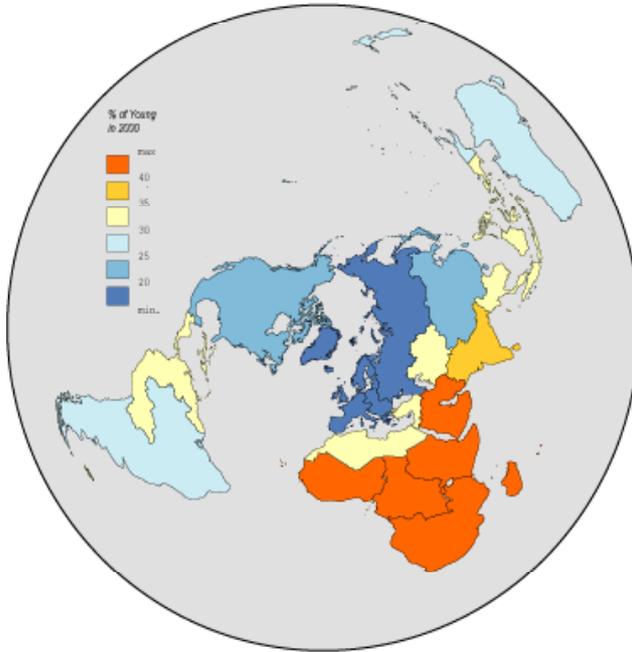
**Map 38 Influence of the spatial framework and the scale on the perception of phenomena : the example of the distribution of young in 2000.**

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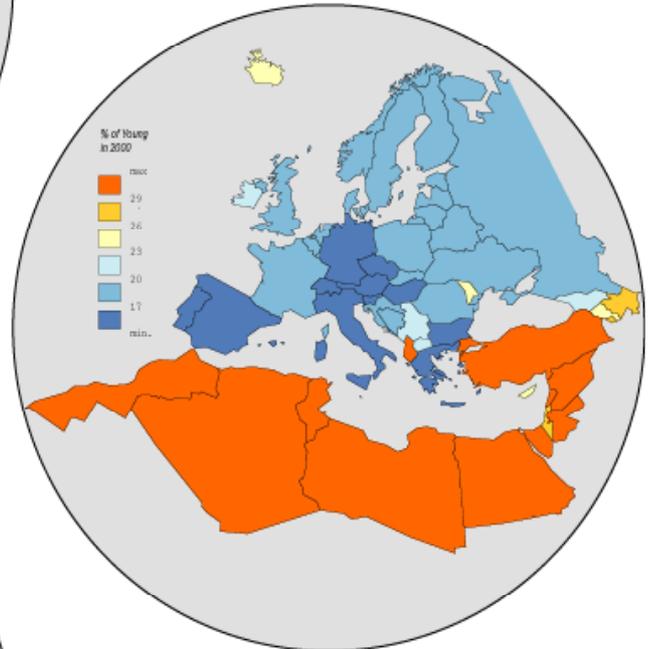
European Spatial Planning Observatory Network  
ESPON 3.1 / Workpackage "Europe in the World"

**THE INFLUENCE OF THE SPATIAL FRAMEWORK**

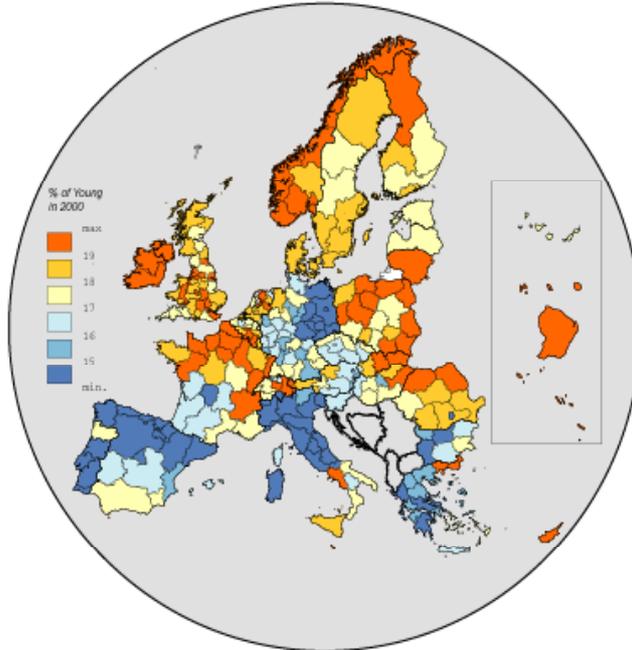
**A GLOBAL VIEW**



**AN PAN-EUROPEAN VIEW**



**AN ESPON VIEW**



(c) Grasland C., Grataloup C., 2003, CNRS-UMR Géographie-cités-GDR Libergeo

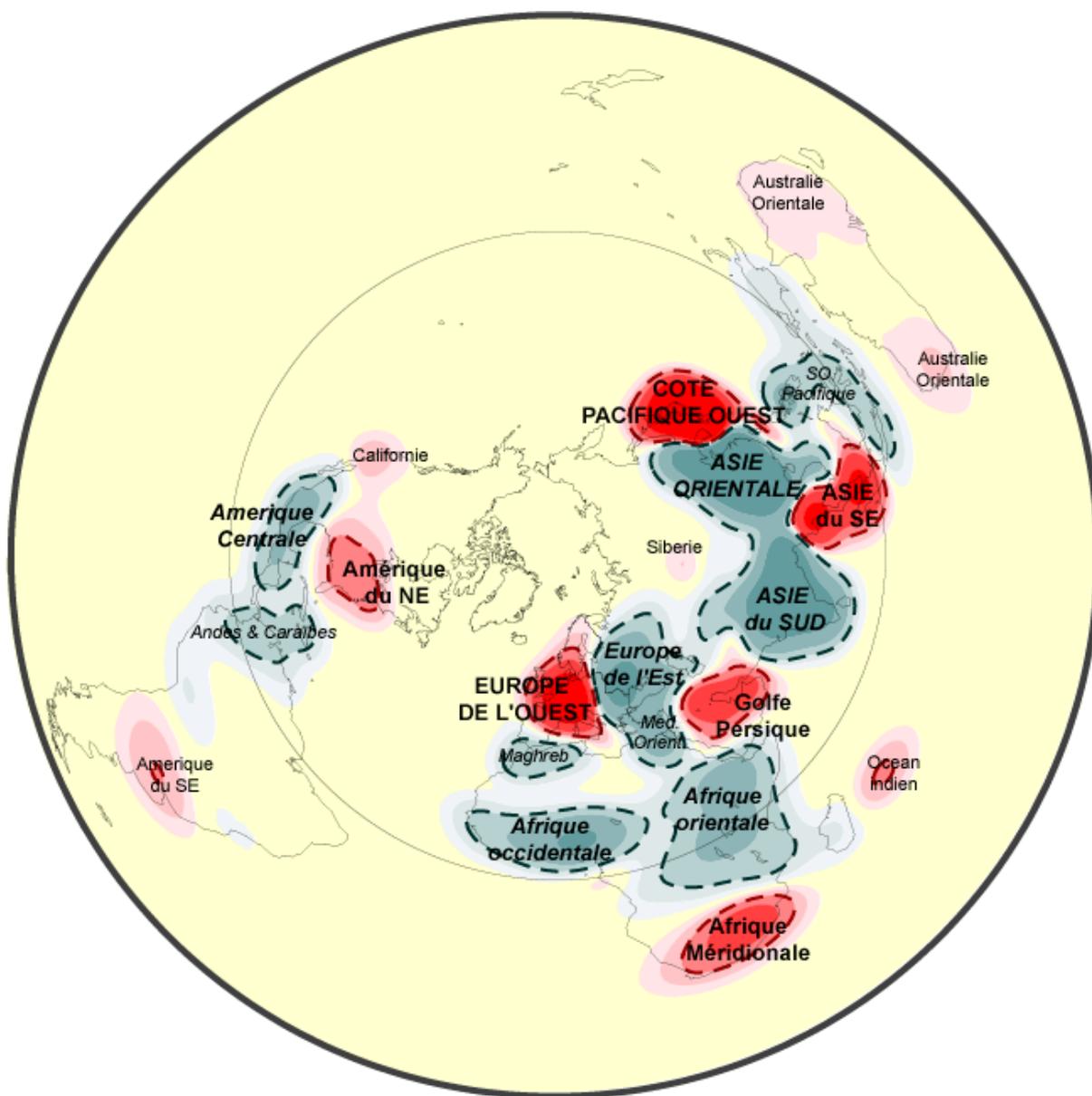
### 11.1.3 Europe in a World without boundaries

This part of the report proposes a set of new representation of the World where the border of states are removed and where the potential effects of spatial proximity can be more easily evaluated. Of course, borders still exists but such maps help to understand the growing importance of transnational flows of migration, investments, ideas, ... Four maps are presented, based on the methodology of gaussian smoothing in a neighbourhood of 1000 km (see. Chapter6.3) .

- *The smoothed distribution of superficiality* reveals clearly that Europe can not be considered as a continent from "geographical" point of view. The delimitation of Europe as a "Continent" can not rely on such a simplistic criteria.
- *The smoothed distribution of population* reveals that Europe can be considered as the 3<sup>rd</sup> concentration of population at world scale (after China and India) but the area of high density connected to Europe involve also part of northern Africa, Middle East and Russia.
- *The smoothed distribution of GDP* confirms that Europe is probably the most important economic pole of the "Triade", but the situation is not very stable and can change quickly according to the level of change with US or the very important growth rate of Eastern Asia.
- *The smoothed distribution of Carbon Dioxide Emissions* is strongly correlated with the distribution of GDP but defines an enlarged area because pollution tends to diffuse from center to peripheries of the world economic poles. It means that an application of Kyoto's protocol limited to richest countries of the world would not be efficient because of simple relocation of pollution in neighbouring countries like Russia or Mediterranean countries (in the case of Europe), China and S.E Asia (in the case of Japan), Mexico and Latin America (in the case of US and Canada).

Those maps should be combined together in order to propose more strategic indexes like the index of economic and demographic polarisation proposed on Map 39 which is derived from the work realised in ESPON 3.1.

**Map 39 Preliminary definition of potential flows of labour force and invest at world scale in 2000**



Source : Grasland C., 2004, Draft version of a paper to be published in 2005

**Comment :** *This map is a preliminary attempt to define potential flows of migration and invests at world scale, using the multiscalar smoothing method discussed and applied to European regions in chapter 6.3 of this report. This maps presents in red (or green) the area which are locally (richer (or poorer) than their neighbourhood and has sufficient population of GDP to be subject to massive flows of migration (from green to red areas) or invest (from red to green areas).*

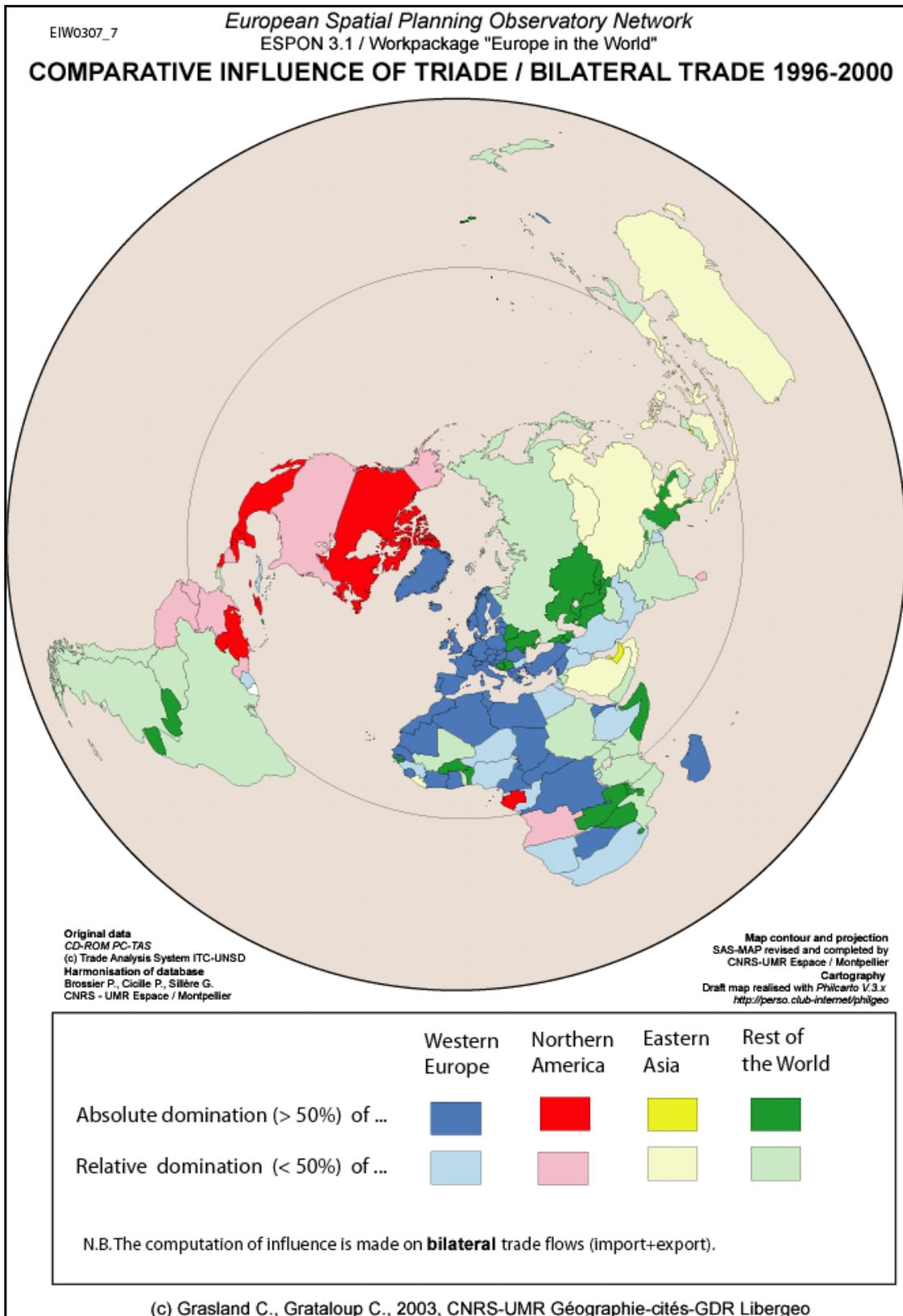
#### **11.1.4 The functional influence of Europe**

This part of the report is an attempt to define the territories of the World which are the most connected to Europe, according to air and trade flows. It is a crucial question for the ESPON program which should extend the statistical coverage of his research to all the territories which are functionally integrated to of Europe, whatever their political situation as candidate or non-candidate to join the EU.

- *The analysis of air flows in 2000* reveals a major influence of Europe on the world air traffic, even when Europe is considered as a whole region and not only as a set of independent states. The aggregation of flows in 17 world regions helps to eliminate the biases related to the division of the world in state (where intra-national traffic of bigger states like US is not taken into account which give a false impression of domination of international traffic by Europe, simply because of the division of Europe by international borders). At this level of analysis, Europe appears as the main destination for all African countries but also Central Asia, Eastern Europe (Russia) and northern America (if we do not consider internal traffic). European influence is lower to the one of NAFTA in central America (Mexico, Venezuela, Colombia, ...) but is higher in southern part of America (Brazil, Argentina, Chile).
- *The analysis of trade flows 1996-2000* reveals a relatively lower influence of Europe, which is more or less equal to the one of its challengers from the Triade (Northern America, Eastern Asia) for this criteria. Nevertheless, we can observe as in previous case a major influence of Europe in a wide part of the world, from Vladivostock (Russia) to Capetown (Southern Africa). The commercial influence of Europe is equal to the one of Northern America in southern part of America. In the case of Persian Gulf, the major influence is for Eastern Asia, because of the growing importations of oils from China and other countries from western pacific coast. It appears also than some parts of the world remains relatively independent from the influence of the Triade like Russia (which has kept an important market with neighbouring countries), southern America or India (Map 40).

Those preliminary results should also be cautiously interpreted and was mainly engaged in order to demonstrate the interest for ESPON to develop the topic "Europe in the World" in the future.

**Map 40 Comparative influence of Europe, Northern America and Eastern Asia according to trade flows at world scale in 1996-2000.**



### **11.1.5 Elaboration of recommendation for further research : ESPON 3.4.1**

The conclusion of the report proposed two priorities for further research to be developed by ESPON on this topic of Europe in the world :

- 1) Identification of the peripheries of Europe through a combination of criteria of homogeneity, flows and accessibility.
- 2) Comparison of the European territory with the other global integration zone of the world.

Those recommendations were followed by the ESPON MC which decided to launch a specific study on the topic "Europe in the World" in 2004 (project ESPON 3.4.1) and considered the study realised by ESPON 3.1 as a milestone for the future research . In this sense, ESPON 3.1 has fully succeeded in the task to "*identify gaps of the ESPON program*" and "*provide guidelines for further research*".

## **11.2 INTERREG III B**

(by Kai Böhme, Nordregio, and Gregory Hamez, UMS RIATE)

### **11.2.1 ESPON results regarding INTERREG**

A number of ESPON projects have addressed INTERREG co-operations. The territorial implications of INTERREG co-operation have been discussed regarding three different aspects. A number of projects focused on the spatial dimension of programme foci, whereas others focused on the spatial co-operation patterns and others on the effects in terms of learning.

#### **11.2.1.1 Spatial foci of programmes:**

Many of the INTERREG III priorities for action address the issues of integrated territorial development and within that context the strengthening of the functional and spatial links between urban and rural areas. With regard to the aim of INTERREG programmes, the issue of rural-urban co-operation and the link to the European Framework Programme (DG Research) have been discussed.

- ESPON 1.1.2 illustrates that the current INTERREG Programme clearly acknowledges the significance of rural development in the European regions and stresses that there is a need for urban-rural and inter-rural co-operation to provide a decent level of services and to solve common problems.
- ESPON 2.1.2 argues that considerations of Framework Programme activities (integrated projects and networks of excellence) should form a central part in the development of new trans-national co-operation programmes. In this context INTERREG programmes could seek to add value to these by supporting knowledge transfer vehicles and facilitating networks of firms.

The territorial impacts of trans-national and cross-border co-operation programmes are analysed by ESPON 2.2.2 with regard to the spatial integration objective.

Cross-border co-operation: The analysis of ESPON 2.2.2 focused on the assessment of cross-border co-operation activities with regard to potentials and bottlenecks addressed and with regard to overall impacts on territorial development. All in all the programmes addressed the main regional bottlenecks resulting from the border situation, namely missing infrastructure links, weak economic structures due to limited market and commuting areas as well as institutional and mental barriers. Small Project Funds turned out to be an efficient instrument to foster socio-cultural integration.

Also European transport networks have effects on border regions as illustrated by the ESPON 2.1.1 project. The biggest number cross-border projects is located in the area of Poland, Czech Republic, Slovakia and Hungary, which account for most of the benefits in the development scenario where only cross-border projects are considered.

Trans-national co-operation: Two macro regions (ARCHIMED and Alpine Space) have been studied by 2.2.2. Common foci of both programmes lie in the field of transport infrastructure improvement, preservation of natural and cultural heritage/environmental protection and tourism development. These priorities address main bottlenecks and potentials of the macro-regions, but budget seems to be too low to reveal significant impacts on trans-national level and not only on smaller regional level. Spatial integration in economic terms was only addressed in the Alpine Space. Both programmes lay on improving institutional conditions. The effects on spatial integration were in both cases limited because of unequal opportunities of participating countries (co-ordination with Phare or Tacis was not sufficient).

#### **11.2.1.2 Spatial co-operation patterns**

The INTERREG programmes studied by ESPON 1.1.1 illustrate the multiple scales involved when trying to assess the degree of poly- or monocentricity of a network: The organisation of cities at national scale influence the spread of partners in each country, while contrasts between Member States can create an imbalance in the number of partners on each side of the border. This is shown by the analysis of programme participation in two INTERREG IIIB regions, NWMA and CADSES. In the NWMA programme, there are interesting differences between France and Belgium on the one hand, where the participants are located in a very limited number of cities, and the UK and the Netherlands on the other, where networks are much denser. Other types of contrasts can be found in the CADSES area, where Austrian participants are concentrated to Vienna while German participants are more widespread. These two countries are the most active, while the other participating countries, namely, Bulgaria, the Czech Republic, Greece Italy, Hungary, Poland, Romania, Slovakia, Slovenia and the nine additional non-ESPON countries have been less active.

Although the ESPON 2.2.3 project addressed INTERREG co-operation patterns, here focusing on the question to what degree these contribute to the creation of cross-border functional regions. The case study is the INTERREG co-operation between Graz and Maribor with the common aim was to strengthen the functional region as a whole, which can be seen as an example of polycentric approach within cross-border co-operation.

These two studies illustrate the fact that size should not be considered as a comprehensive indicator when identifying nodes of polycentric development. Trans-national networks are particularly important for the development of polycentricity if networking is established between 2nd order cities and are thus able contribute to stabilising the position of these cities in the national urban hierarchies. The transnational networking within meso-regions such as e.g. the INTERREG regions, contributes to the development of polycentricity if regional integration and competitiveness results from such co-operation.

### **11.2.1.3 Learning on spatial policy aims**

By their very nature, the Structural Fund programmes promote cross-sectoral approaches to economic development and can indeed be used as a flywheel for other policies. This is also underlined by the ESPON 2.2.1 analysis of INTERREG IIC projects, where a clear peak of learning aspects was on the trans-national dimension of polycentricity and here in particular on transportation issues, followed by questions regarding socio-economic specialisation.

The particular focus of interest is on the learning experiences that such projects may have resulted in, relating specifically to European co-operation and the awareness of spatial dimensions. The basic question informing the research was, to what degree does INTERREG contribute to the awareness of the idea of polycentric development in Europe, as advocated in the European Spatial Development Perspective (ESDP)? Polycentricity is here understood as a function of size, physical links, collaboration and the degree of specialisation of a city region. The possible learning experiences might have come both as a result of the project organisation and co-operation, and as a result of the topic or specific investigations undertaken within the context of the project. Indeed it is often the case that these two aspects are interrelated.

Thus far, the study of ESPON 2.2.1 on INTERREG IIC in the Baltic Sea Region has shown that this Community Initiative has increased participants' awareness and knowledge of polycentricity and has thus clearly functioned as a dissemination instrument for EU policy ideas to regional and local actors.

As regards the content side, the dimensions of polycentric development considered are mainly related to transport issues and co-operation aspects. Increased awareness and knowledge concern in particular the trans-national and regional levels. While it seems natural that there is a focus on the trans-national level, the importance of the regional level is explained through the obstacles of trans-national, interdisciplinary co-operation, which support the strong role of regional sub-groups. A further explanation here is the orientation of the projects towards 'common' and not 'joint' challenges.

In conclusion, the highest potential that INTERREG actually contributes to polycentric development is at regional (micro) level as it was mostly in sub-projects that such learning occurred.

At the trans-national level, the building of a common identity and of trust is a good starting point for future developments towards more polycentricity at that level. The establishment of constant co-operation patterns can actually then be regarded as the first step in the implementation of relational polycentricity.

### **11.2.2 Ideas for further INTERREG activities under the ESPON framework**

Deriving from the findings on INTERREG co-operation a number of possible foci for future ESPON activities in the field of INTERREG can be suggested. The first of which regards the support of INTERREG projects in learning about and applying European spatial policy aims. At the same time, a systematic review of experience and results gained through INTERREG projects may actually facilitate deepening some ESPON results. Finally, a focus for future ESPON research on INTERREG co-operation can be suggested.

#### **11.2.2.1 Dissemination of ESPON results increasing learning in INTERREG**

The study of ESPON 2.2.1 has shown that a considerable number of INTERREG projects are dealing with question related to territorial cohesion and polycentric development, often deepening the understanding of specific aspects of these aims at trans-national and in particular regional level.

These learning effects contribute often to an increased internalisation of European spatial policy aims among local and regional actors and thus in a long term they may also contribute to an application of these aims.

The assessment illustrates also the difficulties INTERREG participants have in operationalising concepts such as polycentric development and in developing genuine trans-national applications. Due to the difficulties of trans-nationality many projects seem finally to focus on the regional level and exchanging experience regarding polycentric development etc. at regional level.

Here, ESPON could provide targeted inputs in ongoing INTERREG debates. Translating ESPON results into information assisting the understanding of polycentricity in trans-national and cross-border situations, on the current state of spatial development and potentials for further co-operation and development, may help a number of INTERREG projects to make use of the ESPON findings for enriching their work.

Furthermore, with view on future INTERREG like programmes, ideas regarding project utilising specific potentials for polycentric development or territorial cohesion in various co-operation areas could be suggest, based on existing ESPON studies. This could be an integrative element of the Interact activities carried out by the ESPON CU, which also would strengthen the dialogue between ESPON and practitioners – i.e. potential users of ESPON results.

#### **11.2.2.2 Utilisation of INTERREG experience for ESPON**

In the same way as INTERREG projects can benefit from utilising ESPON results, also ESPON may benefit from insights gathered in various INTERREG projects. This regards in particular, the questions of

- main conclusions on issues such as morphology, transportation links, socio-economic functional specialisation or co-operation at cross border or trans-national level (possibly involving information on trends, i.e. time series, and flows),
- main policy recommendations deriving from this,
- gaps in terms of research that might be possible to be filled by ESPON studies, and
- innovative approach to either assessing developments or conceptualising policy aims

The analysis for selected INTERREG projects may provide insights in form of possible case studies for ESPON projects, i.e. more detailed insights in how certain spatial development issues are viewed at lower level (e.g. in the field of the conditions for creating functional urban areas and successful networking among actors in related areas). Furthermore, it may facilitate ESPON research in focusing on applied research and identifying fields where more spatial development research is sought after. This could be an integrative element of the Interact activities carried out by the ESPON CU.

#### **11.2.2.3 Further assessments the relevance of INTERREG IIIB zones as regards the flows**

The mission of 3.1 towards INTERREG stayed for a long time unclear because of the overlaps with the burgeoning Interact. But it can be now developed following two strands: summarizing the results of the ESPON projects on INTERREG, and relying on them to propose new ideas for the future of INTERREG. This section deals with the latter.

The INTERREG IIIB transnational areas have been designed as gathering contiguous regions which are supposed to share **similar specificities or concerns**: regions with metropolitan and/or old industry features in North-West Europe, regions with similar mountain traits in the Alpine Space, etc. The idea of partitioning Europe along

similarity lines instead of along national borders is not new. From 1955, so 2 years before the signature of the Treaty of Rome, a pre-configuration of North-West Europe emerged with the so-called CRONWE – Conference of Regions of North West Europe. But one can wonder whether such partitioning is relevant in terms of establishing linkages and partnerships between various actors across the borders, which is the principle of INTERREG cooperation. We aim at showing that the design of transnational areas should not be limited to these apparent similarities, but should include the dimension of flows.

Recent research on cross-border, transnational and global flows of population encourage to take into account **not only the morphological features but also the functional ones**. In other terms, besides the similarity patterns one must not ignore the networking side: flows between cities and between regions.

- From a theoretical point of view, Manuel Castells provides inputs grounding this idea while emphasising the significance of the space of flows in front of the space of places. His rationale especially deals with the development of the information society, together with trends like globalisation, increasing mobility of population...
- From an empirical point of view, several pieces of research undertaken on the changing nature of national borders show the increasing relationships across the border at the transnational scale.

These pieces of research can be found in the ESPON framework. The project 1.1.1 / Polycentrism provides some inputs while analysing the inter-urban linkages at various scales: European scale (urban networking through air traffic and university cooperation), transnational scale (INTERREG IIC networks of cooperation in North West Europe and in CADSES) and local scale (cross border cooperation under INTERREG IIA)<sup>1</sup>. The different examples display the image of an increasing integration of urban networks in Europe, which advocates in favour of more systematically taking into account the relational side.

Similar results are displayed in other pieces of research. In a PhD dissertation defended in June 2004 on the mutations of the border between France and Belgium, G. Hamez shows that the fluidity across the border is not the same according to the geographical scale of analysis<sup>2</sup>. **The border is more open at a transnational scale, while there is no major change at a local cross border scale**. This result is significant in the context of transnational partitioning, as it

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<sup>1</sup> Cf. part 6 of ESPON 1.1.1 Final report, p.163-178

<sup>2</sup> Hamez, G., 2004, Border change, from a cross border to a transnational perspective : geographical approach. The example of the boundary between France and Belgium (Du transfrontalier au transnational: Approche géographique. L'exemple de la frontière franco-belge). PhD dissertation, Geography, University Paris 1

emphasizes that Europeans have a practice of "transnationalism" by their flows and contacts. In other words there would be a spontaneous europeanisation of the territory.

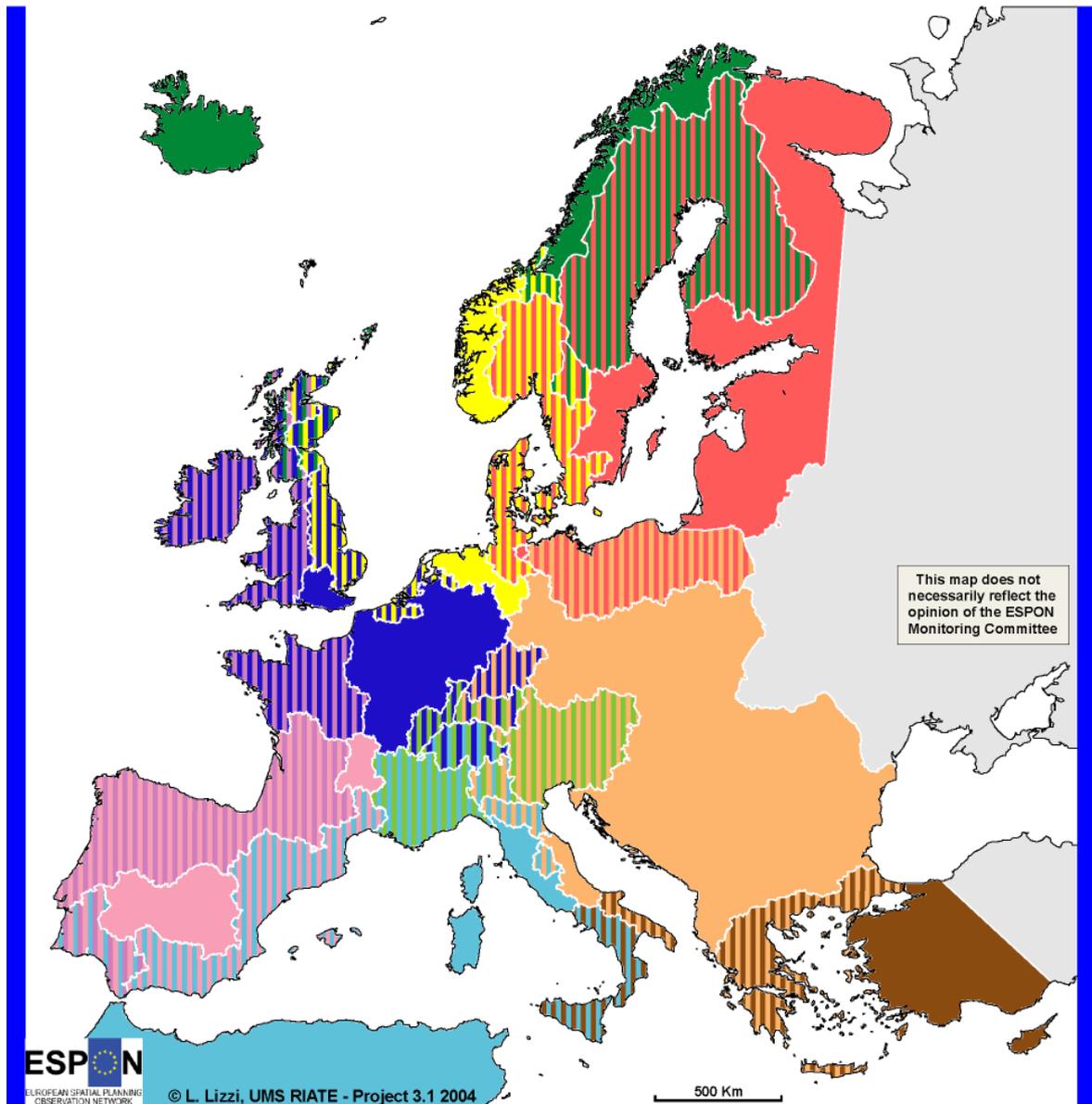
Such a result is demonstrated among others by an unusual though rich indicator: mixed marriages between Belgians and French. The weight of these marriages has been increasing for the last 30 years in France and in Belgium, above all in the regions located far away from the border. In other words, the contacts between French and Belgians stay constant close to the border, but grow at a distance.

The situation is rather complex close to the border, as the situation is different whether there is linguistic continuity across the border or not. Between France and the Walloon Region the same language is spoken on both sides of the border (French), and the mixed marriages stay constant, at a high level. On the contrary, between France and the Flemish Region it is not the case (French on the one side, Dutch on the other), and the mixed marriages decrease.

Besides, the growing significance of inter-European mixed marriages does not concern only the French-Belgian case: the same process, occurring far from the borders, has been found as regards marriages between Germans and French and between British and French in France. This means that these Europeans have more opportunities to be in touch than 30 years ago, even far away from the border. Several trends can explain this process, like the increasing mobility, tourism, studies in another country... Of course the national borders remain lines of discontinuity concerning the marriages, and the majority of marriages gather two people from the same nationality. But the growing importance of inter-European marriages is an indirect and interesting output of the "openness" of the borders...

These different elements are incomplete, and it would be necessary to study other indicators of intra-European mobility. Nevertheless, as these relations across regions and cities look significant, the design of INTERREG IIIB transnational areas should take them into account and not be restricted only to the contiguity and morphological constraints.

**Map 41 INTERREG 3B zones – programming areas in 2000**



- |   |               |   |                       |
|---|---------------|---|-----------------------|
|  | Alpine Space  |  | North Sea             |
|  | Archimed      |  | North West Europe     |
|  | Atlantic Area |  | Northern Periphery    |
|  | Baltic Sea    |  | South West Europe     |
|  | CADSES        |  | Western Mediterranean |

© EuroGeographics Association for the administrative boundaries

Origin of data : EU15 and CC's, Eurostat Regio  
Norway and Switzerland: National  
Statistical Offices

**Source: InfoRegio**

## **Manuals and handbooks**

- **ESPON Glossary**
- **ESPON Bibliography**
- **Annex CD-ROM  
(including manuals)**
- **Annex Performance  
Indicators**



## **12 Manuals and handbooks**

During the project lifetime different manuals and handbooks were produced concerning the tools developed. These mainly regard to technical development like the "Web based GIS" of the "ESPON Hyperatlas". The titles of the manuals and handbooks are listed below.

- Web based GIS  
(Pangiotis Getimis and Dionissios Kalivas, UEHR)
  
- Hyperatlas  
(Hélène Mathian, UMR 8504 géographie-cités)
  
- ESPON data base  
(by Ingo Heidbrink, BBR)
  
- Territorial Impact Analysis (TIA) and its implementation  
(by Friedrich Schindegger, Gabi Tatzberger (ÖIR))

Please see the annex for the full versions of the manuals and handbooks.



**ESPON Glossary**



## **13 ESPON Glossary**

(by Philippe de Boe, PhD consultant)

The intention is to show how is the status quo regarding terms which are used within the ESPON Programme and the corresponding different definitions by the TPGs. By giving some examples it should be illustrated that ongoing TPGs can make use of the existing definitions, which will facilitate their work. On the other hand this chapter will point out how important is the further work on common definitions. Sure that for some terms, because of the diversity of thematic fields in ESPON Programme that is not easy and it must be seen as a process towards definitions.

Please see CD-ROM -> 'Glossary'.



## Bibliography



## **14 Bibliography**

(by Philippe de Boe, PhdB consultant)

The ESPON Bibliography gives an overview about the literature, web-pages, etc. used by the ESPON TPGs. This compilation should serve also as a an aid for ongoing and future TPGs.

Please see paper annex or CD-ROM -> 'Bibliography'.



## **Annex CD-ROM**



## **Annex – CD-ROM**

The CD-ROM attached to the paper version includes:

- Internet based Policy Support System (link)
- Web based GIS (link)  
(including manual)
- Hyperatlas  
(including manual)
- ESPON data base  
(including manual)
- ESPON Glossary
- ESPON Bibliography



## **Annex Performance Indicators**



## Annex – Indication of Performance Indicators achieved

**Table 73: Number of Performance Indicators achieved**

Number of spatial indicators developed: In total Covering The EU territory More than the EU territory	89
Number of spatial indicators applied: In total Covering The EU territory More than the EU territory	49
Number of synoptic cross thematic and synthetic spatial indicators based on ESPON results developed: In total Covering The EU territory More than the EU territory	24
Number of spatial typologies introduced: In total Covering The EU territory More than the EU territory	13
Number of spatial typologies tested: In total Covering The EU territory More than the EU territory	14
Number of synthetic spatial indicators based on which can be combined with the ESPON Hyperatlas: In total Covering The EU territory More than the EU territory	33
Number of spatial concepts defined (glossary of spatial concepts)	53
Number of maps produced	89
Number of ESDP policy options adressed in that field	15