ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

Bundesamt
für Bauwesen
und
Raumordnung

ESPON Project 2.4.2

Integrated analysis of transnational and national territories based on ESPON results

First Interim Report

December 2004

Co-financed by the European Community through the INTERREG III ESPON

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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

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

This basic report exists only in an electronic version.

Bundesamt für Bauwesen und Raumordnung
Bonn, Germany
December 2004

Foreword

This is the first interim report of ESPON Project 2.4.2 "Integrated Analysis of transnational and national territories based on ESPON results". The project started officially on October 14, 2004

Reference points of the tasks of the project are the following:

- general expectations
  - the Commission and the Member States expect a diagnosis of principal territorial trends at EU scale and
  - an identification of difficulties and potentials within the EU territory.
- resulting aims for the project group
  - an integrated and structured analysis of the results of the ongoing and finalised ESPON project results, 'zooming' in on different territorial contexts (entail their specific weaknesses and opportunities) and scales, in order to identify existing spatial patterns and territorial specificities and complementarities

Therefore the project 2.4.2 holds an important position in deepening and integrating results of already existing projects and to relate them to different European territories using the 'three scale approach' defined by the ESPON Programme 2006.

The project team is composed of ten institutions. The institutes are listed below in alphabetic order.

The present First Interim Report of the ESPON Project 2.4.2 is a team effort of all project partners under the leadership of the BBR.[1]

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IIDL - Instituto Interuniversitario de Desarrollo Local
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IRS - Institute for Regional Development and Structural Planning
(Germany)

NIBR - Norwegian Institute for Urban and Regional Research
(Norway)

ÖIR - Österreichisches Institut für Raumordnung
(Austria)

[1] Alphabetic order by names or titles of the institutes or comapnies

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

UPI -Urban Planning Institute of the Republic of Slovenia
(Slovenia)

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.

Table of Contents

Figures

Maps

Tables

Annex

1 Executive Summary

The following chapters of this report represent the first interim report of ESPON project 2.4.2 dealing with an integrated analysis of transnational and national territories based on ESPON results. Main activities during this first project phase contained the deepening and operationalisation of methodological approaches for future analysis on European, transnational and national level as well as a first inventory of data and indicators applied in ESPON projects so far.

Also in the course of the first project meeting, which was held with the participation of all partners of this project in November 2004, these issues were in the centre of discussion. Based on these discussions the report is structured correspondingly to the work packages of ESPON project 2.4.2. For each work package the methodological approach and envisaged outcome is elaborated. Chapter 2 gives a short overview on the work packages and the programme management.

Chapter 3 starts with first results of analysis related to setting the framework for the project and to the review of ESPON data and indicators. The results of this data and indicator review is documented in a comprehensive table which is added to this report as an annex.

The following chapter 4 provides methodological discussions and first drafts of the regional situation analysis of the ESPON space. The situation analysis will provide the main quantitative basis for deepened research on European (macro), transnational (meso) and national (micro) level. ESPON project 2.4.2 further elaborates the Regional Classification of Europe (RCE) as developed by ESPON project 3.1 and discusses alternative approaches for a regional classification.

The methodological approach for analysis on all three levels is discussed in the following chapters 5 (European level), 6 (transnational level) and 7 (national level). Chapter 5 focuses on the analysis on the European level which is related to thematic and territorial aspects of the EU structural funds reform. A methodology for analysis of spatial patterns on macro level is developed which e.g. takes into account scenario calculations for future eligible areas according to current eligibility criteria, but also alternative approaches and criteria for assessing regions under light of different spatial objectives, e.g. cohesion, regional competitiveness and employment, are considered.

Chapter 6 highlights the application of quantitative analysis to the meso level. Quantitative methods of relevance for the identification of transnational spatial patterns are in particular discriminant analysis as well

as factor analysis. While the first one identifies homogeneous regions within Europe, the second type of analysis results in further characterisations of the identified transnational areas. First draft results of these analyses as well as the discussion of further working steps are provided in this chapter.

Chapter 7 outlines a twofold methodological approach for analysis on micro level. Firstly the approach for a general quantitative analysis on micro level is described and secondly the methodology for in-depth pilot case studies on national level is developed. Moreover chapter 7 discusses the selection of pilot country studies which has been decided upon the first project meeting.

Chapter 8 resumes the so far achieved results within the ESPON 2.4.2 Project. An outlook is given with regard to the expected further work steps and results, including the time schedule until the next interim report.

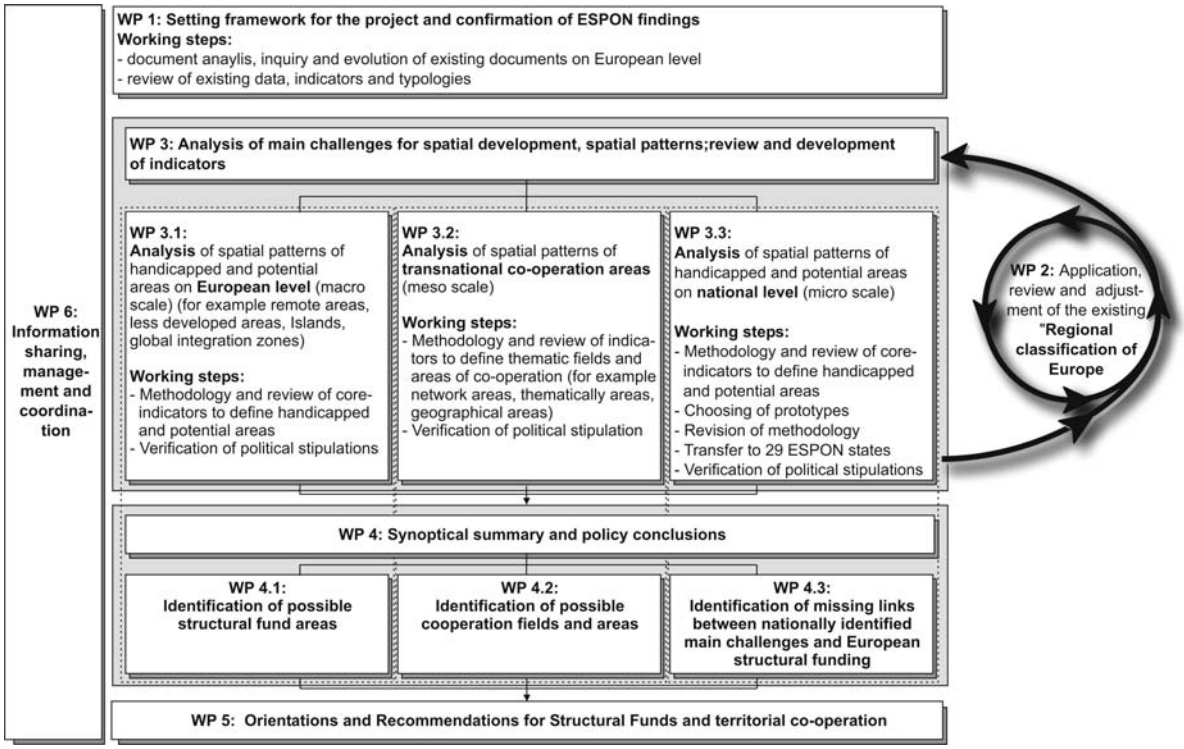
These contents are also in agreement with the issues mentioned in the terms of reference to be covered in the first interim report.

2 Project management and integration

2.1 Project management and co-ordination

The first project meeting of ESPON project 2.4.2 deepened the trustful and cooperative atmosphere within the TPG. Beside content related division of responsibilities between partners issues related to the projects organisation, contracting and financial reporting have been clarified in order to facilitate a smooth and successful running of the project from the beginning.

Figure 1 Work flow – work packages



Due to the relative short time period of ESPON project 2.4.2 the TPG faces a tight time schedule, which requires strong project management and co-ordination. Research and analysis in the context of work package 1, 2 and 3 (cut into 3.1, 3.2, 3.3) will run parallel to each other, so that a close communication, clear division of responsibilities and tasks will be needed. For several working steps this will be organised by elaboration of templates and guidelines by the work package responsible (BBR/IRS). These will serve as common basis of analysis conducted by all partners (e.g. template for inventory of ESPON indicators, guideline for pilot studies). Results of the specific analysis will be integrated in work package reports which will serve as preparation for the Interim Reports.

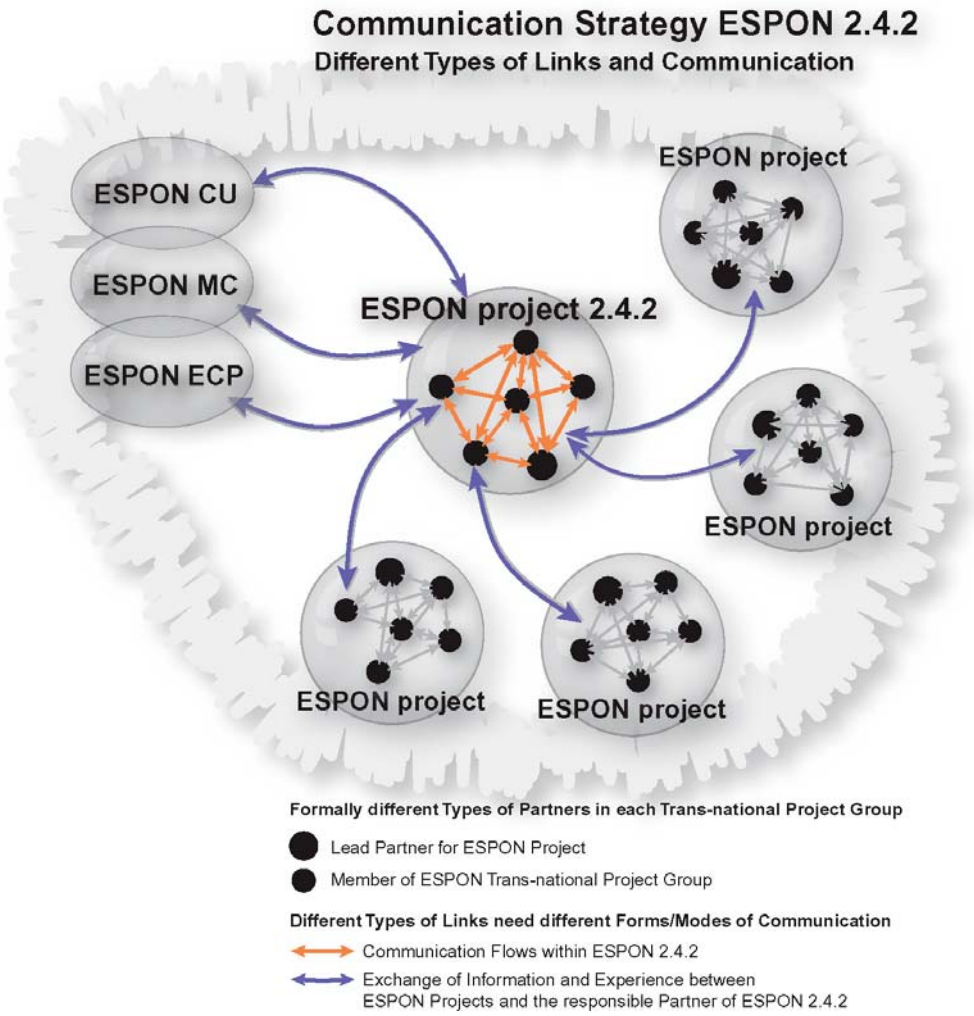
2.2 Integration in the ESPON network

In order to reach the determined objectives of deepening and integrating results of already existing ESPON projects close contacts with other relevant ESPON projects are of great importance for ESPON project 2.4.2.

Therefore, the project will build on a strong co-operation with other ESPON projects and their results, especially with project 3.1 whose results will be considered as the starting point of the planned integrated analysis and research. In addition, a close relationship to the cross-thematic ESPON projects 3.2 "Spatial scenarios" and 3.3 "Territorial Dimension of the Lisbon/Gothenburg Process" will be ensured both to avoid possible overlaps and to integrate available results of these projects as far as possible. However, also results of further first strand projects dealing with territorial development potentials and spatial effects (such as 1.1.2, 1.1.4, 1.2.1, 1.2.2, 1.3.1 or 1.3.2) will play an important role as they provide a basis for the understanding of the existing diversity of spatial patterns of the EU 27 territory and neighbouring countries. Perceptions of other strand-2 projects addressing the territorial impacts of sector policies (2.1.1, 2.1.2, 2.1.3 and in particular 2.2.2) as well as the effects of the ESDP in Member States (2.3.1) and governance of territorial and urban policies from the EU to the local level (2.3.2) will be taken into account in order to achieve the best possible synergy between the various ESPON findings. Since many of the ESPON projects have been finished until now the final reports and previous reports will serve as main basis for analysis of ESPON project 2.4.2. Moreover several institutional links exist between the TPG of ESPON project 2.4.2 and other ESPON TPGs that can be used for further communication. In order to secure complete coverage and competent analysis of ESPON results responsibilities for ESPON projects have been divided between ESPON 2.4.2 partners taking into account existing links and experiences within ESPON.

Beside contacts to other ESPON projects, ESPON project 2.4.2 is prepared to discuss and exchange information with the different entities of the ESPON programme, like the MC, the CU and the ECPs.

Figure 2 Communication strategy ESPON project 2.4.2



3 Setting framework for the project and inventory of ESPON data and indicators

3.1 Framework and philosophy of the project

With the process of European integration and with the enlargement of the European Union, the enriched regional puzzle of Europe underlies changes and reorientation within the spatial pattern both related to new potentials and challenges. Key elements seen as important in the context of social cohesion expressed by convergence, competitiveness as well as territorial cohesion, newly introduced in the Third Report on Economic and Social Cohesion, need to be clarified and readjusted according to the new situations.

Within the ESPON transnational project groups a wide variety of results indicate thematically orientated spatial structures and trends and sectoral policy-determined spatial impacts. All these results have to be seen against the spatial conceptual framework laid down in the European Spatial Development Perspective and the 3rd Cohesion Report. These documents state the objectives of deepening the path to a more balanced and polycentric territorial development of the European territory and targeting at an intervention related to the objectives of convergence, regional competitiveness and employment and territorial co-operation in the new architecture for the EU cohesion after 2006. Against this background one further step is apparent: the need of a more adjusted synoptic analysis of the ESPON results

The analysis in this respect should target at an elaboration of the situation in terms of challenges for the objectives of convergence, regional competitiveness and employment as well as European territorial cooperation indicated in the proposal of a Structural Funds regulation after 2006. Therefore specific territorial characteristics or problem related features need to be identified and their dimension on different territorial levels need to be analysed. An analysis of spatial patterns and challenges for spatial development will take into account those categories of specific territorial features that have already been defined within Structural Funds regulations, e.g.:

- urban problem areas,
- rural areas and areas dependent on fisheries,
- areas with natural handicaps (islands, mountain areas),
- outermost regions or
- certain border areas.

These defined areas will be checked against definitions developed within the context of further European documents (e.g. spatial visions of transnational macro-regions, Kok report on Lisbon Strategy) or within other ESPON projects and their characteristics will be further investigated on the basis of ESPON results.

The project aims at analysing different territorial contexts in order to satisfy the different spatial demands of the spatial objectives - convergence mainly orientated to a European scale, transnational spaces by their definition on transnational level and competitiveness and employment in the Structural Funds orientation on national level. In a kind of policy context-shifted adjustment of the ESPON 'three level approach'[1] the project result will focus on the European scale (macro scale), the diversity of transnational spatial contexts (meso scale) and the national territories (micro scale). The project holds an important position in deepening and integrating results of already existing ESPON projects and relates them to different European territories on different spatial levels.

The above-mentioned spatial analysis is expected to contribute to the enhancement of the enlarged European territorial opportunities and development potentials as well as to the provision of a harmonious and balanced European territory. Moreover, the project will draw general conclusions and suggest policy recommendations for the promotion of the European policies. These should be related especially to territorial cohesion, balance and polycentrism as well as competitiveness, innovation – knowledge economy, environment and risk prevention, accessibility and services of general economic interest in the framework of the ESDP objectives as well as the Third Cohesion Report recommendations. Finally, the project will suggest recommendations in the perspective of the future framework of the Structural Funds on differentiated development priorities/strategies in each of the transnational territories.

[1] The tree level approach has been introduced in ESPON with the Crete Guidance Paper of 3.1.

3.2 Methodology of ESPON report analysis

One main step for laying the foundation for further analysis within ESPON project 2.4.2 is to provide a survey of existing statistical resources and indicators defined by ESPON projects. These indicators provided by ESPON projects will form the main basis of quantitative analysis within ESPON project 2.4.2 since there is hardly any scope to collect additional data within the project. A preliminary inventory of data and indicators thus allows the identification of *existing possibilities* for defining handicapped and potential areas on every scale of the ESPON approach. Moreover the inventory emphasises to what extend integrated territorial analyses based on ESPON results are feasible and where gaps would have to be filled in.

In order to provide such a survey of all indicators used within ESPON projects ESPON project 2.4.2 developed a template ('grille de lecture') which has been completed on a project by project basis. Each project has been reviewed with regard to data and indicators used or developed. The respective information has been qualified by indicating the spatial coverage of data, the time or time period covered, a general assessment of the data quality scoring from 5 (excellent) to 1 (bad) and additional remarks related to the quality of data. Beside existing indicators also missing indicators or data requirements identified by ESPON projects have been reviewed. To grasp the spatial level which is addressed by the indicators it was asked to categorise the indicators according to micro, meso and macro level.

The following finalised and ongoing ESPON projects have been reviewed:

Table 1 Reports reviewed by project partner

ID-number of ESPON project	Responsible project partner	Report reviewed
1.1.1	BIC Lazio	Final Report
1.1.2	ÖIR	Final Report
1.1.3	ÖIR	3rd Interim Report
1.1.4	NIBR	3rd Interim Report
1.2.1	UEHR	Final Report
1.2.2	UPIRS	Final Report
1.3.1	EUROREG	2nd and 3rd IR
1.3.2	UEHR	Final Report
2.1.1	BBR	Final Report

2.1.2	IRS	Final Report
2.1.3	NIBR	Final Report
2.1.4	BBR	3rd Interim Report
2.2.1	IRS	3rd Interim Report
2.2.2	IRS	3rd Interim Report
2.2.3	EUROREG	Final Report
3.1	BBR	Final Report

3.3 Results from inventory of ESPON indicators

Nearly 500 indicators have been listed in total for all ESPON projects (see list of indicators in the Annex). As expected most indicators have been assigned to the micro level, since in general data is available on NUTS 2 or NUTS 3 level. These indicators can serve for analysis on all three spatial levels. The other way round there are only a few indicators specifically related to the meso level and only those indicators available on NUTS 0 level have been specifically assigned to the macro level.

The information given in the templates could not be completed for all projects, since in some cases problems occurred e.g. in relation to assessment of the data quality or identification of the spatial and temporal coverage.

Roughly 80 indicators belong to those indicators marked as core indicators by the respective TPGs. Comparing the core indicators extracted from the ESPON reports with the list of core indicators originally proposed (last up-date June 2003) it becomes obvious that not all indicators originally proposed have been used and some projects used different core indicators than those originally proposed. Some of the general socio-economic core indicators, e.g. indicators on population, GDP or area have been used by several TPGs in different contexts and in relation to specific own indicators.

Due to the large number of indicators from some of the ESPON projects ESPON project 2.4.2 started to categorise the indicators into indicator groups either belonging under one "heading" or subsuming one main indicator and further indicators which have been calculated on basis of the main indicator. Even this rather simple categorisation proofed difficult in some cases, since it is not in all cases apparent on which basis indicators have been calculated or to what kind of group they could be subsumed. This would require deeper content related knowledge of the respective ESPON reports.

The quality of indicators varies strongly. Most indicators have been assessed as being of middle quality (score 4-2), while only a few have been assessed as being of high quality (score 5) or low quality (score 1). The quality of indicators can be further characterised by indicating the spatial and temporal coverage. By far not all indicators cover the whole ESPON territory of EU25+2+2, but many indicators are related either only to EU 15 or only to New Member States and Candidate Countries or show in general considerable gaps. Similar weaknesses apply to the temporal coverage: only for very few indicators complete time series have been used and in many cases the latest year used / available is 1999 or 2000.

3.4 Discussion of further working steps

Following the first overview on ESPON indicators further analysis is required to assess the usefulness of existing indicators for analysis within ESPON project 2.4.2. This is firstly related to a categorisation of indicators according to quality and completeness of spatial and temporal coverage. Secondly a categorisation according to topics is needed in order to establish a concise overview on indicators. Thirdly the inventory of indicators needs to be checked against the ESPON database in order to get information on the direct availability of indicators. On basis of this examination ESPON project 2.4.2 will develop an overview on which indicators can be used for which kind of analysis.

In addition an expanded inventory of information provided by ESPON projects will be needed in order to establish some kind of reference to "where to find what" within ESPON. This second inventory will focus on additional qualitative information like e.g. regional typologies developed / used, regional or national case studies conducted, information given on one specific type of region (e.g. global integration zones, mountain areas) or the extent to which issues of transnational development and cooperation have been included.

Beside further inventory of ESPON results a review of key documents and literature will be conducted in order to identify on the one side existing definitions of challenges to spatial development and of handicapped areas and on the other side already existing strategies and guidelines concerning the framework of Structural Funds, the challenge of social, economic and particularly territorial cohesion as well as the potentials of cross-border and transnational co-operation. In order to deliver comparable results of the document analysis a template will be developed that filters specific information given in the respective document, e.g. spatial objectives defined, territorial dimension or type of area specifically related to the stated

spatial objectives, specific topics related to the respective spatial objective, instruments and strategies developed, characteristic of institutional structures / delivery systems.

Table 2 Draft list of main documents that will be analysed

Title	***Year of publication***	***Publisher***
Spatial Visions of transnational macro regions		
Council Regulation laying down general provision on the ERDF, ESF and Cohesion Fund	2004	Proposal by the European Commission
Lisbon/Gothenburg Strategy	2000	
Kok report on Lisbon/Gothenburg Strategy	2004	European Commission
European Spatial Development Perspective ESDP	1999	European Commission
Third report on economic and social cohesion	2004	European Commission
Exploiting Europe's territorial diversity for sustainable economic growth (discussion paper for the EU informal minister meeting on territorial cohesion, Rotterdam Nov. 29, 2004)		

4 Regional situation analysis of ESPON Space

4.1 Objective of the regional situation analysis

The analysis of the situation of regions in relation to the "Convergence" and the "Regional competitiveness and employment" as well as to cooperation area in terms of its strengths and weaknesses is to be seen as a red thread through almost all documents related to spatial cohesion and the structural funds regulations. The analysis of development disparities, weaknesses and potentials, in particular related to the expected changes in the European and world economies and the strategies adopted to deal with them are seen as fundamental input in operational programmes.

The "integrated analysis of transnational and national territories based on ESPON results" must bring together existing ESPON results and policy related key themes to elaborate structural homogeneous areas as well as coherent spatial clusters.

Methods and approaches for statistical regional analysis

The most basic and transparent way to describe spatial patterns and regional situations can be done by just using one single indicator and its regional distribution as the key descriptor. Despite (or because?) its simplicity this method is of extremely high importance when it comes to policy application and formulation. The most prominent example for this approach is the delimitation of areas eligible for the structural funds objective 1. As well known, one indicator, the gross domestic product, and one threshold value, 75% below the EU average, is all you need to define "lagging regions" in this specific policy context.

A more sophisticated variant would be the combination of different indicators (bi- or multivariate) using diverse normalisation procedures, from national average up to purely statistical standardisation means. This method is comparable to the procedure to delineate the regions eligible in objective 2. Related to a synoptic analysis of existing ESPON results (typologies, classifications), new and further combinations of ESPON indicators, especially of the core-indicators could be envisaged in this respect.

With an additive grouping of indicators the analysis approach gains complexity. Different methods can be used to thematically overlay and cumulate indicators. One approach, applies in the RCE and described in more detail later, could be to additively link indicators (which may be classified by pre-defined threshold values) to complex indexes of regional situations. In this process the degree of transparency decreases parallel to

rising demands of additional information to understand or reconstruct the regional situations.

The next level of complexity builds on multivariate statistical analysis based on linear models. These models analyse the relations between indicators with correlation and regression analysis and condense the statistical information through factor and cluster analysis, for example.

The elaboration of the regional situation of Europe targeting on the delimitation of homogeneous spatial pattern with synoptic regional analysis of regional structures and trends of ESPON project result must according to this cover different aspect with different analytical tools.

GIS based methods of cartographic presentation of results

Beyond statistical analysis a GIS based combination of ESPON result will be considered for analytical support.

The different kinds of data and the different kinds of synoptic analysis ask for complex demands on map making beyond but also including choropleth and symbol mapping.

On the one hand side, regional specific analyses will be provided based on NUTS classifications, on the other hand the cartographic presentation of the elaborated spatial pattern and structures should support further discussion and the political debate in the regional determination. This problem becomes apparent, as transnational regions are one of the territorial focuses in this project.

The cartographic spatial articulation has to be developed in between of a sharply bounded regional mapping and a graphic interpretation of space. This could be done in form of cartographic sketch maps (cartes croquis) within a visual aggregation of individual spatial structures. This can also be done in a GIS-based intersection of beforehand volume-preserved interpolated smoothed surfaces from polygon-related data.

Furthermore, especially for the visualisation of spatial and regional relations and transnational spaces the regional presentations have to be abandoned in the mapping process. For instance, spatial dimensions of different thematic orientations, with regard to their objectives of improving or changing spatial structures, but also including their governance structures and processes, can not be broken down at this stage to specific territorial places, since they only apply to different degrees to the different areas of a given territory.

For this purpose, maps will have to be developed, which combine infographic illustrations with traditional mapping symbols, in order to include the spatial

character of regions, even if they are not precisely depicted. In the frame of the Study Programme in European Spatial Planning a working group has elaborated these questions of mapping, which will be elaborated for further in ESPON project 2.4.2.

4.2 The transparent indicator based approach of regional situation analysis

4.2.1 Basic idea of regional situation analysis

A first and basic step in multivariate and cross-sectoral analysis of regional situations and performances has been made starting from original indicators. This approach offers the advantage of full transparency of the applied methodological steps and of full comprehensibility of results also for non-specialists in mathematical-statistical modelling. In contrast to this, multivariate statistical models (like factor analysis, cluster analysis etc.) try to condense and reconstruct a large part of the information embedded in the original indicators by a smaller number of "artificially produced" variables (factors) or by regrouping the cases (regions) in similar types and classes (cluster). Multivariate statistical models will be dealt with in more detail in the next chapter (4.3).

The ESPON projects have focussed on a broad range of spatially relevant trends and policies and have analysed the patterns of regional incidences and impacts that these trends and policies show. Regional situation analysis has a somehow inverse approach. It starts from territories (regions, national or trans-national territories) analysing the combined characteristics of trends and policies that together form the specific regional setting of problems and potentials, weaknesses and strengths.

With the help of a regional situation analysis 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.

4.2.2 A basic set of indicators for regional situation analysis

A first attempt of a regional situation analysis has been made at the end of the ESPON 3.1 project. Starting from the ESPON data base and the core indicator list a special sub-data base was created providing the basic set of

indicators for the regional situation analysis. Taking into account data availability seven thematic fields of spatial development have been identified forming the core fields of further regional situation analysis: economy, labour market, demography, environment, hazards, accessibility and spatial structure. These seven fields are characterised through a total of 38 indicators which have been made available at NUTS 2 level (see fig.3).

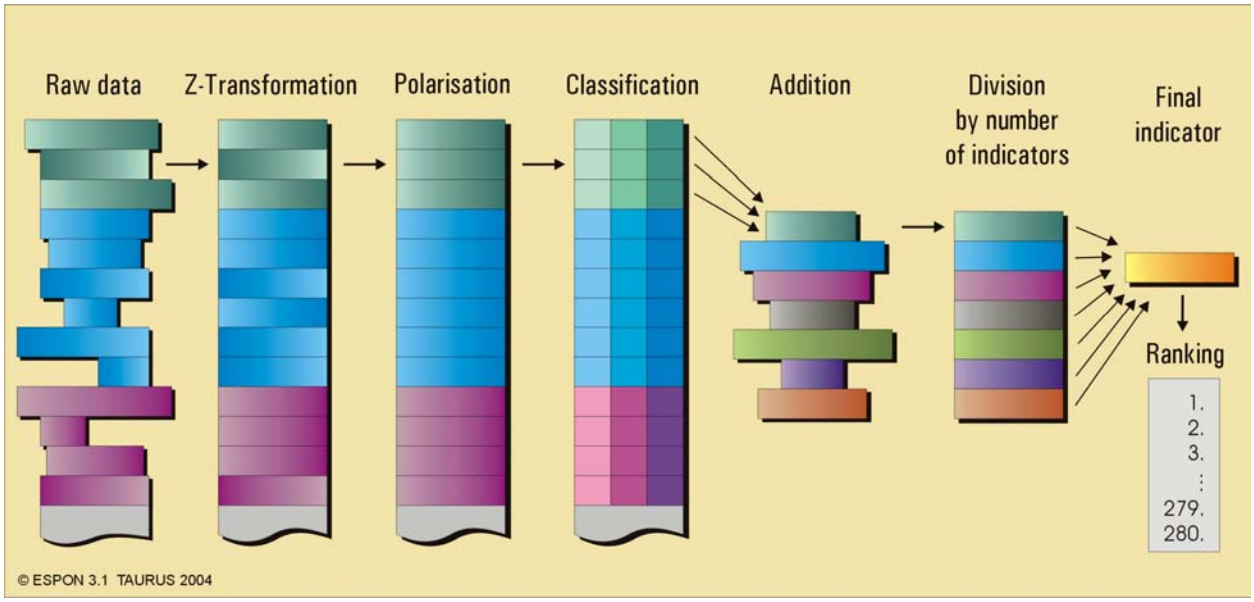
Figure 3 The indicator base for regional situation analysis

Theme and indicators	Description	Polarity
Economy		
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	-
Labour market		
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 km²	+
Internet users	Share of all inhabitants	+
Demography		
Population density	Number of persons per km²	+
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 %	+
Environment		
Artificial surface	Share of total area (Corine)	-
Natural surface	Share of total area (Corine)	+
Agriculture intensity	Output/input ratio	-
Hazards		
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)	-
Accessibility		
Potential accessibility	By road	+
Potential accessibility	By rail	+
Potential accessibility	By air	+
Potential accessibility	Multimodal	+
Spatial structure		
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	+

4.2.3 Working with standardised and polarised indicators

In order to make the 38 indicators comparable each of them has been transformed via z-transformation. All z-transformed distributions have two features in common: their mean is exactly 0 and their standard deviation is 1. Thus a region showing a value of 0 in a z-transformed variable has, related to the original indicator, a value which equals the arithmetic mean of this indicator over all European regions. A region with a z-value of -1 is 1 standard deviation below the European average.

Figure 4 From raw data to ESPON ranking



In a second step the (z-transformed) indicators have been polarised. For this step we have assumed that either a negative deviation from the average shows some "problematic" situation (like low GDP, negative population development etc.) or an above average value does (like high unemployment rate, high risk of natural hazards etc.), and vice versa. After polarisation, all positive values show positive situations, all negative values negative situations.

In a third step the z-transformed and polarised indicators have been transformed into classes. The original idea had been to identify thresholds for these classes on the basis of experts' knowledge, political agreement and/or scientific project results. For instance, in structural funds lagging regions are usually defined as having a GDP/capita value below 75% of EU average. Would it be possible, in a discourse between experts from science and public administrations, to set, in a similar way, thresholds (or classified values) for, e.g., depopulating regions, economically stagnating regions, or regions under specific natural risks or hazards etc.? In our first attempt,

trying to involve the other ESPON-TPGs in this process, this idea has shown as not (or not yet) being possible. Therefore, and as a substitute for this method, we have chosen a purely formal, statistical procedure to define thresholds for problematic (or positive) regional situations. According to this procedure, all regions showing values below -½ standard deviation are classified as indicating some "problem" in this field of research, all regions showing values above +½ standard deviation are regarded as showing a good performance or situation as compared to other European regions.

4.2.4 A regional problem analysis

Once the original indicators have been standardised, polarised and classified, several steps to condense this information are possible. Two possibilities are demonstrated in this chapter and the following one.

A basic and transparent approach to condense the information of the 38 indicators without loosing the contact to the original information is to analyse the cumulation of "problems" as indicated by the classified indicators. A simple way to do this is just counting the number of problems that occur in each specific region and adding them up, separately for each of the seven themes. An example is shown in the following pages.

Map 1/2 shows the weak regions according to the seven single indicators of the first theme, economy. The first map in the map 3/4 compilation shows the summary of the seven economy indicators, simply summing up the single problem indicators. The following maps show the respective summary results for the other themes: labour market, demography, environment, hazards, accessibility, and spatial structure. The very last map of this series shows the overall sum of indicators identifying those regions where a large number of single problems cumulate. Of course, especially this last map is a bit of a "black box", because many different problem constellations can lead to the same number of problems; this is mainly true for the regions that belong to the medium categories. But the black box can easily be resolved by going back to the previous theme related maps or even to the single indicators' maps.

Summing up, the advantage of this procedure is that it is transparent and easily understood. The reader can trace back the results to the original indicators whenever he/she wants to, and does not have to put all his/her faith into artificially constructed indicators that have been produced through the "magic" of multivariate statistical modelling.

Map 1 RCE – Economy-indicator (GDP per capita, GDP per capita growth, expenditure on R&D, personnel in R&D BES)

Regional classification of Europe - economy: GDP per capita

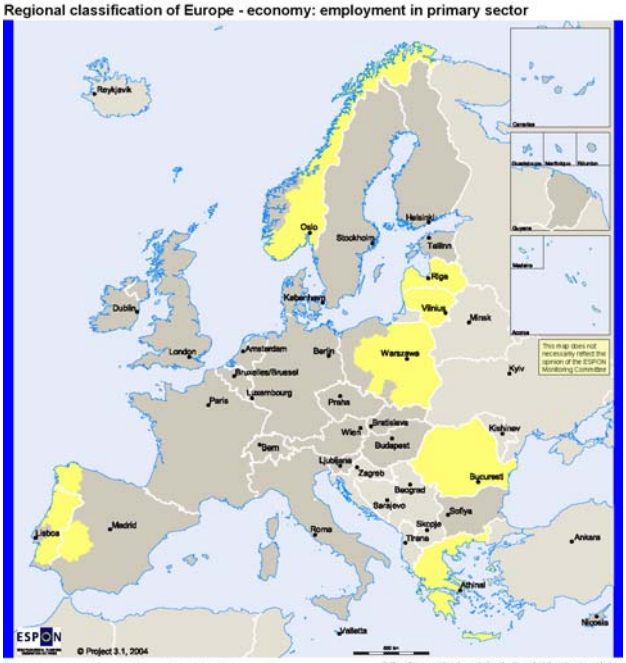
Regional classification of Europe - economy: GDP per capita growth 1995-2000

Regional classification of Europe - economy: expenditure on R&D

Regional classification of Europe - economy: personnel in R&D BES

Map 2 RCE – Economy-indicator (Employment in primary/tertiary sector, firms with own website)

Regional classification of Europe - economy: employment in primary sector



Economy - employment in primary sector
below average (< ½ standard deviation)

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Origin of data: Eurostat, National Statistical Offices, ESPON 3.1
Source: ESPON Database

Regional classification of Europe - economy: employment in tertiary sector

Economy - employment in tertiary sector
below average (< ½ standard deviation)

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Origin of data: Eurostat, National Statistical Offices, ESPON 3.1
Source: ESPON Database

Regional classification of Europe - economy: firms with own website

Economy - firms with own website
below average (< ½ standard deviation)

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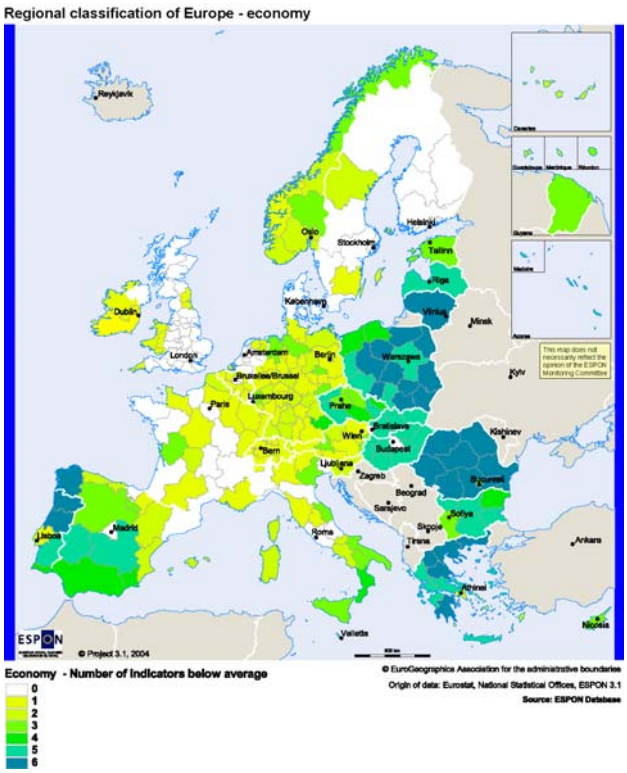
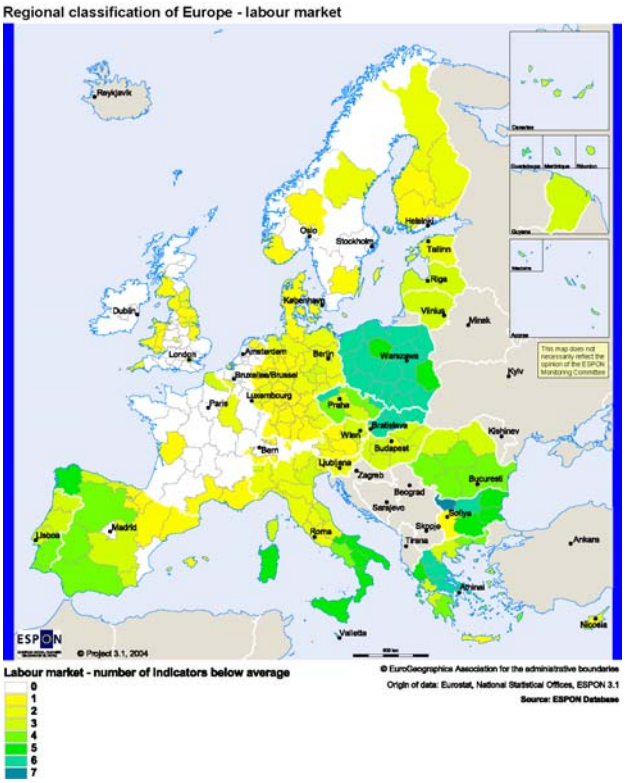
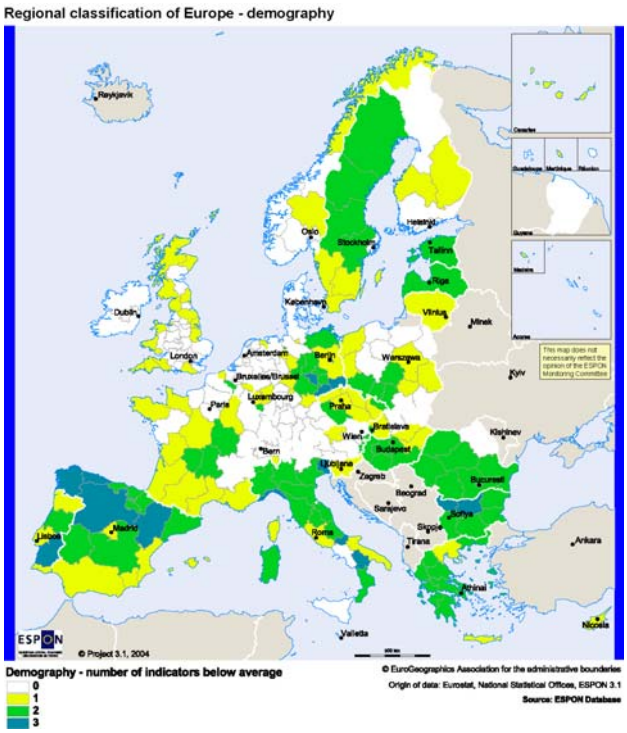
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1
Source: ESPON Database

Map 3 RCE – total number with indicators below average: Economy, Labour market, demography, environment

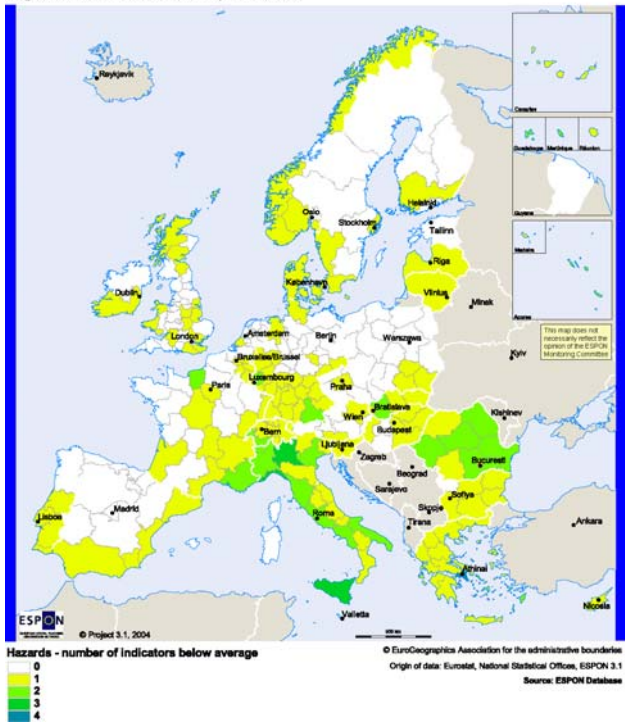




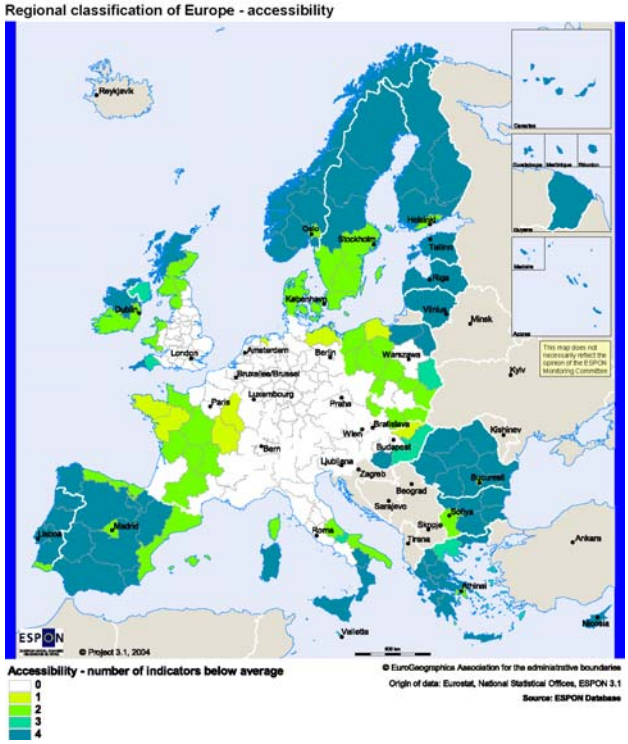


Map 4 RCE – total number with indicators below average: Hazards, Accessibility, Spatial Structure and all thematic fields

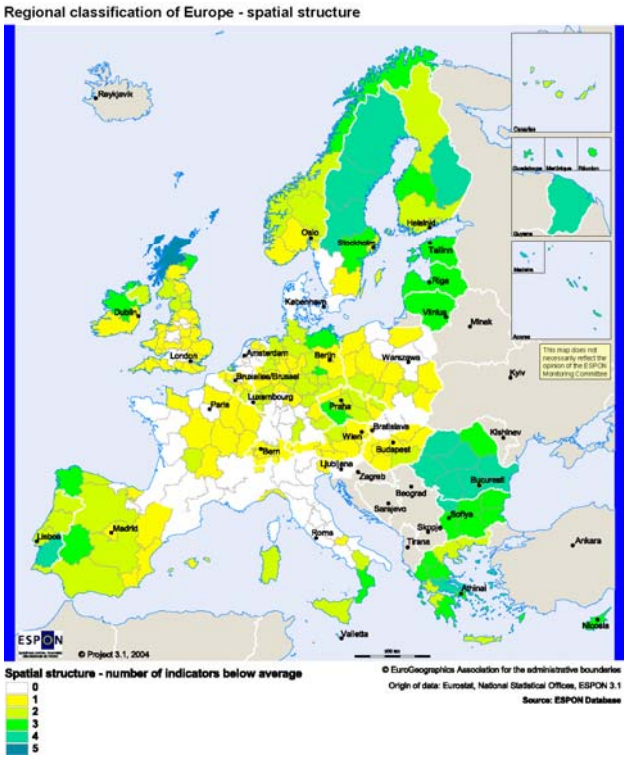
Regional classification of Europe - hazards



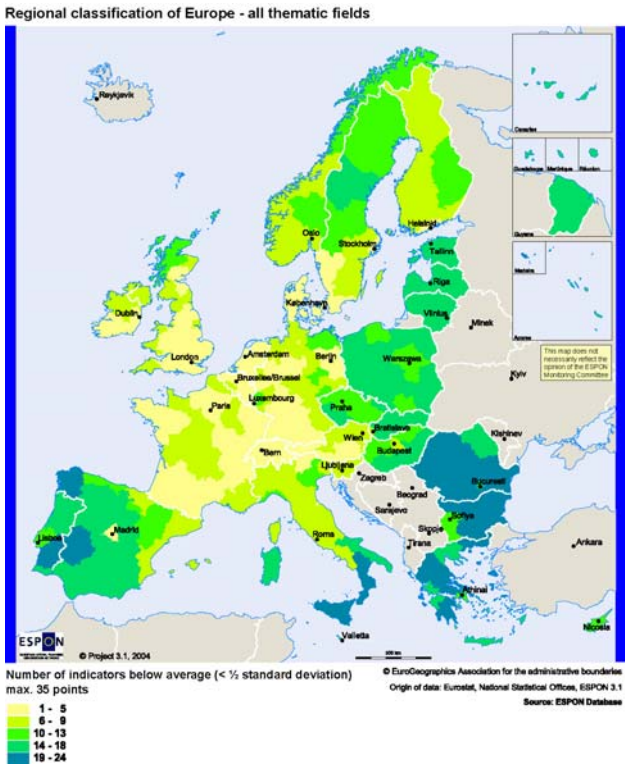
Regional classification of Europe - accessibility



Regional classification of Europe - spatial structure



Regional classification of Europe - all thematic fields



4.2.5 Regional Classification Analysis (ESPON 3.1)

The Regional Classification Analysis (RCE) that has been developed within the ESPON 3.1 project and presented in the Final Report of ESPON 3.1 has a slightly different although basically identical approach.

The main difference to the previously described problem analysis is that in the process of condensing classified indicators to indexes not only negative deviations ("problems") but also positive deviations ("strong points", "potentials", "over-performance") are taken into account. So, based on the same set of data and the same procedures of standardisation, polarisation and classification (see above, ch. 4.2.3, fig. 2) both classes, below average and above average are considered in the further analysis. In the RCE of ESPON 3.1 this has been done by allowing positive deviations to compensate with negative deviations. The following maps 5/6 (which are equivalent to the summary maps 3/4 as shown above) present the results. Regions whose positive and negative deviations of European means compensate are classified as *average*, while regions with a cumulation of positive (negative) deviations from the European mean are classified as *outperforming* (*underperforming*). Again an overall summary map is shown being well aware that - even more than in the summary map of "problems" as developed in the previous chapter - an overall summary of different themes <u>and</u> including a compensation mechanism of positive and negative deviations might be too condensed and too much "black box" to be comprehensible and applicable for regional policy analysis and formulation.

Map 5 RCE - economy, labour market, demography, environment

Regional classification of Europe - economy

Performance on economic indicators

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

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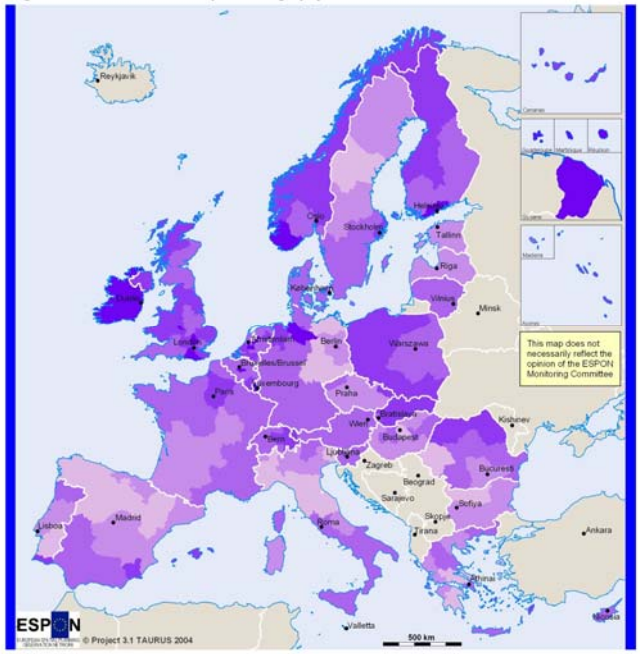
Regional Level: NUTS 2
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1
Source: ESPON Data Base

Regional classification of Europe - demography



Performance on demographic indicators

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

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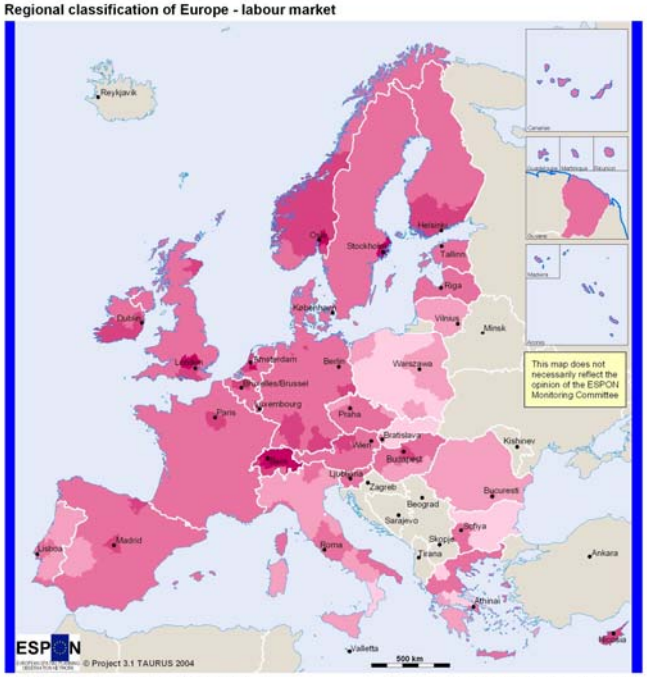
Regional Level: NUTS 2
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1
Source: ESPON Data Base

Regional classification of Europe - labour market



Performance on labour market indicators

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

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Regional Level: NUTS 2
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1
Source: ESPON Data Base

Regional classification of Europe - environment

Performance on environmental indicators

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

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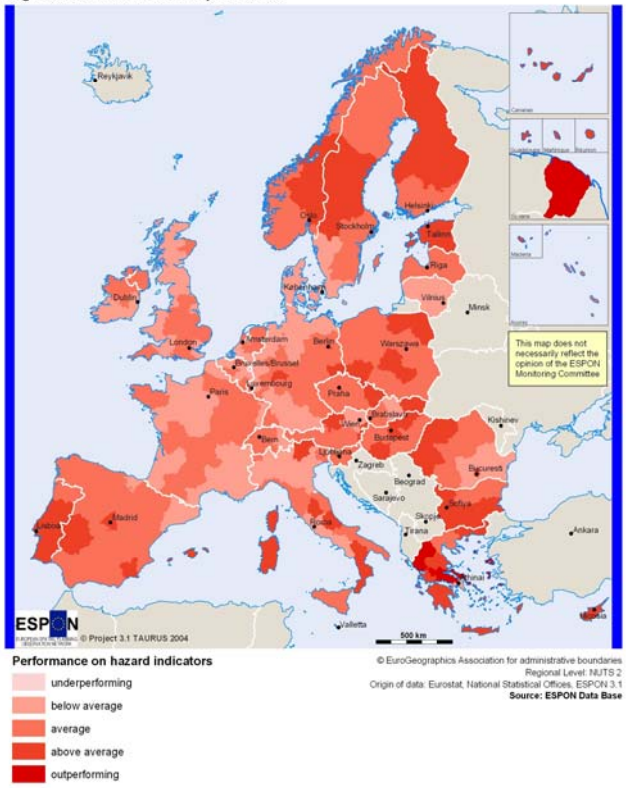
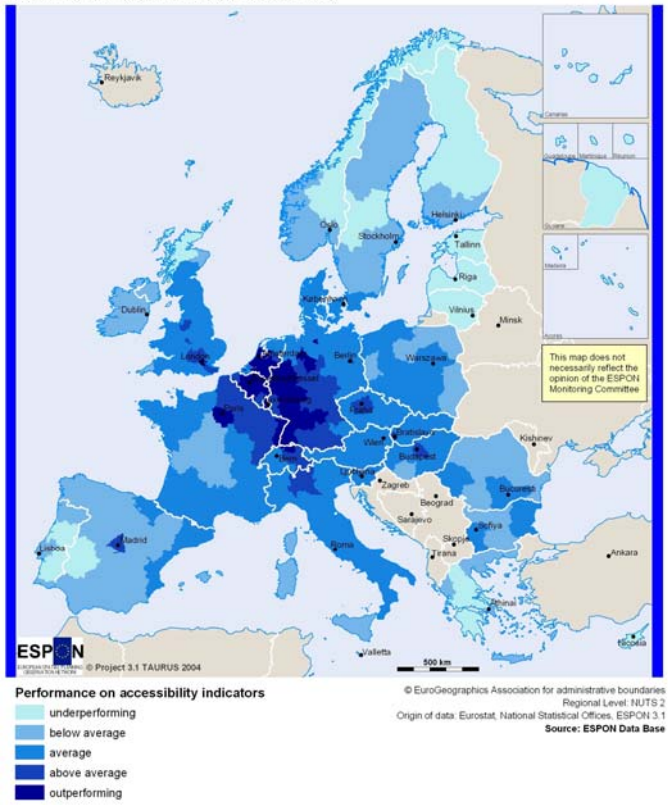
Regional Level: NUTS 2
Origin of data: Eurostat, National Statistical Offices, ESPON 3.1
Source: ESPON Data Base

Map 6 RCE - hazards, accessibility, spatial structure and overall performance

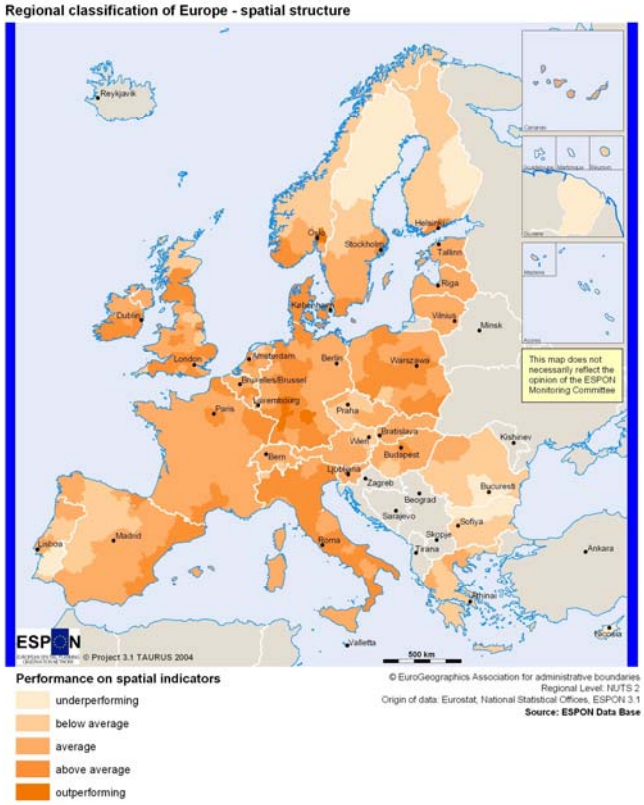
Regional classification of Europe - hazards



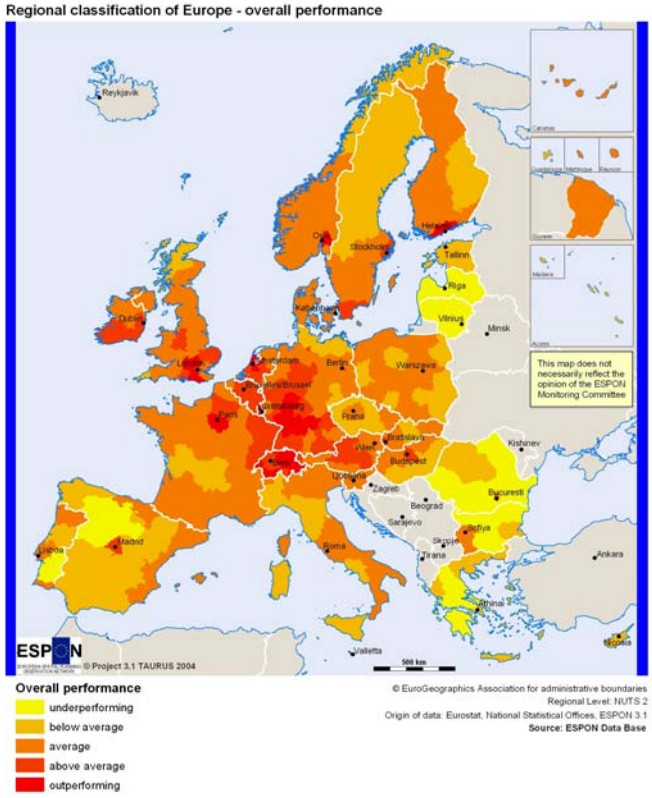
Regional classification of Europe - accessibility



Regional classification of Europe - spatial structure



Regional classification of Europe - overall performance



4.3 Multivariate analysis of regional situations - factor analysis

The previous chapters have argued in favor of simple and transparent methodologies as a valuable basis for policy oriented discussions. It seems that especially for "hard" political decisions and mechanisms clear, transparent and unambiguous indicators are needed. This is obvious for the Structural Funds mechanism, where the eligibility for goal 1 and the labeling as "lagging region" is bound to one simple indicator and a clear threshold: all regions with a GDP/capita of below 75% of EU average are "lagging region" and eligible for goal 1. But also more complex goals, like the Lisbon strategy or goal 2 of the envisaged new SF regulations, deal with (combinations of) simple indicators as criteria for funds allocation and/or for benchmark processes. Seen in this light, it is argued that simple indicators and simple methods have a special value in political debate and in the discourse between science and politics.

On the other hand, these methods surely have their limits, and more complex statistical models should be applied to fully exploit the informational contents of data bases and to test ideas and hypotheses and confront them with data and models. For scientific reasoning it is important to complement simple transparent models with complex mathematical-statistical models in order to strengthen the solid grounds for scientific arguments. Sometimes, in scientific policy advisory, complex models are used to get a better insight into the structures of a set of indicators and to then use this insight to go back to a (scientifically founded) selection of original indicators and to built the final argumentation on the basis of these selected indicators.

During the few weeks of its starting phase ESPON 2.4.2 has made a first attempt to complement results of the regional situation and classification analysis through the application of multivariate models, especially using factor analysis. These results are presented in the following.

4.3.1 Revision of the RCE indicator set

Starting from the RCE indicator set the first step was to check and revise the indicator base. The attempt was made to find additional indicators and fill the gaps between existing and proposed ones. This search was restricted to those indicators that were completely available for all NUTS regions of the 29 ESPON member states.

The search was, among others, directed towards competitiveness and productivity indicators, additional indicators on telecommunication infrastructure, and indicators on long-term unemployment. But at the present stage of data availability no additional indicators could be found. In

the course of the project, a more thorough analysis of the EPSON projects will be done. A review of existing data, statistical resources and core indicators might help to cover the missing points in the future.

For now, the decision was to proceed with the set of RCE indicators, but to omit the ones that are strongly correlated with others thus showing (at least partly) double measurement of identical phenomena and those indicators that reveal unclear and ambiguous interpretations. Such indicators are:

- GDP per capita growth
- firms with own website
- R&D personnel
- employment density
- internet users
- population density
- all 6 hazards indicators
- all 6 indicators for spatial structure

The remaining 20 indicators that formed the basis for the factor analysis are listed in the following table (cf. fig. 3)

4.3.2 Methodology

Factor analysis is used to uncover the latent structure of a set of variables. It reduces the attribute space from a larger number of variables to a smaller number of factors and as such is a "non-dependent" procedure (that is, it does not assume a dependent variable is specified). The method presents the following advantages:

- To create a set of factors to be treated as uncorrelated variables as one approach to handling multicollinearity in such procedures as multiple regression.
- The structural relations of the examined variables are defined
- It is a substantial contribution to the support of already existing theoretical aspects or even more encourages the formation of a new hypothesis system where observed facts or phenomena are explained.

Figure 5 Indicators for factor analysis based RCE proceeding

Indicators	***description***
Income and consumption	
GDP per capita	In PPS
Research and Development	
Expenditure on R&D	Share of GDP
R&D personnel	Total R&D personnel per 1.000 active persons
Employment and labor market	
Employment in tertiary sector	Share of total employment
Employment in primary sector	Share of total employment
Unemployment	Unemployment rate or 2001
Development of unemployment	Change 1998-2001 in percent
Youth unemployment	Unemployed < 25 years per 1000 inh. 15-<25 years
Labor force replacement ratio	Population ages 10-19/ population ages 55-64
High educated population	Highly educated population/total educated pop.
Population structure	
Ageing	Share of population in the ages over 65 in percent
Reproduction potential	20-29 years in 2020 per 20-29 in 2000
Population growth	Change 1995-2000 in %
Land use	
Artificial surface	Share of total area (Corine)
Natural surface	Share of total area (Corine)
Agriculture intensity	Output/input ratio
Accessibility	
Potential accessibility	By road
Potential accessibility	By rail
Potential accessibility	By air
Potential accessibility	Multimodal

- It reduces a large number of variables to a smaller number of factors for modeling process where the large number of variables precludes modeling all the measures individually. As such, factor analysis is integrated in structural equation modeling (SEM), helping create the latent variables modeled by SEM. However, factor analysis can be and is often used on a stand-alone basis for similar purposes.
- It can be used for research of qualitative and quantitative discrepancies between the examined variables.
- To select a subset of variables from a larger set based on which original variables have the highest correlations with the principal component factors.

Factor analysis takes as input a number of measures and tests, analogous to the bumps and shapes. Those that move together are considered a single thing, which it labels a factor. That is, in factor analysis the researcher is assuming that there is a "child" out there in the form of an underlying factor, and he or she takes simultaneous movement (correlation) as evidence of its existence. If correlation is spurious for some reason, this inference will be mistaken, of course, so it is important when conducting factor analysis that possible variables which might introduce spuriousness, such as anteceding causes, be included in the analysis.

Factor analysis is part of the multiple general linear hypothesis (MLGH) family of procedures and makes many of the same assumptions as multiple regression: linear relationships, interval or near-interval data, untruncated variables, proper specification (relevant variables included, extraneous ones excluded), lack of high multicollinearity, and multivariate normality for purposes of significance testing. Factor analysis generate a table in which the rows are the observed raw indicator variables and the columns are the factors or latent variables which explain as much of the variance in these variables as possible. The cells in this table are factor loadings, and the meaning of the factors must be induced from seeing which variables are most heavily loaded on which factors. This inferential labeling process can be fraught with difficulty as diverse researchers impute different labels.

There are several types of factor analysis with the most common being principal components analysis (PCA). However, principal axis factoring (PAF), also called common factor analysis is preferred for purposes of confirmatory factory analysis in structural equation modeling.

Factors and components. Both are the dimensions (or latent variables) identified with clusters or variables, as computed using factor analysis. Technically speaking, factors represent the common variance of variables, excluding unique variance, and is thus a correlation-focused approach

seeking to reproduce the intercorrelation among the variables. By comparison, components reflect both common and unique variance of the variables and may be seen as a variance-focused approach seeking to reproduce both the total variable variance with all components and to reproduce the correlations. Principal component analysis (PCA) is far more common than Principal axis factoring, however, and it is common to use "factors" interchangeably with "components".

4.3.3 Results of the factor analysis

The factor analysis is based on 20 indicators (as shown above) which are grouped into 6 different groups. By using the factor analysis, the above indicators are formed to six new factors. The indicators that form a factor are highly correlated without regard to the thematic field from which they origin. In other words, they form a new factor that might contain some heterogeneous characteristics which, despite their heterogeneity, are highly correlated.

Figure 6 Factor identification in RCE proceeding

Factor Description	***Indicators***
Factor 1: Accessibility	Potential accessibility (by road, rail, air, multimodal), artificial surface, natural surface
Factor 2: Economic growth potential	Employment in tertiary and primary sector, high educated population, development of unemployment, GDP per inhabitant
Factor 3: Unemployment	Unemployment rate, youth unemployment, population growth
Factor 4: R&D	Expenditure on R&D, R&D personnel
Factor 5: Demography	Ageing, Reproduction potential, Labor force replacement ratio
Factor 6: Agriculture	Agriculture intensity

It is worth mentioning that the "GDP per capita" indicator is almost equally shared to four out of six factors of the model. This outcome represents the great importance of GDP in structural and funding criteria.

4.3.4 Thematic results

After the detailed description of the process, the utilized data and the applied method, an overview of the essential results of the statistical analysis is now given. In the first step thematic results are presented. The performance of regions in six factors as they transformed was looked upon: accessibility, economic growth potential, unemployment, research and development, demography and agriculture. The potential differences and the homogeneity of transnational cooperation areas of Interreg III B are also examined (see chapter 6).

Accessibility

An explicit spatial pattern is emerging showing a clear core periphery divide. The map is a visible result of the regional characteristics of six indicators (potential accessibility by road, by rail, by air, multimodal potential accessibility, artificial surface and natural surface). The outperforming regions conglomerate in the core of Europe, especially along the "blue banana", including Luxembourg, Brussels and London and furthermore Paris. From the core to periphery the performance on accessibility diminishes, reaching the lowest level in regions in Spain, in Portugal, in South Italy, in Greece, in Cyprus, in Sweden, in Finland, in Norway, in Baltic States and in some regions in central Europe.

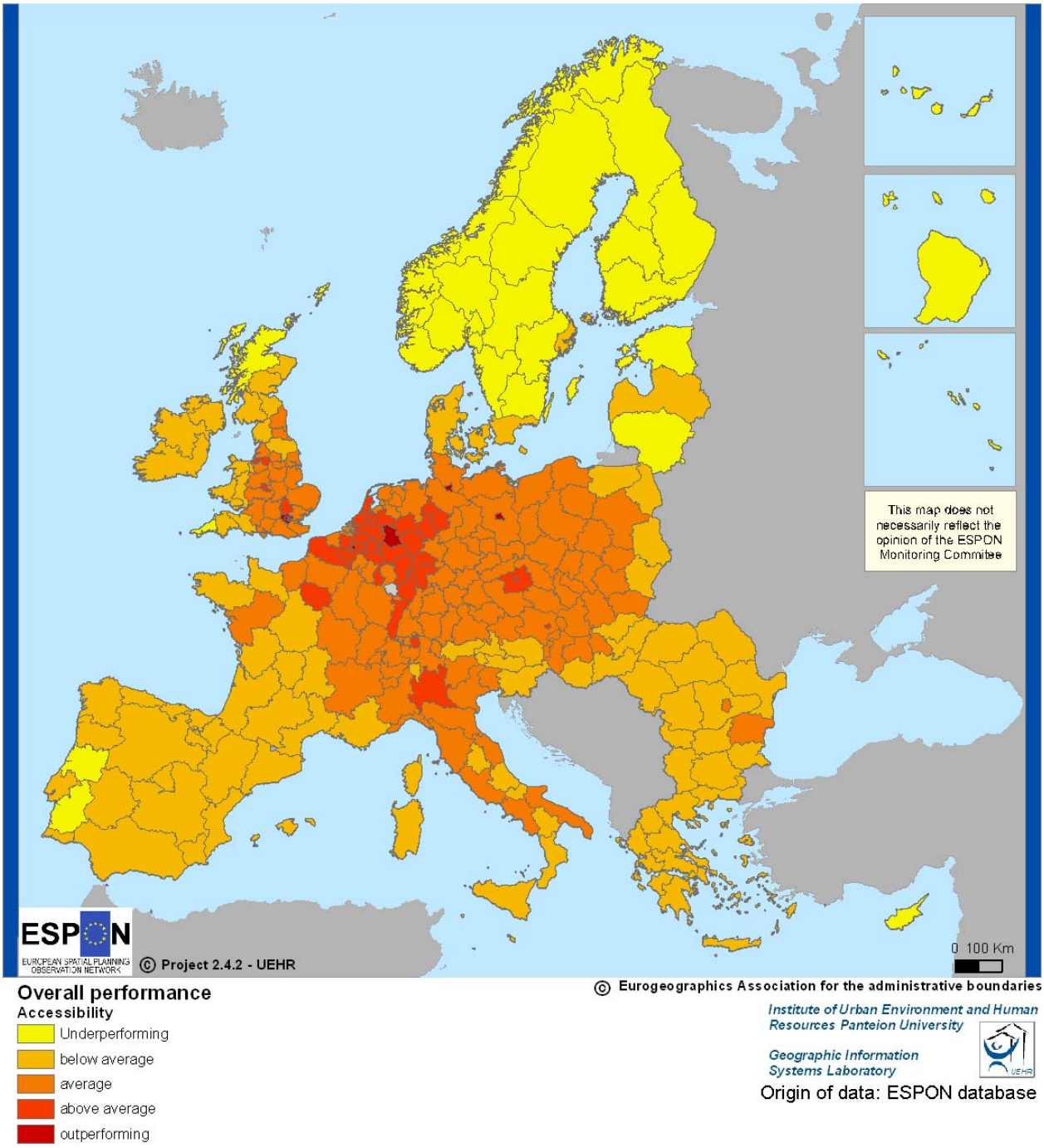
Moreover and not surprisingly a hierarchical pattern can be observed in the peripheral areas with the capitals and neighboring regions performing much better than the others sometimes even an average level.

Economic Growth Potential

A strong correlation manifests between GPD per capita, employment situation and the level of education. The five indicators (Employment in primary sector, employment in tertiary sector, high educated population, development of unemployment and GDP per inhabitant) formed to a factor establish the regional performance. Outperforming regions are scattered in the European space and can be found especially in capital regions. It is worth mentioning that the majority of European regions are below average or act as underperformers.

It is surprising that regions such as Guyane perform much better than other traditional economic centers. This might happen because in the factor's synthesis participate indicators from different thematic fields. Although, this considers to be a more integrated result.

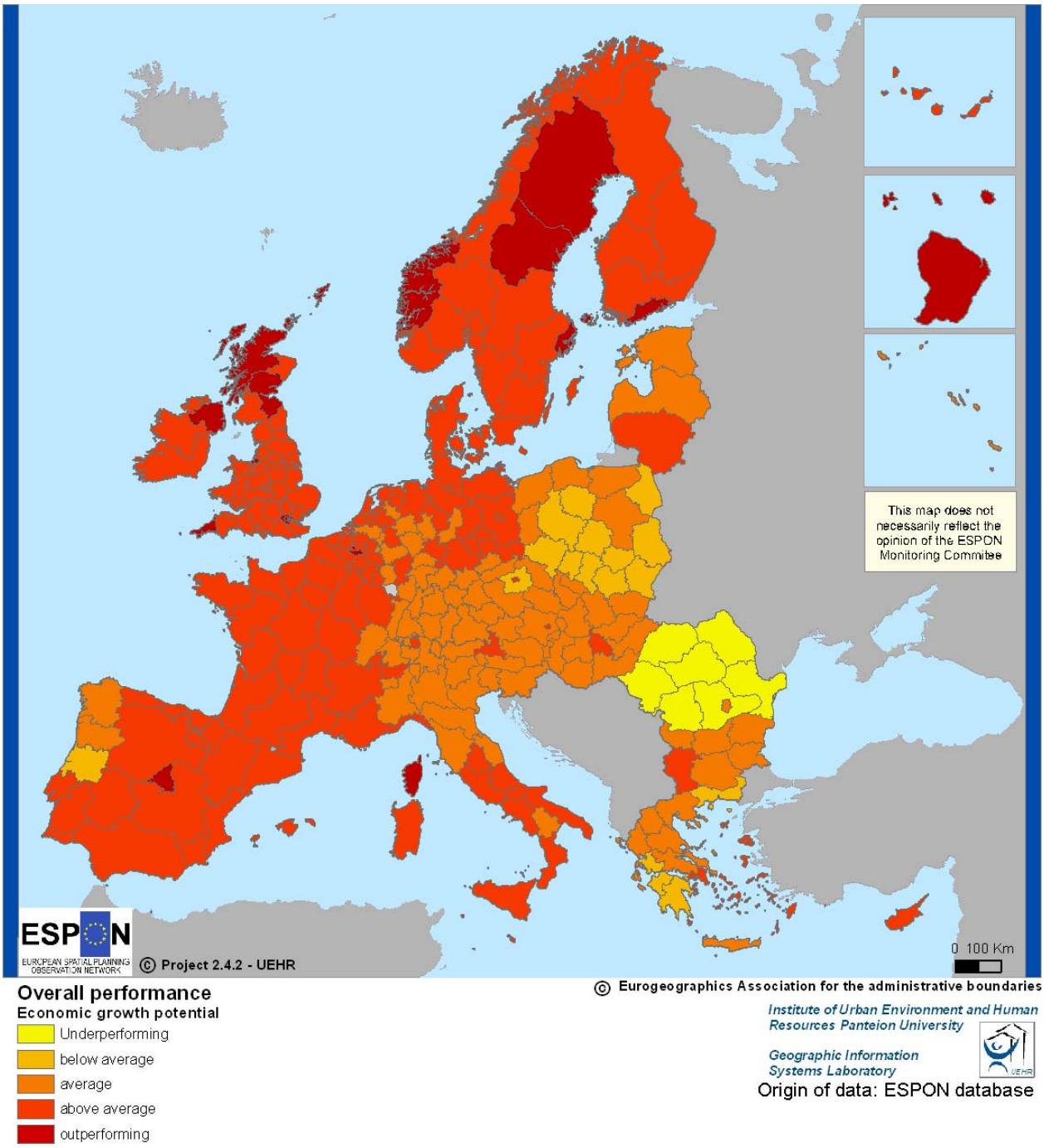
Map 7 Factor 1: Accessibility



Unemployment

Turning to unemployment one can clearly understand how the unemployment rate is affected by the population growth rate (unemployment rate, youth unemployment, population growth). It is obvious that the outperformers are situated in the capital regions and in the core of Europe. In this factor in which the countries of central Europe are performing much better than the countries that belong to the periphery of Europe.

Map 8 Factor 2: Economic growth potential

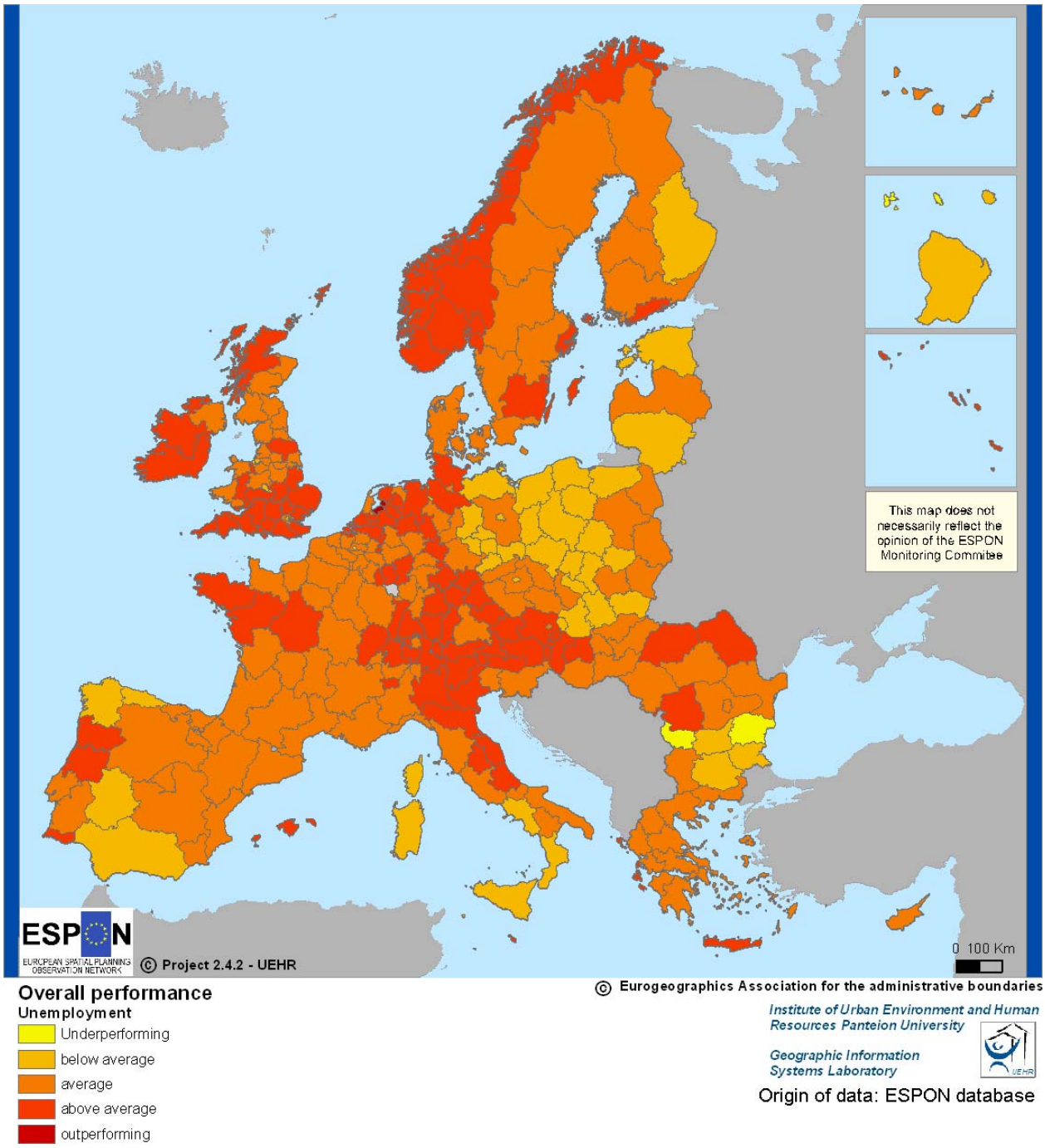


Research & Development

Turning towards Research & Development, we have to mention that the indicators synthesized were clearly originated to this field (expenditure on R&D, R&D personnel). Outperforming regions are scattered all over Europe and situated especially in capital regions.

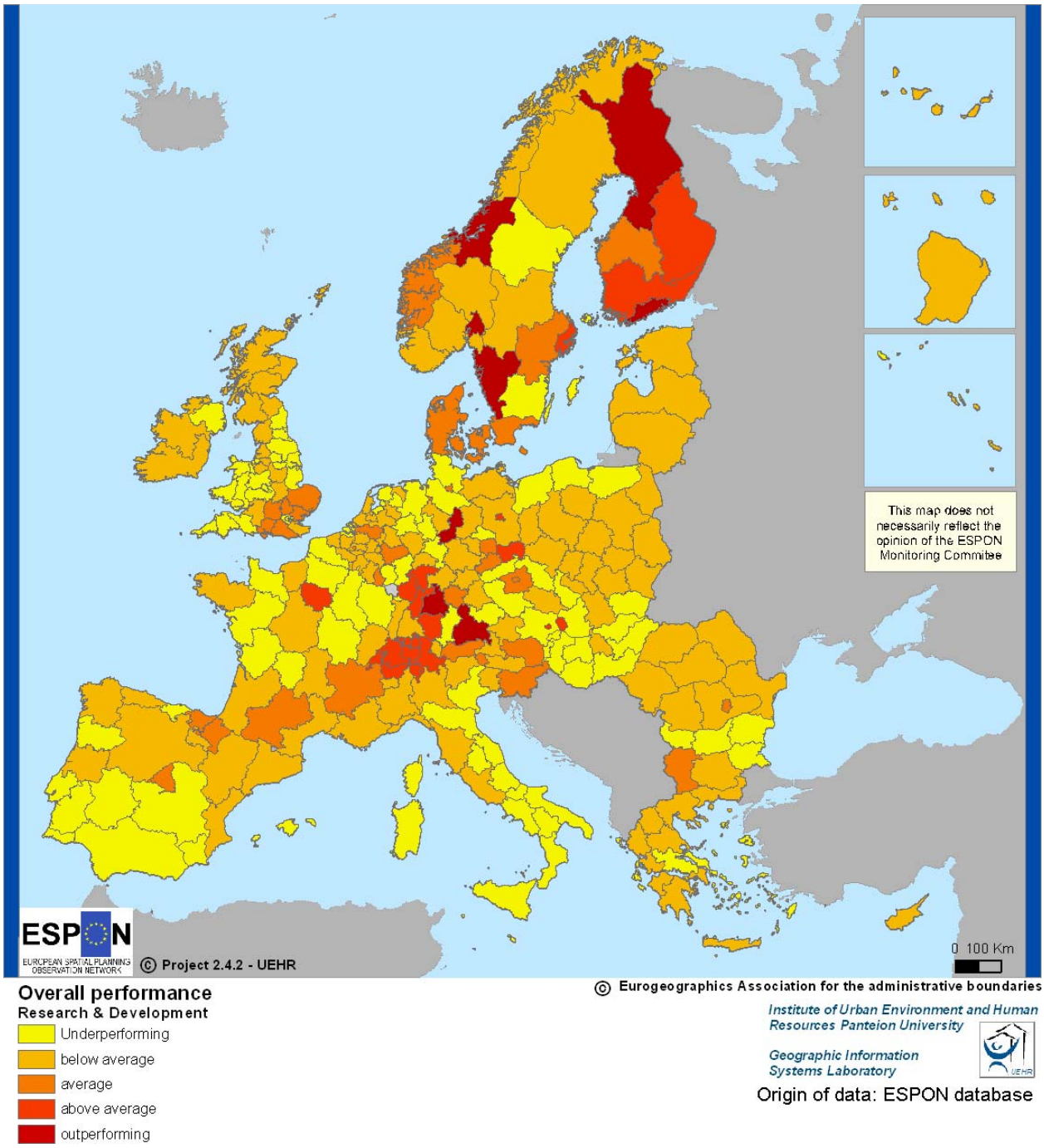
Moreover and not surprisingly, regions of Finland are all above average and performing quite well. Furthermore, we have to mention the

Map 9 Factor 3: Unemployment



outperformance of Bulgaria and especially of its capital region, but also the exceptional performance of regional capital in Eastern Europe. It is significant to mention that five out of thirteen regions of Greece are outperforming.

Map 10 Factor 4: Research & Development

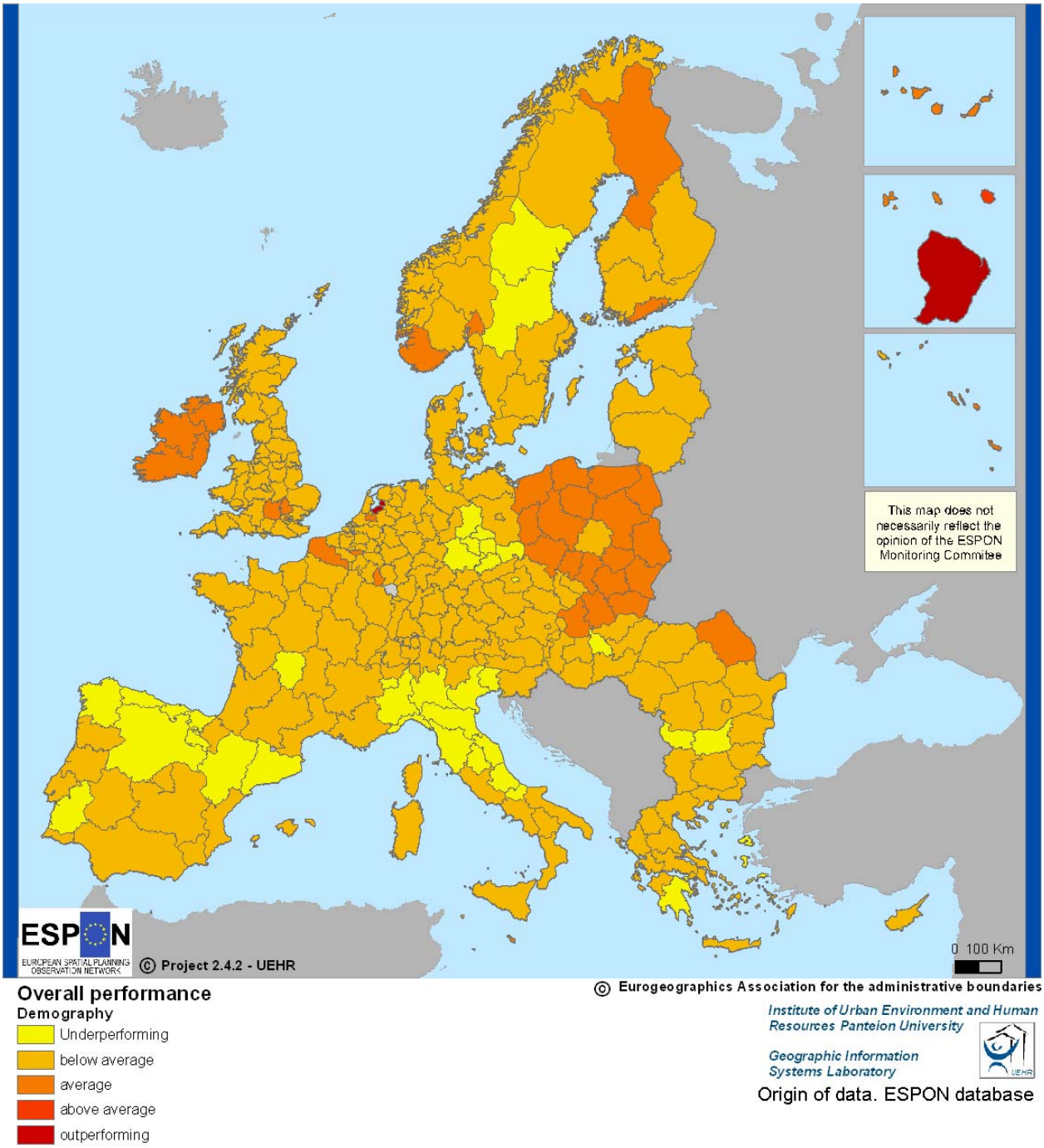


Demography

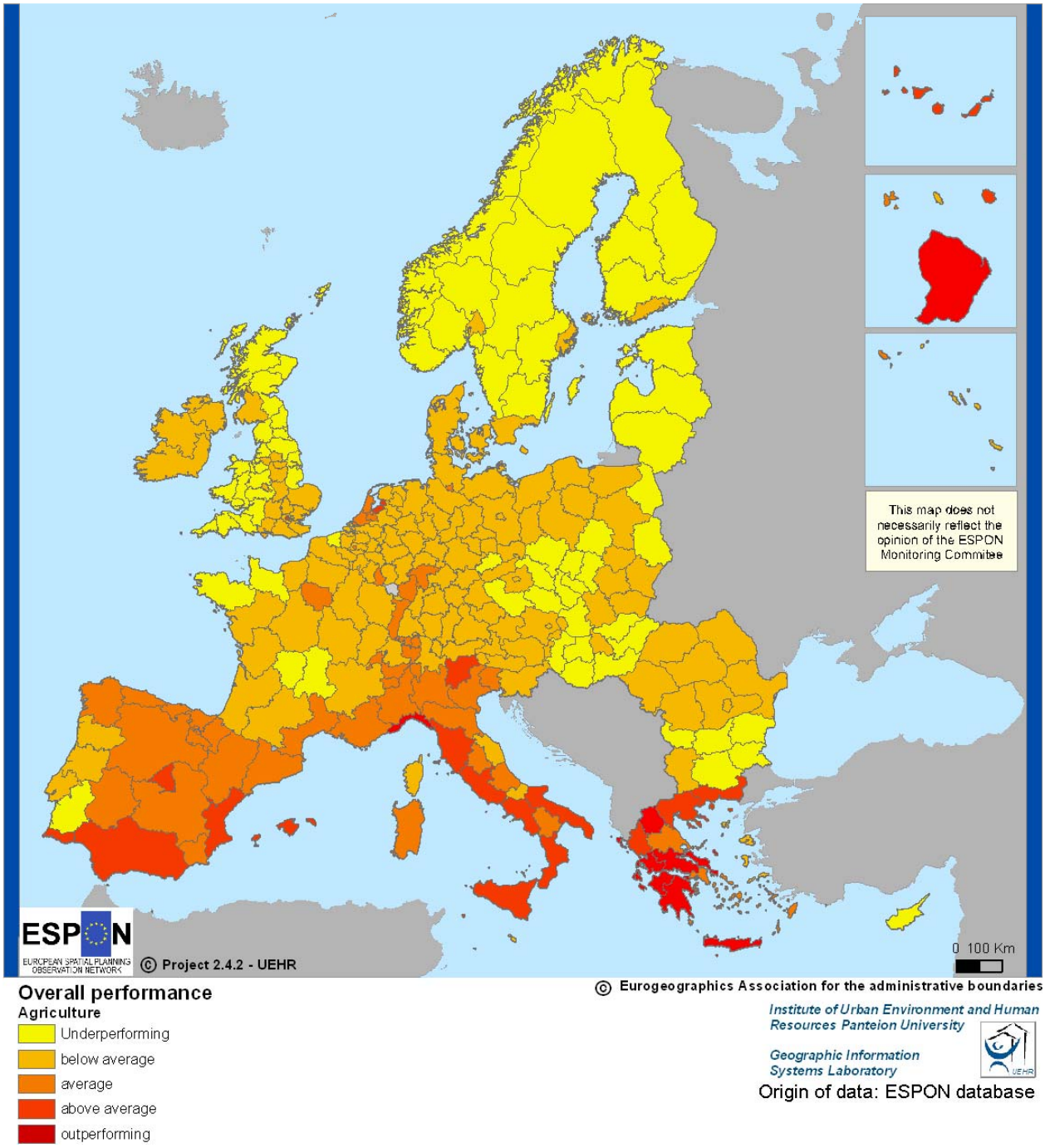
The demographic performance considers an up-to-date and complex theme, represented by three indicators (ageing, reproduction potential, labor force replacement ratio). The map shows a regional classification ranging from outperforming to underperforming regions. In this case outperformer means a region with a relatively vital and young population, whereas underperforming regions are characterized by declining and ageing population that

affects the labor force. Regions facing the biggest demographic problems can be found in Spain, France, UK and in some Baltic States, as well as in some regions of Romania and Scandinavians countries. Regions in West Germany, central Europe, South Italy, South Spain, Portugal, Greece, Romania and Bulgaria seem to perform above or around the average.

Map 11 Factor 5: Demography



Map 12 Factor 6: Agriculture



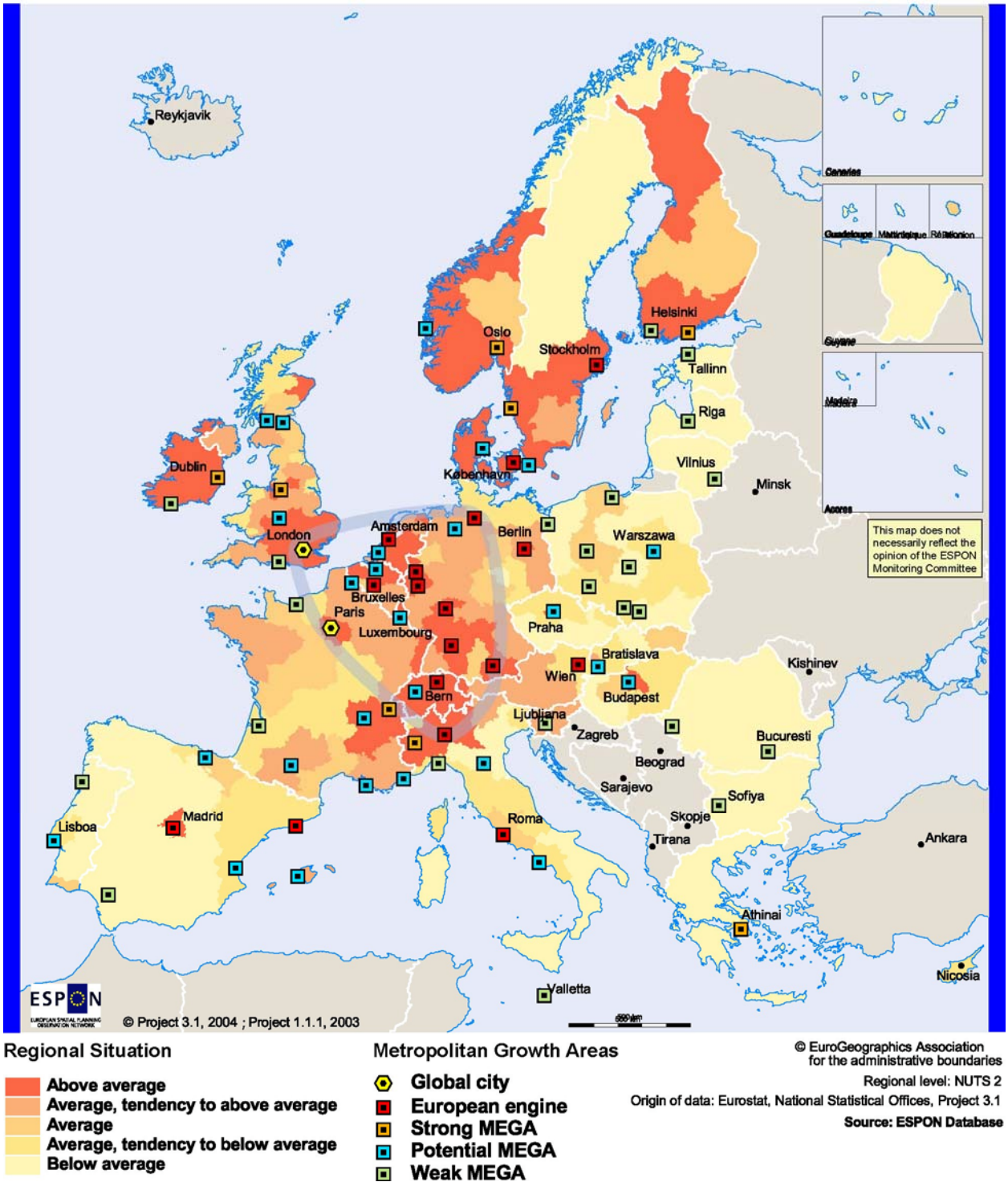
Agriculture

The map shows regions which still have big agricultural sector. Such regions are in South Spain, in South Italy, in Greece in general and in Baltic States.

4.4 Combination of ESPON results

The thematic orientated combination of selected existing ESPON results in a cartographic representation could be one of the first approaches to enhance the value of information.

Map 13 MEGA typology and regional situation



This could be done in form of cartographic overlay that can also be done with bivariate or multivariate grouping of information in cartographic or GIS tools as well as with the help of multiscalar analysis tools like the ESPON Hyperatlas

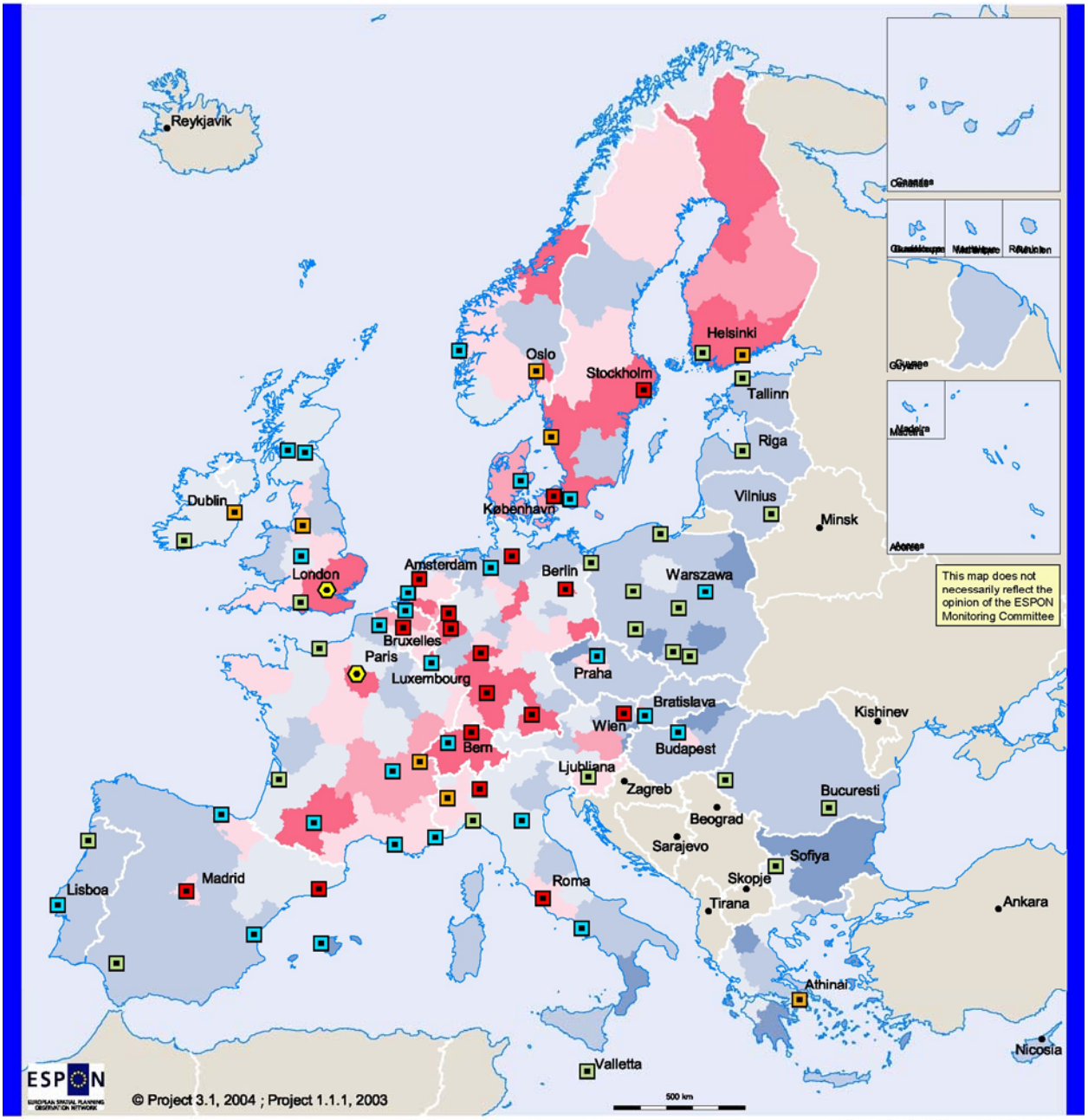
As the examples of cartographic combinations of the ESPON 1.1.1 MEGA typology with other ESPON results like the situation analysis and the R&D importance shows, new aspects in the situation and importance of the MEGA's can be detected due to the context related regional surroundings.

There is an obvious high relationship between the MEGA classification and the regional situations as well as the regional importance of R&D. Beside the global cities European engines are mainly situated in strong regions with an above average situation. They are also situated in regions with the highest importance of R&D.

The interesting finding related to strong and potential MEGA's is that they especially in the new Member States are situated in the regions with the best above average regional situation like Praha, Bratislava and Budapest which might indicate strong impulses for combined development. In the old Member States comparable situations can been found in Dublin, Göteborg and Lyon. Some of the important MEGA's in the old EU 15 do not correspond with their regional environment. This is the case in Athinai, Roma and Barcelona. Concerning the first two this can be explained as these cities have more capital and administrative rather than economic leading function, in Barcelona, the European engine is more concentrated on the metropolitan area which does not match with the regional situation.

Concerning R&D it can also be stated, that global cities and European engines are mainly related to regions with high R&D importance. Sometimes however, the high importance of R&D of a region does not correspond to the weaker importance of the MEGA. This is the case in the region Midi-Pyrénées with Toulouse. Vice versa the metropolitan importance of European engines like Madrid, Roma and Barcelona is not mirrored in the regional R&D situation, indicating the minor importance of R&D related activities in Madrid and Roma. In Barcelona the growth potential seems to concentrate only in the greater metropolitan areas itself without participation of the surrounding region.

Map 14 MEGA typology and R&D importance



Importance of research & development *

- up to -1
- -1 - -0.5
- -0.5 - 0
- 0 - 0.5
- 0.5 - 1
- 1 and more

*Additive combination of standardised R&D-indicators: personnel total, personnel in BES, expenditure on R&D (regional average of ESPON countries = 0)

Metropolitan Growth Areas

- Global city
- European engine
- Strong MEGA
- Potential MEGA
- Weak MEGA

Origin of data: Eurostat, National Statistical Offices

Regional level: NUTS 2

Source: ESPON Database

4.5 Further approaches for the analysis of spatial pattern

4.5.1 Inside ESPON: Cluster Analysis of regional potential of the New Member States and Candidate Countries

Another option for the development of a regional classification of Europe consists in the conduction of comprehensive cluster analyses, which has for instance already been conducted by ESPON project 2.2.2 for the New Member States and Candidate Countries.

Generally speaking, the different methods of cluster analysis aim at the constitution of groups. Within each group, the elements should show high levels of similarity for all characteristics included in the analysis, while the similarities between the groups should be as low as.

Here, the cluster analysis according to Ward has been utilised which is part of the hierarchical agglomerative cluster analysis methods. Starting with the individual elements, which in our case are the NUTS 2 respectively NUTS 3 regions, with each step of aggregation growing groups of regions are built. At each step those two regions respectively groups are aggregated, which show the lowest distance, measured by means of a variation criteria, to each other. This procedure is repeated until all regions and groups are joined in one group.

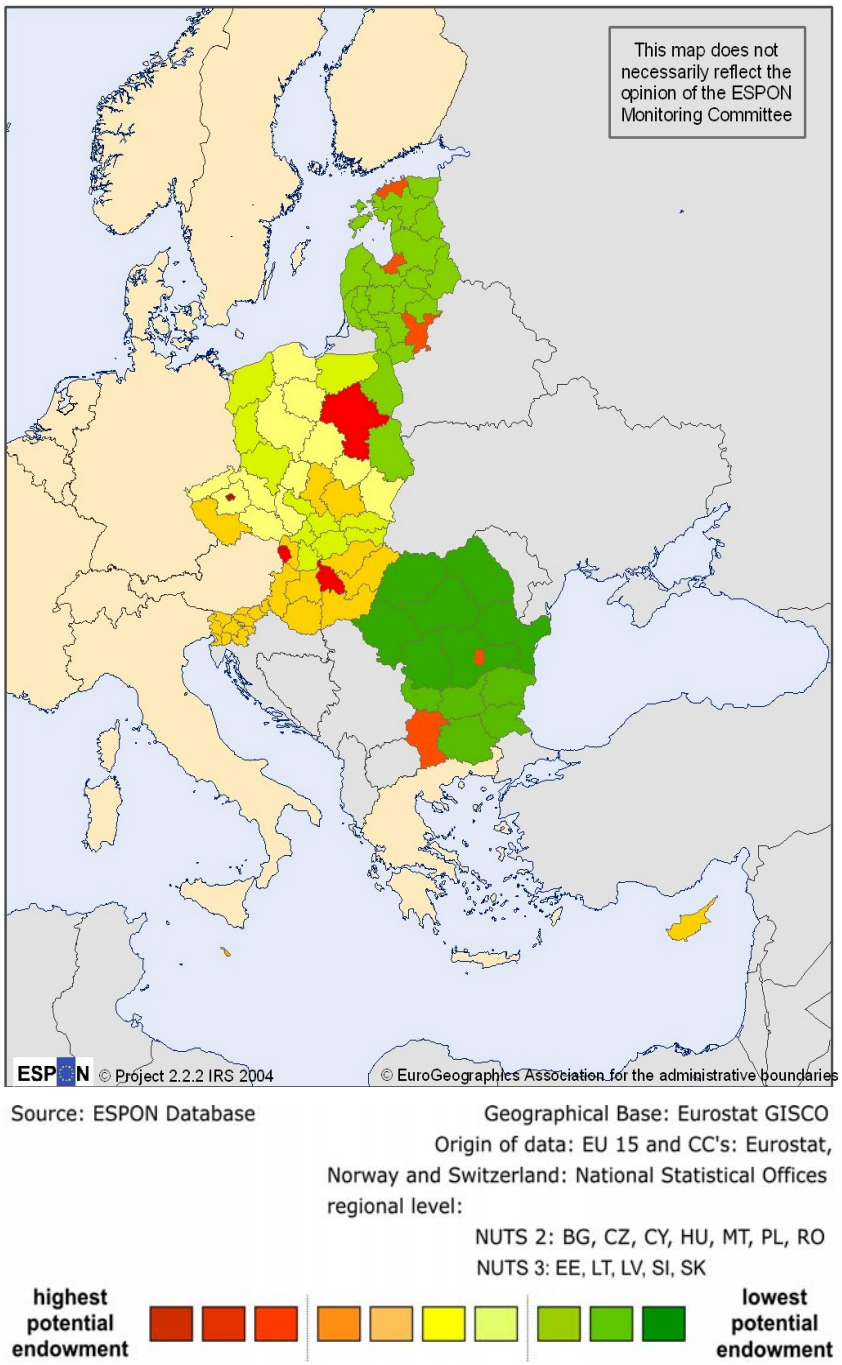
Cluster analysis using Ward's method is a frequently used variant and generally produces very good group constitutions as compared to other cluster analysis methods. Therefore, the elements (regions) tend to be 'correctly' attached to one or another group.

Below sample of a cluster analysis for the New Member States and Candidate Countries is based on the potential analysis conducted by ESPON project 2.2.2[1]. In order to avoid the domination of one or another influence of different variables, all indicators have been standardised and only those potential indicators were included which were not significantly correlated for the regions under consideration. Therefore, from all the potential indicators only the active population density, agricultural respectively service employment, the human capital index, settlement structure, per capita GDP, R&D intensity, multimodal accessibility potential, unemployment and a transformation index, giving some idea about the institutional potential, have been included as variables for the cluster analysis. For instance, population density has not been included as of its high level of correlation with active population density.

[1] For an overview of the respective potential indicators used and the potential analysis see the interim reports of ESPON project 2.2.2.

Both, the distance criteria and the grouping of regions, suggested a division of ten groups of regions among these countries. These ten groups again can in a summarised way be aggregated to three main groups. The first of these groups contains the regions with the highest potential endowment and basically covers different types of capital regions. The second group with its four sub groups consists of types of regions with medium potential endowment with varying potential priorities. Finally, the greenish shaded groups are the regions with the lowest potential endowment within all countries and regions under consideration.

Map 15 Potential of endowment of the regions of the New Member States and Candidate Countries



Furthermore, for each indicator and each group the medium values and variances can be compared. This provides additional information for the regions' position with regard to a number of socio-economic factors, which can assist the interpretation of the regions' characterisation.

However, this approach also has its shortcomings. In some cases, regional delimitation proves to bias the clustering process, as on the same NUTS level in some countries the capital's surrounding area is part of the same and in other countries of another than the capital region. In above cluster analysis, this has certainly affected, for instance, the clustering of Prague.

Furthermore, despite the distance criteria, there is no 'correct' number of groups or cluster. Instead, the number of clusters is influenced by the researcher, background knowledge etc. In addition, despite its favourite grouping process, also the Ward approach has some shortcomings, which are most apparent in the case of extreme values. However, at least for the regions under consideration so far, this approach certainly provided the best results within the clustering process. Yet, similar cluster analyses could be conducted for the whole of the ESPON territory in a comparative way.

4.5.2 Outside ESPON - Regression analysis of EU 15 regional sensitivity in the context of enlargement

The regression analysis deals with the coefficient of determination of one variable by a number of independent variables, assuming within the linear regression, that the dependent or response variable can be explained by a linear combination of independent or predictor variable.

It is used to detect and explain interrelations and to estimate values of the response variable. The regression analysis supposes definite directions in the connection between the variables, it investigates definite “the ... the...” interrelations. It goes therefore further than a correlation analysis which only asks whether there is an interrelation at all.

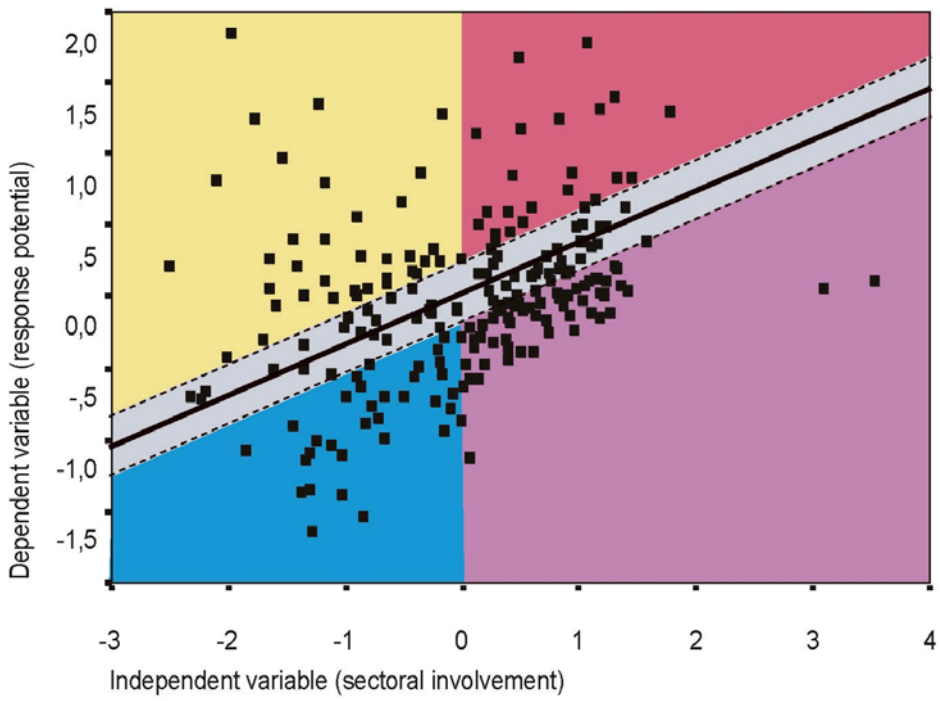
In the regional analysis targeting on the elaboration of spatial pattern and trends the regression analysis can be used to identify regional groups according to the degree of interrelations between the variables.

The following map is the result of a regression analysis dealing with the interrelation of the sectoral involvement of the regional economy in the process of enlargement and the regional potential to react on the possible challenges. It is an example for the way this kind of regional analysis could be used to elaborate thematic oriented regional classification on the basis of the above mentioned “the ... the...” relation.

The sectoral involvement has been expressed through the importance of wage intensive industries (machining and wage intensive consumer goods industries) and capital intensive industries (quality manufacturing and consumer goods industries) which in general had been seen as industrial loser respective winner in the process of enlargement. The regional sectoral sensitivity in combination with the market potential (accessible population weighted with the product related trade relation) has been connected within the regression analysis with the response potential of the regional economy (economic strength, development of employment, R&D potential).

The regional classification has not been done using European or regional averages as thresholds, it has been done using the regression analysis and the deviation of predicted value of the independent (sectoral involvement) and dependent (response potential) variables in relation to the regression line (see figure 7).

Figure 7 Regression analysis scatter plot and definition of regional classes

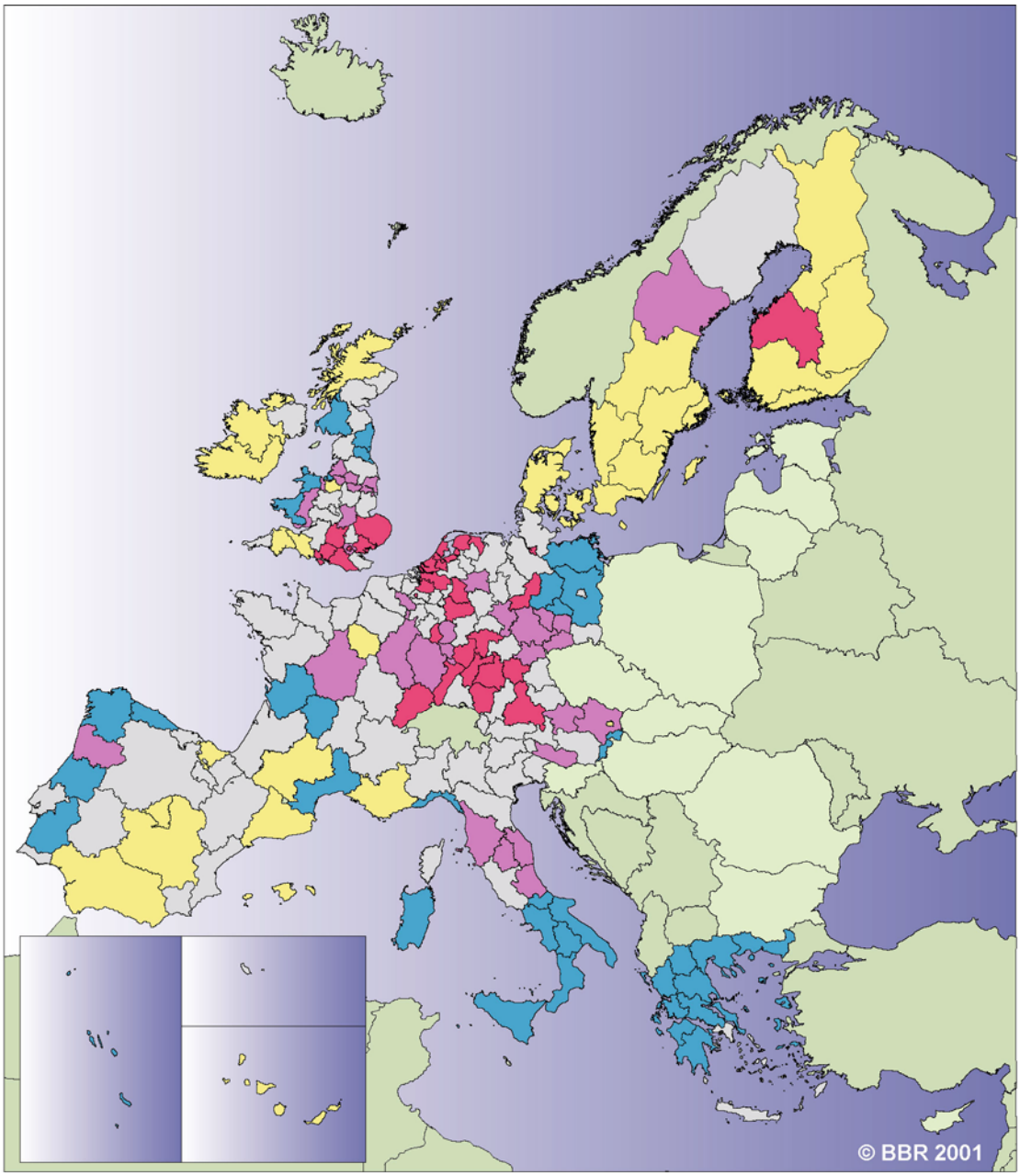


The degree of the response potential being high or low can be determined with values lying above or, respectively, below the regression line. The distinction of the sectoral involvement has been in relation to the mean value of the standardised regional values. The average regional sensitivity has been determined by regional values lying in the range of one standard deviation around the regression line.

The results show that potential impulses of the enlargement tend to concentrate in economic potent regions with strong but not necessarily alone strong importance of the capital intensive industries. This is the case in the German regions, Southeast England, Central Finland and the region Franche-Comté in France. With decreasing degree of sectoral involvement regions of Ireland, South of Sweden and Southwest France join this regional scope.

The situation of the Eastern part of Germany shows that the regions can not participate of potential positive effects of the enlargement without structural adjustments. Due to the industrial situation in the observed sectors, the involvement is only small, the deficits in sectors with expected positive impulses are quite obvious. The economic situation constrains the possibilities to react on potential challenges. This is also the case in other parts of Europe like the South of Italy and parts of Greece despite the spatial closeness to the new Member States.

Map 16 EU enlargement - Types of regional sensitivity and effects



Combination of sectoral involvement and regional response potential*

- High involvement with strong competitiveness with potentially additional economic growth impulse
- Involvement in selected sectors with potentially positive effects on economic growth
- Average regional sensitivity
- Average involvement with potentially economic growth related to structural adjustments
- At present low involvement with explicit regional weaknesses

* The sensitivity was elaborated on the basis of the sectoral structure related to wage intensive and capital intensive sectors of activity (potential loser respective winner of the enlargement) combined with market acces and trade relations and the regional potential with economic structure and strenght and the innovation potential

Source: V. Schmidt-Seiwert: Regionale Wettbewerbsfähigkeit der Regionen der EU - Potenzielle Auswirkungen im Prozess der EU-Erweiterung, Bundesamt für Bauwesen und Raumordnung, Informationen zur Raumentwicklung Heft 11/12.2001, S. 789-797

5 Analysis of spatial pattern on European level

In the discussion paper for the EU informal ministerial meeting on territorial cohesion in Rotterdam, November 29, 2004 with respect to the ESDP the main territorial challenges in the enlarged EU regarding the main demographic, economic, social and environmental trends have been outlined.

The regions have to face demographic challenges and territorial impacts of an ageing population due to particularly natural demographic factors and despite potential challenges from migration. The population of working age is likely to decrease while a large and continuous increase in the proportion of the population aged 65 and over will rise the old-age dependency rates at EU-wide level.

Metropolitan areas and highly urbanised regions are going to experience higher population growth in future while regions with very low population densities are likely to continue to loose population.

The regional socio-economic disparities both in income and employment are deepening. However, weak economic performance is not confined to regions with the lowest levels of GDP per head. Problem regions are spread across the Union and also to the ESPON space. The problems affecting these regions stem from a number of different sources, including the decline of traditional industries, geographical features which constrain development, falling population and a decline in essential services, or a lack of innovative capacity.

In purely statistical terms, the gap between the richest and the poorest regions in the EU-25 has significantly widened compared with the situation within the EU-15. In addition, growth in the new Member States has been disproportionately concentrated in a few regions, particularly in capital cities and surrounding areas.

Growth remains obviously stronger in the EU core areas and in capital cities. Recent trends seem to show less polarised development and the growth of some urban areas at the margin or outside the pentagon: an extension of the core towards the east (Berlin, Munich, Vienna) as well as the growth of capital cities in Scandinavia (Stockholm and Helsinki have become economically strong, especially in new technologies), in the new Member States (significant growth in Budapest, Prague, Ljubljana and the capitals of the Baltic States) and in more peripheral parts of the EU (Dublin, Athens and Lisbon have experienced significant growth over the past decade). The existence of wide socio-economic disparities within cities has not significantly changed in the last years.

The EU territory contains a great diversity of rural areas. The challenges they are facing show a clear link to their location in relation to cities. The development of rural areas is based more and more on interactions with neighbouring areas, particularly urban centres. Increasing territorial diversity means that general measures applied uniformly between regions are no longer appropriate. Development policies need to take account of specific regional characteristics and potentials.

5.1 Thematic and territorial aspect of the EU structural funds reform

All these aspects can be found again, but deepened with respect to the sectoral fields involved in the debate and proposals concerning the structural funds reform after 2006. The proposals of the Commission for the operationalisation to identify the eligibility of related areas in the 3rd Cohesion report and the proposed structural funds regulation further specify the fields of intervention as well as the areas related.

The objective of convergence (objective 1) concerns the less developed regions for which the Treaty calls for a reduction in disparities between "the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas".

Objective 1 regions include those regions with a per capita GDP below 75% of the Community's average as well as those with a per capita GDP below 75% of the Community's average as calculated for the EU 15. The latter are regions in which objective economic circumstances have not changed, only due to the so-called statistical effect their GDP per head has moved above the critical value in the enlarged Union. In the interest of equity, and to allow the regions concerned to complete the process of convergence, these so-called "phasing out" regions obtain support on a diminishing scale.

Under the convergence objective, the European Regional Development Fund (ERDF) shall focus its assistance in these areas on supporting sustainable integrated regional development among other things in the thematic fields of:

- research and technological development (R&TD)
- innovation and entrepreneurship
- small and medium-sized enterprises (SMEs)
- information society

Under this objective the European Social Fund (ESF) pays special attention to the improvement of the labour market related to human capital and employment opportunities

Related to the new objective of regional competitiveness and employment outside the least developed regions (objective 2) two groups of regions are distinguished:

The regions currently eligible for Objective 1 no longer fulfil the criteria for the convergence priority, neither with nor without the statistical effect of enlargement. Such regions will benefit from support on a transitional basis (under the heading "phasing in") which will follow a path comparable to that for regions no longer eligible for Objective 1 in the period 2000-2006.

The second group comprises all other regions of the Union covered neither by the convergence programmes nor by the "phasing in" support described above.

In these areas major concern of the Member States is related to economic, social change and restructuring, trade globalisation, a move towards a knowledge-based economy and society, an ageing population, growing immigration, labour shortages in key sectors and social inclusion problems.

The Commission, aware of its important role to play, proposes a two-fold approach:

Within the ERDF, cohesion policy will help regions by strengthening their competitiveness and attractiveness and taking into account existing economic challenges related to economic change in industrial, urban and rural areas.

Financed by the ESF, the economic change will be supported by policies aiming at full employment, quality and productivity at work, and social inclusion.

The territorial effects in this context will be considered by taking into account:

- The urban dimension
- rural areas and areas dependent on fisheries
- Less densely populated or depopulating areas
- areas with natural handicaps
- outermost regions

5.2 Analysis of spatial pattern

An investigation of problem related spatial pattern should orient on the procedure of the delineation of eligible areas as it is done related to the EU structural funds. This facilitates argumentation in policy related support.

Simulating this classical approach for the delineation of eligible areas in the first step the potential objective 1 matching the convergence criterion will be identified, followed in the second step by the analysis of potential territorial problem related areas outside objective 1 as one part of an overall analysis covering the whole ESPON territory.

5.2.1 Model calculation of potential objective 1 regions in the European Union after 2006

With the intention to concentrate the Structural Funds means to the "poorest" regions of the enlarged Union, in the Third Cohesion Report the Commission of the Union pays attention to the considerable aggrandisement of regional disparities due to the enlargement. In this sense, the concentration within the Cohesion fund is thought to support growth in the least favoured member states and within the framework of objective 1 of the structural funds in the respective regions.

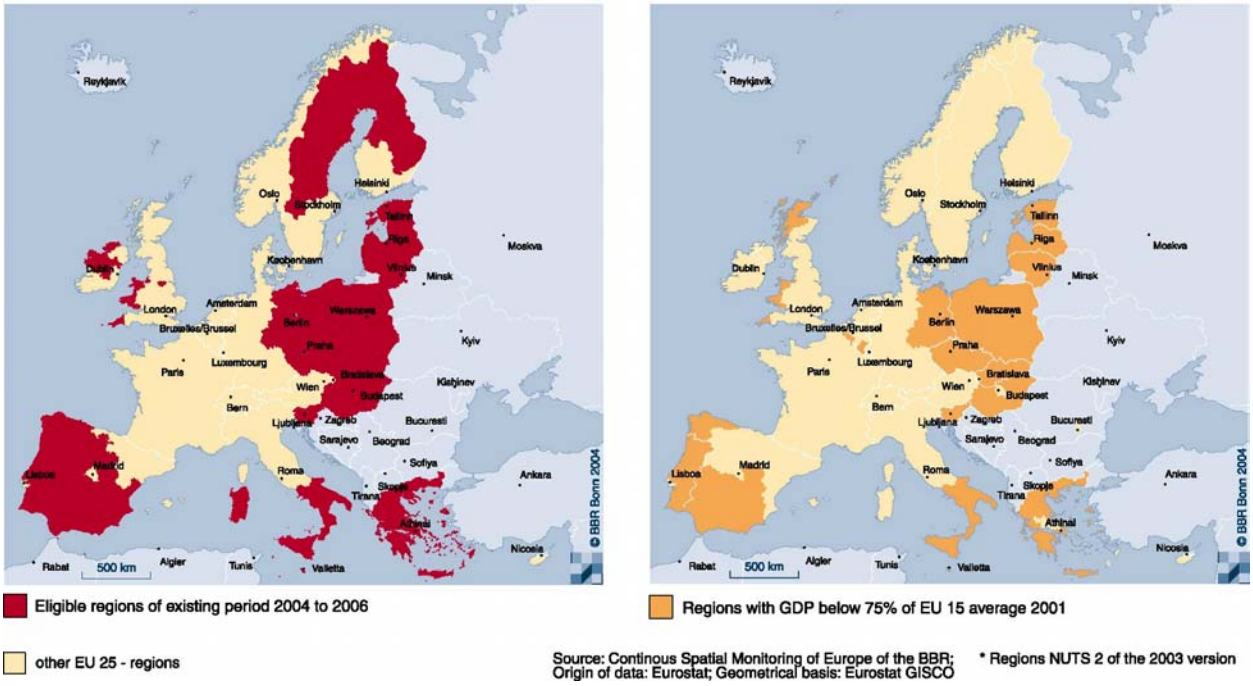
In respect to the delineation of the objective 1 regions of the EU 25, a scenario will be elaborated for time period of data which will be appropriate for the structural fund period delineation for 2007 until 2013.

Concerning objective 1, the corresponding GDP data will cover the years 2001, 2002 and 2003. With regional data available for 2001 and 2002 in the project lifetime only one year has to be estimated to cover the whole period. This will be done on the basis of the data available on national level and the regional distribution taking into account regional trends and disparities.

A first preview of the envisaged analysis, on the basis of by now available data for the year 2001 only, shows already some interesting results.

In the funding period until 2006 almost all regions of the accession countries besides Praha, Bratislava and Cyprus are integrated in the existing Objective 1 setting (see map 17).

Map 17 Objective 1 eligible regions 2004 to 2006 and regions with GDP below 75% EU15 average 2001



About 158m inhabitants, that is 35 % of the total population of the EU 25 live in those economically handicapped regions. In the new member states with 72m these are 98 % of the population. In the old member states, about 84m people, i.e. 22 % of the population, live in these economically disadvantaged regions (NUTS 2 regions as per 2003 version).

In the conception of the Commission for the determination of potential Objective 1 regions, a regional division of the by now enlarged Union into a two-class delineation is foreseen using 75 % of the regional GDP in Purchasing Power Standards.

In 2001, the average GDP in PPS of the enlarged Union reaches 91 % of the according value of the EU 15. The mean value of the accessing countries lies at about 50 % of the EU 25 average value.

Using the GDP of 2001 and the 75 % threshold of the EU 15, the former regional setting more or less persists. The different economic developments of the member states only leads to minor regional adjustments (see map 2).

Table 3 "Phasing-out" and "phasing in" regions

"Phasing-Out": regions affected by the „statistical effect"	**"Phasing-in": Objective 1 regions of the existing Structural Funds period with a GDP above 75% of EU 15 average in 2001**
Belgium:Prov. Hainaut, Prov. Luxembourg	United Kingdom: South Yorkshire
Deutschland: Brandenburg – Südwest, Leipzig	Österreich: Burgenland
Espana: Principado de Asturias, Región de Murcia	Espana: Castilla y León, Comunidad Valenciana, Canarias
Greece: Dytiki Makedonia, Attiki	Ellada: Sterea Ellada, Notio Aigaio
Italia: Basilicata	Suomi-Finland: Itä-Suomi, Pohjois-Suomi
Portugal: Algarve	Sverige: Mellersta Norrland, Norra Mellansverige, Övre Norrland
Ireland: Merseyside, West Wales and The Valleys, Highlands and Islands	Magyarország: Közép-Magyarország
Malta	Portugal: Região Autónoma da Madeira
	Ireland: Border, Midlands and Western
	Italia: Sardegna

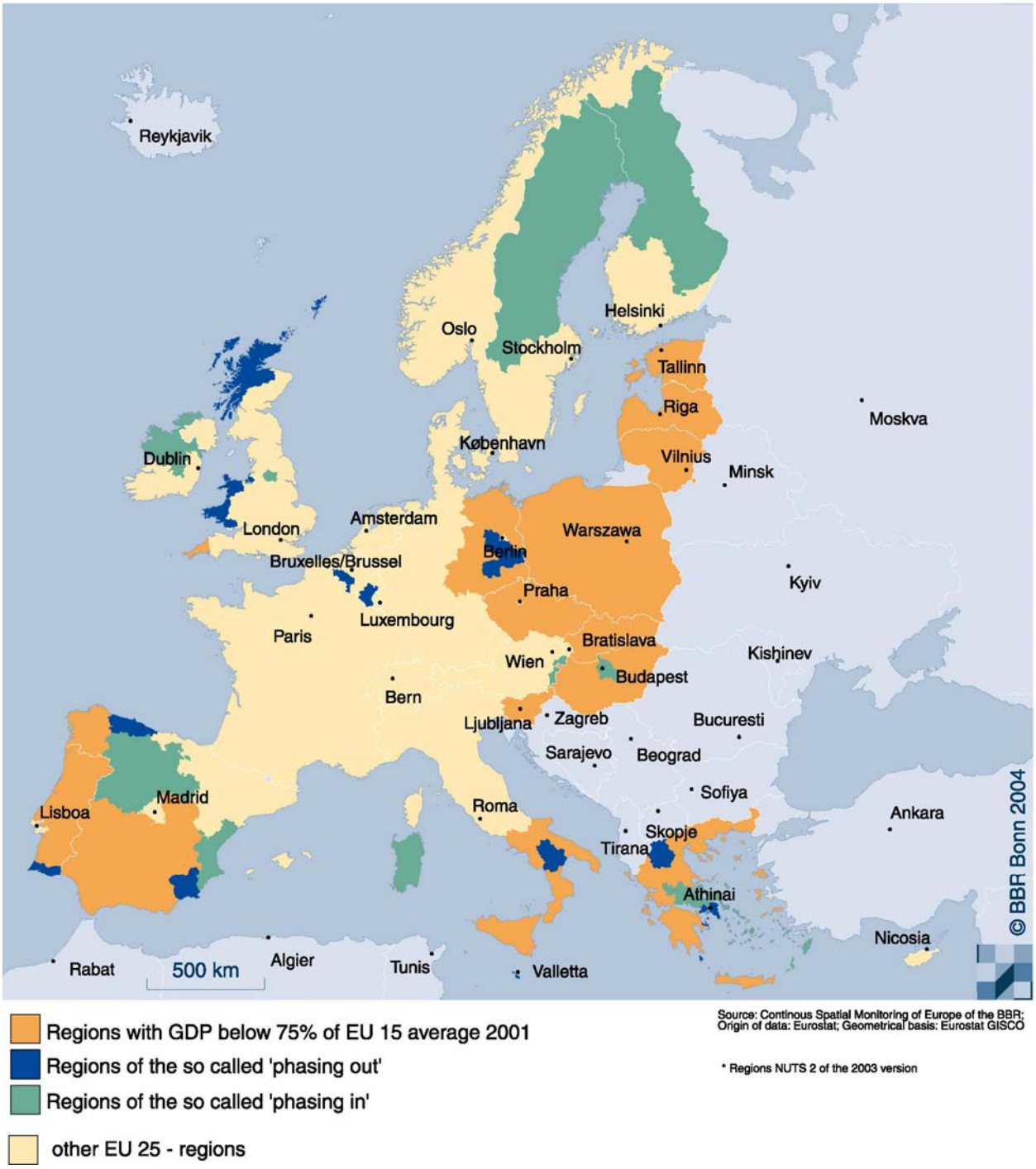
Source: Own calculations; origin of data: Eurostat

This leads to the assignation of potential "proper" Objective 1 regions on the basis of available data for 2001. From the point of view of the European Commission, all regions below 75 % of the EU 15 average form eligible regions with regard to convergence and competitiveness. This group will be divided with different intensities of assistance into

- Objective 1 regions with a GDP per capita below 75 % of the EU 25 average
- "phasing out" regions with the so-called "statistical effect"
- "phasing in" regions of now existing eligible regions which no longer fulfil the convergence criteria (even without the statistical effects of the enlargement).

The "phasing-in" regions mark the transition from the aim of convergence to the new Objective 2 supporting regional development in respect to regional competitiveness and employment.

Map 18 Potential objective 1 regions according to 2001 GDP



On the basis of 2001 GDP figures the new potential regional setting of assistance, which has developed from the existing Objective 1 regions, will look as follows (see Map 2). The "real" Objective 1 regions will concentrate in the new cohesion countries, parts of Eastern Germany and one region in the United Kingdom.

The regions of south-east Brandenburg and Leipzig will be the „statistically affected" regions in the Eastern part of Germany.

Italy and Portugal are, compared with Greece and Spain, less affected by out-phasing regions.

In Northern and Western Europe, only Cornwall remains an Objective 1 region. While Wales and the Scottish Highlands and Islands are "statistically affected" all other regions in Ireland and Scandinavia will loose their Objective 1 status.

As the example of Belgium shows, the set of eligible areas is fundamentally determined by the economic development. In some cases, an assignment of the regions at the very moment is difficult due to the existing data base. Regions like Dytiki Makedonia in Greece or Hainault in Belgium with a GDP per capita of 75.1 % or 75.5 % of the EU average respectively are to be seen as uncertain candidates.

Table 4 Population in potential eligible areas after 2006

Member state	Population 2001	Population in objective 1 regions* 2004-2006*		Population in regions* with GDP per capita 2001 below 75% of the EU15 average		Population in regions* with GDP per capita 2001 below 75% of the EU25 average		Population in regions* affected by the "statistical effect"	
	Total	total	in % of total population	total	in % of total population	total	in % of total population	total	in % of total population
Österreich	8.032.203	275.473	3,4						
Belgique-Belgie	10.281.095			1.529.171	14,9			1.529.171	14,9
Deutschland	82.339.416	13.788.382	16,7	13.788.382	16,7	9.576.650	11,6	4.211.731	5,1
Danmark	5.356.993								
Espana	40.266.315	23.445.621	58,2	15.150.116	37,6	12.958.389	32,2	2.191.727	5,4
Suomi-Finland	5.188.100	1.306.999	25,2						
France	59.188.063								
Ellada	10.937.790	10.937.790	100,0	10.083.367	92,2	5.885.457	53,8	4.197.910	38,4
Ireland	3.852.994	1.015.616	26,4						
Italy	57.927.001	19.231.604	33,2	17.585.478	30,4	16.981.371	29,3	604.108	1,0
Luxembourg	442.000								
Nederland	16.043.205								
Portugal	10.293.190	7.689.862	74,7	7.445.609	72,3	7.051.943	68,5	393.666	3,8
Sverige	8.896.002	1.716.601	19,3						
United Kingdom	58.838.309	4.983.425	8,5	4.086.319	6,9	502.101	0,9	3.584.218	6,1
Kypros	705.998								
Ceska Republika	10.220.016	9.055.583	88,6	9.055.583	88,6	9.055.583	88,6		
Eesti	1.367.002	1.367.002	100,0	1.367.002	100,0	1.367.002	100,0		
Magyarország	10.187.986	10.187.986	100,0	7.357.984	72,2	7.357.984	72,2		
Lietuva	3.481.013	3.481.013	100,0	3.481.013	100,0	3.481.013	100,0		
Latvija	2.355.003	2.355.003	100,0	2.355.003	100,0	2.355.003	100,0		
Malta	392.999	392.999	100,0	392.999	100,0			392.999	100,0
Polska	38.640.027	38.640.027	100,0	38.640.027	100,0	38.640.027	100,0		
Slovenija	1.991.996	1.991.996	100,0	1.991.996	100,0	1.991.996	100,0		
Slovensá Republika	5.402.980	4.801.420	88,9	4.801.420	88,9	4.801.420	88,9		
EU15	377.882.675	84.391.372	22,3	69.668.442	18,4	52.955.911	14,0	16.712.531	4,4
Acceded countries	74.039.021	72.273.029	97,6	69.443.026	93,8	69.050.027	93,3	392.999	0,5
EU 25	452.627.694	156.664.400	34,6	139.111.468	30,7	122.005.938	27,0	17.105.531	3,8

Source : Spatial Monitoring System of Europe of the BBR; origin of data: Eurostat

* Region NUTS 2 in 2003 version

5.2.2 Territorial patterns of regional competitiveness and employment

This part of the analysis will deal with the actual investigation of problem related areas and regions in European context a problem related examination of geographical handicapped regions.

The results can be taken into account in a step further within a combination of different ESPON findings like the MEGA or urban-rural typology with transport axis respective accessibility aspects in the search for e.g. urban concentration zones that are developing along the European transport corridors as development axes or urban poles that function as urban gates towards the new outside European neighbouring areas, the European Pentagon and it's expansion towards the south and east.

Main emphasis will be put on key geographical areas, thematic fields and key sectors taking into account the spatial dimensions of the regional competitiveness and employment related objective mentioned above.

Within the problem related approach ESPON results from transnational project groups elaborated so far will be matched with quantitative proposals for the delineation of regions eligible to objective 2.

With concentration on objective 2 related indicators measuring e.g.:

- Degree and structure of unemployment
- Development and structure of employment
- Educational level
- R&D and Innovation

The aim is the identification of e.g. (just to mention a selected range at this stage):

Urban areas with structural problems

Potential urban growth poles

Rural regions with structural problems

Regions undergoing industrial restructuring

Regions with special labour market problems

To cover the different nature of problems and aspects in the spatial context the relating statistical criteria have be compared with selected average values like EU 25, Member State as well as to regional averages. In the combination of different indicators like e.g. unemployment, employment,

educational level, GDP and population policy relevant weighting factors for each criterion will be considered to match the analytical importance. Topic related EU documents will be investigated in this respect.

Furthermore, it could be worthwhile setting these indicators in relation to the goals of the Lisbon strategy, calculating e.g. the demands of additional regional employment as well as the growth in GDP. This will include an ESPON data base related evaluation of the Lisbon indicators in relation with ESPON project 3.3.

As related to ESPON typologies and classifications and under consideration of regional delineations e.g. of the mountain and island studies of the Commission, the results will be combined with the above mentioned urban and rural dimension and geographic handicapped regions as well as e.g. peripheral and low accessibility areas.

For these areas the identification of imbalances or potentials is of great importance. Concerning the key factors, it is of high interest to filter those with major impact on territorial development taking into account the above mentioned priority spatial patterns of European interest where the key factors will be tested and synthesised.

With a multi–criteria spatial synthesis of the above spatial analysis priorities and key factors an attempt will be started to profile global spatial integration zones, stressing their major spatial features, potentials and bottlenecks through a European level approach.

6 Analysis of transnational co-operation fields and areas

Within the ESPON project 2.4.2 the transnational level is according with the meso level in line with the so-called three level approach. Main aim of the analysis concerning the transnational co-operation fields and areas is to identify transnational spatial patterns with a high potential for added value through territorial co-operation. One main difficulty of this aim is the complexity of what could be understood and what is meant by the term transnational areas. Transnational areas are on most European activity fields not clearly defined. Most important research topics are therefore the following:

- How can transnational areas be defined?
- How do they look like?
- What are their main characteristics?
- Is there a possibility to delimit such areas by statistical analysis, i.e. by impartial criteria?
- How important is homogeneity within these areas?

6.1 Lessons learnt from ESPON 3.1

One of the most important ESPON tasks is the translation of political spatial concepts into a more concrete and measurable basis with the help of statistical and territorial analysis. In this respect regional classifications 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 a 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.

The ESPON data base, developed within ESPON 3.1, as well as additional indicators provided by ESPON projects play therefore a decisive role in order to provide the information required. It includes unique ESPON results as well as fundamental regional background information necessary for the analysis of European regional structures and trends. The data base is composed of core data, indicators and typologies that provide the common backbone of the ESPON projects. Particularly the indicators can be seen as fundamental for the analysis of spatial structures and trends within the ESPON territory.

Regarding the meso level analysis of ESPON 2.4.2 – the identification of transnational spatial patterns with a high potential for added value through territorial co-operation – these data and indicators form a crucial part and two related analysis methodologies out of ESPON 3.1 will be enhanced and applied: the discriminant analysis and the Regional Classification of Europe (RCE).

Both methodologies are applied on different levels concerning their spatial scope and thematic differentiation. While the discriminant analysis can be used to identify the extent to which a given transnational region builds a homogeneous region compared to those regions not included, the factor analysis shows homogeneous and heterogeneous patterns within a given transnational region disregarding comparisons to not included regions.

In order to scrutinise the applicability of these data-based analytical methods for the delimitation of possible transnational co-operation areas they were in a first step exemplarily applied for some of the existing INTERREG IIIB co-operation areas. It has to be stressed that the using of the INTERREG areas is not the focus of the programmatic direction of the ESPON 2.4.2 project, but these areas are suitable starting points for the examination of transnational identities through discriminant analysis and the Regional Classification of Europe (RCE).

The following chapters are therefore describing the up to now elaborated results of the appliance of these two methodologies on transnational level.

6.1.1 Application of Discriminant Analysis and RCE / Factor Analysis for the purpose of territorial co-operation[1]

With the application of the discriminant analysis in the field of territorial co-operation one main question should be answered: Is it possible to characterise and identify homogenous transnational areas by indicators? The answer is yes. By means of this analysis methodology it becomes apparent that specific criteria are characterising one co-operation area and delimits these regions against others. Or to say it in another way: specific indicators are illustrating the specific characteristics of a co-operation area. The application of the discriminant analysis leads therefore to a quite unambiguous differentiation of the existing INTERREG IIIB co-operation areas concerning their spatial and socio-economic structure.

[1] RCE and Factor Analysis have been described in more detail in chapter 4 "Situation analysis of ESPON Space", see above.

The potential differences and the homogeneity of the INTERREG IIIB co-operation areas can be examined and highlighted by the F-Ratios of the used indicators. The F-Ratio describes in this context the significance of an indicator for a certain spatial setting. The higher the F-Ratio the higher is the indicator's significance for the characterising or typing of an area.

Building up on few indicators with highest F-Ratios, which are primarily characterising the current microstructure of co-operation areas (spatial patterns, socio-economic situation, risk of natural hazards, research and development potential etc.) some INTERREG IIIB examples have been chosen in order to visualise the possibilities for delimiting transnational co-operation areas on a statistical basis.

In addition to the application of discriminant analysis, ESPON 2.4.2 will proceed with the Regional Classification analysis of Europe, including factor analysis. The aim of using this kind of analysis on the transnational level is to show the homogeneity or heterogeneity of regions compared with each other and in relation to a larger area, for example an existing INTERREG IIIB co-operation area.

As shown above[2] the grouping of 20 indicators has led to 6 different factors which can be labelled as following:

Factor 1: Accessibility

Factor 2: Economic growth potential

Factor 3: Unemployment

Factor 4: Research and Development

Factor 5: Demography

Factor 6: Agriculture

Concerning an analysis of potential transnational co-operation fields and areas the factor analysis is used in a first step to examine existing transnational co-operation areas of the INTERREG IIIB programme. In order to identify homogenous and heterogeneous features the transnational regions are characterised by the given factors, each factor classified into five categories (weak, below average, average, above average, strong). This examination leads to identification of patterns within the regions.

The following chapters are describing the results of the applied discriminant analysis in some chosen INTERREG IIIB co-operation areas. These examples are giving an idea of the possibilities for delimiting transnational areas on a

[2] For a more detailed explanation of the applied methodology and a full list of indicators used in the factor analysis see chapter 4.3 above.

statistical basis. Thereby the choice is in no way a valuation but demonstrates a non goal-orientated selection of examples for visualising the main results of the discriminant analysis.

Where feasible at this stage of work, the results of the discriminant analysis have been integrated with the results of the factor analysis. The outcome of the combination of these two methodologies leads to interesting insights concerning the specific characteristics of the whole co-operation areas in comparison to other regions as well as the internal structure of the area.

6.1.1.1 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.

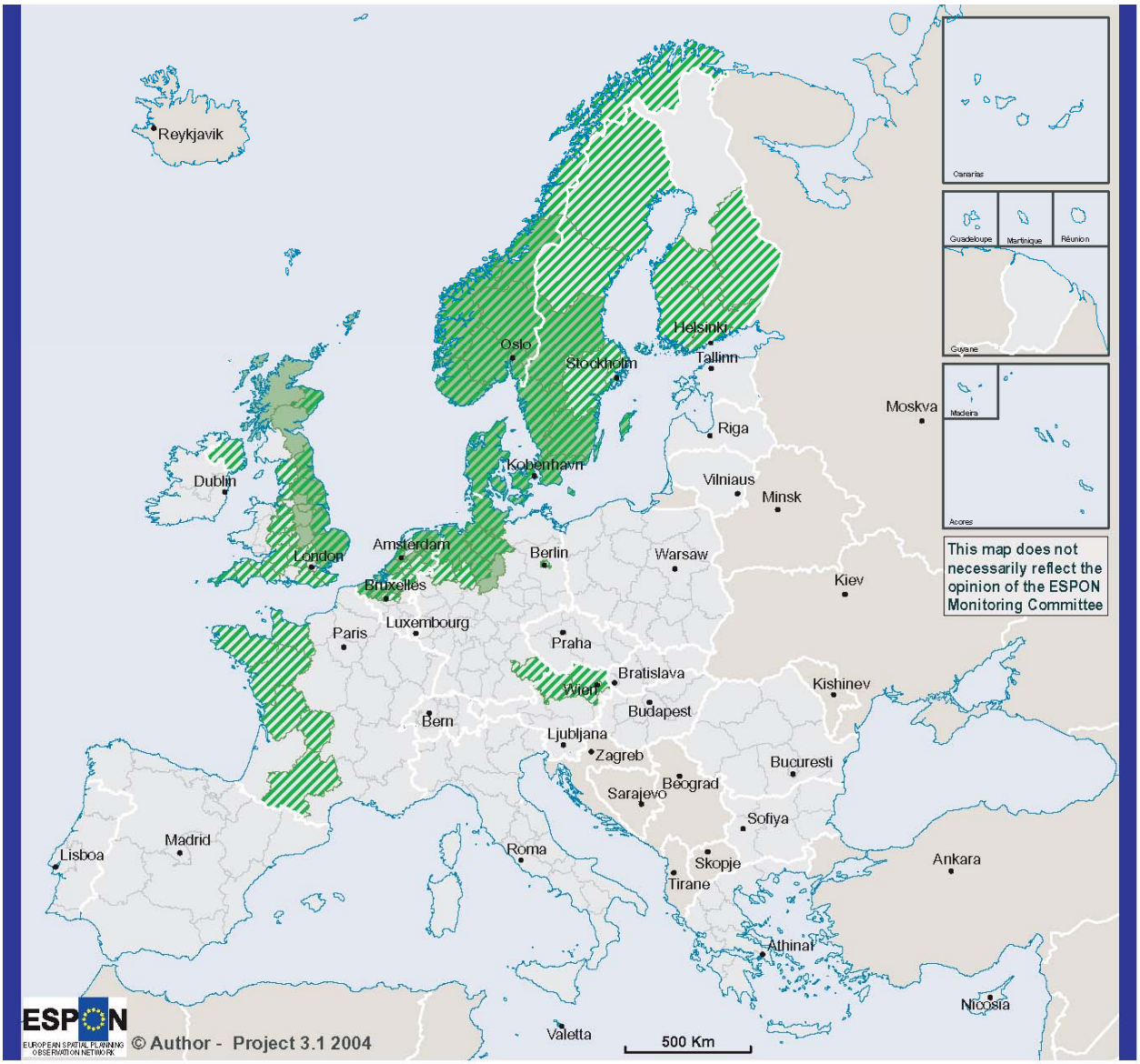
Regions outside the North Sea area, but estimated area member due to the indicator performance are regions like Niederösterreich and Wien, Vlaams Brabant, Niederbayern und Berlin, Itä and Väli Suomi, as well as some Dutch, British and Swedish regions not belonging to the area. Vice versa some British regions of the area like North and South Yorkshire, Eastern Scotland and the Highlands and Islands do not fit according their values and are grouped out of the area.

Highest F-Ratios separating the North Sea Area

Indicator	**5 highest F-Ratios**
REPRODUCTION POTENTIAL	38,48
EARTHQUAKE HAZARD POTENTIAL	26,22
INTERNET USERS	23,24
UNEMPLOYMENT	20,50
FIRMS WITH OWN WEBSITE	20,44

Source: ESPON project 3.1, final report, p. 344

Map 19 Potential Classification of Comparable Spatial patterns in Transnational Co-operation Areas – Example North Sea Region



Legend

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Regional Level: NUTS 2
Source: ESPON 3.1

Existing co-operation area

Co-operation area as a result of discriminant analysis

As the above figure shows, the discriminant analysis discloses a fairly wide range of regions which have similar spatial patterns and/or socio-economic structures as the existing INTERREG IIIB North Sea co-operation area. The estimation out of the analysis therefore leads to a significant enlargement of the existing area especially by regions in the northern part of Norway, the northern part of Sweden, the southern part of Finland as well as regions of Wales, northern Ireland and northern France. In contrast the statistical facts of nearly the whole of Scotland, the Middle of England and two regions in

mid Germany offer significant varieties compared with the North Sea Regions average. For purely statistical reasons the spatial shape of the North Sea Region would change noticeably but these results are not taking into account the important role of identical thematic problems or existing linkages between the regions around the North Sea.

6.1.1.2 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 field of Research and Development (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.

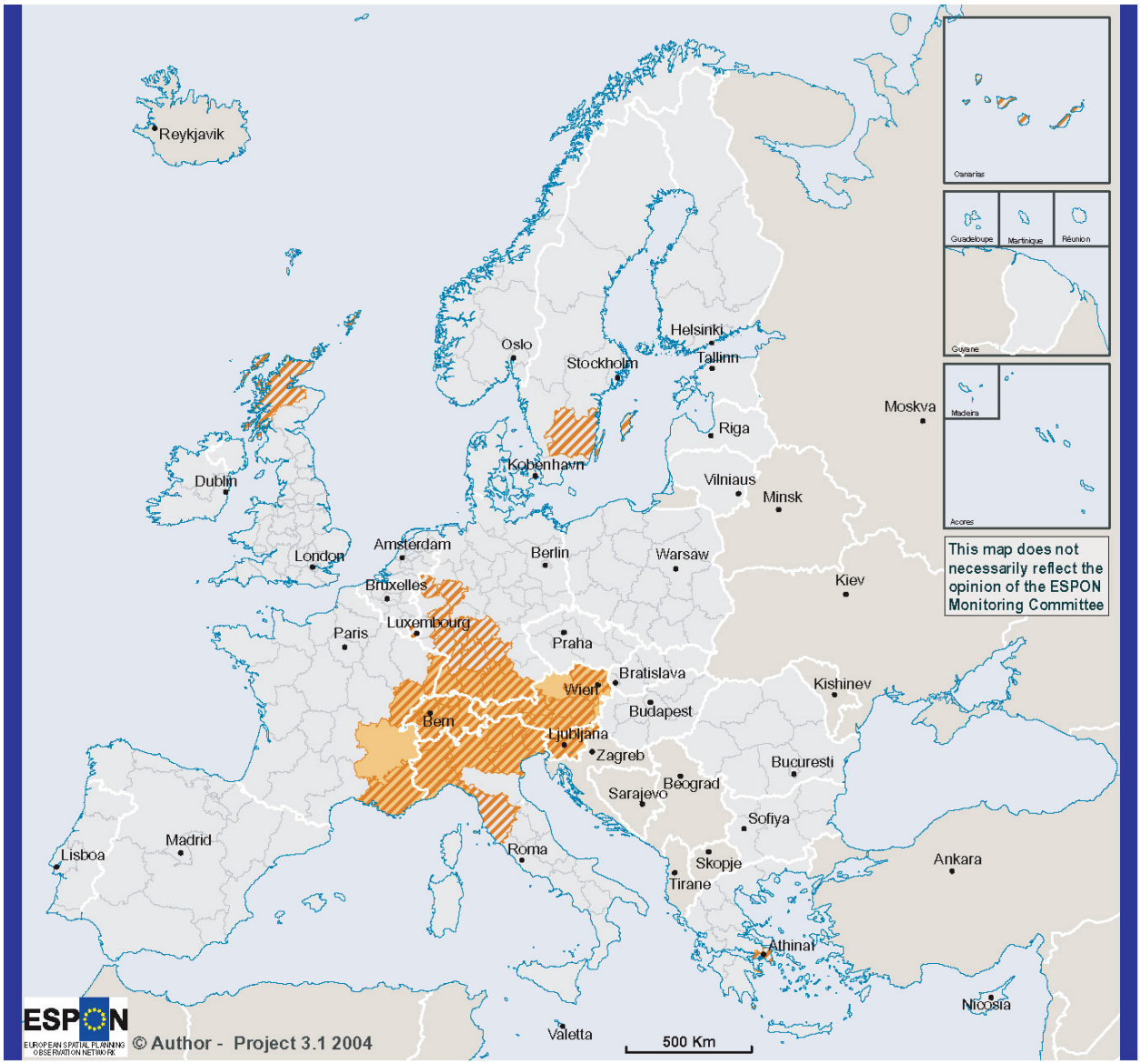
With 93,2 % of correct classified regions (cases) in the original classification the regional setting of the Alpine Space can be seen as solid. Only a few regions are estimated as not belonging to this space. These are Burgenland, Wien and Oberösterreich. According to their indicator values additional regions would be included into the area as the regions of Stuttgart and Karlsruhe, Mittel- und Unterfranken, und Karlsruhe in Germany, Canarias in Spain, Rhone-Alpes in France, the Toscana in Italy, Attiki in Greece, Småland med Öarna in Sweden and the Highlands and Islands in Scotland.

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, final report, p. 347

Map 20 Potential Classification of Comparable Spatial patterns in Transnational Co-operation Areas – Example Alpine Space



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© EuroGeographics Association for administrative boundaries

Regional Level: NUTS 2

Source: ESPON 3.1

Existing co-operation area

Co-operation area as a result of discriminant analysis

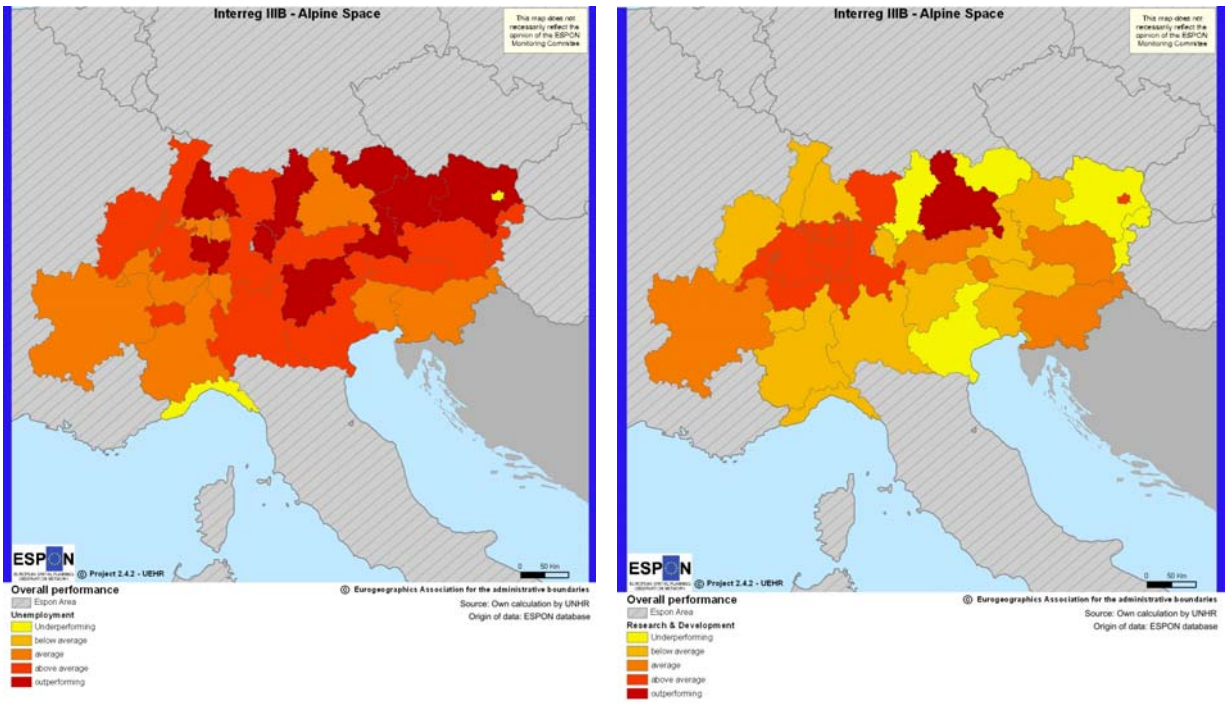
Concerning the estimated coverage of the Alpine Space the discriminant analysis shows similar spatial structures and patterns beyond the existing co-operation area. Some of the results might be astonishing and it has to be stressed that all regions are treated the same by this kind of statistical analysis. The real location of regions and the spatial microstructure does not carry weight. Remarkable is the fact that two regions of the existing Alpine Space area (one in the southern part of France and one in Austria) are estimated to be excluded because of statistical reasons. In the purpose of

these results it could be interesting to deepen the view on this regions, identify the regional distinctions and reflect these more detailed results with real spatial flows and merges.

Results of the factor analysis regarding Unemployment and Research & Development

The discriminant analysis stressed that among other things the indicators "R & D personnel in business sector" and "youth unemployment" are the ones which are separating the alpine space from other co-operation areas. Mirrored against the results of the factor analysis a more detailed picture can be given.

Map 21 Alpine Space – Unemployment and Research & Development



Regarding the "economic growth potential" the area is quite balanced. The majority of the regions are on the average or below the average. Only some regions like Rhone-Alpes, Liguria and Suisse du Nord-est Zuerich are strong or - like Slovenia and Suisse Orientale – are weak in this respect. A rather homogenous picture is also shown according to the results of the factor "Unemployment". All the regions fluctuate from average to strong with the exception of Liguria and Wien.

Comparing with the discriminant analysis one could argue that the characterising importance of the indicator "unemployment" is acknowledged because of the quite homogenous picture of the whole area. Nevertheless this indicator has to be examined in more detail. Whereas the low level of youth unemployment is separating the Alpine Space from other co-operation

areas the factor analysis shows in an internal view that except two exemptions the Unemployment rate is on average at best or above average. This means that the Alpine Space is performing quite well in Europe-wide comparison but has still some internal structural problems regarding the employment market.

In "Research & Development" there are few regions in Switzerland that perform above the average and only one, Oberbayern that is strong. All the others perform below the average.

In this context the factor analysis shows a more differentiated situation inside the Alpine Space. Whereas the high range of employment in the Research & Development sector is separating this co-operation area from the others (discriminant analysis) the internal view stresses that only few regions are above average but most of them are below.

6.1.1.3 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 co-operation area.

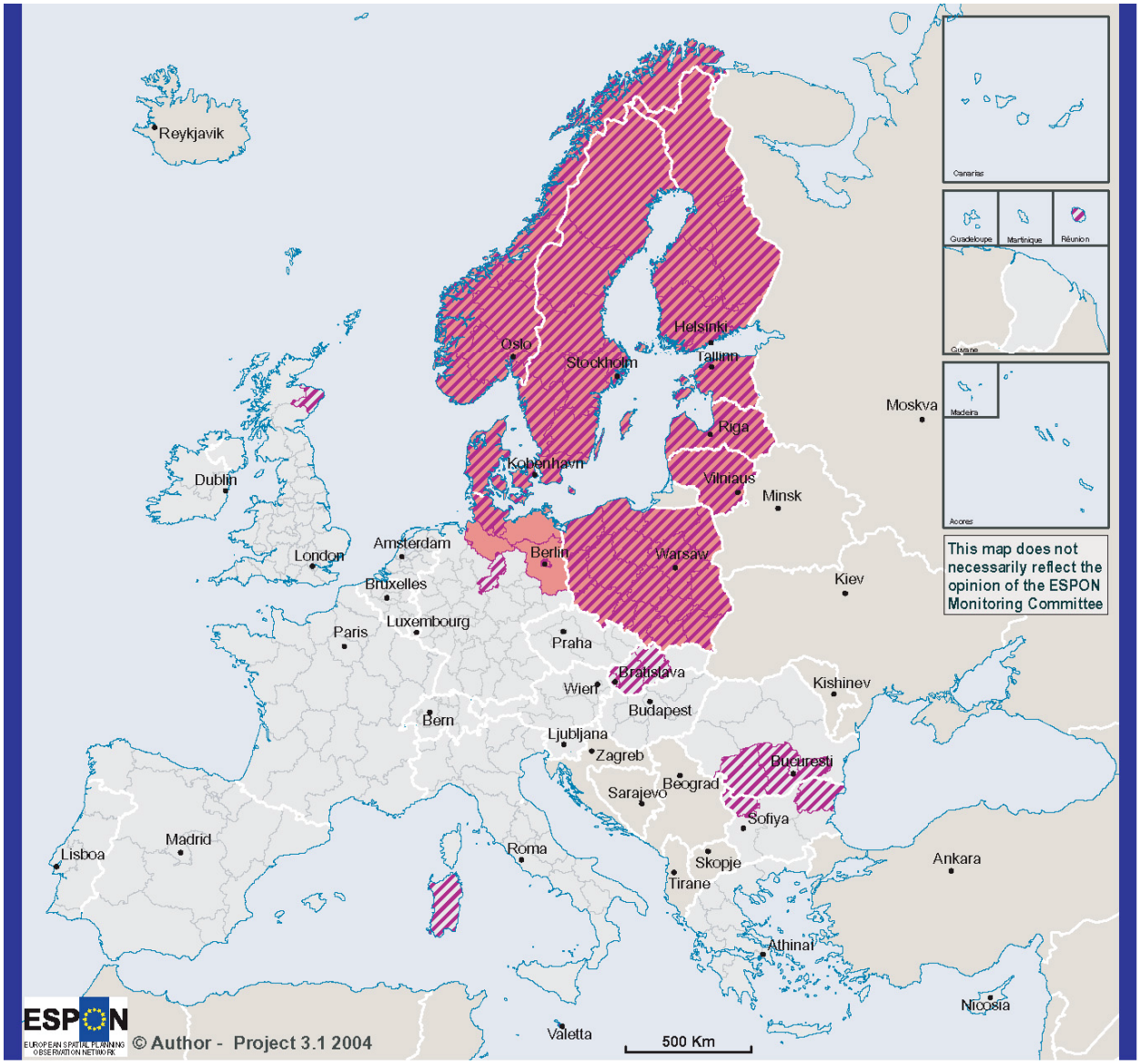
Four regions are regrouped outside the area, those are Brandenburg, Hamburg, Mecklenburg-Vorpommern and the region Lüneburg all in Germany. To the Baltic Sea area would belong in respect to their spatial characteristics regions like Severozapaden and Severen Tsentralen in Bulgaria, Réunion and Sardegna in France respective Italy, Malta, the southern regions of Romania large parts of Slowakia and North Eastern Scotland.

Highest F-Ratios separating the Baltic Sea Area

Indicator	5 highest F-Ratios
FLOOD EVENTS	44,46
DEVELOPMENT OF UNEMPLOYMENT	43,33
EARTHQUAKE HAZARD POTENTIAL	37,99
POTENTIAL ACCESSIBILTY ROAD	29,07
OUTPUT/INPUT RATIO AGRICULTURE	22,76

Source: ESPON project 3.1, final report, p. 348

Map 22 Potential Classification of Comparable Spatial patterns in Transnational



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Regional Level: NUTS 2

Source: ESPON 3.1

Legend

Existing co-operation area

Co-operation area as a result of discriminant analysis

Co-operation Areas – Example The Baltic Sea Area

For the Baltic Sea Area it stands out that the estimated co-operation area is fairly well in line with the existing one. Nevertheless the analysis shows structural heterogeneity particularly in the northern part of Germany. Nobody would seriously argue that the regions Brandenburg, Hamburg, Mecklenburg-Vorpommern and Lüneburg should be excluded from the Baltic Sea co-operation. But in terms of "accessibility" or "output/input ratio agriculture" these regions are showing noticeable differences compared to

Baltic Sea Regions average. Interesting is also the estimated inclusion of eastern Scotland. In sense of a consolidation it could be useful to rethink the structural similarities and varieties of this part of Scotland in comparison to the remaining Baltic Sea Area.

6.1.1.4 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 West Europe from the other regions.

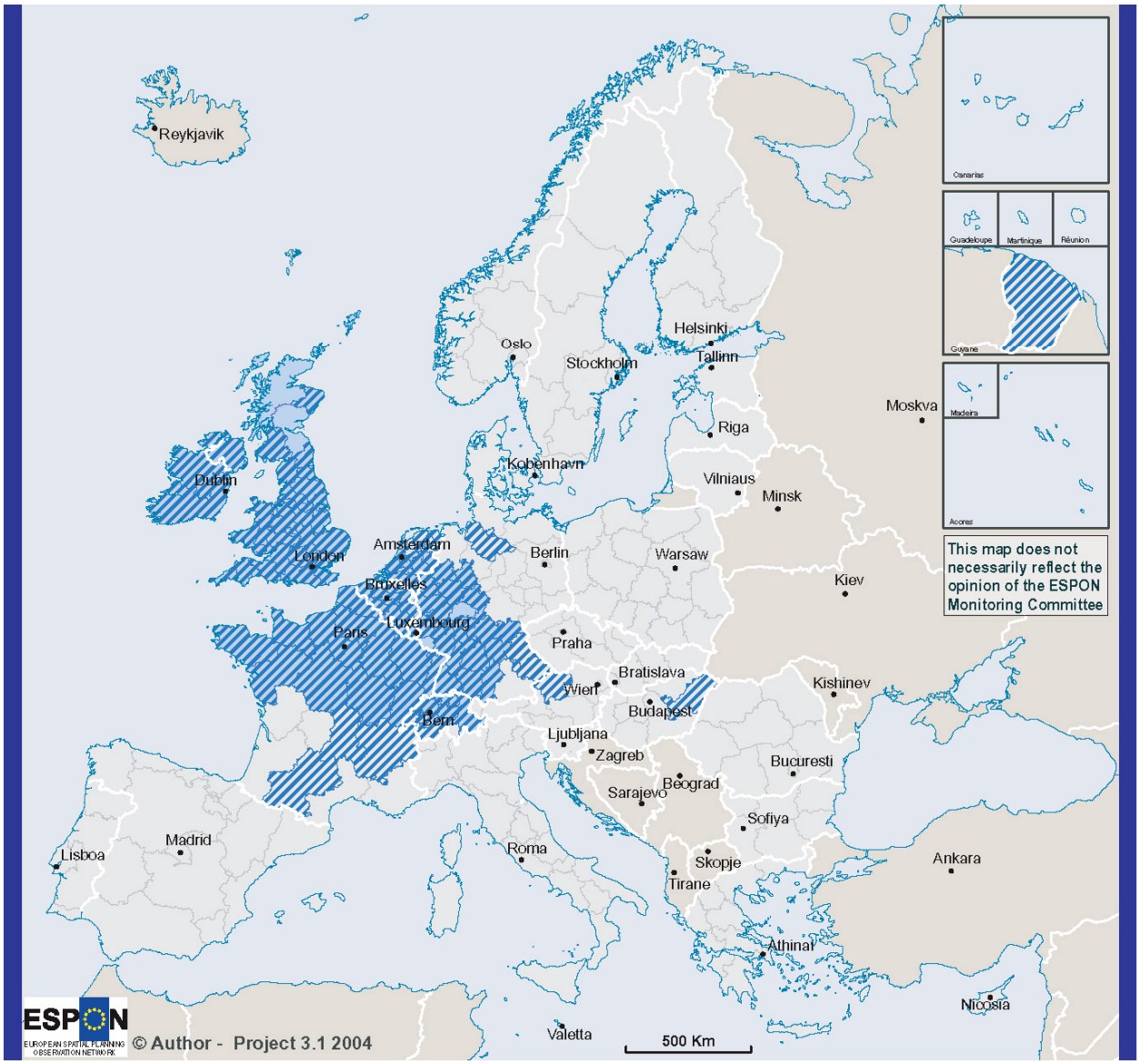
The estimated regional shape leads related to the dominance of accessibility to a modified regional shape in a more South and South East direction, excluding the regions of Ireland, Northern England and Scotland and Basse Normandie in France and instead including Western parts of Austria, parts of Switzerland 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.

Highest F-Ratios separating North West Europe

Indicator	5 highest F-Ratios
POTENTIAL ACCESSIBILITY RAIL	225,23
POTENTIAL ACCESSIBILTY 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, final report, p. 350

Map 23 Potential Classification of Comparable Spatial patterns in Transnational Co-operation Areas – Example North West Europe



Legend

Existing co-operation area

Co-operation area as a result of discriminant analysis

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Regional Level: NUTS 2
Source: ESPON 3.1

Estimated changes regarding the spatial shape of the current co-operation area North West Europe are mostly caused by the indicators for accessibility in all transport sectors. Regarding to this indicator particularly regions in the middle and southern part of France seem very much to be comparable with the situation in the whole co-operation area North West Europe. Just this kind of statistical comparableness is not to be found in the northern part of Scotland whereby these areas are getting a bit out of the line. Especially for

the case of North West Europe it could be interesting to deepen the analysis in order to find out if these areas could be shaped more precisely.

6.1.1.5 The Atlantic 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 regions like Cheshire, Herfordshire and Shropshire in the United Kingdom and Galicia and Andalucia in Spain will be estimated outside the Atlantic Arc.

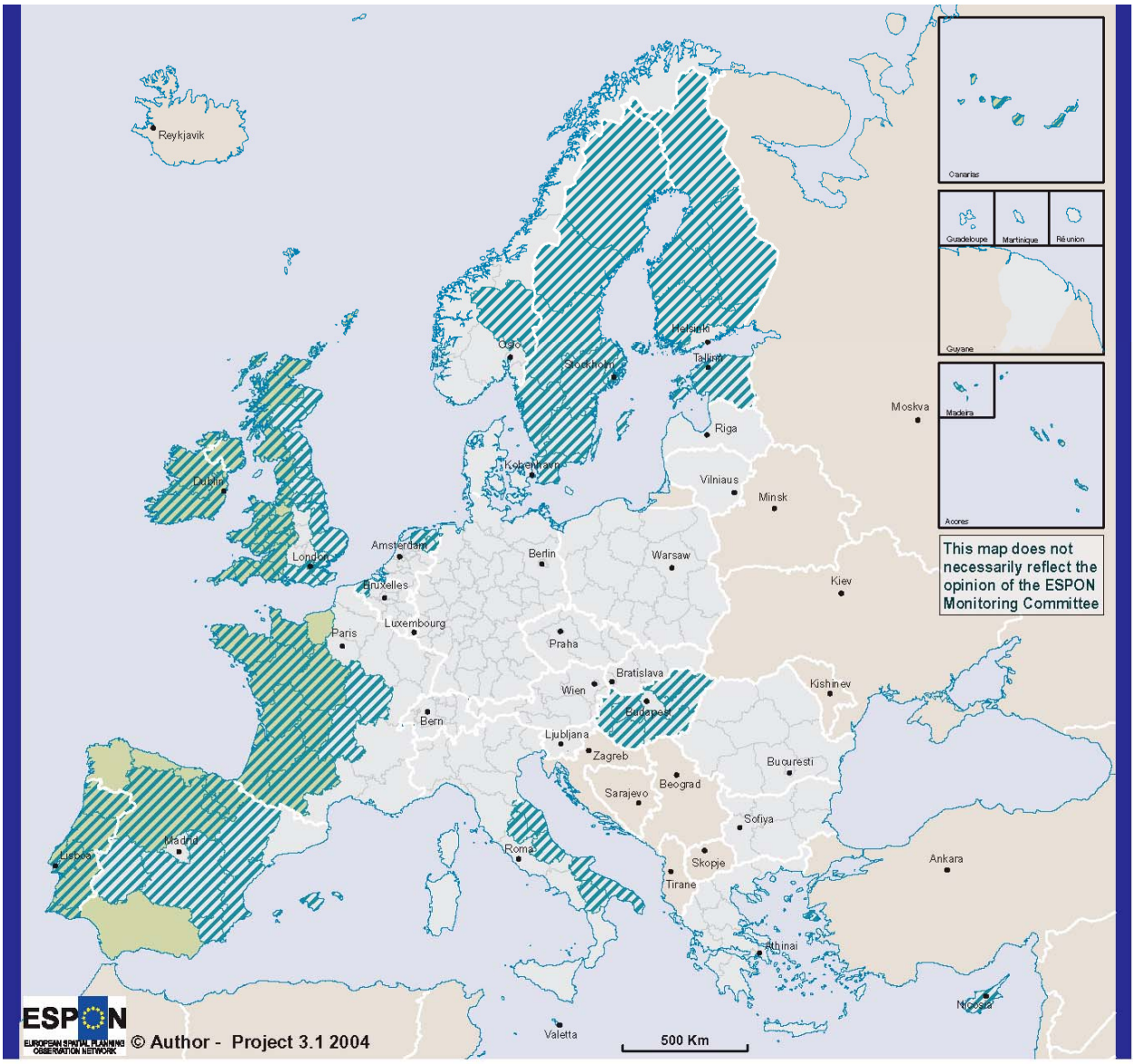
Indicating and emphasising the fringe situation of the original classification are those regions which will belong into the classification due to the value characteristics. Those are Scottish regions and regions in South West England, almost all Swedish Regions and Hedmark og Oppland in Norway, the Aegean Islands of Greece as well as Umbria and Marche in Italy and finally the region Eszak Alföld in Hungaria.

Highest F-Ratios separating North West Europe

Indicator	**5 highest F-Ratios**
POTENTIAL ACCESSIBILITY RAIL	225,23
POTENTIAL ACCESSIBILTY 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, final report, p. 350

Map 24 Potential Classification of Comparable Spatial patterns in Transnational Co-operation Areas – Example The Atlantic Arc



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Regional Level: NUTS 2

Source: ESPON 3.1

Existing co-operation area

Co-operation area as a result of discriminant analysis

This co-operation area is mostly characterised by its weak performing in terms of accessibility. Therefore the above figure shows that – because of similar structures in many other regions – this co-operation area would be extended in a significant way. The results of the discriminant analysis particularly indicate that - with the exemption of Hungary – many costal regions in the eastern part of Great Britain and Italy, in the Netherlands and in south Spain are having comparable structures as the current Atlantic Arc

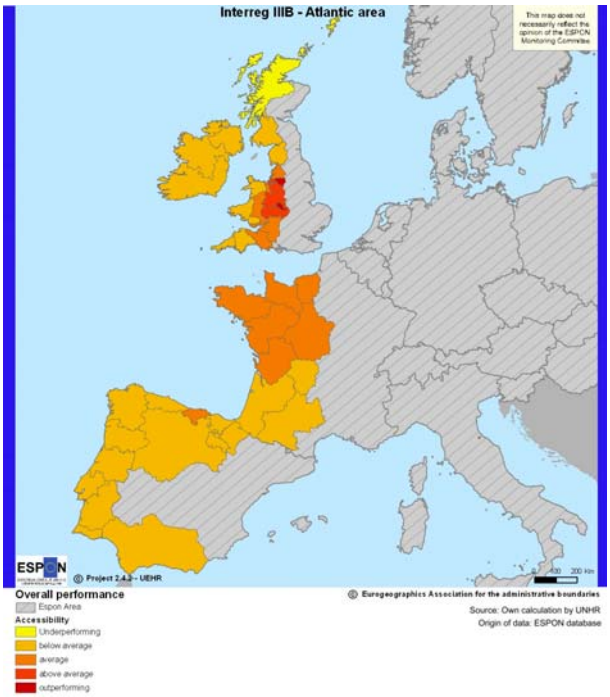
Area but are not covered by it. Additionally Sweden, Finland and Estonia are featuring the similar structural characteristics. In the same time regions in the northern and southern part of Spain as well as in north France would be excluded due to verifiably structural varieties.

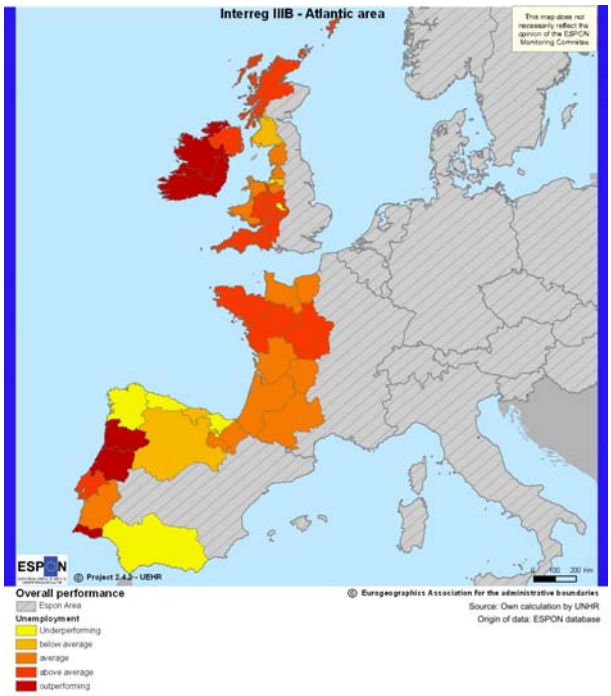
Whereas some consolidations could be useful in sense of territorial transnational co-operation and hence should be discussed the results show also that by the estimation of the Atlantic Arc by the discriminant analysis the results would lead to a disintegration of the existing co-operation area. But this finding follows only on a purely statistical analysis. Experiences in transnational co-operation have shown that similar topics and spatial references between the co-operating regions are important aspects for successful working together. Because of the non existing spatial criteria the discriminant analysis is only able to show statistical relatedness between regions but no flows or linkages with neighbouring ones. The effective delimitation of the Atlantic Arc Area against the background of structural and spatial criteria important for sustainable territorial co-operation would therefore yield to a different coverage as shown in the figure above.

Results of the factor analysis regarding Accessibility and Unemployment

Beside the results of the discriminant analysis those of the factor analysis could give a more deepened picture of the internal situation of the Atlantic Arc Area.

Map 25 The Atlantic Arc – Accessibility and Unemployment





This co-operation area is not very well situated as far as "Accessibility" is concerned. The whole area performs around the average and only the north part of UK is weaker. The analysis shows a more or less homogenous internal picture of the regions in this respect.

This underlines the results of the discriminant analysis which has identified the peripheral location as the most significant separating indicator for the co-operation area in comparison with others areas in the ESPON territory.

The results of the "Unemployment" factor are rather vague. There are regions that are strong like Norte and Centro in Portugal, but also regions that are weak like Galicia in Portugal and Andalucia in Spain. Therefore one is not able to argue that the regions range to the same level.

The indicator "Unemployment" was the most significant one beside the "Accessibility" within the discriminant analysis. Nevertheless a more detailed view on the internal situation shows remarkable disparities between the Atlantic Arc regions. Whereas the above average range of Unemployment is significant in comparison to other INTERREG IIIB areas some regions are quite well performing in the internal comparison due to a low level of Unemployment. The results of the factor analysis are showing that in terms of statistical results and average it is always important to glance at different examination levels in order to draw an as precisely picture of the actual situation as possible.

6.1.2 Conclusion and further working steps

The factor analysis as well as the discriminant analysis are regio-statistical and non spatial analysis methodologies. Therefore all regions are treated the same – independent from their spatial location, their importance for regional development impulses or their linkages to neighbour regions. Both described methodologies could therefore only be a first step to find out new approaches for transparent and explicit transnational delimitations of co-operation areas by statistical analysis. These methodologies have to be further developed. Still open questions have to be answered. For example if and how it will be possible to combine the diverse factors of the factor analysis to one integrated picture of each co-operation area and what such a picture could be illustrating.

Regarding the discriminant analysis the shown results are only first efforts trying to use the developed methodology out of ESPON 3.1 for an application in the field of possible transnational co-operation fields and areas. Of course one can ask if it will be feasible to gain more unambiguous results by "fine-tuning" the discriminant analysis methodology itself or perhaps by an other ranking of the used indicators.

Additionally to the mentioned aspects the applied statistical analysis are building up on existing co-operation fields which means that they are visualising an already existing form of spatial co-operation. It is not the aim of ESPON 2.4.2 to concentrate on the analysis of already existing co-operation areas. Rather than this the project aims at the elaboration of new data- and indicator based possibilities to identify fields and areas suitable for transnational co-operation.

The next step on this way will therefore be the application of cluster and factor analysis on European level – detached from existing co-operation areas. This new approach will lead to the identification of regions with for example comparable economic structures, similar geographical general conditions, comparable potentials and risks etc. A great challenge will be to define and identify not only comparable situations but also complementarities that could form a basis for transnational co-operation. It will be examined which kind of spatial patterns could be defined all over the ESPON territory and to which extend this leads to new perceptions concerning delimited areas which high potential through transnational co-operation. The results could than be integrated with more thematic aspects regarding transnational co-operation.

6.2 Analysis of relevant European documents beside ESPON

Complementary to the indicator based approaches an analysis of relevant European documents such as the "European Spatial Development Perspective", the "Third Cohesion Report", the "Proposals for a council regulation laying down the general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund" and others is envisaged within the ESPON 2.4.2 project. Aim of this analysis is the identification of purely and particularly transnational fields of action co-operation building upon the examination of those fields where co-operation already exists and those where transnational co-operation is still missing. In doing so, it will be very important to examine those kinds of thematic fields which are currently dominating the various activities in transnational co-operation.

Key source for this kind of information will be the INTERREG III Initiative beside other technical related transnational co-operations, for example out of the environment sector, the transport sector or the urban development sector. The divers reports and documents published by the other initiatives but within the INTERREG III framework particularly will built the basis for this analysis. Primarily the results of the mid-term evaluation as well as the activities presently undertaken during the updating of some of the "spatial

visions" within the co-operation areas are excellent capable for gaining core zones with a high potential for added value through territorial co-operation.

6.3 Identification of transnational fields of action

In a third step the gathered results of the application of statistical analysis will be integrated with the results of the more content related document analysis of INTERREG III and other transnational territorial co-operation initiatives. It is intended to create an intersection of statistical and content related results to come up with new approaches for defining sustainable transnational territorial co-operation fields and areas.

6.4 Conclusion

The ESPON 2.4.2 project is today in a very early stage of work. Nevertheless, the first steps undertaken in an experimental way of using statistical analysis for delimiting territorial transnational co-operation areas are showing interesting insights. Therefore it is essential to build up on these first steps and scrutinise how useful the application of such methodologies can be in sense of territorial co-operation and spatial development.

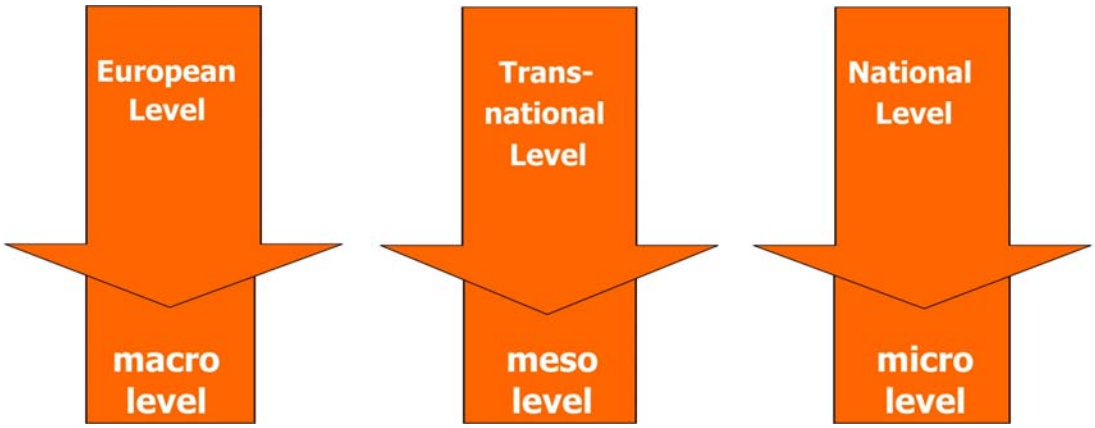
It will be vital to combine those statistical approaches with territorial and content related results out of practical work in the field of transnational co-operation.

The integration of both could lead to a more transparent, tangible and comprehensible method of surrounding territorial co-operation areas as well as to a balanced spatial microstructure inside such areas.

7 Analysis on national level

According to the framework of the methodology pointed out in the tender of ESPON project 2.4.2 and the respective ToR specific reference was made with regard to the analysis of the micro level, which in case of this ESPON project has to be understood in terms of the national rather than the regional level. Generally speaking, the corresponding analysis can be differentiated between two main strands, the first one covers the whole ESPON territory on a purely quantitative basis analysing each country separately and the second one realises more qualitatively oriented case studies which will have to be tested by means of the below described pilot case studies. However, to ensure coherence between the two approaches of the micro level analysis, also the first step will be conducted for the respective countries simultaneously to the case studies. Consequently, though the quantitative description of main territorial trends, at the beginning, can generally cover the whole ESPON territory, interpretation should concentrate on the countries covered in the pilot case studies rather than on the whole territory.

Figure 8 Adjustment of the ESPON 3-level approach

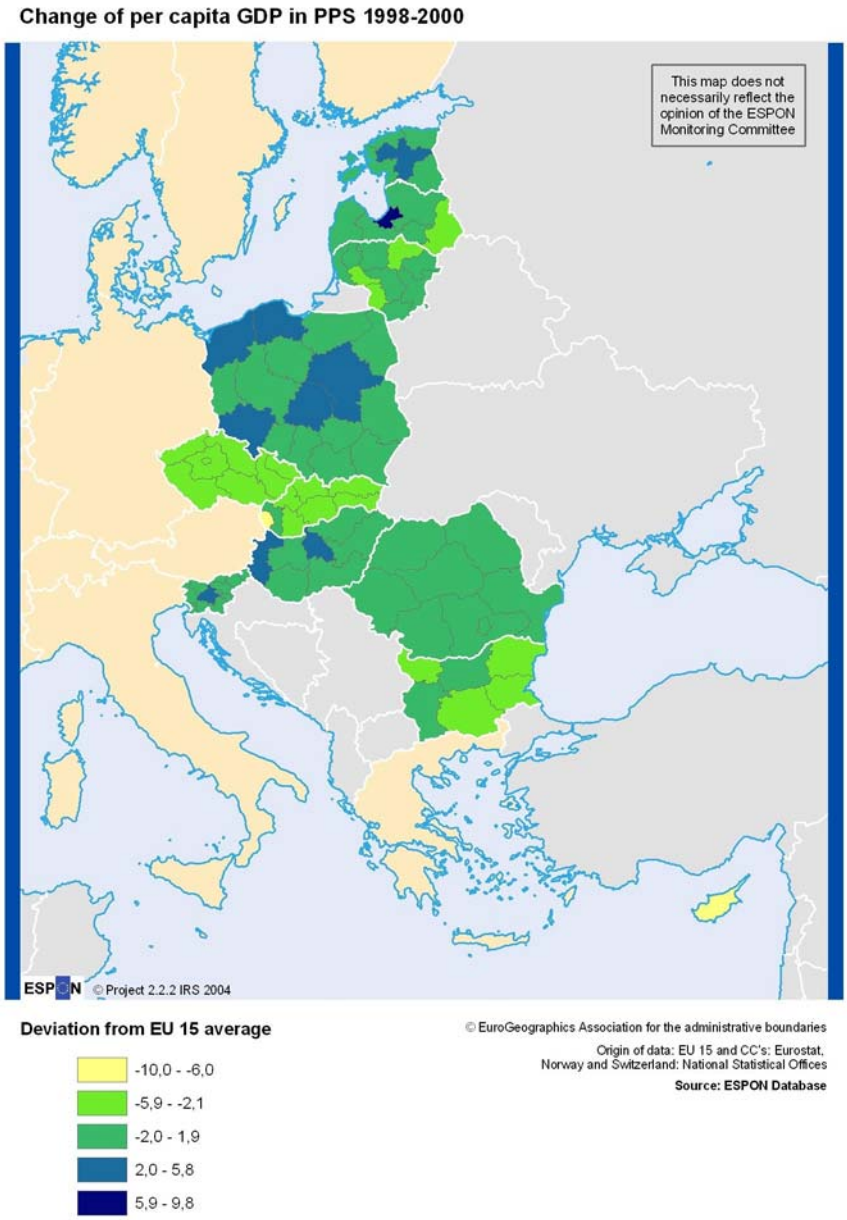


7.1 General methodology on micro level

The general micro level analysis for all countries – independent of the extension of the pilot case studies to all ESPON countries – will have to concentrate on quantitative data supplied by the different channels of the ESPON programme, i.e. ESPON data base and single ESPON projects. This step aims at a first description of the main territorial trends, imbalances and potential areas, both, in terms of thematic and spatial areas, on national level. To achieve this spatially more differentiated description, the respective indicators shall be analysed and interpreted for the regions of each country using, for instance, national averages as reference measure rather than

building on European averages. The different outcomes of these two different reference levels can e.g. be illustrated by comparing GDP per capita development in Central and Eastern Europe in map 26 and 27.

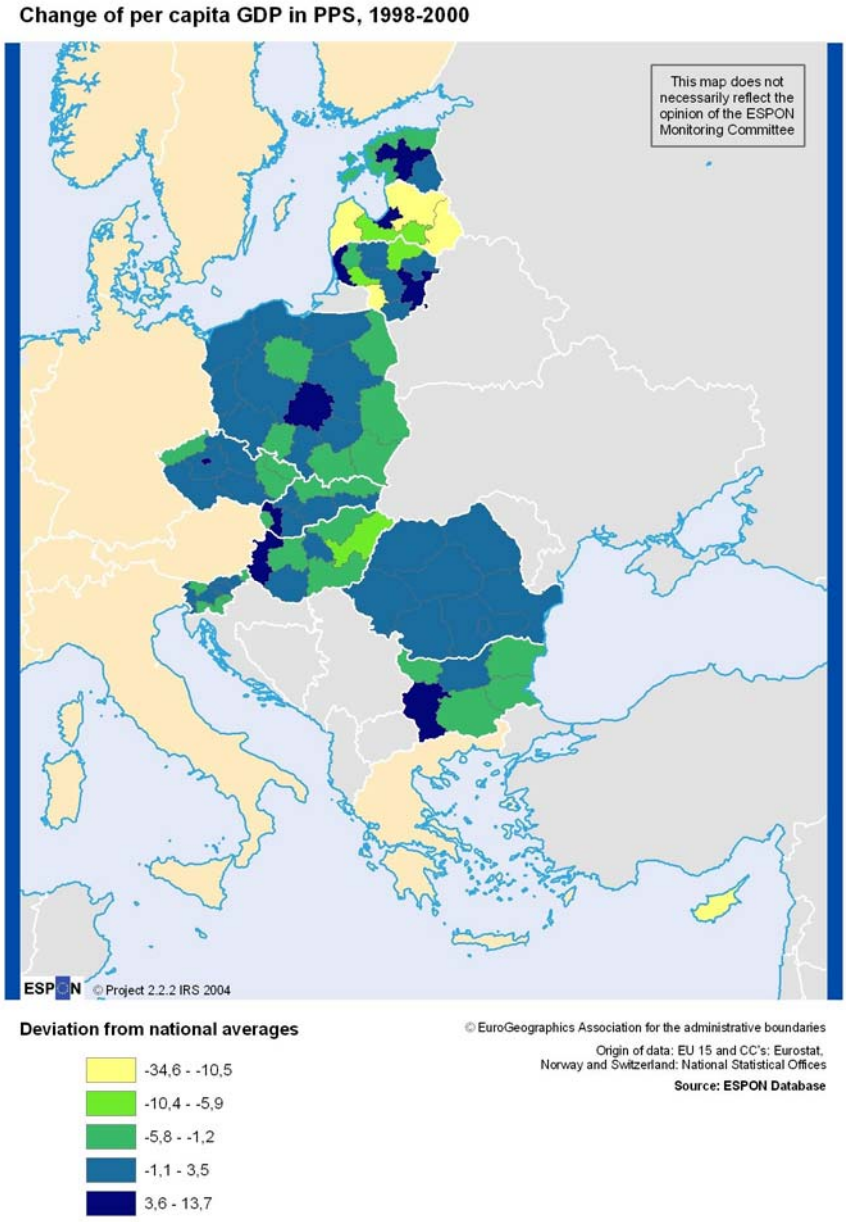
Map 26 Change of per capita GDP in PPS in relation to EU 15 average, 1998-2000



A comparison of these maps points out that, in the case of Poland, for example, there are quite a number of regions with income growth rates above national average though at European average only some of the regions with main agglomerations, i.e. weak or potential MEGA's, reflect above average growth. Thus, while on macro level basically the regions with MEGA's can be regarded as potential areas, on micro level additional regions

hold comparative potentials for national cohesion. Hence, it is the spatial reference which is crucial for these findings on micro level as compared to meso and especially macro levels.

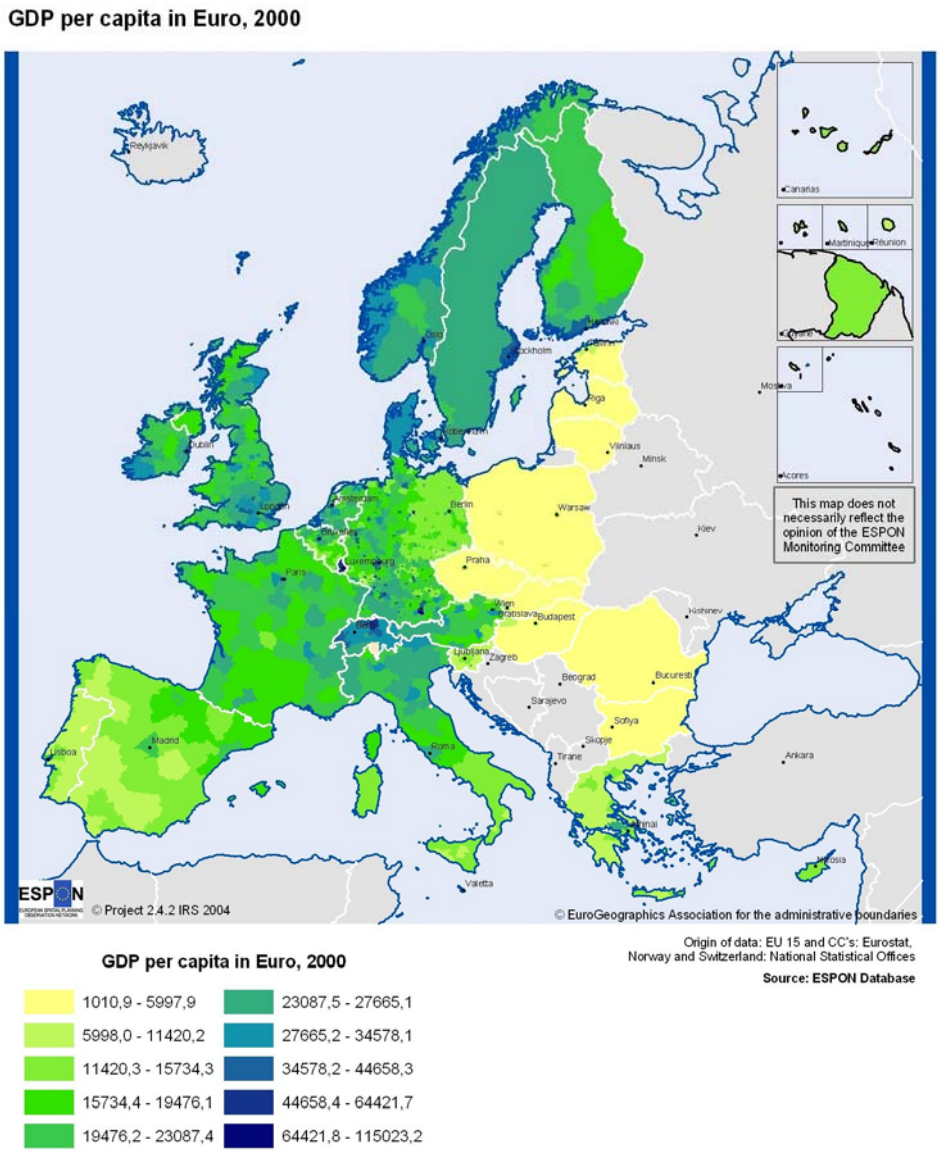
Map 27 Change of per capita GDP in PPS as related to national averages, 1998-2000



Furthermore, looking at one country at a time, though with the same methodology for all countries under consideration, allows for a stronger differentiation of classifications per country than the analysis of the whole ESPON territory with only one reference value. This can best be illustrated by looking again at GDP per capita distribution across Europe. While for the

whole territory in map 28 in total 10 income groups have been distinguished, giving a fairly differentiated picture of European income differentials, no single country actually covers all income groups and quite a number of countries is even only represented by very few – if not only one – income group.

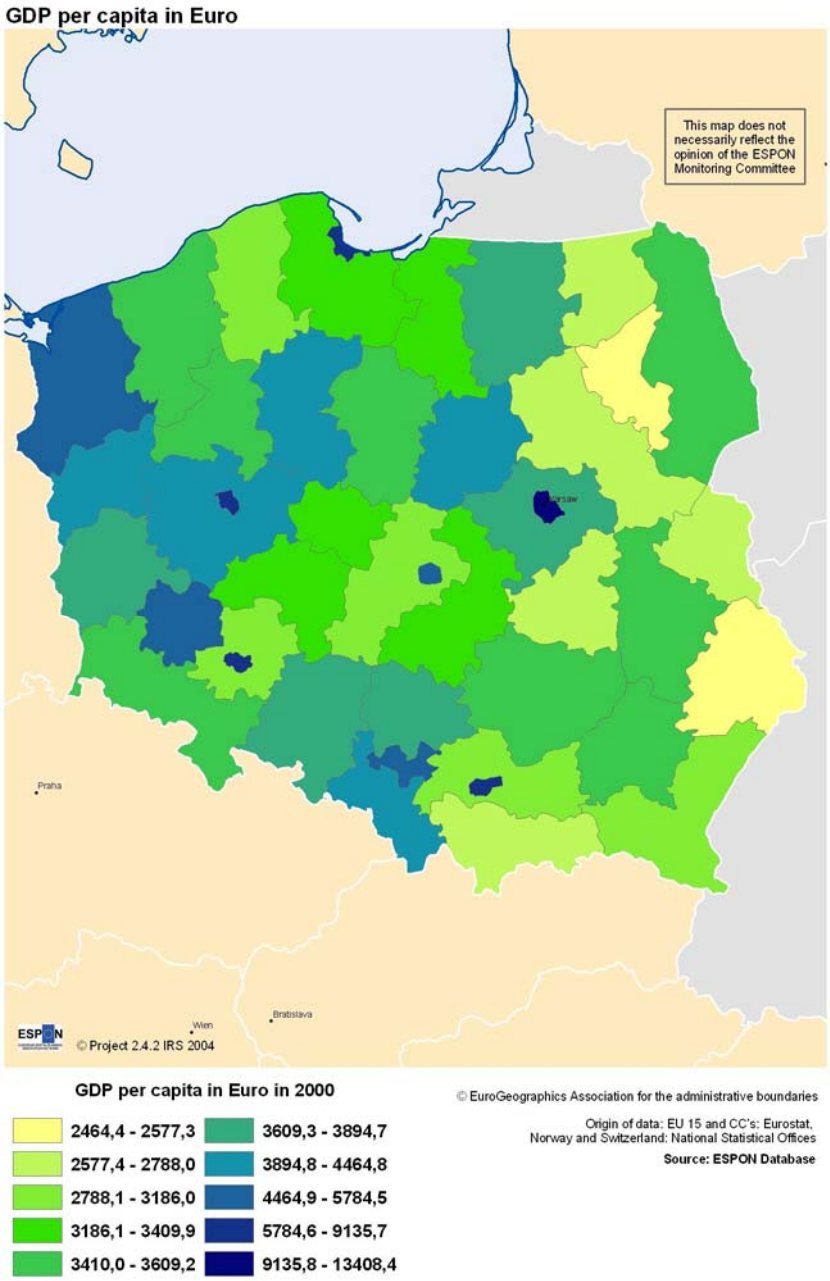
Map 28 GDP per capita in Euro, 2000 – ESPON space



This suggests a more or less equal income distribution in these countries though, by far, this is not the case, which can be illustrated by having a corresponding number of income groups for one country (map 29 for Poland). Similarly, depending on the indicator used, deviations from national averages can be utilised for the visualisation of disparities at micro level, as is, for instance, provided in the final report of ESPON project 3.1. Anyhow, especially with regard to more comprehensive quantitative measures a

country by country approach, conducting the analysis for one country at a time, might be more appropriate when it is not possible to draw on national average values. Due to a subsequently coherent methodology for all countries of the ESPON space, however, comparative results can envisaged for the whole territory as opposed to singular analyses of the different countries in different projects.

Map 29 GDP per capita in Euro, 2000 – Poland



Quantitative analysis, at least for the pilot studies, shall draw on both methodological approaches proposed in the frame of WP 2, i.e. RCE and multivariate analysis. In this case, both methods would have to be

recalculated for the separate countries under consideration. Possibly, this recalculation also needs to be adjusted to the respective countries' 'needs' as of different kinds of problem fields. Thus, for these more comprehensive classifications and measures, quantitative micro level analysis shall only be conducted for the countries covered by the pilot case studies during the first analytical phase of the project, allowing for later extension of the improved and verified WP 2 methods.

7.2 Methodology for pilot case studies

Pilot case studies, again, will basically consist of two different analytical parts, which together will allow for a comprehensive zoom on the respective countries distinguishing the main territorial trends, imbalances and potential areas. The pilot case studies will thus draw on both quantitative and qualitative data and information available from different sources.

First, and most important, ESPON results need to be reviewed extensively on micro level for the respective countries. This review aims at the collection of all country specific information already gathered by other ESPON projects under way and those already finalised. Furthermore, specific policy recommendations drawn by these projects could also supplement later policy recommendation development by ESPON project 2.4.2. Partially, this review will be supported by the analysis undertaken in WP 1, for instance by providing information on typologies referring to the national level as reference measure. However, additional reviews will be necessary in order to gain country specific information not necessarily provided on a general level and for all countries but referring to specific results. In order to achieve a comparable review of the pilot case studies, the TPG envisages the development of a template which asks for equivalent information for each of the respective countries plus the provision of additional information available from either of the ESPON reports. Thus, while the pilot case studies are conducted, a kind of minimum standard for information provided by the ESPON programme should be set on the basis of the information gathered for this sample of countries, which could then be utilised for the remaining country studies.

Second, this work package aims at the development of ideas and recommendations supporting territorial cohesion and cooperation not only with regard to EU policies but also with reference to national policy objectives. Also to achieve comparative results on this field, a template is envisaged which will ask for different kinds of information necessary to gain comprehensive knowledge for the understanding of the relation between national regional policy objectives and EU objectives. By analysing national regional policies with regard to their objectives, instruments, spatial

targeting etc. the TPG will be enabled to find areas for cooperation, both, with regard to transnational and thematic issues. For this part of the analysis first results can be drawn from respective national regional policy reviews undertaken by ESPON projects 2.2.1 and 2.2.2.

The respective findings, for instance, will be reviewed with regard to questions as following:

- What are the rationale and concept of regional policy at different spatial levels?
- In how far have recent changes or planned developments in regional policy been compatible with EU policies? Is compatibility particularly referred to?
- Which are the main national regional policy instruments and to which of the territorial objectives are they related? (incentive types, eligibility criteria, target groups, expenditure trends)
- Are different policy instruments targeted on specific areas or types of regions? Do these differ between different instruments?

For the whole assessment of the pilot case studies, it will be important to actually relate all the gathered and analysed quantitative and qualitative information to each other. This has to be realised, in order to gain a comprehensive, though differentiated, picture of the respective countries and to provide corresponding policy recommendations. This need suggests the above mentioned simultaneous approach for both analytical steps of this work package, i.e. detailed quantitative analysis and pilot case studies.

7.3 Selection of case studies

During the very first phase of this project, the TPG had intense discussions on the selection of prototype case studies. These prototypes are supposed not only to show the utility of such an approach but to gain methodological as well as thematically differing information on the micro level. Therefore, the countries for the pilot studies have been selected on the basis of a number of different criteria.

According to these criteria, the TPG wants to include different kinds of countries of the ESPON space as related to EU membership, i.e. old and new EU members plus non-EU but ESPON countries. Furthermore, the pilot studies were not only supposed to be conducted in the home country of the TPGs partners but also in other countries. These criteria mentioned so far, among others, partly ensure that different data and information quality and availability is considered in the group of pilot study countries. This aims at generalised knowledge about the availability of quantitative but especially

qualitative data in different kinds of countries of the remaining ESPON space. In this context, the TPG's methodological approaches are tested also for countries in which the TPG has not got a partner in order to gain knowledge about the realisation and possible problems within the whole ESPON space.

However, also some very generalised spatial indicators have been considered for the selection of the pilot studies. Among these are countries of different size, the extent of the country's socio-economic development, the degree of anticipated spatial disparities within the countries as well as spatial coverage of the ESPON territory from North to South (East – West coverage has been included through the criteria of old and new members of the EU).

The comprehensive consideration of these criteria led to the selection of not only 3 to 4 but 5 representative pilot study countries, to which the foundation of selection is stressed in the table below.

Table 5 Selection of representative pilot studies

Criteria		D	N	PL	P	SI
EU member	Member	X		X	X	X
	Non-member		X			
Period of membership	Old member	X			X	
	New member			X		X
TPG partner	Partner country	X	X	X		X
	Non-partner country				X	
Country territory	Large country	X		X		
	Small country				X	X
Socio-economic dynamic	Dynamic country					X
	Consolidated country	X				
Level of disparities	Strong disparities	X		X		
	Low disparities		X			
Spatial coverage	Northern country		X			
	Southern country				X	

8 Conclusions

8.1 Outlook and further working steps

Against the background of the spatial objectives of convergence, regional competitiveness and employment as well as territorial co-operation, as formulated by the European Commission, ESPON project 2.4.2 aims at an integrated analysis of transnational and national territories with regard to specific spatial patterns and challenges. The approach of ESPON project 2.4.2 in this context is to apply and enhance results from finalised and ongoing ESPON projects according to different spatial levels: the European macro level, the transnational meso level and the national micro level. In the short time of running ESPON 2.4.2 mainly elaborated the methodological approaches for each spatial level and compiled a first inventory of ESPON results with respect to data and indicators.

The inventory of data and indicators proofed to be very useful in order to identify existing possibilities but also missing links and information for the analysis intended by ESPON project 2.4.2. As the high number of indicators identified (about 500) illustrates ESPON results include a wide variety of topics and approaches. What became apparent in this respect is that this variety on the one side provides an enormous pool of valuable information but on the other side holds the problem of comparing and integrating the results. With regard to indicators e.g. by far not all indicators cover the whole ESPON territory and are available for complete time series. Additionally there is the even more challenging fact to correctly interpret and integrate the results and information given. Therefore deepened analysis and inventory of ESPON results will be required within ESPON project 2.4.2.

The "integrated analysis of transnational and national territories based on ESPON results" must bring together existing ESPON results and policy related key themes to elaborate structural homogeneous areas as well as coherent spatial clusters. Against this background the elaboration of the regional situation of Europe is aiming at the identification of homogeneous spatial patterns with synoptic regional analysis of regional structures. The analysis of ESPON project results has to cover different aspects with different analytical tools.

The elaboration of spatial patterns could be done in an effective way using one indicator as it e.g. happened with the use of the gross domestic product and its regional deviation to the EU average as threshold in the structural fund objective 1 delimitation of eligible areas. It can also be done in a more sophisticated way with a combination of different indicators (bi- or multivariate) using diverse normalisation values from national average up to

purely statistical standardisation means, a method comparable to procedure to delineate the regions eligible in objective 2. In this respect related to a synoptic combination of existing ESPON results (typologies, classifications), appropriate new and further combinations of ESPON indicators, especially of the core-indicators could be envisaged.

In this understanding the next level of complexity builds on statistical analysis looking for the relations between variables and indicators with correlation and regression analysis and finally related to the discovery of classifications and spatial pattern with factor and cluster analysis.

Another option for the development of a regional classification of Europe consists in the conduction of comprehensive cluster analyses, which has for instance already been conducted by ESPON project 2.2.2 for the New Member States and Candidate Countries.

Beyond the statistical analysis a GIS based intersection and combination of ESPON result will be considered for analytical support. The different kinds of data to be included and the different kinds of synoptic analyses ask for complex demands on map making – beyond but also including choropleth and symbol mapping.

For this purpose, maps will have to be developed, which combine infographic illustrations with traditional mapping symbols, in order to include the spatial character of regions, even if they are not precisely depicted. In the frame of the Study Programme in European Spatial Planning a working group has elaborated these questions of mapping, which will be further elaborated in ESPON project 2.4.2.

Regarding the investigation of problem related spatial patterns on the European level the project is aiming at the development of a procedure for the delineation of eligible areas under the EU structural funds.

Simulating this classical approach in the first step the potential objective 1 matching the convergence criterion will be identified, followed in the second step by the analysis of potential territorial problem related areas outside objective 1 as one part of an overall analysis covering the whole ESPON territory.

In respect to the delineation of the objective 1 regions of the EU 25, a scenario will be elaborated for time period of data which will be appropriate for the structural fund period from 2007 to 2013. The corresponding GDP data will have to cover the years 2001, 2002 and 2003. With regional data available for 2001 and 2002 in the project lifetime only one year has to be estimated to cover the whole period. This will be done on the basis of the

data available on national level and the regional distribution taking into account regional trends and disparities.

Using statistical methodologies like discriminant or factor analysis on the meso, i.e. transnational level, has shown that such methods are in principle appropriate for the delimitation of transnational co-operation areas. But they have to be further developed. Still open questions have to be answered. For example if and how it will be possible to combine the divers factors of the used factor analysis to an integrated picture of areas with comparable structures. Or if it will be feasible to gain more unambiguous results by "fine-tuning" the discriminant analysis by ranking the used indicators against the background of the experiences already made by territorial co-operation.

Next steps on meso-level will therefore be the application of cluster and factor analysis on European level – detached from existing co-operation areas. This will lead to the identification of regions with for example comparable economic structures, similar geographical general conditions, comparable potentials and risks etc. It will be examined which kind of spatial patterns could be defined all over the ESPON territory and to which extend this leads to new perceptions concerning delimited areas with high potential through transnational co-operation.

Additionally the statistical results will be integrated with results of a content related document analysis of INTERREG III and other transnational territorial co-operation initiatives. It is intended to create by this an intersection of statistical and content related results to come up with new approaches for defining sustainable transnational territorial co-operation fields and areas.

As outlined above, the micro level analysis in ESPON project 2.4.2 is related to the regions of national territories. Due to the foreseen structure of the project in the terms of reference, this analysis will have to consist of two different methodological aspects, first the general micro level analysis on the basis of quantitative data in ESPON, and second country case studies, which – in the first phase of the project – will cover selected pilot studies only.

Apart from the review of country specific ESPON results, the country studies will also focus on the development of ideas and recommendations supporting territorial cohesion and cooperation on micro level. Thus, for this analysis it is important to gain comprehensive knowledge for the understanding of the relation between national regional policy objectives and EU objectives.

Consequently, the micro level analysis shall be able to provide information for national and regional authorities, which allows for relating regional characteristics in a larger context, i.e. the national context and together with meso and macro level analysis in the European context. This way it shall offer the basis and, especially, the development frame for regional policy

options in the respective countries. The analysis will furthermore point out, where potential inconsistencies or even contradictions between different policy levels tend to occur. Also this information can be helpful for future policy decisions.

8.2 Activities envisaged until 2nd Interim Report and Time Schedule

The inventory of ESPON related results was due to the time limit until this First Interim Report concentrated on data and indicators. Until the 2nd interim report this inventory will be extended and thus completed through a more content related analysis of both, already finished and still ongoing ESPON projects. For this work an analysis guideline has to be developed and provided for all partners involved in order to gain comparable and continuos results. Additionally it is envisaged to include the analysis of significant European documents (e.g. ESDP, Third cohesion report) in this analysis.

As described in the chapter above, on every level of the ESPON three level approach various activities have to be done. The suggested integrated analysis of the European territory at macro level will be applied in order to gather a first draft of delimitation possibilities for structural fund areas (particularly objective 1):

1. On European level, the first sketches for the model calculation for objective 1 regions will be elaborated with updated GDP figures.
2. Related to problem orientated analysis the spatial scope and the thematic fields of investigation will be elaborated. The existing data base (ESPON data base) and project 3.2 updates have to be considered.

At transnational level the next activities have to focus on two parallel strands:

1. a content related analysis of European documents in order to identify typical transnational co-operation fields out of already existing territorial co-operation processes
2. the application of a factor and cluster analysis to define similar socio-economic structures and spatial patterns all over the ESPON territory.

In a first draft the outcome of both strands will be merged to define thematic priority fields and transnational territories of high potential for co-operation.

Regarding the national, i.e. micro level, pilot case studies will be undertaken for the selected countries. For the further inventory as well for the pilot studies a guideline will be developed and provided to those partner involved in the gathering of the studies. This integrated approach will help to achieve a certain comparability between the studies and gain experience for a

possible transfer of the used methodology for an enlarged national analysis covering all ESPON 25 countries, Rumania, Bulgaria, Norway and Switzerland.

Table 6 Selection of representative pilot studies

Envisaged activities	2005					
	01. – 15. Jan	15. – 30.	01. – 15. Feb.	15. – 28. Feb.	01. – 15. Mar.	15. – 30. Mar.
Development of inventory guideline						
Content related inventory of ESPON reports						
application of integrated analysis at European level						
Data investigation for problem related analysis (objective 2)						
Draft delimitation of objective 1 and 2 areas						
Content related analysis of European documents against the background of thematic co-operation fields						
Application of factor and cluster analysis on transnational level						
Development of national study guideline						
National case studies						
2nd Interim Report						

ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

Bundesamt
für Bauwesen
und
Raumordnung

ESPON Project 2.4.2

Integrated analysis of transnational and national territories based on ESPON results

First Interim Report

December 2004

ANNEX

Co-financed by the European Community through the INTERREG III ESPON

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
core indicators											
average population total							core indicator		1999		ESPON 1.1.2
population density							core indicator		different years		ESPON 1.1.2
GDP pps per inhabitant in EU average							core indicator		1995-2000 yearly		ESPON 1.1.2
level of education							core indicator		1995, 2000		ESPON 1.1.2
Population density		x					Core indicator, NUTS 3 (2)	ESPON 29	1999		ESPON 1.1.4
National Total fertility rate		x					Core indicator, regionalisation in map 5.2-5.4, Eurostat and national sources for Switzerland and Norway	ESPON 29 Complete regionalisation only for 1999	1990, 1995, 1999		ESPON 1.1.4
Population by sex and age	Share of children: 0-14/Total population	x					Core indicator, NUTS2, map 7.4	ESPON 29	2000		ESPON 1.1.4
	Ageing population 65+/total population	x					Core indicator, NUTS2	ESPON 29	2000		ESPON 1.1.4
	"Labour Force" Replacement Ratio: 10-19/20-64	x					Core indicator, NUTS2, map 7.11	ESPON 29	2000		ESPON 1.1.4
	Ageing "Labour Force": 55-64/20-64	x					Core indicator, NUTS2, map 7.8	ESPON 29	2000		ESPON 1.1.4
	Post-Active Dependency Ratio: 65+/20-64	x					Core indicator, NUTS2, map 7.6	ESPON 29	2000		ESPON 1.1.4
	Aged People vs. Youth: 65+/15-24	x					Core indicator, NUTS2, map 7.7	ESPON 29	2000		ESPON 1.1.4

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Changes in Natural Growth Potential: 20-29 years in 2020/20-29 years in 2000	x					Core indicator, NUTS2, map 7.10	ESPON 29	2000		
	Population in "functional"/"strategic" age groups						Core indicator, NUTS 3	ESPON 29	1990-1999 (latest)		
	Dependency ratio (total population/population 20-64	x					core indicator, map 5.6, source NewCronos and national statistical bureaus	ESPON 29, except Ireland	1999		ESPON 1.1.4 **ESPON project number**
Total area for urban settlements				x			Core indicator, NUTS 3 (2). Quality problems concerning national comparison	ESPON 29	1999 (latest)		ESPON 1.1.4
Population in urban settlements			x				Core indicator, NUTS 3 (2)	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
Natural population growth			x				Core indicator, NUTS 3, map 5.1 shows change for 1999, estimations from New Cronos	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
Direct indicator of depopulation			x				Core indicator, NUTS 3, map 7.2. Quality problems at regional level concerning border changes. No problems at national level	ESPON 29	1995-2000		ESPON 1.1.4

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Typology of depopulation			x				Core indicator, NUTS2, changes in regional division can reduce quality, and there are quality problems for some eastern European countries. Better on national level than on regional level.	ESPON 29	2000		ESPON 1.1.4
Number of births		x					Core indicator, NUTS 3	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
Number of deaths		x					Core indicator, NUTS 3, quality reduced if used for life expectancies on sub groups according to nationality (unrecorded emigration)	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
Total population			x				Core indicator, NUTS 3 (2), quality somewhat reduced by illigal immigration and unrecorded emigration by registered immigrants	ESPON 29	1980/90-1999 (latest)		ESPON 1.1.4
Area		x					Core indicator, NUTS 3 (2)	ESPON 29	Latest available for the different nations		ESPON 1.1.4

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
In-migration							Core indicator, NUTS 2, not relevant on national level	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
Out-migration							Core indicator, NUTS 2, not relevant on national level	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
Net migration							Core indicator, NUTS 2, not relevant on national level	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
Net-migration/migratory balance by age groups							Core indicator, NUTS 2, not relevant on national level, also typology of migratory balances by ages and typology of migration by main age groups, typology crossing mobility and migratory balances.	ESPON 29	1996-1999		ESPON 1.1.4
Areas that have bccn flooded							core indicator			Flooding on the contaminated lands, e.g. chemical plants	ESPON 1.3.1
Areas affected by droughts							core indicator				ESPON 1.3.1
Areas affected by forest fires (on EU 27+2 level only 2000 data available for the project)							core indicator		2000	Number of forest fires	ESPON 1.3.1
Areas affected by winter storms (on NUTS II level)							core indicator	NUTS2 level			ESPON 1.3.1
Mountainous areas							core indicator			Population density/GDP (in mountainous areas	ESPON 1.3.1
Earthquake casualties							core indicator				ESPON 1.3.1
Areas with active volcanoes							core indicator				ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Extreme precipitation (>25 mm)							core indicator			Population density/GDP (in areas affected by extreme precipitation)	ESPON 1.3.1
Locations of nuclear power plants (amount of reactors and power in MGW)							core indicator	ESPON space + former CCCP (Europaen part)			ESPON 1.3.1
Major crude oil shipping lines / major oil ports							core indicator				ESPON 1.3.1
Location of large dams < 5x106 m3							core indicator			Location of large dams	ESPON 1.3.1
Population density as the number of inhabitants per km^2			x				core indicator, define the pressure of the population on land and natural heritage, NIUTS 3	EU 27+2	2000		ESPON 1.3.2
Richness of species identified of European importance			X				core indicator, NUTS 2	EU 27+2			ESPON 1.3.2
Extent and richness of semi-natural habitat type			x				core indicator, NUTS 2	EU 27+2			ESPON 1.3.2
Protected natural areas			x				core indicator, NUTS 2				ESPON 1.3.2
Potential accessibility by road			x				core indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Potential accessibility by rail			x				core indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Potential accessibility by air			x				core indicator	EU 27+2	2001		ESPON 1.2.1
Impact of 13 transport policy scenarios on GDP (SASI model)		x					core indicator	EU29, NUTS 3	1991-2001; 2001-2021		ESPON 2.1.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Impact of transport policy scenarios on equivalent variation of income,all 13 scenarios (CGEurope model)		x					core indicator	EU29, NUTS 3	1991-2001; 2001-2021		ESPON 2.1.1
Utilisable Agricultural Area (UUA) as a percentage of total land area			x				core indicator, NUTS3		2000		ESPON 2.1.3
Percentage of farm holders under the age of 35 years				x			core indicator, NUTS2	EU15?	1990, 1993, 1995, 1997		ESPON 2.1.3
Percentage of farm holders over the age of 65 years				x			core indicator, NUTS2	EU 15	1990, 1993, 1995, 1997		ESPON 2.1.3
Agricultural output per hectare				x			core indicator, NUTS2		Annual, 1990-1997		ESPON 2.1.3
Agricultural output per Agricultural Work Unit (AWU)				x			core indicator, NUTS2		Annual, 1990-1997		ESPON 2.1.3
Percentage value added by agriculture, forestry and fishing			x				core indicator, NUTS3		Annual, 1995-2000		ESPON 2.1.3
Value of fertiliser input per hectare of arable land				x			core indicator, NUTS2		Annual, 1990-2001		ESPON 2.1.3
Annual average SF spending as share of regional GDP in Euro, 1999			x				core indicator, NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	EU 15, regions receiving SF	SF period 1994-1999		ESPON 2.2.1
RnD intensity (RnD expenditure as % of GDP), EU 15 = 100					x		core indicator, NUTS 2, for several countries NUTS 1/ NUTS 0 data used	EU 27, except MT	1999, for CZ, HU, SK and LU 2000		ESPON 2.1.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
RnD personnel as % of labour force						x	core indicator, NUTS 2	EU 27, except UK, RO, CH, DK, IE, NO	different years between 1997 and 2000 for different countries		ESPON 2.1.2
Total pre-accession aid spending as % of GDP				x			core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO, Malta and Cyprus only partly covered	periods 1998-2000 and 2001-2002		ESPON 2.2.2
Pre-accession aid spending by programme				x			core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	CEE NMS plus BG and RO	periods 1998-2000 and 2001-2002		ESPON 2.2.2
GDP in €/in PPS per capita			x				core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	NMS plus BG and RO	1998, 2001	Incomplete time series, e.g. no values Czech Republic 1999	ESPON 2.2.2
Active Population			x				core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	NMS plus BG and RO	1998, 2001	Single values missing, e.g. Bulgaria 1998, Malta 1998, Slovenia SI00D /SI00E	ESPON 2.2.2
Indicator multimodal accessibility				x			core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	NMS plus BG and RO	2001	Time series missing for all countries	ESPON 2.2.2
Human capital Index /Active Population by education				x				NMS plus BG and RO	1999, 2001	Values missing for Bulgaria 1999, no NUTS 3 data	ESPON 2.2.2
Population density			x				core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	NMS plus BG and RO	1998, 2001	Single values missing, e.g. Malta 1998, single regions Poland 2001	ESPON 2.2.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality**					comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
		5	4	3	2	1					
Employment by sector				x			core indicator	NMS plus BG and RO	1998, 2001	Single values missing, e.g. Bulgaria 1998, Malta 1998, no NUTS 3 data	ESPON 2.2.2
Unemployment rate				x			core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	NMS plus BG and RO	1999, 2002	Single values missing, e.g. Bulgaria 1999, Malta 1999 and 2001, data on NUTS 3 level partly not available, e.g. Slovenia 1999	ESPON 2.2.2
R&D employed as % of active population			x				core indicator, NUTS 2	NMS plus BG and RO	1998, 2001		ESPON 2.2.2
Activity rates							core indicator	Nuts2 for 20 contries (but some areas missing); not available or no reply for 7 countries	1994-2001 or 1995-2001 (with some exceptions)		ESPON 2.2.3
Employment in manufacturing							core indicator	Nuts2 for 27 (but some areas missing);not available or no reply for 2 countries	1994-2001 or 1995-2001 (with many gaps)		ESPON 2.2.3
Employment in services							core indicator	Nuts2 for 29 (but some areas missing);	1994-2001 or 1995-2001 (with many gaps)		ESPON 2.2.3
Employment							core indicator	Nuts2 for 24 countries (but some areas missing); not available or no reply for 5 countries	1995-2000 (with many gaps and exceptions)		ESPON 2.2.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
High-tech Employment in manufacturing							core indicator	Nuts2 for 17 (but some areas missing) ;not available or no reply for 12 countries	1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
High-tech Employment in services							core indicator	Nuts2 for 17 (but some areas missing);not available or no reply for 12 countries	1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
% population with tertiary qualification							core indicator	Nuts2 for 21 countr (but some areas missing); not available or no reply for 8 countries	1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
GDP euro per inhabitant							core indicator	Nuts3 for 28(but some areas missing) ; not available or no reply for 1 countries	1995-2000 (with many gaps and exceptions)		ESPON 2.2.3
GDP purchasing power							core indicator	Nuts3 for 27(but some areas missing) ; not available or no reply for 2 countries	1995-2000 (with many gaps and exceptions)		ESPON 2.2.3
Population							core indicator	Nuts3 for 27(but some areas missing) ; not available or no reply for 2 countries	1994-1999/2000 (with many gaps and exceptions)		ESPON 2.2.3
Population by sex and age							core indicator	Nuts3 for 27(but some areas missing) ; not available or no reply for 2 countries	1994-2000 (with many gaps and exceptions)		ESPON 2.2.3
Unemployment							core indicator	Nuts3 for 26(but some areas missing) ; not available or no	1994-2001 (with many gaps and exceptions)		ESPON 2.2.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
								reply for 3 countries			
Activity rates at NUTS III or below							core indicator	NUTS 3 or below	1995,2000 or 2001 or1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
Income of households at NUTS IV and V							core indicator	Nuts 4 and 5	1995,2000 or 2001 or1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
Unemployment at NUTS IV and V							core indicator	Nuts 4 and 5	1995,2000 or 2001 or1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
other indicators											
FUA indicators	FUA size: Number of inhabitants per FUA, and classification in four categories	x						EU27+2	2000 (almost always)		ESPON 1.1.1.
	FUA transport: two sub-indicators (classification in four categories): presence of airports > 50 000 pass.; presence of port >20 000 TEU.		x				refined indicators might be available at a larger scale	EU27+2	2000 (almost always)		ESPON 1.1.1.
	FUA manufacturing: Gross value added in industry					x	Not avalaible at the FUA level. Analysis on NUTS3	EU27+2	2000 (acceding countries: 1999)		ESPON 1.1.1.

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	FUA knowledge basis: Higher education institutions: Presence of university and number of university students (classification in four categories).			x			based on national experts; classification criteria not always uniform	EU27+2	2000 (almost always)		
	FUA decision making: Presence of headquarters of the top 500 companies in each country, rated by turnover (classification in four categories).			x			refined indicators might be available at a larger scale	EU27+2	2001		
	Tourism: Number of bed places in hotels or similar establishments (classification in four categories).			x			refined indicators might be available at a larger scale. Analysis on NUTS3.	EU 15 + National offices	Most figures from 2001		
	FUA administrative structure (classification in four categories).		x				based on national experts	EU27+2	2000 (almost always)		ESPON 1.1.1. **ESPON project number**
MEGA indicators	MEGA mass: total population and gdp			x			GDP is not avalaible at the FUA level. Analysis on NUTS3	EU27+2	2000 (almost always)		ESPON 1.1.1.
	MEGA economic competitiveness: GDP per capita in PPS, Location of Top 50 European companies			x			Data are not avalaible at the FUA level. Analysis on NUTS2	EU27+2	2000 (almost always)		ESPON 1.1.1.

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	MEGA connectivity: number of passengers at airports, multimodal accessibility indicator			x			Functional relantioship are difficult to measure; generalized lack of suitable indicators	EU27+2	2000 (almost always)		
	MEGA knowledge basis: Educational level, share of employment in R&D		x				Data are not avalaible at the FUA level. Analysis on NUTS2	EU27+2	2000 (almost always)		ESPON 1.1.1. **ESPON project number**
PUSH indicators	PUSH agglomerative capacity of FUAs: Extent of 45 minute Isochrones around FUAs centre		x				calculated on average speed on different classes of roads	EU27+2	2000 (almost always)		ESPON 1.1.1.
	PUSH agglomerative structure of FUAs: Degree of overlap of neighbouring PUSH areas	x						EU27+2	2000 (almost always)		ESPON 1.1.1.
	PUSH Settlements structure: Proportion of settlements area in each PUSH area			x			11 land use classes in the Corine database (plus other for Sweden, Norway, and Switzerland)	EU27+2	2000 (almost always)	Identification of built up areas is stile critical at this scale: detailed information available from other satellite sources	ESPON 1.1.1.
population urban									different years		ESPON 1.1.2
population rural									different years		ESPON 1.1.2
population change									1990, 1995, 2000		ESPON 1.1.2
immigration by (country of) origin									1995, 2000		ESPON 1.1.2
tourism: number of arrivals and overnight stays									1995, 2000		ESPON 1.1.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
year of passing the 50%- and 15%-mark of share of population employed in agriculture in working population									?		ESPON 1.1.2
land cover (agricultural land, artificial land, wilderness)									1990, 2000		ESPON 1.1.2
Gross Domestic Product pps per inhabitant, in EU average									2000		ESPON 1.1.2
Percentage of artificial surfaces									1986-1996		ESPON 1.1.2
Percentage of agricultural land use									1986-1996		ESPON 1.1.2
Percentage of forest areas									1986-1996		ESPON 1.1.2
Density of road and rail network									2001		ESPON 1.1.2
Market accessible from each NUTS III by car in 1 hour									1999		ESPON 1.1.2
Population accessible from each NUTS III by car in 1 hour									1999		ESPON 1.1.2
Index of population centrality									1999		ESPON 1.1.2
Trips generated per person									2001		ESPON 1.1.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality**					comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
		5	4	3	2	1					
Polycentricity inidcator		X					The developed approach measures polycentricity by identifying three dimensions of polycentricity: the size or importance of cities (population, economic activity), their distribution in space or location and the spatial interactions or connections between them: (TIR Part2/ Ch. 2/ p.7)	EU-Accession Countries (+ Romania, Bulgaria)			ESPON 1.1.3
σ-convergence							σ-convergence is probably the most useful concept. It is based on the standard deviation, across regions, of the logarithm of real GDP per capita. When the standard deviation declines over time σ-convergence applies." (TIR Part1/ p.26)	EU-25 + 2 (i.e. Romania, Bulgaria)			ESPON 1.1.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
ß-convergence.							It refers to the coefficient ß in the following equation: (1) $\hat{Y}_{i,T} = \alpha + ß \ln Y_{i,t0} + u_{i,T}$ where $\hat{Y}_{i,T}$ denotes the average yearly growth rate of real GDP per capita in region i between the years t0 and T, $Y_{i,t0}$ is initial GDP in year t0 and $u_{i,T}$ represents the specific shocks between times t0 and T. The ß-coefficient measures the speed of convergence. A negative coefficient denotes convergence." (TIR Part1/ p.26)	EU-25 + 2 (i.e. Romania, Bulgaria)			ESPON 1.1.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Spatial association							the Moran I spatial autocorrelation statistic: Moran I measures the similarity of attribute values in an area, the degree to which a spatial phenomenon is correlated to itself in space. In other words, it indicates how much two properties – locational similarity and similarity in some other dimension – vary together. The expected value for Moran's I is -1/(n-1) which approaches 0 for a large number of regions. Values of I are in the range from approximately -1 to 1. (TIR Part1/ p.27)	EU-25 + 2 (i.e. Romania, Bulgaria)			ESPON 1.1.3
Herfindahl index of regional specialisation:							describe changes occurring within regions and how these changes relate to regional performance measured in GDP/h.	260 NUTS2 regions (excl. Switzerland & Bulgaria)			ESPON 1.1.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
							(TIR Part2/ Ch.4/ p.3)				
geographic concentration							to describe territorial structures and changes occurring between regions and at the wider geographic scales in terms of trends towards concentration or dispersion. (TIR Part2/ Ch.4/ p.3)	260 NUTS2 regions (excl. Switzerland & Bulgaria)			ESPON 1.1.3
Population change in percent			x				map4.1	ESPON 29	1995-1999		ESPON 1.1.4
Typologised population change (Components of population change)			x				map4.2,	ESPON 29	1996-1999		ESPON 1.1.4
Ageing indicators	Share of population 65+ (ageing)		x				map 5.5, map 7.5 , information not complete. Complete information for forcastings, several maps in chapter 8 for different models.	ESPON 29 except Ireland (according to map 7.5 information is also lacking for Slovakia and NUTS regions in Wales, Cornwall and Saxony)	2000, forecasting 2025, 2050		ESPON 1.1.4
	Average score on indirect "ageing"/"depopulating" indicatores		x				Map 7.9, average scores not necessarily appropriate	ESPON 29	2000		ESPON 1.1.4

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Average score on indirect "ageing"/"depopulating" indicatores grouped (quantiles)		x				average scores not necessarily appropriate	ESPON 29	2000		ESPON 1.1.4 **ESPON project number**
Population decline indicators	Share of NUTS2 average population 1999 living in NUTS3 regions with population decline 1995-1999	x						ESPON 29	1995, 1999		ESPON 1.1.4
	Share of NUTS2 area comprising NUTS3 regions with population decline 1995-1999	x						ESPON 29	1995, 1999		ESPON 1.1.4
Population variation 2000-2050			x				Map8.3, 8.8, 8.9	ESPON 29	2000-2050		ESPON 1.1.4
Degree of urbanisation			x				NUTS3 (2)	ESPON 29	1990-1999 (latest)		ESPON 1.1.4
International migration				x			Problems concerning registration of migrants and national coverage	ESPON 29	Work in progress, not part of 3. interim report		ESPON 1.1.4
Comparison of 'teledensity' between the largest cities and the rest of the country in European countries (ch. 3.1.3, p. 57)				X			the definition of the term "teledensity" is missing	EU 15 + Norway, Bulgaria and Romania	2000		ESPON 1.2.2.
Proportion of fixed line household penetration by locality type (ch. 3.1.3, p. 59)		X					the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Proportion of mobile telephony household penetration by locality type (ch. 3.2.2, p. 75)		X					the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
Proportion of PC household penetration by locality type (ch. 3.3.2, p.88)		X					the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
Proportion of Internet household penetration by locality type (ch. 3.4.2, p. 102)		X					the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
Intensity of use of Internet: growth in daily use by degree of urbanisation (ch. 3.4.2, p. 105)		X					the indicator accurately describes the phenomenon	EU 15	2002		ESPON 1.2.2.
Broadband DSL availability by locality (ch.4.1.1, p. 115)		X					the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
Proportion of broadband household penetration by locality type (ch. 4.1.4, p. 137)		X					the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
The number of pan-European networks 'noded' in a region (ch. 4.3.2, p. 155)		X					the indicator accurately describes the phenomenon	EU 27+2	2001		ESPON 1.2.2.
Degree of vulnerability in Europe											ESPON 1.3.1
Floods indicators	• Growth of population and GDP in areas that have been flooded									Building restrictions (retention areas) / safety measures in flooded areas	ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
	• Areas that have bccn flooded						core indicator			Flooding on the contaminated lands, e.g. chemical plants	
	• Population density/GDP (in areas that potentially can bc flooded)										
	• Combincd indicator of Population density'GDP and flooded areas according to flood frequency sińce 1985										
	• Clasification of flooded areas according to flood frequency sińce 1985										
	Large river flood event recurrence								1985-2002		
	The share of rivers in NUTS 3 level area										
	Highest 7-day precipitation										
	Floods hazard										
	Flood risk										ESPON 1.3.1
Droughs indicators	• Growth of population and GDP in areas affected by droughts										ESPON 1.3.1
	Areas affected by droughts						core indicator				ESPON 1.3.1
	Population dcnsity/GDP (in areas affected by droughts)										ESPON 1.3.1
	Combined indicator of Population density GDP and drought Yulnerability										ESPON 1.3.1
	• Classification of drought vulnerability										ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Negative deviation of precipitation										
	Average dry spell length (precipitation <0,5 mm)										
	Areas economical dependent on agriculture, except wineyards										
	Areas energy production is dependent on hydropower (Project 2.1.4)										
	Nuclear power plants' cooling system										ESPON 1.3.1
											ESPON project number
Forest fires indicators	Areas affected by forest fires (on EU 27+2 level only 2000 data available for the project)						core indicator		2000	Number of forest fires	ESPON 1.3.1
	Forest areas									Forest fire mitigation practices	ESPON 1.3.1
	GDP/capita									Burnt area	ESPON 1.3.1
	Dependency ratio									Population density/GDP (in areas affected by forest fires)	ESPON 1.3.1
	Forest fire hazard										ESPON 1.3.1
Winter storms indicators	Growth of population and GDP in areas affected by winter storms									Early warning systems / safety measures against winter storms	ESPON 1.3.1
	Areas affected by winter storms (on NUTS II level)						core indicator	NUTS2 level			ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
	Population density/GDP (in areas affected by winter storms)										
	Combined indicator of Population density/GDP and winter storm vulnerability (on NUTS II level)							NUTS2 level			
	Classification of winter storm vulnerability (on NUTS II level)							NUTS2 level			
	Approximate probability of having winter storms										
	Changes in annual wind speed										
	GDP/capita										
	Dependency ratio										
	Economic winterstorm risk										
	Winter storm hazard										
	Winter storm risk										ESPON 1.3.1
Landslides/ Avalanches indicators	Growth of population and GDPin mountainous areas									Building codes / restrictive land use in landslide avalanche areas	ESPON 1.3.1
	Mountainous areas						core indicator			Population density/GDP (in mountainous areas	ESPON 1.3.1
	Combined indicator of Population density/GDP.: and landslide and avalanche) vulnerability										ESPON 1.3.1
	Slope steepness										ESPON 1.3.1
	Peak ground acceleration										ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
	GDP/capita										ESPON 1.3.1
Earthquakes indicators	Growth of population and GDP in areas with earthquake probability									. Building codes / safety measures in areas wth high earthquake probability	ESPON 1.3.1
	Areas with earthquake probability (basically the entire territorial area)										ESPON 1.3.1
	Population density/GDP (in earthquake prone areas										ESPON 1.3.1
	Combined indicator of Population density/GDP and earthquake Vulnerability according to ground acceleration of occurred										ESPON 1.3.1
	Classification of earthquake Vulnerability according to ground acceleration of occurred earthquakes										ESPON 1.3.1
	Peak ground acceleration										ESPON 1.3.1
	Earthquake casualties						core indicator				ESPON 1.3.1
	GDP/capita										ESPON 1.3.1
	Dependency ratio										ESPON 1.3.1
	Economic earthquakes risk in Europe										ESPON 1.3.1
	Peak ground acceleration in proportion of acceleration of gravity %										ESPON 1.3.1
	Earthquake risk										ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Volcanic eruptions indicators	Growth of population and GDP in areas with volcanic activities									Building codes / safety measures in case of volcanic activities	ESPON 1.3.1
	Areas with active volcanoes						core indicator				ESPON 1.3.1
	Population density/GDP (in areas with volcanic activities)										ESPON 1.3.1
	Combined indicator of Population density/GDP and volcano activity										ESPON 1.3.1
	Classification of volcanoe activity										ESPON 1.3.1
	Known volcanic eruptions										ESPON 1.3.1
	Volcanic activity										ESPON 1.3.1
	GDP/capita										ESPON 1.3.1
	Dependency ratio										ESPON 1.3.1
Extreme Presipitation (havy rainfall/hail) indicators	Highest 7-day precipitation									Growth of population and GDP in areas with extreme precipitation	ESPON 1.3.1
	Heavy precipitation (>10 mm)									Areas with the possibility of extreme precipitation	ESPON 1.3.1
	Extreme precipitation (>25 mm)						core indicator			Population density/GDP (in areas affected by extreme precipitation)	ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
	Change of preciptation %							ESPON space NUTS 0	model for 2071-2100 (base on data for 1961-1990)	Combined indicator of Population density/GDP and areas with the possibility of extreme precipitation	
	Change of runoff %							ESPON space NUTS 0	model for 2071-2100 (base on data for 1961-1990)	• Classification of areas affected by extreme precipitation	
	Volcanic eruption hazard									Early waning systems / safety measures against extreme precipitation	
	Volcanic eruption risk										ESPON 1.3.1
Extreme temperatures (heat and cold waves) indicators	Number of warm days (Tmax >25°)									• Growth of population and GDP in areas with extreme temperatures	ESPON 1.3.1
	Number of tropical nights (Tmin > 20°)									Areas with the possibility of extreme temperatures	ESPON 1.3.1
	Number of freezing days (Tmax <0°)									• Population density/GDP (in areas affected by extreme temperatures)	ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Number of frost nights (Tmin <0°)									Combined indicator of Population density/GDP and areas with the possibility of extreme temperatures	ESPON 1.3.1 **ESPON project number**
Hazards from nucelar power plant indicators	Growth of population and GDP in areas close to nuclear power plants										ESPON 1.3.1
	New installations of nuclear power plants										ESPON 1.3.1
	Locations of nuclear power plants (amount of reactors and power in MGW)						core indicator	ESPON space + former CCCP (Europaen part)			ESPON 1.3.1
	Population density/GDP (in areas close to nuclear power plants)										ESPON 1.3.1
	Combined indicator of Population density/GDP and the amount of reactors and power inMGW										ESPON 1.3.1
	Occurred nuclear power plant disasters (no MCAs yet in Western Europe)										ESPON 1.3.1
	International saftey standars										ESPON 1.3.1
	Location of nuclear power plants										ESPON 1.3.1
	The distance from nuclear power plants										ESPON 1.3.1
	GDP/capita										ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
	The potential risk of radioactive contamintion in case of nuclear fallout										
	Economic nuclear power plant accident risk in Europe										
											ESPON 1.3.1
Hazards from the marine transport of hazardous goods indicators	Growth of population and GDP in coastal areas close to major crude oil shipping lines/ major oil ports										ESPON 1.3.1
	Increase of the amount of shipped crude oil										ESPON 1.3.1
	Major crude oil shipping lines / major oil ports						core indicator				ESPON 1.3.1
	• Population density/GDP (in coastal areas close to major crude oil shipping lines / major oil ports)										ESPON 1.3.1
	Combined indicator of Population density/GDP and the amount of traffic/closeness to coast (?)										ESPON 1.3.1
	Classification of shipping line vulnerability (amount of traffic/closeness to coast?)										ESPON 1.3.1
	• EU 27+2 safety regulations										ESPON 1.3.1
	Location of oil terminals, refineries, storages										ESPON 1.3.1
	Location of oil rigs										ESPON 1.3.1
	Location of pipelines										ESPON 1.3.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
	Risk of oil spills on coastal areas economical dependent on tourism										
	Risk of oil spills on coastal areas' nature protection and valuable nature areas										
	Mjor oil spills								1967-2002		ESPON 1.3.1
Hazards from large dams	Location of large dams < 5x106 m3						core indicator			Location of large dams	ESPON 1.3.1
	• Population density/GDP (in areas close to large dams)									Growth of population and GDP in areas downstream of largc dams	ESPON 1.3.1
	• Combined indicator of Population density/GDP and the Amount of water (m3) stored in the reservoirs									New installation of a large dam	ESPON 1.3.1
	Amount of water (m3) stored in the reservoirs										ESPON 1.3.1
Size of agricultural area				x			CORINE land cover 2000 is not available for pan Europe (only recently available for Ireland, Luxemburg, The Nederlands, Latvia, Estonia, Slovenia and Malta	CORINE, FAO	1990	Natural value is related to the process of extenstification and intensification	ESPON 1.3.2
Population change as the increase or decrease in numbers of inhabitants per km^2			x				provide an insight in trends that have taken or will take place in the pressure of population on land	EU 27+2	1995-2000		ESPON 1.3.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
							and natural heritage, NUTS 3				
GDP per area			X				other indicator, NUTS 2	EU 27+2	2000		ESPON 1.3.2
GDP change			X				other indicator, NUTS 2	EU 27+2	1995-2000		ESPON 1.3.2
Innovation				X			Regional Summary Innovation Index (RSII)	EU 15			ESPON 1.3.2
Tourism: Bed density as the number of beds per km^2				x			NIUTS 3	for the majority of the regions			ESPON 1.3.2
Tourism: Change number of beds				x			NIUTS 3				ESPON 1.3.2
Infrastructure: Road density as meters of motor and railway per km^2							NIUTS 3	for the majority of the regions			ESPON 1.3.2
Potential MEGAs											ESPON 1.3.2
Urban pressure: Population density, GDP per area, bed density, road density			x				Qualitative measure for urbanisation				ESPON 1.3.2
Percentage of built-up land as land that is used for urban structures, urban development and/or infrastructure				x			other indicator, NUTS 2	CORINE	1990		ESPON 1.3.2
Flood risk				x			NUTS 3	EU 27+2	1996-2002		ESPON 1.3.2
Fragmentation of natural areas				x			other indicator, NUTS 2	EU 27+2			ESPON 1.3.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Distribution of designated natural areas (IUCN)				X			other indicator, NUTS 2				ESPON 1.3.2
Multimodal potential accessibility			x				other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Density of motorways and express ways by population				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Average travel time by car to reach the three nearest cities of more than 100 000 inhabitants				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Travel time by cars to reach the nearest city of a given minimal population				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Hierarchy of Network				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Length of high speed and main rail lines (km)/NUTS3 population (1999)				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Fractal dimension of networks											ESPON 1.2.1
Connectivity to transport terminals by car (hours) of the capital or centroid representative of the NUTS3				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Cost to motorway entrances				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Connectivity to rail stations				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Connectivity to commercial seaports by car of the capital or centroid representative of the NUTS3 (HOURS)				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Costs to commercial seaports by truck				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Connectivity to commercial airports by car of the capital or centroid representative of the NUTS3 (HOURS)				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Time for road freight transport				x			other indicator, NUTS 3	EU 27+2	2001		ESPON 1.2.1
Cost for freight road transport				x			NUTS 2	EU 27+2	2001		ESPON 1.2.1
Travel times of one hour or less by air or rail between 71 MEGA's				x				EU 27+2	2003		ESPON 1.2.1
Time to reach the nearest MEGA by trucks				x				EU 27+2			ESPON 1.2.1
Average time to reach all the MEGA's				x				EU 27+2			ESPON 1.2.1
Number of cities of more than 100 000 inhabitants accessible by cars by step of time				x				EU 27+2			ESPON 1.2.1
European transport corridors in relief				x				EU 27+2			ESPON 1.2.1
Daily population accessible by car				x			other indicator, NUTS 3	EU 27+2	1999		ESPON 1.2.1
Dialy market accessible by car in terms of GDP				x			other indicator, NUTS 3	EU 27+2	2000		ESPON 1.2.1
Daily population accessible by rail				x			other indicator, NUTS 3	EU 27+2	1999		ESPON 1.2.1
Dialy market accessible by rail				x			other indicator, NUTS 3	EU 27+2	2000		ESPON 1.2.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Daily accessiblitiy by air between 71 MEGA's				x				EU 27+2	2003		ESPON 1.2.1
Daily accessibility surfaces				x							ESPON 1.2.1
Personal trips generated				x			other indicator, NUTS 2	EU 27+2			ESPON 1.2.1
Personal trips attracted				x			other indicator, NUTS 2	EU 27+2	1999		ESPON 1.2.1
km per person in generated by car/ purpose: business				x			other indicator, NUTS 2	EU 27+2	2001		ESPON 1.2.1
km per person in generated by car/ purpose: leisure and visits				x			other indicator, NUTS 2	EU 27+2	2001		ESPON 1.2.1
Freight volume generated				x			other indicator, NUTS 2, NUTS 3	EU 25			ESPON 1.2.1
Car traffic on road / Purpose: Business				x			other indicator, NUTS 2	EU 27?			ESPON 1.2.1
Freight road assignment: volumes				x				EU 27			ESPON 1.2.1
Freight road assignment: number of lorries				x				EU 27			ESPON 1.2.1
Freight rail assignment: volumes				x				EU 27			ESPON 1.2.1
Freight sea assignment and maritime routes				x				EU 27	2002		ESPON 1.2.1
Economical potential accessible from seaports				x							ESPON 1.2.1
Potential freight corridors from European maritime gateways				x					2002		ESPON 1.2.1
Airport traffic				x			NUTS 3	EU 27+2	2002		ESPON 1.2.1
Flows between MEGA's				x			NUTS 2				ESPON 1.2.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Road traffic deaths				x			other indicator, NUTS 2		1998-2001		ESPON 1.2.1
Number of tons of goods going through nodes and edges				x			NUTS 2	EU 27?			ESPON 1.2.1
Transit flow per area				x			NUTS 1, NUTS 2, NUTS 3	EU 27			ESPON 1.2.1
Emission of air pollutants				x			NUTS 2	EU 15			ESPON 1.2.1
Suppression of edges				x				EU 27			ESPON 1.2.1
Suppression of nodes				x				EU 27			ESPON 1.2.1
Suppression of hazardous link				x				EU 27			ESPON 1.2.1
Vulnerability to flooding				x				EU 27			ESPON 1.2.1
Vulnerability to snow and black ice				x				EU 27			ESPON 1.2.1
Length of road network (km)				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Length of railway network, km (2001)				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Inland waterways				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Number of commercial seaports				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Number of commercial airports				x			NUTS 3	EU 27+2	2001		ESPON 1.2.1
Accessibility indicators	Accessibility rail/road , travel, by policy scenario (SASI model)	x					indicator	EU29, NUTS 3			ESPON 2.1.1
	Accessibility rail/road/air, travel, by policy scenario (SASI model)	x					indicator	EU29, NUTS 3			ESPON 2.1.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Accessibility road, freight, by policy scenario (SASI model)	x					indicator	EU29, NUTS 3			
	Accessibility rail/road, freight, by policy scenario (SASI model)	x					indicator	EU29, NUTS 3			
	Accessibility (weighted by population) (STIMA)			x			indicator	EU15, NUTS 2	1999		
	Accessibility absolute growth at 2020 in the three scenarios Modelling result (STIMA)			x			indicator	EU15, NUTS 2	2020		ESPON 2.1.1 **ESPON project number**
Internet absolute growth at 2020 in the three scenarios Modelling result (STIMA)				x			indicator	EU15, NUTS 2	2020		ESPON 2.1.1
Pc GDP average growth rate at 2020 in the three scenarios Modelling result (STIMA)				x			indicator	EU15, NUTS 2	2020		ESPON 2.1.1
Pc GDP average growth rate in the three scenarios - differences from the EU mean at 2020 (STIMA)				x			indicator	EU15, NUTS 2	2020		ESPON 2.1.1
Business RnD expenditure as % of GDP					x		NUTS 2, for several countries NUTS 1/ NUTS 0 data used	EU 27, except MT	1999, AT 19998		ESPON 2.1.2
Human resources in science and technology core as % of labour force						x	NUTS 2, for IE NUTS 1	EU 15, except DK	1999		ESPON 2.1.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Employment in medium-high and high-tech manufacturing sectors as % of total workforce						x	NUTS 2	EU 15, incomplete ES, FR, DE, GR, SE	most recent year available		ESPON 2.1.2
Employment in high-tech services in % of total workforce						x	NUTS 2	EU 15, incomplete ES, FR, DE, GR, SE	most recent year available		ESPON 2.1.2
Population with tertiary education level as % of total working age population						X	NUTS 2	EU 27, incomplete GB, missing IE, BE	2000		ESPON 2.1.2
Typology of regions based on z-score analysis						x	NUTS 2	EU 15, incomplete PT, FR, DE, GR, SE, missing DK, IE, BE	different years		ESPON 2.1.2
typology of regions based on cluster analysis 1						x	NUTS 2	EU 15, incomplete: PT, GR, IT, ES, DE, missing DK, IE	different years		ESPON 2.1.2
typology of regions based on cluster analysis 2						x	NUTS 2	EU 15, incomplete: GR, IT, ES, DE, PT, missing DK, IE	different years		ESPON 2.1.2
typology of regions based on combination of approaches						x	NUTS 2	EU 15, incomplete: PT, missing DK, IE	different years		ESPON 2.1.2
total number of project participants in 5th FRP weigthed by population				x			NUTS 2	EU 27	2000		ESPON 2.1.2
Arable as percentage of Utilisable Agricultural Area				x			other indicator, NUTS2		Annual, 1974-2001		ESPON 2.1.3
Agricultural work unit (AWU) per hectares				x			other indicator, NUTS2		Biennial, 1990-1007		ESPON 2.1.3
AWU per holding				x			other indicator, NUTS2		Biennial, 1990-1007		ESPON 2.1.3
Percentage change in the number of holders				x			other indicator, NUTS2		Annual, 1990-1997		ESPON 2.1.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Percentage change in the number of old farmers				x			other indicator, NUTS2, no missing value for EU15, 100 per cent missing for new member states	EU15	Annual, 1990-1997		ESPON 2.1.3
Percentage change in the number of young farmers				x			other indicator, NUTS2	EU15?	Annual, 1990-1997		ESPON 2.1.3
Percent employed in agriculture, forestry and fishing				x			other indicator, NUTS3, 6.5 percent missing for EU15, 100 percent missing for new member states	EU15	Annual, 1988-1997		ESPON 2.1.3
Fallow as a percentage of Utilisable Agricultural Area				x			other indicator, NUTS2		Annual, 1995-2001		ESPON 2.1.3
Farm Net Value Added (FNVA) per AWU				x			other indicator, NUTS2		Biennial, 1990-1997		ESPON 2.1.3
FNVA per hectare of Utlilisable Agricultural Area				x			other indicator, NUTS2		Annual, 1990-2001		ESPON 2.1.3
Less Favoured Area (LFA) land as percentage of Utilisable Agricultural Area				x			other indicator, NUTS2		Biennial, 1990-1997'		ESPON 2.1.3
Livestock Units per holding				x			other indicator, NUTS2		Biennial, 1990-1997		ESPON 2.1.3
Permanent crops as a percentage of Utilisable Agricultural Area				x			other indicator, NUTS2		Annual, 1974-2001		ESPON 2.1.3
Permanent grass as a percentage of Utilisable Agricultural Area				x			other indicator, NUTS2		Annual, 1974-2001		ESPON 2.1.3
Standard Gross Margin per Agricultural Work Unit				x			other indicator, NUTS2		Biennial, 1990-1997		ESPON 2.1.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Total agricultural subsidies per hectare of Utilisable Agricultural Area			x				other indicator, NUTS3		1990, 1999		ESPON 2.1.3
Total agricultural subsidies per hectare of Agricultural Work Unit			x				other indicator, NUTS3		1990, 1999		ESPON 2.1.3
Utilisable Agricultural Area as a percentage of total area				x			other indicator, NUTS2		Annual, 1974-2001		ESPON 2.1.3
Hectares of Utilisable Agricultural Area per holding				x			other indicator, NUTS2		Annual, 1990-1997		ESPON 2.1.3
SF spending per capita	SF spending per capita		x				NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	EU 15, regions receiving SF	SF period 1994-1999		ESPON 2.2.1
	Structural Fund spending per capita (transport related) combined with connectivity to transport terminals weighted by surface, 2001 (two-dimensional matrix)		x				NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	EU-15, regions receiving transport related SF	SF period 1994-1999, connectivity 2001		ESPON 2.2.1
	SF spending per capita (transport related) combined with potential accessibility by road (EU15=100) (two dimensional matrix)		x				NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	EU-15, regions receiving transport related SF	SF period 1994-1999, no year for accessibility indicator		ESPON 2.2.1
	SF spending per capita combined with Net Public capital stock					x	NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	Spain	SF period 1994-1999, capital stock 1994		ESPON 2.2.1

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Annual average population change 1995-1999 and total SF spending per capita		x				NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	EU 15, regions receiving SF	SF period 1994-1999		
	SF spending per capita and annual average employment change between 1995-2000			x			NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending, period of employment change depends on national data availability	EU 15, regions receiving SF	SF period 1994-1999		
	SF spending per capita combined with ranking "change in GDP per capita in relation to national average"		x				NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	EU 15, regions receiving SF	SF period 1994-1999		ESPON 2.2.1 **ESPON project number**
Share of SF spending (%) combined with population density					x		no information: year of population density, NUTS level	EU 15, regions receiving SF	SF period 1994-1999		ESPON 2.2.1
Annual average SF spending as share of regional GDP in Euro, 1999			x				core indicator, NUTS 3, data on SF spending covers approx. 93,5 % of total actual spending	EU 15, regions receiving SF	SF period 1994-1999		ESPON 2.2.1
Total pre-accession aid spending as % of GDP	Total pre-accession aid spending as % of GDP			x			core indicator, different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO, Malta and Cyprus only partly covered	periods 1998-2000 and 2001-2002		ESPON 2.2.2
	Pre-accession aid spending and change of GDP per capita (PPS) between 1998 and 2000, EU15=100			x			different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO	average annual pre-accession aid 1998-2000		ESPON 2.2.2

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Pre-accession aid spending and change of GDP per capita (PPS) in relation to national average between 1998 and 2000			x			different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO	average annual pre-accession aid 1998-2000		ESPON 2.2.2 **ESPON project number**
Total pre-accession aid spending per capita				x			different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO, Malta and Cyprus only partly covered	periods 1998-2000 and 2001-2002		ESPON 2.2.2
Pre-accession aid spending according to regional potentials addressed				x			different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO, Malta and Cyprus only partly covered	periods 1998-2000 and 2001-2002		ESPON 2.2.2
	Location quotients for pre-accession aid spending according to potentials addressed by region			x			different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO, Malta and Cyprus only partly covered	1998-2000		ESPON 2.2.2
	Location quotients combined with various data/ indicators on regional potentials following below):			x			different NUTS levels for different countries (NUTS 2 or NUTS3)	New Member States plus BG and RO, Malta and Cyprus only partly covered	1998-2000		ESPON 2.2.2
Regional typology based on cluster analysis				x			different NUTS levels for different countries (NUTS 2 or NUTS3)	NMS plus BG and RO	1998, 2001		ESPON 2.2.2
Income of households								Nuts2 for 10(but some areas missing) ;Nuts 3 for Belgium; not available or no reply for 16 countries	1995-1999 (with many gaps and exceptions)		ESPON 2.2.3

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
GVA at Nace 17								Nuts2 for 10(but some areas missing) ;Nuts 3 for Belgium; not available or no reply for 16 countries	1995-1999 (with many gaps and exceptions)		ESPON 2.2.3
GVA at Nace 3								Nuts3 for 25(but some areas missing) ; not available or no reply for 4 countries	1995-1999 (with many gaps and exceptions)		ESPON 2.2.3
Life expectancy (urban sample only) (1b) and NUTS III or below								NUTS 3 or below	1995,2000 or 2001 or1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
Environmental data/pollution levels (urban sample only) (1b) and NUTS III or below								1b/NUTS 3 or below	1995,2000 or 2001 or1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
NACE 17 sector breakdown information at NUTS 3 and below ([1c])								NUTS 3 or below	1995,2000 or 2001 or1994-2001 (with many gaps and exceptions)		ESPON 2.2.3
RCE indicators	RCE: Additive combination of classified accessibility indicators	x					indicator	EU27+2, NUTS 2			ESPON 3.1.
	RCE: Additive combination of classified economy indicators	x					indicator	EU27+2, NUTS 2			ESPON 3.1.
	RCE: Additive combination of classified environment indicators	x					indicator	EU27+2, NUTS 2			ESPON 3.1.

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	RCE: Additive combination of classified hazard indicators	x					indicator	EU27+2, NUTS 2			
	RCE: Additive combination of classified labour market indicators	x					indicator	EU27+2, NUTS 2			
	RCE: Additive combination of classified demography indicators	x					indicator	EU27+2, NUTS 2			
	RCE: Additive combination of spatial structure indicators	x					indicator	EU27+2, NUTS 2			
	RCE: Final indicator (additive combination of classified indicators)	x					indicator	EU27+2, NUTS 2			ESPON 3.1. **ESPON project number**
Deviation indicators	Deviation - Gross Domestic Product by Population ('euros per inhabitant) around Nuts 2's neighbours			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		ESPON 3.1.
	Deviation - Gross Domestic Product by Population 'euros per inhabitant; index Nuts 0)			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		ESPON 3.1.
	Deviation - Gross Domestic Product by Population ('euros per inhabitant; index EU-15)			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		ESPON 3.1.
	Deviation - Gross Domestic Product by Population ('euros per inhabitant; index nuts 2's neighbours)			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		ESPON 3.1.

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Deviation - Gross Domestic Product by Population, 'purchasing power standards per inhabitant, around Nuts 2's neighbours			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		
	Deviation - Gross Domestic Product by Population, 'purchasing power standards per inhabitant; index Nuts 0,			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		
	Deviation - Gross Domestic Product by Population, 'purchasing power standards per inhabitant; index EU-15,			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		
	Deviation -Gross Domestic Product by Population, 'purchasing power standards per inhabitant; index Nuts 2's neighbours,			x			indicator, no data for CH and NO and remote areas	EU27+2, NUTS 2	1999		ESPON 3.1. **ESPON project number**
Discontinuities indicators	Discontinuities - Gross Domestic Product by Population, 'euros per inhabitant, absolut difference		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		ESPON 3.1.
	Discontinuities - Gross Domestic Product by Population, 'euros per inhabitant		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		ESPON 3.1.

Micro level (national)											
existing indicators	existing subindicators / combined indicators	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	Discontinuities - Gross Domestic Product by Population, 'euros per inhabitant		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		
	Discontinuities - Gross Domestic Product by Population, 'euros per inhabitant, relative difference		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		
	Discontinuities - Gross Domestic Product by Population, 'purchasing power standards per inhabitant, absolut difference		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		
	Discontinuities - Gross Domestic Product by Population, 'purchasing power standards per inhabitant		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		
	Discontinuities - Gross Domestic Product by Population, 'purchasing power standards per inhabitant		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		
	Discontinuities - Gross Domestic Product by Population, 'purchasing power standards per inhabitant, relative difference		x				indicator	EU27+2, regional level: NUTS 2i NUTS 2j	1999		ESPON 3.1. **ESPON project number**

Meso level (transnational)										
existing	Quality**					comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
	5	4	3	2	1					
Geographical types of borders (TIR Part2/ Ch. 2/ p.34)	X						EU-Accession Countries (+ Romania, Bulgaria) NUTS 3			ESPON 1.1.3
Ethnic-historical types of border regions (TIR Part2/ Ch. 2/ p.37)	X						EU-Accession Countries (+ Romania, Bulgaria) NUTS 3			ESPON 1.1.3
Density of border crossing points (TIR Part2/ Ch. 2/ p.39)	X						EU-Accession Countries (+ Romania, Bulgaria) NUTS 3			ESPON 1.1.3
Economic disparities of neighbouring regions (TIR Part2/ Ch. 2/ p.41)	X						EU-Accession Countries (+ Romania, Bulgaria) NUTS 3			ESPON 1.1.3
Participation in EUREGIOS and co-operation associations (TIR Part2/ Ch. 2/ p.41)	X						EU-Accession Countries (+ Romania, Bulgaria) NUTS 3			ESPON 1.1.3
									Flows of people, goods, services and knowledge	ESPON 1.1.3
territorial discontinuity on GDP per capita (in PPS) between contiguous regions (EU15 = 100)		x				NUTS 2	EU 15	1999		ESPON 2.2.1
development of disparities across borders (change in GDP/capita in PPS 1995-99)		x				NUTS 2	EU 15	1995-99		ESPON 2.2.1

Macro level (European)											
existing indicator	existing subindicator	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Polycentricity index - size: Number of FUAs; Slope of regression line of the rank-size distribution of FUA populations; Primacy rate in terms of FUA population; Slope of regression line of the rank-size distribution of FUA GDP; Primacy rate in terms of FUA GDP.				x			Data are not avalaible at the FUA level. Analysis on NUTS2	EU27+2	2001		ESPON 1.1.1.
Polycentricity index - location: Gini coefficient of the size of the Thiessen polygon around each FUA (airline distance)				x			Measured on airline distance, not in travel times or travel costs	EU27+2	2001		ESPON 1.1.1.
Polycentricity index - connectivity: Slope of the regression line between the accessibility and the population of FUAs; The Gini coefficient of the accessibility of FUAs;				x			Functional relationship are difficult to measure; generalized lack of suitable indicators	EU27+2	2001	flows of good and services; potential interaction	ESPON 1.1.1.
Polycentricity index - economic competitiveness: GDP per capita in PPS, Location of Top 50 European companies				x			refined indicators might be available at a larger scale	EU27+2	2001		ESPON 1.1.1.

Macro level (European)											
existing indicator	existing subindicator	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
Polycentricity index - social equity: Gini coefficient of the GDP per capita of NUTS 3 regions				x			refined indicators might be available at a larger scale	EU27+2	2001		ESPON 1.1.1.
Polycentricity index - environmental sustainability: Energy consumption in oil equivalents/GDP				x			refined indicators might be available at a larger scale	EU27+2	2001		ESPON 1.1.1.
Main telephone lines per 100 inhabitants (ch. 3.1.1, p. 43)		X					the indicator accurately describes the phenomenon	EU 25+2	2003		ESPON 1.2.2
Bertelsmann transformation and status indicator				x			NUTS 0	NMS, BG and RO	2003		ESPON 2.2.2
fixed line telehones indicators	% of households with a fixed line (ch. 3.1.2, p. 47)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2002		ESPON 1.2.2.
	Household fixed line penetration and Objective 1 status (ch. 3.1.2, p. 50)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
	The relationship between fixed line uptake and Objective 1 status (ch. 3.1.2, p. 51)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
	The relationship between fixed line uptake and GDP category (ch. 3.1.2, p. 52)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.

Macro level (European)											
existing indicator	existing subindicator	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	The relationship between fixed line uptake and population density/urban status (ch. 3.1.2, p. 53)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between fixed line uptake and Pentagon location (ch. 3.1.2, p. 54)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The level of 'national effect' in fixed line uptake (ch. 3.1.2, p. 55)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2. **ESPON project number**
mobile telephones indicators	% of households with at least one mobile (ch. 3.2.2, p. 65)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2002		ESPON 1.2.2.
	Household mobile penetration and Objective 1 status (ch. 3.2.2, p. 67)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	?		ESPON 1.2.2.
	The relationship between mobile uptake and Objective 1 status (ch. 3.2.2, p. 68)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
	The relationship between mobile uptake and GDP category (ch. 3.2.2, p. 69)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.

Macro level (European)											
existing indicator	existing subindicator	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	The relationship between mobile uptake and population density/urban status (ch. 3.2.2, p. 70)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between mobile uptake and Pentagon location (ch. 3.2.2, p. 71)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The level of 'national effect' in mobile uptake (ch. 3.2.2, p. 72)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2. **ESPON project number**
PC penetration indicators	% of households with a PC (ch. 3.3.2, p. 79)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2002		ESPON 1.2.2.
	Household PC penetration and Objective 1 status (ch. 3.3.2, p.81)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	?		ESPON 1.2.2.
	The relationship between household PC penetration and Objective 1 status (ch. 3.3.2, p.82)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.

Macro level (European)											
existing indicator	**existing subindicator**	**Quality****					**comments quality related**	**spatial coverage**	**time or time period respectively**	**required**	
		5	**4**	**3**	**2**	**1**					
	The relationship between household PC penetration and GDP category (ch. 3.3.2, p.83)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between household PC penetration and population density/urban status (ch. 3.3.2, p.84)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between household PC penetration and Pentagon location (ch. 3.3.2, p.85)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The level of 'national effect' in PC uptake (ch. 3.3.2, p.86)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2. **ESPON project number**
Internet uptake indicators	% of households with Internet access (ch. 3.4.2, p. 92)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2002		ESPON 1.2.2.
	Household Internet penetration and Objective 1 status (ch. 3.4.2, p. 94)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	?		ESPON 1.2.2.

Macro level (European)											
existing indicator	existing subindicator	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	
	The relationship between household Internet access and Objective 1 status (ch. 3.4.2, p. 95)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between household Internet access and GDP category (ch. 3.4.2, p. 96)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The correlation between household Internet uptake and GDP per capita (ch. 3.4.2, p. 97)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between household Internet access and population density/urban status (ch. 3.4.2, p. 98)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between household Internet access and Pentagon location (ch. 3.4.2, p. 99)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The level of 'national effect' in Internet uptake (ch. 3.4.2, p. 100)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2. **ESPON project number**

Macro level (European)											
existing indicator	existing subindicator	Quality** 5	4	3	2	1	comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
broadband indicators	DSL and cable modem coverage by locality (ch. 4.1.1, p. 113)				X		NUTS 0, the indicator accurately describes the phenomenon	EU 15	2002		ESPON 1.2.2.
	% of households with broadband Internet access (ch. 4.1.3 - p.124)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2002		ESPON 1.2.2.
	Household broadband penetration and Objective 1 status (ch. 4.1.3 - p.127)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	?		ESPON 1.2.2.
	The relationship between broadband Internet access at home and Objective 1 status (ch. 4.1.3 - p.128)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.
	The relationship between broadband Internet access at home and GDP category (ch. 4.1.3 - p.129)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2.

Macro level (European)											
existing indicator	**existing subindicator**	**Quality****					**comments quality related**	**spatial coverage**	**time or time period respectively**	**required**	
		5	**4**	**3**	**2**	**1**					
	The correlation between household broadband penetration and GDP per capita (ch. 4.1.3 - p.130)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between broadband Internet access at home and population density/urban status (ch. 4.1.3 - p.131)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	The relationship between broadband Internet access at home and Pentagon location (ch. 4.1.3 - p.132)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		
	Proportion of broadband households within Internet households (ch. 4.1.3 - p.133)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2002		
	The level of 'national effect' in broadband Internet uptake (ch. 4.1.3 - p.134)		X				NUTS 0, the indicator accurately describes the phenomenon	EU 15	2004		ESPON 1.2.2. **ESPON project number**
Estimated proportion of firms with Internet access (ch. 4.2.2, p. 143)			X				NUTS 0, the indicator accurately describes the phenomenon	EU 27+2	2003		ESPON 1.2.2.

Macro level (European)											
existing indicator	existing subindicator	Quality**					comments quality related	spatial coverage	time or time period respectively	required	ESPON project number
		5	4	3	2	1					
Estimated proportion of firms with their own website (ch. 4.2.2, p. 146)			X				NUTS 0, the indicator accurately describes the phenomenon	EU 27+2	2003		ESPON 1.2.2.

Indicators required		
Indicators required	**Subindicators required**	**ESPON project number**
Regional specialisation data on NUTS 3		ESPON 1.1.3
Flows of people, goods, services and knowledge		ESPON 1.1.3
Classification of areas affected by extreme temperatures		ESPON 1.3.1
regulations on preparedness (see glossary). Also: Guidelines and agreements for cross-border cooperation between regions.		ESPON 1.3.1
Hazardous plants	Growth of population and GPD in areas close to hazardous plants	ESPON 1.3.1
	New installations of hazardous plants	ESPON 1.3.1
	Locations of hazardous plants (amount of hazardous plants'.')	ESPON 1.3.1
	Population density/ GDP in areas close to hazardous plants)	ESPON 1.3.1
	Combined indicator of Population density/.GDP and the amount of hazardous plants)	ESPON 1.3.1
	Occurred hazardous plants disasters (e.g. from SPIRS/MAH databuse)	ESPON 1.3.1
Location of chemical plants		ESPON 1.3.1
Hazardous waste deposits	Growth of population and GDP in areas close to hazardous waste deposits	ESPON 1.3.1
	New installations of hazardous waste deposits	ESPON 1.3.1
	Locations of hazardous waste deposils (amount of hazardous waste deposits?)	ESPON 1.3.1
	Population density/GDP (in areas close to hazardous waste deposits)	ESPON 1.3.1
	Combined indicator of Population density/GDP and the amount of hazardous waste deposits (?)	ESPON 1.3.1
	Occurred hazardous waste deposits disasters	ESPON 1.3.1

Indicators required		
Indicators required	**Subindicators required**	**ESPON project number**
	Location of hazardous waste deposits	ESPON 1.3.1
Location of nuclear waste storages		ESPON 1.3.1
capacity of transport links		ESPON 1.2.1
a matrix origin / destination of individual vehicles		ESPON 1.2.1
data for displacements at a local level		ESPON 1.2.1
costs of transport links		ESPON 1.2.1
data about the traffic on road and railway		ESPON 1.2.1
timetables of trains and planes		ESPON 1.2.1
data of flows from main ports and airports and traffics between airports		ESPON 1.2.1
CAP expenditure only available on national level, except for Farm Accountancy Data Network sample data, which shows support received rather than expenditure.		ESPON 2.1.3
CAP expenditure by policy measure at NUTS3 level		ESPON 2.1.3
Outputs of principal commodities, annually, at NUTS3 level		ESPON 2.1.3
Farm numbers, farm workforce, and subsidy receipts at NUTS3 level		ESPON 2.1.3
Level and composition of farm household incomes at NUTS3 level		ESPON 2.1.3
Proportion of each NUTS3 area designated under environmental legislation		ESPON 2.1.3
Proportion of each NUTS3 area designated under Structural Funds and LFA		ESPON 2.1.3
Proportion of each NUTS3 area covered by LEADER programmes		ESPON 2.1.3
Electricity production by power source (hydroelectric, nuclear and thermal power)		ESPON 2.1.4

Indicators required		
Indicators required	**Subindicators required**	**ESPON project number**
Final energy consumption by energy type and consumption sector		ESPON 2.1.4
Energy prices for industry (tax included)		ESPON 2.1.4