Ulysses

Using applied research results from ESPON as a yardstick for cross-border spatial development planning

Targeted Analysis 2013/9/30

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This report presents a more detailed overview of the analytical approach to be applied by the project. This Targeted Analysis is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, 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.eu

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

This basic report exists only in an electronic version.

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1. Ulysses general analytical approach

With the Treaty of Lisbon of 2009 territorial cohesion became one of one of the main objectives of European policies, besides economic and social cohesion. The Treaty identifies territorial cohesion as a shared competency between the Union and the Member States.

The Green Paper on Territorial Cohesion (2008) identified territorial cohesion as *a means of transforming diversity into an asset that contributes to sustainable development of the entire EU (p. 4)*, thus allowing regions to mobilize their intrinsic development potential. According to the new Territorial Agenda of European Union (2011), territorial cohesion can be understood as *a set of principles for harmonious, balanced, efficient, sustainable territorial development (p. 4)*.

As stated by the Sixth Interim Report on Economic and Social Cohesion (2009), the strengthening of territorial cooperation, in its different aspects, is one of the main strategies to boost territorial cohesion. Cross-border areas have an important role in this context, not only with regard to territorial cohesion, but also to territorial competition since, as is mentioned in the Territorial Agenda, one of the major challenges faced by the EU today is *accelerating integration of our regions, including cross-border areas, in global economic competition and at the same time increasing dependencies of states and regions in the world (p. 3)*.

The Fifth Cohesion Report by the European Commission (2010) supports the Europe 2020 strategy (2010) by showing how regions and Cohesion Policy can contribute to achieving its objectives. The Fifth Cohesion Report stresses that headline targets of the Europe 2020 strategy will not be achievable by policies formulated at the EU or national level alone. In contrast, overcoming territorial disparities through the right mix of national, regional and local governing structures will play critical roles in defining and implementing policy measures based on territorial specificities.

Hence, the Fifth Cohesion Report reinforces the role of cross-border areas as the main playgrounds for territorial co-operation, though recognizing the higher transactions associated to such policies *due to different institutional systems, cultures and languages* (pp. xiv), emphasising the importance of access to services, sustainable development, 'functional geographies' and territorial analysis.

Within this policy framework, the main purpose of the Ulysses project consists of using applied research results from ESPON as a yardstick for decentralised cross-border spatial development planning. The four main objectives of the project are the following:

- **Promote ESPON research results**: To generally raise the awareness among the involved stakeholders on the basic function / the practical utility of decentralised cross-border spatial development and to promote a more widespread use of ESPON research results for elaborating high-quality cross-border spatial development concepts.
- **Multi-thematic territorial analyses**: To do 6 multi-thematic territorial analyses for the cross-border areas by making use of available ESPON applied research results and other local analyses / data, mainly for initiating and supporting more comprehensive processes that will lead to an up-grade of already existing cross border spatial development concepts and to the generation of new ones, by taking into consideration future territorial challenges that are pin-pointed by the ESPON 2006 Programme and the current ESPON 2013 Programme.
- **Experience exchange**: To promote the exchange of experience and best practice in the field of cross border spatial development and to stimulate the promotion of cross-border strategies for preparing the future INTERREG Programmes.
- **Application of targeted research results in the selected Cross Border Cooperation (CBC)**: To promote a further application of targeted research results in the selected Cross Border Cooperation (CBC) areas and to review the general usefulness of applied research results produced by the ESPON Programme in the context of cross border spatial development, while disseminating widely the practical experiences made with the Ulysses project.

More specific objectives of Ulysses are:

- **Multi-scale and multi-thematic territorial analysis**. To establish a territorial socioeconomic profile (territorial dynamics) and to analyse the performances of each case study area considering the six targeted themes and different territorial scales. The objective is to identify the territorial drivers and dynamics.
- **Institutional performance analysis:** To identify key institutional drivers that could allow building better baseline strategies in order to address the main identified challenges.
- **Integrated analysis and scenarios:** To make an integrated analysis of the territorial performance and dynamics and the institutional performance, relating the quantitative analysis with the policy structures and actions aiming at identifying the current challenges that case study areas are facing. To examine how the cross-border areas overlap with already existing ESPON scenarios for a prospective identification of future challenges.
- **Policy recommendations** To formulate (i) strategic guidelines to cope with identified challenges within each cross-border area, (ii) some inputs for methodological guidelines for future cross-border analysis, and (iii) policy recommendations at a national and EU level for encouraging cross-border area territorial cooperation.

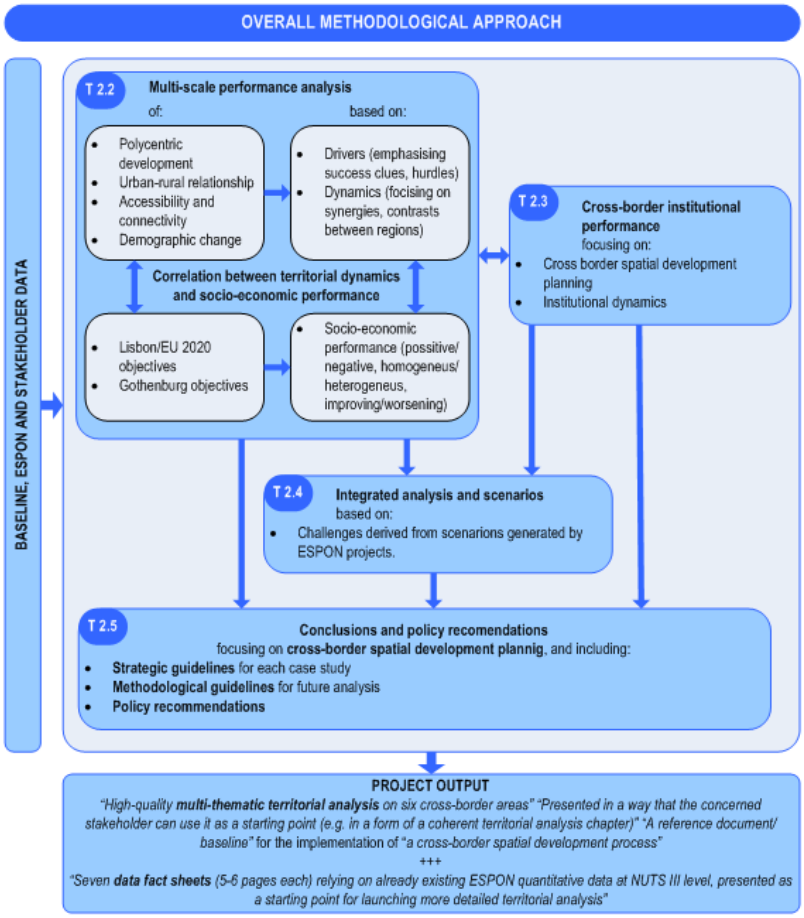


Figure 1: Ulysses project flow

2. Methodology and hypothesis for further investigation

Ulysses is a case study (CS) -oriented project which intends to promote the use of ESPON applied results as a yardstick for decentralized cross-border spatial development planning. Ulysses uses applied research results produced under the ESPON 2006 and ESPON 2013 Programmes as well as of more area-specific data, information and research results already available for the relevant cross-border areas. The focus is clearly on producing analytical results rather than on realising a cross-border harmonisation of quantitative data. The project's final results will be presented in a way that the concerned stakeholders can use them as a starting point for launching comprehensive processes leading to an elaboration of new cross-border spatial development concepts.

This chapter has been structured according to the tasks and subtasks that constitute WP2. Figure 1 illustrates the way in which the different tasks to be undertaken in the Ulysses project are linked.

Task 2.1 - Case study coordination

Context

Ulysses is featured as a case study oriented project. This means that the whole research will be based on different case studies that will share to a certain extent the same methodology and concepts, but will eventually include **tailored analyses** on specific situations and challenges not necessarily shared by all CS. The involvement of Ulysses' stakeholders will be crucial for identifying these specific research areas, providing the data needed to produce the analysis and designing an adapted research agenda covering those specific topics.

The case studies to be implemented are:

- CS 1: The Upper Rhine cross-border area along the land borders between France, Germany and Switzerland.
- CS 2: The cross-border area along the entire Spanish-French land border (Pyrenees). CS 3: The cross-border area along the land border between Greece and Bulgaria.
- CS 4: A cross-border area covering parts of the Northern Finland-Russian land border (Karelia).
- CS 5: A cross-border area along the borders between Poland, Germany (land border) and Sweden (maritime border).
- CS 6: Extremadura/Alentejo (ES/PT).

The "**data fact sheet**" analysis will be focused on:

- EUREGIO (EUREGIO)
- Öresundskomiteen (The Öresund Committee)
- Duna-Körös-Maros-Tisza Euroregion (Danube-Kris-Mures-Tisa Euroregion)
- EuRegio Salzburg-Berchtesgadener Land-Traunstein (EuRegio Salzburg-Berchtesgadener Land-Traunstein)
- Regione Autonoma Friuli Venezia Giulia (Autonomous Region of Friuli Venezia Giulia)
- Nemuno euroregiono Marijampolės biuras (PI Nemunas Euroregion Marijampole Bureau)

- Ems Dollart Region (Ems Dollart Region)

Challenges

- To coordinate and control the case studies and "data fact sheets" research and methodologies
- To agree on methodology and research concepts.
- To obtain the statistical information needed in due time.
- To do a continuous surveillance of the specific EU policies, programmes and initiatives relevant to this project.

Methodology

The CS coordinator is responsible for the development of a coherent implementation of the research methodology for each CS and data fact sheets analysis. Consequently, the CS coordinator will collect all the case study reports and will follow and monitor the development of the different analyses.

The CS coordinator will also offer support for data collection to the methodological leaders, and will facilitate the communication between the different CS leaders, the stakeholders and ESPON CU.

Task 2.2 - Multi-scale performance analysis

Context

The aim of this task is to establish a territorial socioeconomic profile (territorial dynamics) and to study the territorial performances of each CS region, regarding the six targeted themes and different territorial scales. The building of the territorial profile is primarily supported by a quantitative analysis which aims at identifying the relative position/behaviour of each cross-border area, in what concerns cross-border polycentric development, urban-rural relationship, accessibility & connectivity and demographic change. As far as possible, the evolution of the territorial profile of each cross-border area will be described in a clear and synthetic way, mainly by means of factor analysis, identifying the main drivers of the actual territorial socio-economic situation. The territorial performance analysis is a quantitative analysis related to the Lisbon/EU 2020 and Gothenburg objectives, which may allow to identify causal relations between drivers and relative performances of each cross-border area.

Challenges

The main challenge of this task will be **to identify the nexus between territorial socio-economic dynamics and the performance**. However, the analysis must be complemented by a more **qualitative analysis**, since both territorial dynamics and territorial performance are relevant per se. Unique and clear-cut causal relations between them may not emerge, while relevant drivers for the territorial dynamics may have no significance to the territorial performance. The objectives are:

- To identify what are the territorial drivers and dynamics. These drives will help us to emphasise what are the positive and negative factors influencing the territorial dynamics. The territorial dynamics analysis will be also focused on the existence of synergies inside each cross-border area, highlighting the positive combination of circumstances involved.

- To identify the correlation between these dynamics and the territorial performance, based on Lisbon/EU 2020 and Gothenburg objective indicators, allowing selecting the most relevant among the drivers previously identified.

Methodology

As it has been said before, the **territorial profile** aims to describe the evolution of the territorial situation of each cross-border area in a clear and synthetic way, while the **territorial performance** analysis is a quantitative analysis related to the Lisbon/EU 2020 and Gothenburg objectives.

For analysing both dimensions, different indicators of each of the cross-border area will be compared **on different scales**: (1) between different NUTS III (and in some cases NUTS II or IV) of the cross-border area as well as confining ones; (2) between the cross-border area and the countries to which they belong to; (3) between different NUTS III (and in some cases NUTS II or IV) of the cross-border area and the cross-border area regions belonging to a different country within the same cross-border area, and; (4) between different NUTS III (and in some cases NUTS II or IV) of the cross-border area and a reference index that might be established by the EU27 average, the leading region in the EU27, the individual countries of which the cross-border area are part or any other reference that might be useful to understanding the regions performance for a specific indicator (for example, regarding fertility rates, it might be useful to evaluate regions according to the renewal of their population: a fertility rate of 2,1). This procedure will contribute in understanding the effect of the border on the regions' behaviour. For example, a comparison of one side of the border of a cross-border area to the national average as well as the other side of the border might help understanding whether a region's performance is more influenced by its border position or by the realities of countries it belongs to.

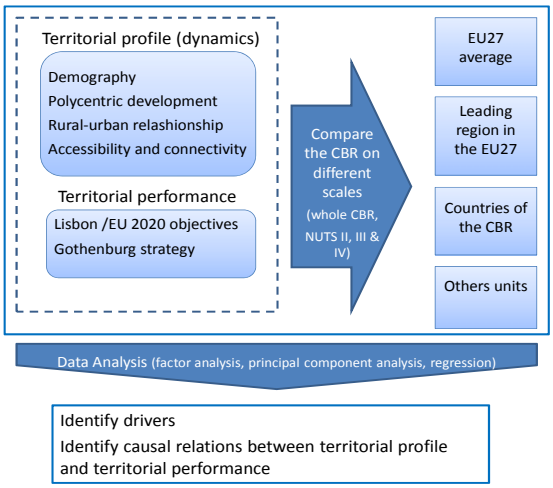


Figure 2. Research approach for Task 2.2

The **different themes** will also be subjected to different statistical analysis in order to identify causal relations between the relative performances of each cross-border area and the territorial profile, as well as the main drivers behind the different performances (namely by means of a factor analysis). The main outputs produced by this task will be:

- A territorial profile of each cross-border area, based on the different themes under analysis;
- An evaluation of the territorial performance based on Lisbon/EU 2020 and Gothenburg objective indicators;
- Analysis of the relations between the territorial performance and the territorial profile;

- Analysis of the most relevant drivers that influence the regions behaviour regarding the different themes;
- Use the analysis as a basis for developing policy guidelines.

The main challenge for this analysis will be data quality and availability:

- Some years or regions are not covered by ESPON 2007 and 2013 databases;
- Some indicators are not available at the desired spatial and/or temporal scales;
- Many complex indicators that were produces for specific ESPON projects have not been updated;
- Some areas under analysis are not covered neither by previous ESPON projects, nor by EUROSTAT basic data collections (especially in the cases of regions falling within Russia, Byelorussia and Serbia)

In order to overcome these potential drawbacks, some contingency methods have been set up:

- Request the stakeholders for the missing data;
- Use interpolation or extrapolation techniques to complete missing data;
- Use different (but similar) indicators for different regions;
- Adapt the interpretation of the results (interpret results as an indication and not a scientifically sound analysis);
- Estimate missing data by means of a function that correlates a missing variable with other variables in a large number of similar regions;
- Eliminate indicators from the analysis whenever none of the former alternatives is feasible.

As has been pointed out in the project's proposal, the **multi-thematic and multi-scale analysis** will be done for all the different case-studies. Although the task leader is responsible for defining the methodology and treating some of the data centrally, the partners will be undertaking their own analysis in the case study for which they are responsible. Therefore, a thorough coordination between the task leader and the other partners is crucial for this Task. This coordination will be done as follows:

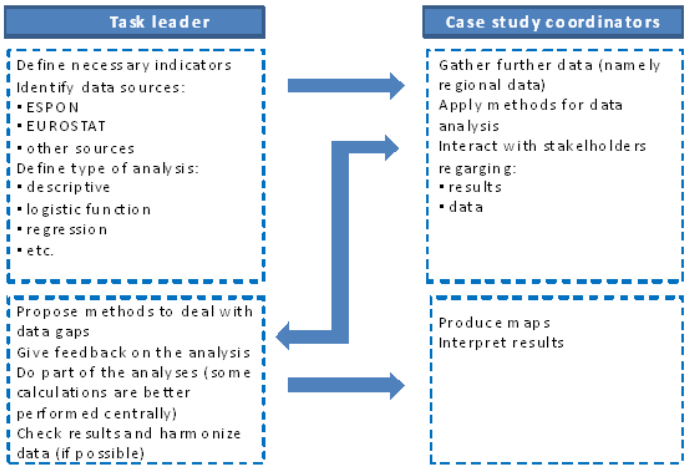


Figure 3. Workflow in Task 2.2

In this workflow, and despite the methodological guidelines that are established, the case study coordinators have a certain degree of autonomy for adding further data and indicators to the analysis. Namely, a closer contact with the CBR in general, and the stakeholders in particular, can allow the identification of new data sources as well as indicators with regional relevance that might not be available on a broader scale. The case study coordinators will also be responsible for establishing a bridge with the stakeholders, so that their feedback on the direction of the project is taken into account.

The analysis will be divided into 4 basic phases, which are themselves split into different steps, in order to give it the necessary flexibility.

The **first phase**, which has already been achieved, deals with identifying data sources and defining general procedures and methodologies. This process has been developed by the Lead Partner (LP) and the University of Aveiro (P5).

The **second phase** is dedicated to the analysis of the different themes: polycentric development, urban-rural relationship, accessibility and connectivity, demography and Gothenburg and Lisbon/Europe 2020 Strategy. This phase will also include qualitative analysis of those relevant problems that can not be addressed otherwise (e.g. cultural aspects of urban-rural relationship), as well as those issues lacking of the quantitative data required for consistent statistical analysis.

The **third phase** is devoted to an in-depth statistical analysis. This phase will be used to identify the main drivers as well as the causal relation of the territorial profile and performance. This phase will be developed simultaneously with the individual analysis of the different themes, but the main effort will be done towards the end of this Task, when the information for the different subthemes has been treated and (to some extend) harmonized.

The **fourth phase** will be used to analyse results and present the conclusions. In the final part of this phase the conclusions will be organized and treated for the Interim Report, and therefore it will coincide chronologically with the Interim Report.

All these phases will be adapted to the existing conditions observed within each cross-border area and will by no means produce a comparative analysis of the involved case studies. Each cross-border area will be analysed separately, sharing a common methodological approach but adapting the analysis to the particular problems found within each region. Specific research agendas will be discussed between each case study coordinator and the respective stakeholders and submitted to the LP for validation.

The **data fact sheets** will be *entirely* compiled through the first and second phases of this Task, relying on existing quantitative information at NUTS III level gathered from the ESPON 2006 and 2013 Databases. The third and fourth phases refer exclusively to the six multi-thematic territorial analyses (i.e case studies). Data fact sheet will not be included in any other research task within this project.

Phase 1: Identify data sources/define procedures

Objective: The objective of this phase is twofold. On one hand, it establishes a methodological guideline to be followed in the multiscale analysis and to define the coordination of the workflow between the different partners. On the other hand, it includes a first evaluation of the available indicators in the ESPON or EUROSTAT databases or other sources as well as significant data gaps.

Outputs: Procedures to guide the analysis. Provide a first list of the available indicators.

Phase 2: Analysis of the different themes

For analysing the different themes, a uniform approach is established:

A. Identify the available (and desirable) data to be collected from ESPON, EUROSTAT, stakeholders, etc.

B. Search for further data (contact stakeholders, other regional or national sources): All Partners. In the data collection, it is important to keep in mind that in order to be able to

produce the analysis at different scales, the indicators have themselves to be made available at different levels: EU, NUTS 0, I, II, III. LAU 1 & 2.

C. Define methods for the analysis:

C.1. Develop contingency methods for data gaps

C.1.1. estimate missing data (intrapolation, extrapolation, etc.)

C.1.2. substitute indicator by similar ones

C.1.3. eliminate indicators

C.2. Establish a procedure in the use of the indicators

C.2.1. Define the references for the regional comparison (namely the different scales at which the comparison shall be done)

C.2.2. Define ways to present results (maps, tables)

D. Do the analysis:

D.1. Treat the data (produce excel files with a uniform format)

D.2. Apply formulas

D.3. Use outputs to produce tables and maps according to a uniform procedure

D.4. Produce an in-depth analysis of those issues jointly identified between the case study coordinators and the respective stakeholders.

E. Complete the analysis with a review of qualitative materials coming from various data sources:

- Previous ESPON reports;
- National and regional reports;
- Sectoral reports provided by the stakeholders.

Phase 3: In-depth statistical analysis

Objective: Identify main drivers and causal relations between the territorial profile and territorial performance.

Methods: Factor analysis, principal components analysis, regressions, etc.

Inputs: Analysis made for the different subthemes.

Outputs: Conclusions regarding the performance of the different regions and the main drivers that explain their behaviour and that can be used to develop policy recommendations.

Steps:

1. Define the methods to use for the analysis and communicate it to all partners (P5)
    a. Identify most important indicators
    b. Define techniques (regressions, cluster analysis, factor analysis)
2. Prepare the data (P5)
3. Apply methods to the data (some are applied by all partners, some only by the P5)

Phase 4: Reach conclusions

Objective: Analyse the results and write down the main conclusions for the Interim Report.

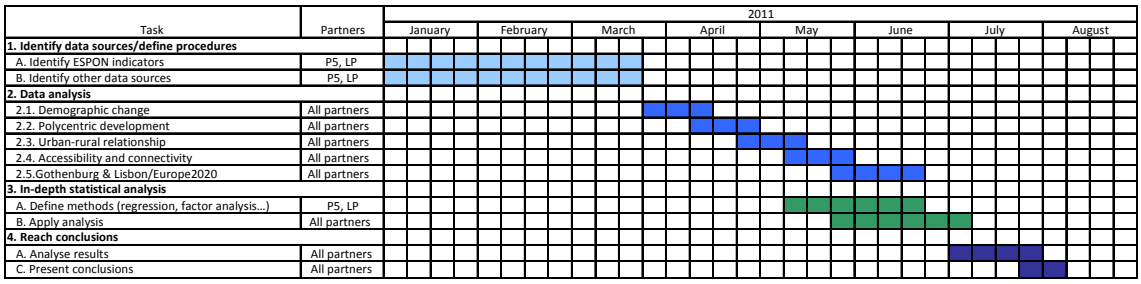
Inputs: Analysis made for the different subthemes and in-depth analysis.

Steps:

1. Present results and conclusions from the analysis (all partners)

2. Treat the conclusions for the inception report (all partners)

The following time-schedule is proposed for accomplishing Task 2.2's objectives:



Task	Partners	2011 January	February	March	April	May	June	July	August
1. Identify data sources/define procedures									
A. Identify ESPON indicators	P5, LP								
B. Identify other data sources	P5, LP								
2. Data analysis									
2.1. Demographic change	All partners								
2.2. Polycentric development	All partners								
2.3. Urban-rural relationship	All partners								
2.4. Accessibility and connectivity	All partners								
2.5.Gothenburg & Lisbon/Europe2020	All partners								
3. In-depth statistical analysis									
A. Define methods (regression, factor analysis…)	P5, LP								
B. Apply analysis	All partners								
4. Reach conclusions									
A. Analyse results	All partners								
C. Present conclusions	All partners								

Task 2.3 - Institutional performance analysis

Context

The Ulysses project is expected to deliver a 'reference baseline' to sustain, in each of the involved cross-border areas, the launching of – technically and operationally – more comprehensive cross-border spatial development planning processes. For this purpose, additionally to the socio-economic analysis, the aspects concerning the institutional performance are of crucial importance.

Challenges

The main challenges to be handled within the territorial governance analysis are the following:

- To capture and visualise the key features of the governance settings of each of the six case study regions in the form of *institutional mappings.*
- These mappings will focus on *spatial planning* and *transport policies* as well as on *cross-border institutions*
- Comparing the different settings will serve as a basis for the integrated analysis and the analysis of ESPON scenarios.

Methodology

The methodology for this task has been divided in the following phases:

Phase 1: Desktop research / drafting on institutional mappings

In a first phase, the existing information on the institutional setting is brought together, referring to both ESPON results and existing specific regional information. These insights will be further developed with existing region specific information from official and 'grey' literature and consider as well internet based information. The information gathered will be summarized and visualised in form of *institutional mappings,* aiming to analyse, visualise and localise the institutional settings. In the creation of these mappings special attention will be given to the *institutional levels* involved and the *territorialised perimeters* of the institutions. The mappings will moreover register the types of actors and of different forms of cooperation. Finally, in cooperation with the task 2.4, the relation between institutional and socio-economic performance will be explored.

Phase 2: Interactive part

The institutional mappings, resulting from desktop research, have to be verified and completed through an interactive phase. Complementary information has to be obtained, in particular from local/regional experts and to regional authorities. For efficiency reasons, this consultation process should take the form of a short survey.

Phase 3: Finalisation

The final phase of this task will bring together all the collected information in order to finalising the institutional mappings, in the form of cartography and other relevant media of comparative analysis presentation. In parallel, the results obtained will be of particular interest to the accomplishment of Tasks 2.4 and 2.5.

Task 2.4 - Integrated analysis and scenarios

Context

Institutional arrangements and governance processes are influent factors in the territorial performance, and in that aspect cross-border areas are no exception. There may be various relations between relevant actors based on the different levels of cooperation and competition analysed by Task 2.3 which influence all the themes addressed in the Task 2.2. These links might also influence and be influenced by future territorial scenarios across Europe.

Challenges

The integrated analysis will build on the findings from the multi-thematic, multi-scale analysis (Task 2.2) and the institutional performance analysis (Task 2.3). The challenges of this task are:

- To identify how the performance of cross-border areas is conditioned by institutional structures and governance processes and whether there is a potential for improving that performance via policy actions. In particular, attention will be given to the questions whether and how the stakeholders can influence the territorial performance through specific agendas for enhanced cross-border territorial cooperation.
- To investigate how Ulysses Cross Border Areas are positioned in relation to the qualitative scenarios produced by previous ESPON projects.

Methodology

The methodology designed for this task comprises the following phases:

Phase 1: Integrated analysis

The methodology for the integrated analysis is based on qualitative research techniques, arranged in a two-step procedure:

The **first step** deals with the classification of particular thematic issues based on the following straightforward qualitative methodology:

- Coding of the institutional mappings produced by Task 2.3 through interpretive techniques.
- Transformation of these codes into no more than 7 classes, if appropriate.
- Visualisation of results.

This procedure will be performed at a NUTS III (II) level for all the concerned cross-border areas. The results will illustrate whether there are differences between NUTS III (II) of the different cross-border area and implicitly show whether there is a border effect, resulting from the condition of 'natural' barrier that the border constitutes.

The **second step** aims at linking the themes examined by Task 2.2 and the institutional mappings produced by Task 2.3. This will be preferably handled by means of analysis of variance:

- A factor analysis will be used to identify the most important institutional factors explaining the variance of the performance indicators related to Lisbon and Gothenburg strategies across all the Cross Border Areas;
- A cluster analysis will allow identifying groups of similar regions, handling in isolation, as above, the institutional indicators classified by the previous task.

The final design of this research step will largely depend on the specific results obtained from tasks 2.2 and 2.3. In any case, it will include a deep qualitative analysis on the impacts of the policies most directly related to the challenges detected by Task 2.2.

Phase 2: Scenarios

Ulysses will analyse the Cross Border Areas in the light of some qualitative scenarios developed by previous ESPON project 3.2 - Spatial Scenarios and Orientations in relation to the ESDP and Cohesion Policy. These scenarios will be overlapped with the analytical results produced within Ulysses using the following methodology:

1. A simple baseline scenario for the year 2030 will be defined for each Cross Border Area, based on the projection of the actual trends upon all the themes concerned and on the identified relations in the context of the integrated analysis.
2. This baseline scenario will be compared to a selection of some relevant scenarios produced under ESPON project 3.2 - Spatial Scenarios and Orientations in relation to the ESDP and Cohesion Policy, namely:
    a. The integrated baseline scenario.
    b. The cohesion-oriented scenario.
    c. The competitiveness-oriented scenario.
3. The results of the comparison will be discussed in terms of the coherence of the baseline scenario designed by ESPON 3.2 and the ones produced by Ulysses for each cross-border area. The possible impacts of the cohesion-oriented and competitiveness-oriented scenarios on the cross-border areas will also be discussed. A set of maps to facilitate the visualisation of the main findings will be produced as well.

The most important regional challenges detected in both phases calling for a cross-border joint action will be an output for Task 2.5.

Task 2.5 - Conclusions and policy recommendations

Context

Being ESPON a 'policy-oriented' research program, the conclusions and policy recommendations are an essential part of every ESPON report. In this regard, Ulysses aims at (i) interrelating the results produced from previous tasks, (ii) summarizing the key points as basic conclusions, and (iii) formulating relevant policy recommendations for each cross-border area at different levels.

Policy recommendations should be legible, applicable and usable by policy makers, to be delivered at regional, cross-border area, national and EU scales. Additionally, policy recommendations will take the form of strategic and methodological guidelines for future implementations.

Challenges

This Task is expected to provide strategic guidelines for each cross-border area that will be articulated as:

- Main findings of the integrated and scenario analysis (Task 2.4), to highlight the most relevant challenges and development opportunities having cross-border relevance, pin-pointing those thematic areas requiring cross-border joint actions.
- Legible, applicable and usable policy recommendations presented at various scales (region, cross-border area, national and EU levels).

Methodology

The methodology for the implementation of this Task is presented in the following sequence of activities:

Step 1: Link and summarize the conclusions drawn during previous tasks, particularly by the integrated and scenario analysis, as the major input for the following research steps.

Step 2: Based on the project development experience, methodological guidelines for future analysis will be produced, allowing for potential transferability of the methodology and research approaches of Ulysses at other CBA. These guidelines will be devoted to illustrate what types of problems and obstacles have emerged along the way during the implementation of the project, and what research questions should be given particular attention in following studies.

Step 3: Produce methodological guidelines for future analysis, allowing for potential transferability of the results. These guidelines will be devoted to illustrate what types of problems and obstacles have emerged along the way during the implementation of the project, and what research questions should be given particular attention in following studies.

Step 4: Formulate policy recommendations at national and EU (ESPON area) levels. This topic will address questions such as how the ESPON programme or DG-REGIO policies might contribute fostering territorial co-operation within cross-border areas in future programming periods, within the present policy framework of the EU.

3. Analysis of the relevant information and data availability

3.1 Data management

Data management will be dealt with in Ulysses adhering to the following principles:

- The main data sources will be ESPON 2006 and 2013 databases, together with conventional accessible statistical repositories like EUROSTAT and national statistical institutes.
- Whenever those databases are insufficient or outdated, stakeholders will be requested to provide alternative data.
- Data will be analysed for two extreme years (1995 circa and as close to 2010 as possible and one intermediate year (2000); these intervals will be tentatively the

same for all cases. When data is not available for the selected years, interpolation or extrapolation techniques will be used.

- Specific contingency plans including the use of comparable indicators or the use of qualitative information will be designed for persistent data gaps.

3.1.1. Type of indicators

Four main levels of indicators will be considered:

Level 1 - descriptive indicators: The descriptive indicators are divided into three main groups:

1a- External data to be pre-processed: Data directly taken from ESPON or other databases, but that cannot be used directly because of its strong dependency on the size of the unit of analysis (e.g.: population, GDP, length of roads, etc.). Such data must be transformed in order to eliminate the dependency referred to above (e.g.: population density, GDP per capita, length of roads by km2, etc.).

1b- External directly usable data:

- Data from ESPON or other databases that is independent on the size of the unit of analysis (e.g.: the percentage of the population with more than 60 years, number of patents per million inhabitants or the above mentioned indicators – population density, etc.);
- Data reflecting the change between the two extreme years mentioned above (e.g.: population growth, GDP per capita growth, etc.);
- Besides the indicators that are directly drawn from the ESPON databases, more complex indicators can also be produced by applying statistical methods to the data.

1c- Internally produced multi-scale analysis indicators: Indicators which, rather than showing absolute values, show values relative to standards (e.g.: population density of region X / population density of the reference area). The unit that works as a standard can be the entire cross-border area, the overall country, the EU, the leading region in the country or the leading region in the EU.

Level 1 indicators will be the only ones considered for the **data fact sheets**.

Level 2 - synthetic and final indicators:

1a- Indexes combining several indicators (e.g.: index of education obtained by combining the percentage of population with different levels of educational attainment);

1b- Indexes produced through factor analysis (e.g.: index of innovation resulting from a principal component analysis of several socio-economic indicators).

Level 3 - catching-up performance indicators: These indicators show the speed of catching-up with the leading regions. Assuming a standard logistic process of catching-up with the leader (such as moving from the level of 50% of the innovation index of the leading region up to the level of 99% in 25 years), it is possible to see if regions are catching up faster or slower than the standard process or if they are diverging, i.e. growing less than the leading region.

Level 4 - explanatory indicators: Level 2 and 3 indicators describe the performance of regions under analysis concerning both inputs and outputs of performance. It is possible to

estimate a regression function where a synthetic output indicator (or a reduced number of indicators) is explained by inputs. Such regressions must be performed for a large number of units of analysis (e.g. all NUTS II regions of the countries containing the cross-border area under analysis) in order to obtain significant results.

Applying such equation to the cross-border area (NUTS III), the residuals (differences between actual and estimated outputs) show how regions are performing worse or better than the standard process (regression equation). A careful analysis of the residuals can be combined with the results of Tasks 2.3 and 2.4 in order to provide the basis for policy guidelines.

Level 5 - indicators of border effects: In order to detect the effect of borders on the patterns of settlement it is necessary to perform a more detailed analysis at LAU 1&2 levels. Calculating the demographic potential of the LAUs neighbouring the border and comparing with the average potential of the corresponding NUTS III and NUTS II levels, it is possible to see if the border acts as an attractor or a repulsor of human settlement.

A preliminary list of indicators gathered for Ulysses can be found in Annex I to this report.

4. Use of relevant ESPON results and data in the Ulysses project

Cross-border spatial development is by definition thematically cross-cutting. Ulysses takes into consideration a range of important territorial issues and challenges pin-pointed by strategic European policy orientations and/or by recent ESPON applied research. The reference projects from ESPON 2006 programming period are:

- ESPON-INTERACT study on “Spatial visions and scenarios”
- ESPON-INTERACT study on “Territorial evidence and cooperation”
- ESPON Project 1.1.1 “Urban areas as nodes in a polycentric development”
- ESPON Project 1.1.2 “Urban-rural relations in Europe”
- ESPON Project 1.1.3 “Enlargement of the EU”
- ESPON Project 1.1.4 “Spatial effects of demographic trends”
- ESPON Project 1.2.2 “Telecommunication services and networks”
- ESPON Project 1.3.1 “Spatial effects of natural and technological hazards”
- ESPON Project 1.3.2 “Territorial trends of the management of the natural heritage”
- ESPON Project 1.3.3 “Impacts of cultural heritage and identity”
- ESPON Project 2.1.1 “Territorial impact on EU transport policies”
- ESPON Project 2.4.2 “Integrated analysis on transnational and national territories”
- ESPON Project 3.2 “Spatial scenarios in the relation to the ESDP”
- ESPON Project 3.3 “Territorial dimension of the Lisbon-Gothenburg Process”

From ESPON 2013 programming period, the reference projects are:

- DEMIFER - Demographic and Migratory Flows Affecting European Regions and Cities
- EDORA - European Development Opportunities in Rural Areas
- CAEE - The Case for Agglomeration Economies in Europe
- METROBORDER - Cross-Border Polycentric Metropolitan Region0s
- SURE - Success for Convergence Regions’ Economies

5. Specific remarks on the project's content, process and expected results

The initial content of the Ulysses project was modified after the kick-off meeting, celebrated with the Ulysses Stakeholders and ESPON. All the agreed changes are listed in the Annex III to the Subsidy Contract. These can be summarized as follows:

- **Conceptual definitions:** Ulysses will use the cross-border definition of official EU documents such as the Green Paper of Territorial Cohesion. For the case studies, the research team will make use of the territorial cross-border areas identified and defined in the Ulysses project's specifications.
- **Methodological issues**: The strategy to identify the functionality will be based on a multi-scale territorial analysis. Each cross-border area will be compared to their respective countries and the European Union through reference indexes. That analysis would allow comparing and identifying differences in the territorial dynamics and performance between cross-border areas and their geographical contexts. This analysis can also be helpful in identifying specific functionalities and dynamics which overlap with other ESPON scenarios and the main territorial drivers and challenges.
- **Institutional analysis:** This analysis will help in identifying key institutional drivers that could facilitate the construction of better baseline strategies to cope with the main challenges identified in the project for each case study. In any case, the main objective of this task is not simply the mapping of the institutional framework, taking for granted that the stakeholders already have that knowledge and it will be provided to the TPG.
- **Scenarios**: Ulysses will develop qualitative scenarios based on the analysis of the different scenarios previously developed by other ESPON projects and their overlapping with the analytical results produced in the project.
- **Policy recommendations**: Policy recommendations to be formulated according to the Ulysses' results will be presented in the form of strategic guidelines to cope with identified challenges in each cross-border areas, methodological guidelines for future cross-border analysis, and policy recommendations at a national and EU levels aiming to encourage cross-border area territorial cooperation.
- **Statistical information**: ESPON database will be the main data source. However, ESPON database is majorly available at NUTS II scale and hence the stakeholders will asked to provide additional data for a more accurate analysis. On the other hand, qualitative information will be also provided by stakeholders.
- **Stakeholders**: The stakeholders play an important role in Ulysses project. As it has been pointed out, they are expected to provide quantitative and qualitative information for the analysis to be carried out by the TPG. In this sense, the coordination between the TPG, the stakeholders, the Help Desk and the Cluster Leader of each Joint Geographical cluster will be a key element in the project. Data provision and qualitative analysis information will be canalized by the stakeholders through the Geographical Clusters, the Helpdesk and the TPG contact poin.

6. Deliverables, outputs and dialogue with the stakeholders

The Lead Partner (LP), who also coordinates the case studies, works in close collaboration with the stakeholders representing the areas under research and the Helpdesk. The LP will maintain regular communication with the stakeholders during the entire project, and especially in its initial phase, in order to fully understand the stakeholders' requirements and needs and make sure that the methodology suggested by ESPON is fully understood and meets their

expectations. Intense bilateral communication flows will also take place between case study leaders and their respective stakeholders.

The following reports will be delivered during the project:

- **Interim report:** The LP will take over the submission of the Interim Report by 15 October 2011. This report focuses on the presentation of the intermediate project results and an insight on how the project is expected to formulate recommendations.
- **Draft Final report**: The LP will take over the submission of the Draft Final Report by 29 February 2012. This report presents the final results of the project and focuses on relevant conclusions and recommendations. The report will include draft final versions of all expected project deliveries. The draft final report will be based on all partner's contribution.
- **Final report**: The LP will take over the submission of the Final Report by 30 April 2012. The overall and area-specific results will be presented in the Closing Seminar of Ulysses by the LP in April 2012.

7. Main expected barriers

There are three main barriers that might affect the project progress:

- **Data availability in non EU cross-border regions:** Concretely, one of the main barriers will be to get the statistical information from Northern Finland-Russian land border (Karelia).
- **Data gaps**: There are statistical data gaps and lack of harmonization of data within some of the cross-border areas under analysis.
- **New data:** The ESPON 2013 database has been updated after the project started, obliging to a complete review of the indicators included in Ulysses' initial research plan and this has eventually led to a partial revision of the research plan itself.

8. Orientation towards the Interim Report

- First Joint Workshop of the four Geographical Clusters, first working partnership between the TPG and Ulysses stakeholders and the second meeting of the Ulysses Steering Group. (February/ March 2011).
- Second meeting of the TPG (September 2011)
- Second Joint Workshop of the four Geographical Clusters, the second working partnership meeting between the TPG and Ulysses stakeholders and the third meeting of the Ulysses Steering Group (October/November 2011)

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ISBN

Annex I – Preliminary list of indicators selected for Task 2.2

One of the main objectives of the ULYSSES project is to use the different ESPON Programme results for the cross-border spatial development and to promote the use of these research results for elaborating high-quality cross-border spatial development concepts.

Consequently, for each of the different dimensions under analysis (polycentric development, urban-rural relationship, accessibility and connectivity, demographic change and Gothenburg and Lisbon/Europe 2020 Strategy), a list of related indicators has been selected from the ESPON data-base. Regrettably, many of these indicators are incomplete or available only for limited territorial units or time references, and it has been therefore necessary to gather further data from ESPON, from the stakeholders or from other sources.

The following table lists some of the indicators gathered so far from ESPON and other available databases:

Variable name	Coverage	Years	Source of data
Cross-border polycentric development			
Share of population in cities below 50.000 inhabitants	NUTS 2	2001(?)	ESPON: BBR
Share of population within functional urban regions in each NUTS 3	NUTS 3	??	ESPON: Nordregio
Population in FUA	FUA	??	
Primacy rate (share of largest city population to total population in %)	NUTS 2	2002	ESPON: Heidbrink / Schmidt-Seiwert
Number of FUA in NUTS3	NUTS 3	1999	ESPON: Nordregio
Typology on polycentricity, 6 types	NUTS 3	1999	ESPON: Nordregio
Employment and commuting among NUTS level 2 regions (1000)	NUTS 2	1999-2009	EUROSTAT Regional DB
Urban-rural relationship			
Relative rurality based on national classifications	NUTS 3	1985-2001 varying	ESPON: Nordregio
Percent of value added from agriculture forestry and fishery products	NUTS 3	1999	ESPON: SAC
Employment by economic activity, at NUTS levels 1 and 2 (1000) (1999-2009, NACE Rev.1.1) All NACES	NUTS 1, 2	1999-2009	EUROSTAT Regional DB
Employment by economic activity, at NUTS levels 1 and 2 (1000) (1999-2009, NACE Rev.1.1) Agriculture and Fishing	NUTS 1, 2	1999-2009	EUROSTAT Regional DB
Agricultural areas (hectares)	NUTS 0,1,2,3	2000	ESPON: SAC
Land under permanent crops (hectares); Heterogenous agricultural areas	NUTS 0,1,2,3	2000	ESPON basic indicators (DB 2013)
Number of households by degree of urbanisation of residence (1000)	NUTS 1, 2	1999-2009	EUROSTAT Regional DB
Net Value added from agriculture	NUTS 2	2002-2009	EUROSTAT Regional DB
Accessibility and connectivity			
Total trips generated in each NUTS2	NUTS 2	2001	Mcrit
Length of highroad network (km)	NUTS 3	2001	Mcrit
Lenght of motorway network (km)	NUTS1&2	1998-2008	EUROSTAT Regional DB
Length of railway network, km (2001)	NUTS 3	2001	Mcrit
Length of road network (km)	NUTS 3	2001	Mcrit

Number of commercial airports	NUTS 3	2001	Mcrit
Number of rail stations serving high speed rail lines	NUTS 3	2001	Mcrit
Traffic in commercial airports (in million passengers/year 2000)/inhabitants (1999)	NUTS 3	2001	Mcrit
Connectivity to commercial airports by car of the capital or centroid representative of the NUTS3 (HOURS)	NUTS3	2001	Mcrit
Time (minute) to the nearest motorway access, by car of the capital or centroid representative of the NUTS3	NUTS3	2001	Mcrit
Connectivity to rail stations (minutes) weighted by surface	NUTS3	2001	Mcrit
Multimodal potential accessibility: absolute level; standardised;change of standardised;relative change;absolute change	NUTS 3	2001;2006	ESPON Accessibility DB
Potential accessibility by air: absolute level; standardised;change of standardised;relative change;absolute change	NUTS 3	2001;2006	ESPON Accessibility DB
Potential accessibility road: standardised;relative change;absolute change;index change	NUTS 3	2001;2006	ESPON Accessibility DB
Potential accessibility rail: 2006, EU27 = 100; relative change;absolute change; index change	NUTS 3	2001;2006	ESPON Accessibility DB
Households with internet access (% of households)	NUTS 2	2006-2010	EUROSTAT Regional DB
Households with broadband internet access (% of households)	NUTS 2	2006-2010	EUROSTAT Regional DB
Firms access to fibre backbones	NUTS 2	2001	ESPON 122/ESPON database
Demographic change			
Population density	NUTS 0	1995-2003	
Dependency rate 1995	NUTS 0	1995	ITPS
Population density 2003	NUTS 1	2003	
Population density	NUTS 2	1997-2008	EUROSTAT Regional DB
Population density 2000	NUTS 2	2000	
Total fertility rate	NUTS 2	1990;95;99	ITPS
Dependency rate	NUTS 2	1995-2000	ITPS
Population by age 10-14; 15-19; etc.	NUTS 2	1996-2003	
Population by sex and age groups on 1 January - NUTS level 3 regions - males under 15	NUTS 3	2000-2010	EUROSTAT Regional DB
Population by sex and age groups on 1 January - NUTS level 3 regions - males from 15 - to 64	NUTS 3	2000-2010	EUROSTAT Regional DB
Population by sex and age groups on 1 January - NUTS level 3 regions - males over 65	NUTS 3	2000-2010	EUROSTAT Regional DB
Population by sex and age groups on 1 January - NUTS level 3 regions - females under 15	NUTS 3	2000-2010	EUROSTAT Regional DB
Population by sex and age groups on 1 January - NUTS level 3 regions - females from 15 - to 64	NUTS 3	2000-2010	EUROSTAT Regional DB
Population by sex and age groups on 1 January - NUTS level 3 regions - females over 65	NUTS 3	2000-2010	EUROSTAT Regional DB
Population density (inhabitants/sqkm)	NUTS 1, 2,3	1999-2009	EUROSTAT Regional DB
Fertility rates by age	NUTS 2	1997-	EUROSTAT Regional

		2008	DB
Area of the regions (Km2)	NUTS 1, 2,3	1999-2010	EUROSTAT Regional DB
Demographic balance and crude rates - Crude rate of natural increase	NUTS 1, 2	2000-2010	EUROSTAT Regional DB
Demographic balance and crude rates - Crude rate of net migration including corrections	NUTS 1, 2	2000-2010	EUROSTAT Regional DB
Demographic balance and crude rates - Crude rate of increase	NUTS 1, 2	2000-2010	EUROSTAT Regional DB
Total Dependency Ratio	NUTS 0, 1,2,3	2005	ESPON:DEMIFER
Old Age Dependency Ratio	NUTS 0, 1,2,3	2005	ESPON:DEMIFER
Change in Old Age Dependency Ratio	NUTS 0, 1,2,3	2005	ESPON:DEMIFER
Young Age Dependency Ratio	NUTS 0, 1,2,3	2005	ESPON:DEMIFER
Labour Force Replacement Ratio	NUTS 0, 1,2,3	2005	ESPON:DEMIFER
Population density	NUTS 3	1995-2009	EUROSTAT Regional DB
Average Population by sex	NUTS 3	1995-2009	EUROSTAT Regional DB
Total population	NUTS 0,1,2&3	1995-2009	EUROSTAT Regional DB
Natural population change	NUTS 0,1,2&3	1995-2009	EUROSTAT Regional DB
Net migration	NUTS 0,1,2&3	1995-2009	EUROSTAT Regional DB
Annual average natural population change	NUTS 0,1,2&3	1995-2009	EUROSTAT Regional DB
Annual average net migration rate	NUTS 0,1,2&3	1995-2009	EUROSTAT Regional DB
Annual average population change	NUTS 0,1,2&3	1995-2009	EUROSTAT Regional DB
Total fertility rate	NUTS 2	1995-2009	EUROSTAT Regional DB
Gothenburg & Lisbon/Europe 2020 Strategy indicators			
Innovation & research			
Patent registrations to the EPO per million inhabitants	NUTS 2	2001;2004	BBR
Human resources on science and technology and sub-groups in % of active population (annual data 1999-2009)	NUTS 2	2001/2005/2009	EUROSTAT
Tertiary education 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Life-long learning 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Public R&D expenditures 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Business R&D expenditures 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Non-R&D innovation expenditures 2004	NUTS 0,1,2	2004-2006	RIS, 2009
SMEs innovating in-house 2004	NUTS 0,1,2	2004-2006	RIS, 2009

Innovative SMEs collaborating with others 2004	NUTS 0,1,2	2004-2006	RIS, 2009
EPO patents 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Product and/or process innovators 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Marketing and/or organisational innovators 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Resource efficiency innovators - Labour 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Resource efficiency innovators - Energy 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Employment medium-high & high-tech manufacturing 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Employment knowledge-intensive services 2004	NUTS 0,1,2	2004-2006	RIS, 2009
New-to-market sales 2004	NUTS 0,1,2	2004-2006	RIS, 2009
New-to-firm sales 2004	NUTS 0,1,2	2004-2006	RIS, 2009
Tertiary education 2006	NUTS 0,1,2	2004-2006	RIS, 2009
Life-long learning 2006	NUTS 0,1,2	2004-2006	RIS, 2009
SMEs innovating in-house 2006	NUTS 0,1,2	2004-2006	RIS, 2009
Innovative SMEs collaborating with others 2006	NUTS 0,1,2	2004-2006	RIS, 2009
EPO patents 2006	NUTS 0,1,2	2004-2006	RIS, 2009
Product and/or process innovators 2006	NUTS 0,1,2	2004-2006	RIS, 2009
Marketing and/or organisational innovators 2006	NUTS 0,1,2	2004-2006	RIS, 2009
3.1.3a Resource efficiency innovators - Labour 2006	NUTS 0,1,2	2004-2006	RIS, 2009
3.1.3b Resource efficiency innovators - Energy 2006	NUTS 0,1,2	2004-2006	RIS, 2009
3.2.1 Employment medium-high & high-tech manufacturing 2006	NUTS 0,1,2	2004-2006	RIS, 2009
3.2.2 Employment knowledge-intensive services 2006	NUTS 0,1,2	2004-2006	RIS, 2009
3.2.5 New-to-market sales 2006	NUTS 0,1,2	2004-2006	RIS, 2009
3.2.6 New-to-firm sales 2006	NUTS 0,1,2	2004-2006	RIS, 2009
Economy & employment			
Gross domestic product (GDP) at current market prices at NUTS level 3	NUTS 3	1995-2008	EUROSTAT
Economically active population with tertiary education - level 1999	NUTS 2	1999-2009	EUROSTAT Regional DB
Economically active population total 1999	NUTS 2	1999-2009	EUROSTAT Regional DB
Employed persons in all NACE	NUTS 2	2002	BBR
Final consumption expenditure of households by consumption purpose - COICOP 2 digit - volumes (index per inhabitant 20000=100)	NUTS 0	1990-2006	EUROSTAT

Social cohesion			
Expenditure in EUR per inhabitant on family and children for 2002 in 1995 constant prices	NUTS 0	2002	
Expenditure in EUR per inhabitant on sickness and health 2002 in 1995 constant prices	NUTS 0	2002	
At-risk-of-poverty rate after social transfers by gender	NUTS 0	1995-2009	EUROSTAT
At-risk-of-poverty rate before social transfers by gender	NUTS 0	1995-2009	EUROSTAT
Share of long-term unemployment (12 months and more), by NUTS 2 regions	NUTS 2	1999-2009	EUROSTAT
Long-term unemployment rate	NUTS 2	1999-2003	
Unemployment rates by sex, age groups and highest level of education attained (%)	NUTS 0	2004;2006	EUROSTAT
Employment rate of the age group 15-64, by NUTS 2 regions	NUTS 2	1999-2009	EUROSTAT
Environment			
CO2 Emissions	NUTS 0	2002	DGET, Eurostat
CO2 intensity	NUTS 0	2002	DGET, Eurostat
CO2 per capita	NUTS 0	2002	DGET, Eurostat
Emissions of Acidifying Substances Acidifying Potential 2002 (kt)	NUTS 0	2002	DGET, Eurostat
Greenhouse Gas Emissions (CO2 equivalent)	NUTS 0	1997-2008	EUROSTAT
Energy intensity of the economy	NUTS 0	1990-2008	EUROSTAT
Occurrence of snow avalanches	NUTS 3	2004	GTK
Number of observed forest fires/1000sq. km in NUTS3 region	NUTS 3	1997-2003	GTK