Bundesamt
für Bauwesen und
Raumordnung

1st Interim Report

ESPON project 3.1

Integrated tools for European Spatial Development

20.12.2002

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1 Executive summary

The ESPON project 3.1 “Integrated Tools for European Spatial Development” is the co-ordinating and cross-thematic project of the ESPON Programme 2006[1]. It gives support to the co-ordination on the technical and scientific level of the ESPON 2006 Programme and the projects under measure 1 and 2, including data collection, development of a GIS facility and map-making, thematic coordination preparing for the cross thematic exploitation of integrated results based on all projects prepared under the programme.

The 1st Interim Report of the ESPON project 3.1 is subdivided into 8 chapters. It includes a presentation of the work and current results of nine TPGs which started their work in July 2002, as well as the findings and outcomes of the first ESPON Seminar. Mentioned seminar took place in Mondorf-les-Bains, Luxembourg, on November 21st and 22nd, 2002.

This first chapter gives a guidance for the reader who wants to have a fast overview of the content of the different chapters.

The second chapter “Introduction” informs about the achievement of the ESPON and gives an overview about the ESPON project 3.1. In this chapter the relation between ESPON, the ESDP including its spatial goals and EU sectoral policies is described. The before mentioned overview about the project 3.1 introduces briefly into the specific objective of the transnational project group (TPG).

The third chapter is subdivided in two parts . Part one explains the philosophy and approach, namely the input, output of and added value produced by the project 3.1. The second part portrays the networking inside of the team, inside the ESPON Programme 2006, with accession and neighbouring countries and with related projects, programmes, organisations, etc.

[1] „Horizontal and coordinating cross-theme studies (projects under Priority 3) as a key component. Evaluation of the results of the other studies towards integrated results such as indicator systems and data, typologies of territories, spatial development scenarios and conclusions for the territorial development.“ ESPON Programme 2006 (2002).*ESPON Programme 2006* [online] Available from : http://www.espon.lu/online/documentation/projects/index.html [09.12.2002]

The fourth chapter called “Thematic approaches: Spatial trends and policies” introduces the currently four projects of priority 1, thematic projects, and also four projects on priority 2, policy impact projects.

- Thematic studies (projects under Priority 1) work on the territorial effects of major spatial developments on the background of typologies of regions, and the situation of cities on the base of broad empirical data.
- Policy impact studies (projects under Priority 2) work on the spatial impact of Community sector policies, Member States" spatial development policy on types of regions with a focus on the institutional inter-linkages between the governmental levels and instrumental dimension of policies on the base of broad empirical data.

Each subchapter starts with a brief description of the connection between the presented priority 1 and priority 2 project. The succeeding description of the different projects follows a common structure: “approaches, methodologies, typologies and concepts, indicators, data availability and mapping” to facilitate the reading and comparing.

As a third part each subchapter contains a summary of the working group outcomes of the above mentioned ESPON Seminar in Mondorf-les-Bains.

The fifth chapter titled “review of methodological analysis” includes two subchapters, “clarification of concepts” and “territorial impact assessment”. The first subchapter gives a preliminary definition and description of the term concept and spatial concepts as well as corresponding items. Sources like the ESDP and SPESP are explained and go further into the questions on which is expected in this working field from the project 3.1 and what are or will be the contributions from the other TPGs. First clues in this context are the terms of reference (ToR), the addendum and 1st Interim Report of each project. The subchapter on “territorial impact analysis” approaches to explain and define the term. The “European Biography” of the term is described as well as elements of assessment tools and assessment models. A preliminary conclusion resumes the status quo of the actual discussion.

The sixth chapter titled “ESPON Data Base and Cartography” is divided into three subchapter. The first deals with the standards for data transfer and the common ESPON data base for regional statistic, geographic and network data. The second

subchapter includes main ideas for the provision of choropleth maps and the standards for the ESPON common map design to be used by all transnational project groups (TPGs). It consists further more of the outline of the ESPON web based GIS to be used in future for the creation of interactive online maps within the ESPON. Those mapmaking facilities can also be used by the interested public. The last big issue of the second subchapter deals with the ESPON hyperatlas as a new tool to visualise fundamental spatial analysis beyond simple cartographic presentation. The third subchapter explains the first approaches to the data networking and integration of the all over ESPON data base.

The seventh and last chapter describes “Additional Activities of the ESPON Project 3.1”. It encloses two subchapters. The first subchapter portrays the activities of the project 3.1 concerning the integration of accession (ACs) and neighbouring countries (NCs) to facilitate common views on the spatial development trends and policy issues in an enlarging European Union. The second subchapter titled “from analysis to policy recommendation” treats on how the analytical work carried out under the framework of ESPON, involving spatial analysis tools, cross-sectoral approaches, descriptions of current trends and spatial impacts of various policies, is intended to result in recommendations for future policy-making and supporting the aims expressed in the ESDP-document. Different starting points are mentioned and explained.

All in all the 1st Interim Report of the ESPON Project 3.1 is very comprehensive and encloses beside of the explanation of the ESPON background a intensive description of the approaches of the different TPGs as well as first results concerning to made decisions (definition of technical terms, data, indicators, and so on). A second very important part of the 1st Interim Report is the synopsis of the different outputs by the TPGs. Further on the elementary approach in the field of data base and cartography is laid down and gives support and guidance to the other TPGs by:

- defining common concepts and tools
- laying common grounds for the ESPON indicators and GIS system
- considering the integration of AC’s and NC’s
- giving a first framework for the integration of results and future policy conclusions.

2 Introduction

The growing European integration and the forthcoming enlargement has put the question of territorial cohesion of Europe on the political agenda. For more than ten years EU Member States, through their Ministers responsible for spatial planning, and European Commission have been working together to develop joint perspectives and strategies for the development of the European territory. These have finally been formulated as the *European Spatial Development Perspective* or *ESDP* document and adopted in Potsdam, Germany, in 1999.

2.1 ESPON and the ESDP

From the beginning this political process was closely connected with the scientific analysis of territorial development and supported by scientific policy advice. Already in 1994, during the Ministerial Meeting in Leipzig, Germany, there was – in principal – a consensus on the need of an Observatory for European Spatial Planning, to be established in the form of a network of national spatial planning research institutes. For several reasons this network, which since the Ministers' Meeting in Echternach, Luxembourg, in 1997 was named ESPON (European Spatial Planning Observation Network) did not start before 1999 (as the SPESP test phase) or 2002 (as the ESPON 2006 Programme), respectively.

Although ESPON came into being only after the ESDP was finished, ESPON and ESDP have been closely related from the beginning, and the main questions for ESPON have been formulated in the ESDP, already. The final ESDP document which was adopted in Potsdam (Germany) in May 1999, stressed the needs for an ESPON network as important element of the implementation or application of the ESDP. In this context the ESDP proposed

- that the European Commission should examine periodically and systematically the spatial effects of policies – such as the Common Agricultural Policy, Transport Policy and "Trans-European Networks", Structural Policy, Environment Policy, Competition Policy and Research and Technology Policy (ESDP §167)
- that an ongoing spatial monitoring system is required at Community level (ESDP §170)

- that the European Commission and the Member States agree upon reliable criteria and indicators, in order to be able to effectively support sustainable development of the regions and cities (ESDP §171)
- that the development of long term scenarios for spatial development is necessary (ESDP §172)
- and that the European Commission and the Member States engage on the assessment of emerging trends, their driving forces and their spatially differentiated impacts (ESDP §172).

The implementation of these tasks should be provided by the institutionalisation of a "European Spatial Planning Observatory Network". The ESPON network is to take over the function of a European Agency: "the setting up of another European Agency could be unnecessary if successful networking between national research institutes is established." (ESDP §173)

The ESPON 2006 Programme is based on these proposals and, additionally to these requirements formulated in the ESDP, takes into account recent (and forthcoming) European developments that are of crucial importance for the development of European spatial policies, above all the future enlargement of the European Union combined with the strong need for institutional reforms and for new approaches and innovative concepts for EU policies.

2.2 Spatial goals of the ESDP

ESPON is strongly connected with the three fundamental goals of the ESDP

- economic and social cohesion,
- conservation of natural resources and cultural heritage,
- more balanced competitiveness of the European territory,

which are translated into three spatial planning policy guidelines

- balanced and polycentric urban system and new urban rural relationship,
- parity of access to infrastructure and knowledge,
- sustainable development, prudent management and protection of nature and cultural heritage

From these policy guidelines 11 policy objectives are derived and the policy objectives finally are concretised through 60 policy options.

The ESDP could be considered as a non-spatialised frame for a spatial project. Although there had been draft maps during the discussion process, the final ESDP does not illustrate the spatial vision that it promotes by maps. Included maps only describe existing situations. Many objectives and options of the ESDP are meant to apply to specific territories, such as "urban areas", "peripheral areas", "gateways", "cultural landscapes". In that way they are "spatial goals", but the territorial range to which they apply can not be identified with certitude on basis of the document. They are neither delineated on maps nor are they defined by precise criteria that could help to identify them without doubt.

To express goals and options in a spatially more concrete way may appear just a technical question, but far from this, it involves highly sensitive political dimensions, particularly for issues where this will imply a focus of Community financial means and policies on specific cities and/or regions. As a consequence, the spatial goals remain rather abstract and give a large range of interpretation to the actors in charge of implementing them through specific territorial or sectoral plans. On the one hand this allows each European institution to adapt ESDP to their context and thus strengthens the principle of subsidiarity, but on the other hand this might hamper the global consistency and relevance of the ESDP vision.

It is one of the central tasks of ESPON to contribute to more clarity in aims, concepts and measures of European spatial policy.

Another approach to provide a basis for territorialisation can be seen within the frame of Interreg II C / III B transnational programmes. In many co-operation areas seen "spatial vision" projects contributed to a more territorial and concrete operationalisation of the ESDP goals and options. ESPON should consider and reflect these approaches.

2.3 ESPON and EU sectoral policies

Of specific importance is the role of ESPON towards sectoral policies, in particular sectoral Community policies. Three years after the adoption of the ESDP, a process of integration into Community policies has indeed started. Actually, the ESDP is referred to in various recent policy documents such as:

- the Second Report on economic and social cohesion,

- the directive setting a framework for a Community water policy,
- the communication of the Commission on a European strategy for sustainable development,
- the White paper on European governance,
- the project of revision of the 1996 decision on the trans-European transport network.

The Second Cohesion Report (January 2001) introduced the territorial dimension as one of the ways to achieve the revision of regional policy in the light of the forthcoming EU enlargement. It stresses the territorial cohesion as a third dimension beside economic and social cohesion. The report explicitly refers to the ESDP. Moreover, inclusion of some results of the SPESP indicates that the ESPON can provide relevant input. On basis of the ESDP, ESPON is thus in charge of analysing the territorial effects of EU policies and contributing to the revision of regional policy and other EU policies with relevance for the territorial dimension.

Community policies provide a way to implement the spatial objectives of the ESDP. Actors in charge of Community policies and strategies become more and more aware of the importance of the territorial dimension. This appears not only for policies whose territorial dimension is obvious, but even for policies such as R&D for which the need to have a more territorial approach has lately been clearly expressed. The ESPON will explore the spatial impacts of different EU policies.

The more and more concrete prospect of enlargement also plays a role in this process, not only because the territorial extension of the EU asks to re-think and adapt its structure, but also because the ratio between needs and available means will ask for a more efficient and focused use of those means: less than ever it is possible to make everything everywhere. The prospect of the enlargement of the EU brought the adaptation of the Community policies to the foreground, notably the regional policy. There was from the start a privileged link with this policy, as the process had since the beginning been informally hosted by the DG in charge of regional policy in the Commission, but until then works referred to spatial planning rather than regional policy. ESPON associates new partners from the future Member States, as well as close neighbours, and in that way already takes on board enlargement and its potential consequences.

Figure 1: Main sources

Main sources

- Conclusions of the second meeting of ministers responsible for spatial planning in Turin, October 1990
- Conclusions of the third meeting of ministers responsible for regional policies and spatial planning held in The Hague on November 18th and 19th, 1991
- "Network of Spatial Planning Research Institutes in Europe", note presented by the German Presidency to the informal Council of ministers in charge of spatial planning held in Leipzig, on September 21th and 22d, 1994
- Conclusions of the informal Council of ministers in charge of spatial planning held in Leipzig, on September 21th and 22d, 1994
- “European Spatial Development Perspective - First official draft" - Presented at the informal meeting of Ministers responsible for spatial planning, Noordwijk, 9 and 10 June 1997
- “Concept for the establishment of the “European Spatial Planning Observatory Network” (ESPON)" Ministry for Spatial Planning of Luxemburg, presented by the Presidency at the ministerial seminar in Echternach, December 1997
- Declaration of Ministers and Heads of delegation meeting in Echternach on December 9th, 1997
- "ESDP - European Spatial Development Perspective - Towards Balanced and Sustainable Development of the Territory of the European Union" - Agreed at the Informal Council of Ministers responsible for Spatial Planning in Potsdam, May 1999
- Conclusions of the Informal Council of EU Ministers responsible for Spatial Planning held in Potsdam on 10-11 May 1999"
- "European Co-operation in Spatial Planning 2000-2006 - ESDP Action programme", presented by the Finnish Presidency at the informal meeting of ministers responsible for spatial planning and urban/regional policy in Tampere, October 1999
- "Study Programme on European Spatial Planning - Final Report" + CD, BBR, Forschungen, Heft 103.2, Bonn 2001
- "European Network of Territorial Analysis", note of the Commission to the CSD members, August 17th, 2000 + modified version of October 24th, 2000
- "European Spatial Planning Observation Network (ESPON) - Guidelines for 2001-2006", end 2000
- "Unity, solidarity, diversity for Europe, its people and its territory - Second report on economic and social cohesion", European Communities, 2001
- "European Spatial Planning Observation Network - The ESPON 2006 Programme - Programme on the spatial development of an enlarging European Union", final version 30/01/2002
- "ESPON - European Spatial Planning Observation Network", presentation for the SUD WG of the CDCR on September 24th, 2002

Figure 2: ESDP and ESPON: a co-evolutionary process

ESDP and ESPON: a co-evolutionary process

The first ideas of ESDP and ESPON appeared about at the same time, more than ten years ago, in the context of the meetings of the Ministers in charge of spatial planning in the European Union Member States and the European Commission. The need to gain a better understanding of the territorial trends in the EU as a whole emerged in parallel with the intention to develop a common vision of its spatial development.
The proposal to set up an "observatory of the spatial evolution" has been launched in Turin (Italy), in November 1990. One year later in The Hague (Netherlands), the Ministers supported the setting up of a network of study and research centres to gather the data requested for analyses on spatial planning at the Community level. The informal Council of ministers in Leipzig (Germany), in 1994, recommended to set up a network of European research institutes on spatial planning under the form of a European Observatory, at the same time that they adopted the underlying principles for the ESDP, whose development had been decided in Liège (Belgium) at the end of 1993.

The Committee for Spatial Development (CSD) was charged of preparing a project for the Observatory, as well as elaborating a draft ESDP. The base for the Observatory project was a note of the German presidency, where significant features of the actual ESPON were already present, notably the involvement of the Member States and the Commission, and a network structure organised around a central secretariat and national focal / contact points.

Yet work on the ESDP evolved more rapidly than the consensus building on the Observatory because the efforts were focused on finishing and adopting the document, and there was not yet a clear picture of the organisational framework of such an Observatory and even of its work programme. So, although the ESDP process and the contributions and draft versions prepared under the hospices of the respective EU presidencies were indeed supported by national research institutes and agencies, also in European networks, a formal institution came not into being before the ESDP was finished. Nevertheless, important empirical contributions (under the Spanish and Italian EU Presidencies as well as “Trend Scenarios of European Spatial Development) (Strassbourg 1995) have been done preparing the ESDP.

The first official draft ESDP adopted in Noordwijk (Netherlands) in 1997 underlined shortcomings in relevant data availability encountered during the drafting process, as well as lack of reliable criteria and indicators for establishing a typology of regions and urban areas. The fact that no maps could be adopted was a clear symptom. The Noordwijk draft ESDP stresses the urgent need for an adequate technical and scientific base.

The integration of the ESPON project in the "ESDP action programme" adopted in Tampere (Finland) a few months later confirmed the link between ESDP and ESPON": in order to avoid any ambiguity, this could be changed to "a few months after the adoption of the final version of the ESDP. The need *“to take concrete steps in applying the ESDP"* and, in particular, *“to improve knowledge, research and information on territorial development as well as to prepare for an enlarged territory of the European Union"*, was emphasised.

The attempts that had been made under Luxembourg’s presidency in 1997 to set up a permanent structure for the ESPON did not succeed, mainly because of a lack of appropriate juridical and financial framework. But, as one result of the Ministers’ meeting in Echternach (Luxembourg, December 1997), the Study Programme on European Spatial Planning (SPESP) was launched in December 1998. The SPESP was centred on the ESDP themes, and it constituted a feasibility test for the envisaged ESPON, notably networking of specialised institutes from the 15 Member States and the 15 national focal points, co-financed by Member States and Commission. The results of the SPESP were encouraging enough to envisage a middle term solution for the ESPON.
Finally, the Interreg III (2000 – 2006) regulations provided the necessary framework for the establishment of the ESPON as a temporary institution, so that work could start on the elaboration of the ESPON 2006 programme.

2.4 The ESPON Project 3.1 – Integrated Tools for European Spatial Development

The ESPON Project 3.1 belongs to the third strand of the ESPON Programme and holds therefore a key position in the elaboration (and holds therefore plays the role of coordinating and integrating results from other project groups) of the whole programme. The main task is to prepare a common ground for the projects and the integration of the results of the other ESPON projects towards co-ordinated conclusions.

Figure 3: Projects of the ESPON Programme 2006

Projects of the ESPON Programme 2006
The ESPON Programme 2006 will contain at the end around 20 projects. The first group of projects started their work in July 2002.

Projects launched July 2002:

1.1.1	The role, specific situation and potentials of urban areas as nodes of polycentric development
1.1.2	Urban-rural relations in Europe
1.2.1	Transport services and networks: territorial trends and basic supply of infrastructure for territorial cohesion
1.2.2	Telecommunication and energy services and networks: territorial trends and basic supply of infrastructure for territorial cohesion The role, specific situation and potentials of urban areas as nodes of polycentric development
2.1.1	Territorial impact of the EU transport and TEN policies
2.1.2	Territorial impact of the EU research and development policy
2.1.3	The territorial impact of CAP and rural development policy
2.2.3	Territorial Effect of Structural Funds in Urban Areas
3.1	Integrated tools for European spatial development

Project which will start in the future:

1.1.3	Particular effects of enlargement for the polycentric development Identification of spatially relevant aspects of the information society
1.1.4	The spatial effect of demographic trends and migration
1.3.1	The spatial effects and management of natural and technological hazard in general and in relation to climate change.
1.3.2	Territorial trends in the management of the natural heritage
1.3.3	The role and spatial effects of cultural heritage and identity
2.1.4	Territorial trends of energy services and networks and territorial impact of EU energy policy
2.2.1	Territorial effects of EU Structural Funds
2.2.2	Territorial effects of the 'Aquis Communitaire', Pre-accession Aid and Phare/Tacis/Meda Programmes
2.3.1	The application and effects of the ESDP in the Member States
2.3.2	The co-ordination of territorial and urban oriented policy from the EU to the local level

The analysis made by the 3.1 project are not limited to the actual European Union (EU) territory. An important task is to integrate the accession countries into such analysis as well as neighbouring countries like Switzerland and Norway.

2.5 The specific objectives

The ESPON Project 3.1 gives support to the co-ordination unit on technical and scientific level of the ESPON 2006 projects under measure 1 and 2, including data collection, development of GIS facilities and map-making, thematic co-ordination preparing for the cross thematic exploitation of integrated results based on all projects prepared under the programme.

The work takes place on five levels:

- technical and analytical support and co-ordination (data-base, GIS and map-making, concepts and typologies for spatial analysis, spatial concepts)
- territorial and thematic co-ordination of the ongoing projects
- preparation for the exploitation of results of all projects
- compilation and structuring of recommendations to further policy development in support of territorial cohesion
- assistance in the promotion and networking of the ESPON programme

The project contains the following elements:

- providing a common framework for the projects prepared under priorities 1 (spatial effects) and 2 (territorial impact)
- summarising and evaluating intermediate and final results of the projects under priority 1 and 2 from a technical and scientific point of view in order to support integrated results of the ESPON 2006 Programme
- bringing added value to the results of single projects through the dialogue with TPGs on their results and their potential use in different contexts, such as scenarios and recommendations for policy development.
- examining the achieved results in the light of the ESDP
- supporting the preparation of making results of the ESPON Programme accessible to policy makers
- supporting the communication and better understanding of spatial development trends and issues of territorial cohesion within an enlarged EU

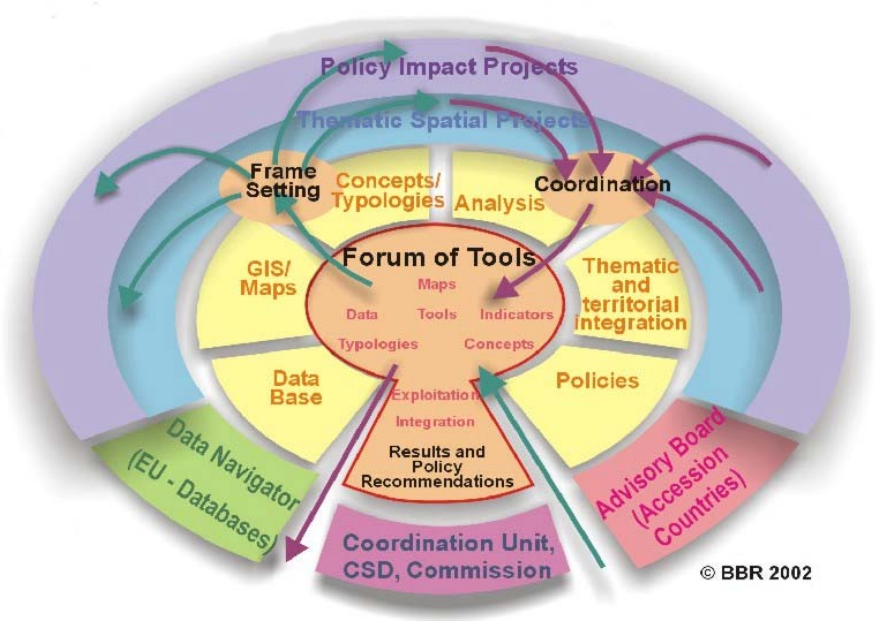
- supporting the elaboration of consistent recommendation to future policy development in support of a better balanced and polycentric European territory that recognises the importance of a territorial dimension.

To fulfil these tasks the ESPON Project 3.1 works in close co-operation with the ESPON Co-ordination Unit and the other Transnational Project Groups (TPGs).

3 The role of the ESPON 3.1 Project – Integrated Tool for European Spatial Development

3.1 Philosophy and approach of the project

Figure 4: project scheme – integrated tools for the spatial dimension



In the graphic, one important task of project 3.1 is formalised as transforming the interaction between project 3.1 and the project environment (other TPGs, European Agencies, Experts from Accession Countries, etc.) into an output and deliverables is described by the set of rings around the core of the output. The figure above indicates the input by the outer ring, namely:

- policy impact projects
- thematic spatial projects

- data navigator and data bases
- accession countries and neighbouring countries advisory

The output is indicated by the “Forum of Tools” in the centre of the figure:

- spatial tools
- integrated data bases
- indicators
- typologies
- territorial concepts
- maps

These core outputs are complemented by the deduction of policy recommendations, indicated by the flow from the core towards the users and applicants. These flows are representing the main outputs and deliverables for external use which will be provided by the project.

Between these input and output layers the reference points of the tasks of the project are listed by different partitions:

- thematic structures and reference points deriving from the input provided by other projects and by own additional efforts
- territorial structure reference points such as countries, spatial integration zones, etc.
- data base development and cartography
- policy impact methodologies
- policy development

Project 3.1 will gain added values for the ESPON programme by deliver products which support the programme on different levels. By working in a cross-project manner a significant surplus value will arise.

- Added values (1): final products for the Co-ordination Unit

The main products will be delivered for the use by the Co-ordination Unit (and via the Co-ordination Unit by the European Commission and the Committee on Spatial

Development). These are, e.g.: common database and indicator system, papers on concepts and policy recommendations, contributions for European documents (3rd Cohesion Report etc.).

- Added values (2): frame-setting for other TPGs / projects

Another type of product will be used internally, i.e. within the ESPON programme. These internal products will be addressed to other TPGs and include, for instance, the setting up and delivery of standards and guidelines (referring to data collection, cartography, concepts etc.) which can be used by other TPGs for their work and help the Co-ordination Unit in its co-ordination task.

- Added values (3): exploiting results gained by other TPGs / projects

In the other direction, TPG 3.1 makes use of results and recommendations of the other TPGs, e.g. by creating links between the different TPGs synergetic effects could fructify the work in a reciprocative way as well as cross-checking and evaluating results for the purpose of integration and for contributions to synthetic reports.

- Added values (4): genuine contributions by project 3.1

Besides the networking aspect, an important part of added value of project 3.1 is based on genuine contributions that are not covered by the single projects of the themes 1 and 2, i.e. building a common data set and a joint system of indicators and tools, and defining and operationalizing concepts and tools. The activities and outcomes of the project 3.1 should be balanced with respect to giving room for “innovative” methods and thinking without loosing sight of meeting the demand of policy decisions based on EU-wide data and analysis that is currently available.

- Added values (5): promotion strategy / publications / networking

Finally, TPG 3.1 will have the task in supporting the CU in its task for internal and external networking and co-operation and by implementing a promotion strategy.

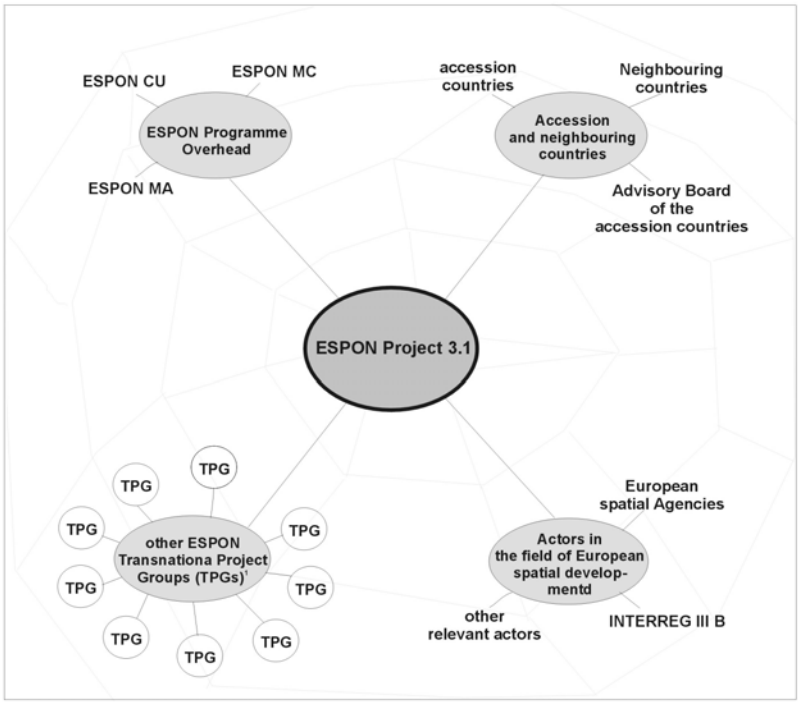
3.2 ESPON Project 3.1 Networking

The central aim of the project 3.1 is to strengthen the ESPON programme level and by supporting the ESPON Co-ordination Unit in its task to secure integrated approaches and results of the whole ESPON programme.

The networking activities of the project 3.1 can be subdivided in four groups. Networking with:

- the other ESPON Transnational Project Groups (TPGs)
- ESPON Programme overhead, i.e. ESPON Co-ordination Unit, ESPON Managing Authority, ESPON Monitoring Committee, ESPON Contact Points etc.
- INTERREG III B co-operation areas, European agencies and other actors in the field of European spatial development
- accession countries and neighbouring countries

Figure 5: Networking activities of ESPON 3.1



[1]total: 19 other TPGs

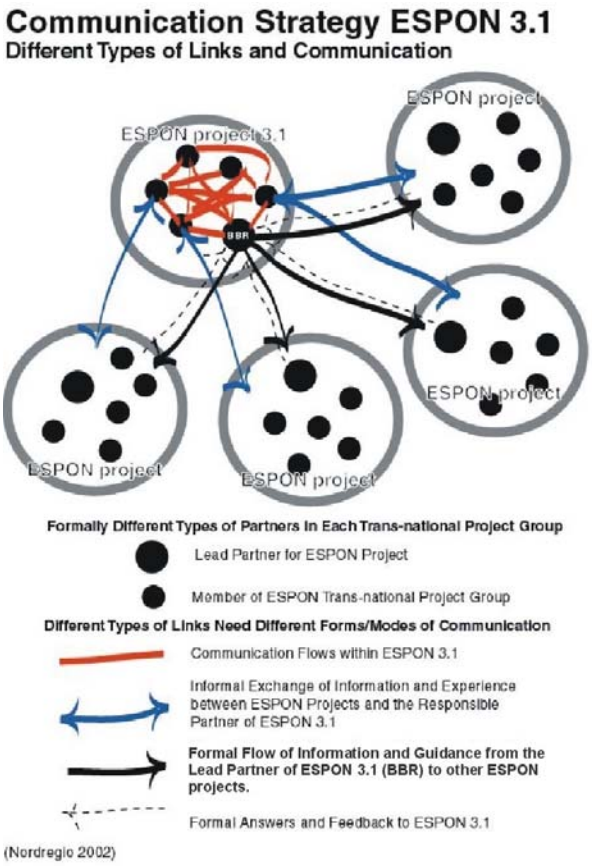
In the project 3.1 the team reflects the European range of different perspectives. The main goal will be to come to joint results and conclusions and policy recommendations that are consensual in the working team wherever possible. In this sense, the working method will be based on good internal communication and networking and the search for common results rather than a strict division of

labour. Therefore the project is in close contact with the ESPON Programme overhead, other actors in the field of European spatial development (i.e. INTERREG III B secretariats, European Spatial Agencies), the accession countries as well as some neighbouring countries of the EU.

Beside of the important external work of the project, the internal co-operation and collaboration plays an important role. The internal project networking consists of an internal networks between the members of the 3.1 project.

Networking on other TPGs of the ESPON Programme

Figure 6: Communication Strategy ESPON 3.1



The graphic shows that the partners inside of the 3.1 project are responsible for the informal exchange and information flows between 3.1 and the other TPGs (as well as the INTERREG III B secretariats).

4 Thematic approaches: Spatial Trends and Policies

The following chapter presents the first results of the work of the eight Transnational Project Groups (TPGs) which started their work in July 2002. Each subchapter combines two ESPON projects. One of them represents a priority one project, focusing on the analysis of spatial development trends in Europe, and the other one representing a priority two project, focusing on the analysis of territorial effects of EU policies. In the following order the TPGs, their procedures and their first findings will be presented:

- approaches
- methodologies
- typologies and concepts
- indicators (policy relevance)
- data availability
- mapping

4.1 The ESPON Project 1.1.1 The role, specific situation and potentials of urban areas as nodes of polycentric development & ESPON Project 2.2.3 Structural fund in Urban Areas

Introductory remarks on chapter 4.1 (ESPON 1.1.1 and 2.2.3)

The approach followed by this report assumes that the ESPON project 1.1.1 on polycentrism and 2.2.3 on territorial effects of Structural Funds in urban areas are complementary. Both of them address European spatial development with a focus on urban areas. While the discussion on polycentrism emphasises the analysis of European spatial development, the discussion on Structural Funds in urban areas concentrates on the impact of this specific policy field on spatial development.

Both projects have been working independently from each other, so far. Nevertheless, both of them highlight the act of balancing between cohesion and competitiveness when it comes to the urban issue within the wider framework of European spatial policy.[2] As regards the other aspects of the projects, the work

[2] In terms of polycentrism this implies: Raising the competitiveness of functional urban areas (polycentrism) within a country raises cohesion at the national level. At the same time, raising competitiveness of a strong capital regions (mono-centrism) raises the potential that it may become a node in the wider network of trans-national urban systems, the development of which, in turn, leads to greater cohesion at the European level (polycentrism). A similar dilemma is seen in the field of urban policies focusing on the one side on global competitiveness of urban areas

carried out so far follows different approaches. Despite that a number of indicators intended to use, may in the end be identical.

In general the work carried out so far looks promising both as regards analytical approach and policy relevance.

4.1.1 The ESPON Project 1.1.1 *The role, specific situation and potentials of urban areas as nodes of polycentric development*

The ESPON project 1.1.1 is a thematic study dealing with the key-concept of polycentrism put forward in the ESDP document. Polycentrism is understood as a political strategy for achieving the aim of balanced competitiveness across the European territory. This implies the aim of spreading the benefits of good social and economic performance across the continent, while at the same time strengthening the global competitive position of Europe as a whole.

The approach taken by the project stresses that polycentrism is related to different geographical scales:

- Local level (intra urban)
- Regional level (inter-urban)
- National level
- Meso-regional or trans-national, continental level

The task of this project includes the elaboration of a comprehensive definition of polycentrism and of the major concepts linked to it, as well as a critical analysis of these concepts and their current usage. It is intended to be done through a *Critical Dictionary of polycentrism and related notions*.

Furthermore, the project acknowledges the importance of governance for the implementation of European policy aims and studies governance constellations facilitating polycentric development.

Approaches and Methodology

The approach taken by the ESPON project 1.1.1 is characterised by a strong division into working packages. As a consequence of this, there is a wide range of methodologies applied in this study. In general, the study approaches polycentrism from three sides:

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and on the other side on social cohesion and overcoming internal disparities within single urban areas.

- **Definition and application of the concept of polycentrism**
  The analysis of strategic planning/policy documents, academic publications and secondary literature, will result in both definition of polycentrism and related concepts and an overview of how it is used in planning at various geographical levels.
- **Mapping polycentricity in Europe (incl. Indicators and typologies)**
  Following the above mentioned understanding that polycentrism means different things at different geographical levels, it is intended to analyse/map out polycentrism regarding four aspects:
    1. *Functional urban areas in each country*, based on the work carried out under the Study Programme on European Spatial Planning (SPESP), carried out at NUTS 5 level.
    2. *National urban systems* for EU 27+2, carried out at functional urban area level (NUTS 4 or 3).
    3. *European and global urban system* considering functions of cities as well as their position in the European system. The quantitative analysis carried out at NUTS 4 or 3 level comprises four aspects, mass criterion, competitiveness criterion, connectivity criterion and motors of change criterion.
    4. *Accessibility analysis* considering both European polycentrism (NUTS 3) and internal differentiation of selected urban systems (NUTS 5) by using different kinds of accessibility indicators.
- **Governance dimension of polycentrism**
  Finally, the issue of polycentrism is approached under the urban governance framework. Institutional structures and the nature of decision-making mechanisms, co-operation and power partitioning influence the direction taken and the ability to successfully implement policy options. Therefore, existing institutional arrangements for a sample of polycentric urban regions will be mapped and barriers and opportunities for effective partnerships will be identified.

Thus, this study comprises a wide range of methods reaching from literature review to data analysis, case studies and roundtable/interviews with key actors at the EU and national level.

Typologies and concepts

Following this approach the study aims at a number of typologies addressing various aspects of balanced polycentric development in Europe:

- **National level urban typologies**
  Urban regions are classified according to the volume and versatility of size as well as with regard to their functional specialisation. The purpose is to describe the unique characteristics of urban regions and, thus, to provide options for mapping a prospective European urban typology.
- **European urban typologies**
  Here, it is intended to bring together various aspects deriving form the analysis. The aim is to develop one typology taking into account competitiveness of the urban system, economic decision-making centres, human capital, connectivity and motors of change.
- **Typology on functional European urban networking**
  In order to avoid analysing polycentrism solely in terms of its morphological aspects, the functional dimension is also taken into account, i.e. networks and flows developed between urban areas at European, national and regional scale. Key aspects are airflows, university networks, scientific networks and Interreg co-operations.
- **Typology of governance relationships related to polycentrism**
  Rather implicitly the interim report suggests, that there may also be a topology of existing institutional arrangements for a sample of polycentric urban regions and of barriers and opportunities for building effective partnerships (analysis of existing innovative inter-urban institutional partnership arrangements).

Indicators (policy relevance and data availability)

- **Functional urban areas in each country**
  Defined of indicators (from statistical institutions) on population and commuting on NUTS 5 level
- **National level urban typologies**
  Defining the strength of functional urban areas within a country by measuring the variables on population, R & D, , production and turnover of selected sectors of industry (tourism, transport, trade), the role of exports, the headquarter functions of leading European companies and accessibility.

- **The European urban typologies**
  will be measured with variables on population, labour market, economic output and the presence and turnover of top European companies in selected relevant sectors of activity mainly in trade and services. Furthermore business travel and multi-modal accessibility are considered.

As regards the functional urban networks, the data are based on few expressions of co-operations and relations:

- Air flows: number of passengers, tons of freight between them and other airports in the world, for the 20 last years (each 10 years).
- University networking: Universities co-operation in the context of ERASMUS thematic networks; exchanges of students in the context of ERASMUS programmes.
- Scientific networks, in the context of the 5th Framework Programme.
- INTERREG co-operation: urban co-operation in the context of INTERREG 3 A and B, based on case studies.

Further elaboration on the indicators on functional and economic specialisation (e.g. using aggregations of SIC codes, location quotients, qualitative analysis) will be done during the following months. The idea is to map different functions of functional urban areas (services, financial sector etc.). In addition, further elaboration on the indicators on different flows will also be done during the following months. The Idea is to map different functional links between functional urban areas. The Data Navigator and other ESPON projects might be inspirational to both of these issues

- **Accessibility**
  The transport analysis (* = Required from national statistical institutes)will focus on transport network on the European as well on the regional and local level. Indicators of population, employment and commuting will be used on NUTS level 5.

As regards the policy relevance, the project relates clearly to the ESDP document and policy options related to polycentrism. Thus the criteria selected for developing the various typologies reflect clear policy relevance. This is especially true when it comes to the typology of the European urban system. Criteria such as

the competitiveness criterion, or the connectivity criterion reflecting capacities of urban systems as well as the motors of change criterion relating to the dynamic of urban systems promise results pointing ahead and illustrating potentials for policy-making. In the same way the accessibility analysis based on indicators for the degree of polycentrism will be a valuable input to the debate on polycentrism and the question of transportation and not at least the European transportation policy. Acknowledging the importance of institutional arrangement for implementing policies, the study on governance relationship will prove to be highly policy relevant when it comes to the question of implementing the idea of polycentric development.

4.1.2 The ESPON Project 2.2.3 *Structural Funds in Urban Areas*

The ESPON project 2.2.3 is a policy impact study dealing with territorial effects of Structural Funds in urban areas. So far the focus of the work has been on two aspects, namely conceptualising the notion of territorial impact assessments for policies (including a discussion on relevant indicators and typologies) and identifying the areas of policy relevance (including relevance for the future development of the Structural Funds).

In the following the approach and methodology developed for a territorial impact assessment are described followed by first approaches towards typologies and the related issues of indicators and mapping.

Approach and Methodology - Territorial Impact Assessment

The project approaches the concept of Territorial Impact Assessment (TIA) as a tool or procedure for assessing the Territorial Effects of the Structural Funds against spatial policy objectives or prospects for urban areas across Europe. In this context the critical task is to establish suitable assessment criteria. This should seek to recognise the broad positive and negative effects of Structural Fund activities; the implications of strategies or development plans and the inter-relationships (and possible knock-on effects) of supported actions. A key task will be to identify what these effects might be in practice, and over what distance they might occur. In his respect TIA may be seen as a mechanism by which to appraise the positive and negative externalities of the supported activities being

assessed. In particular, the project seeks to develop suitable criteria is based around:

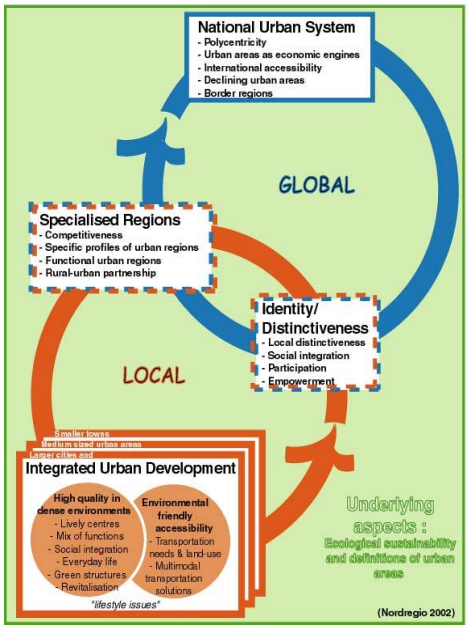
- The role of Structural Funds in urban areas
- The territorial dimension to these activities
- The factors that influence that dimension

The methodological approach to this study is based upon a mix of literature review, secondary data analysis, detailed case study analysis and individual and group interviews. In general, the study is to be progressed through nested case studies, an initial European scale assessment will be made to provide an overall perspective covering the EU, candidate and neighbouring countries.

Indeed, the conceptual model developed operates a two key levels:

- Thematic Conceptualisation and Identification of Urban Issues This level of the study follows a policy led-approach given the attention that the actual policy debate at national and European level is to determine the aspects focused on for the assessment. In this regard it is emphasised that the role of Structural Funds may be seen as twofold. On the one hand supporting international and global competitiveness (strengthening the strong actors) and on the other hand supporting European cohesion and focusing on overcoming disparities within urban areas (strengthening less favoured areas). The relation between these two aspects can be illustrated in the figure.

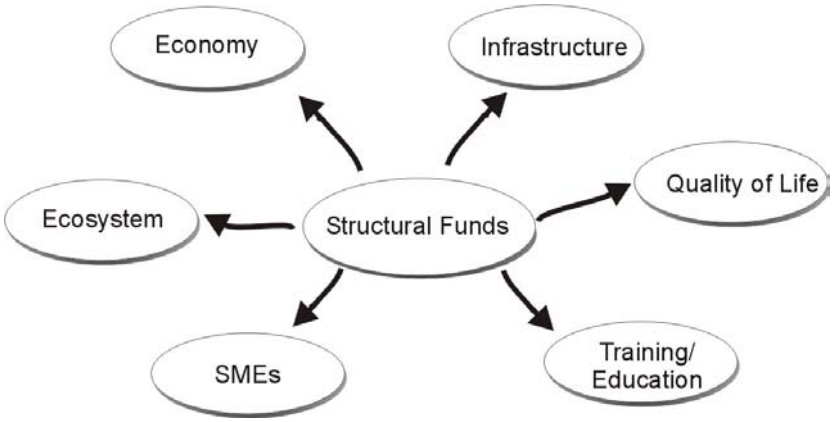
Figure 7: Urban Policy – Driving Forcess



- **Assessing the role of Structural Funds**

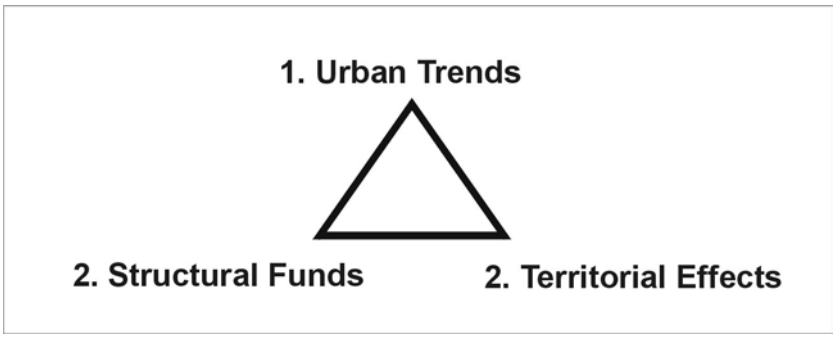
  With regard to Structural Funds, the thematic conceptualisation has following focus:

Figure 8: Thematic conceptualisation of a territorial impact assessment of Structural Funds



- The second level focuses on assessing the role of Structural Funds with in this framework, both with respect to coverage and outcomes. The conceptual model for doing so takes as its starting point the following triangular relationship:

Figure 9: Mutual Influences of Trends, Interventions and Effects



- The study intends to explore how these elements interact and the influence on this process. This will be explored, to different degrees at a European level, a Member State level and at the level of individual urban areas. The territorial effects of Structural Funds can be conceptualised at two levels.

- (1) The Pan European Dimension which relates mainly to the distribution of Structural Funds expenditure in urban areas and focus thus on developing a typology of urban areas.

- (2) The Local Dimension which relates mainly to the distance over which Structural Funds interventions in urban areas are transmitted and focus thus on factors influences the territorial spreading of such interventions.

Typologies and concepts

The core of the Territorial Impact Assessment model is seen in a typology of urban regions related to a number of functional and territorial criteria. In the table below the relevant domains (possible dimensions of the typology) haven been listed. This list is a modification of the functional and territorial criteria described in the proposal. These domains are suited to base a typology on that reflects the trends in urban areas.

Figure 10: Possible Dimensions/Domains of a Typology of Urban Areas

• **Level of urbanisation** Urban regions are the focus of this study. In the definition of urban areas the results of earlier SPESP studies will be used. • **Geographical position** Urban development is influenced by the geographic position of the urban region, such as its accessibility, physical qualities (e.g. coastal, mountainous), central/peripheral/border location, administrative status. • **Nature of the urban system** The spatial composition of the urban region has to be taken into account, whether an agglomeration, network of cities.	• **Nature of economic base** Employment by sector and its development are the focus in this respect. • **Economic performance** Economic performance is indicated by the urban region's GDP (and its development) and unemployment data. • **Social performance** Social performance in particular applies to income distribution and its development

In addition to the above summarised approach to conceptualising of territorial effects of Structural Funds, an additional paper has been elaborated analysing policy options identified in the ESDP relevant for the task of this study (territorial impact assessment of structural funds in urban areas). This paper is intended to support the focus on policy relevance and to extract important definitions from the ESDP, as e.g. "global economy integration zone", "gateway city" and "spatial corridors".

Indicators (policy relevance)

To measure territorial effects it is proposed to define indicators describing the distribution over the territory. Following the approach of dividing the study into a

pan-European dimension and a local dimension two sets of indicators have been defined as useful and measurable

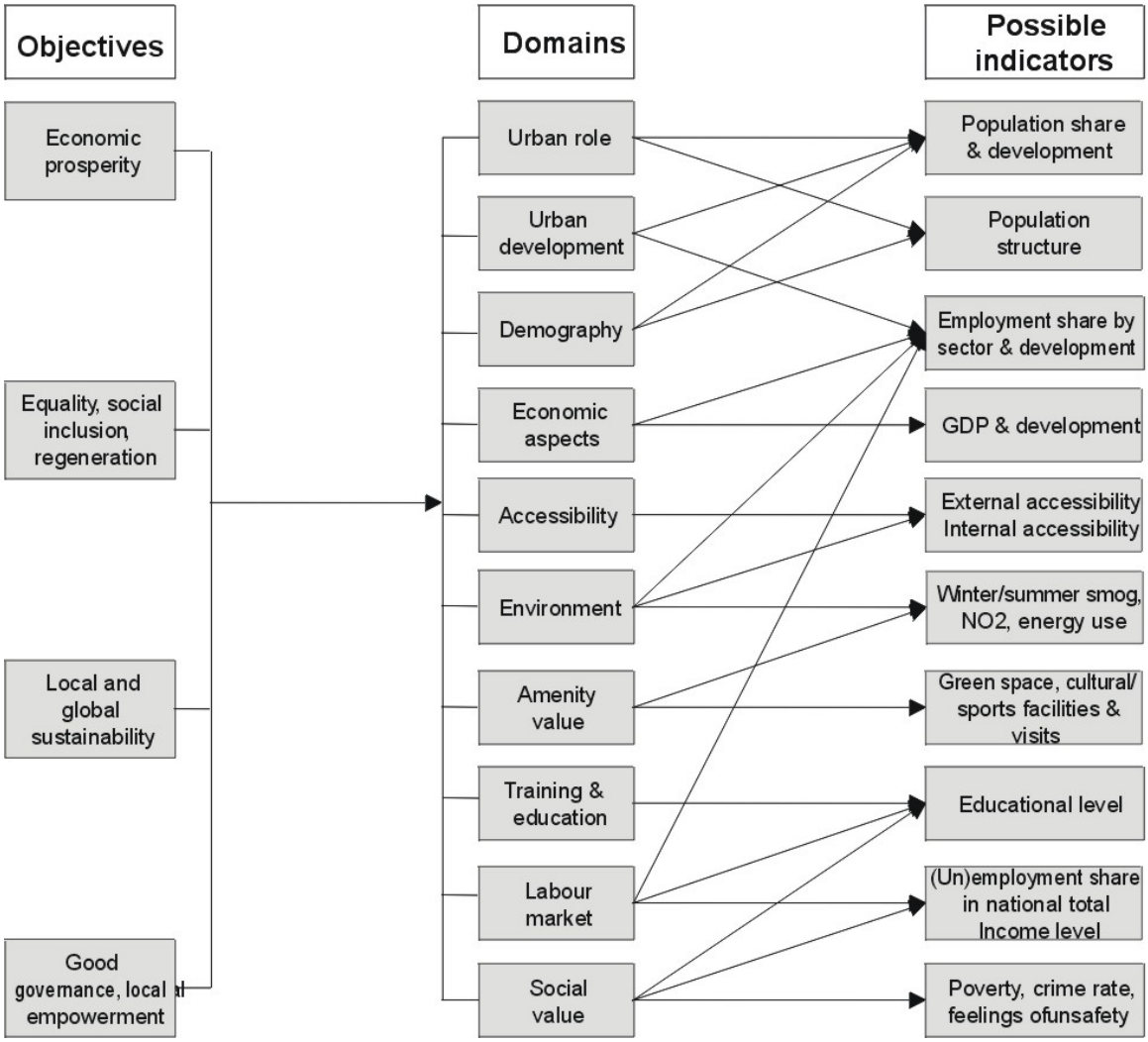
- Indicators for an urban typology
  Relating to level urbanisation, nature of the urban system, the economic base and the economic and social performance

- Characterising the urban role, the industrial base, the urban development amenity and social value, safety and environmental value, the geographic position and the accessibility.

The team will draw on data, at the most appropriate level. In principal data will be sought at NUTS III level. In the national and regional case studies more geographical detail (below NUTS III level) can be analysed if appropriate. As regards data for the urban typology, a first check has shown that most of the indicators are available for EU 15.

As regards the policy relevance, the indicators are developed in close relation to the review of national and urban policy documents related to urban policies and the analysis of the ESDP as regards the focus of this study. A general reflection of indicators and the supported policy dimension is offered by the following figure:

Figure 11: Indicators and Policy Dimensions



The policy relevance is furthermore sought to support by a set of main questions which are categories in three types:

- Policy description moments
- Policy relevance to ESDP objectives component
- Policy integration component.

Mapping

The mapping element will evolve over time, and will be an iterative process. Research discussions will influence the design of the communication material in addition to the communication material helping to advance in the research.

The materials to be produced will be harmonised according to ESPON 3.1 project and will try to be as simple and understandable as possible. They will mostly consist in:

- Interactive web mapping facilities for novice users to get access to basic indicators and produce their own thematic maps and graphics.
- Main graphics based on statistical data
- Thematic maps based on statistical data attached to administrative zones. They will be produced according to the criteria developed for the SPESP updated by ESPON 3.1

Symbolic or conceptual maps and images to communicate key ideas, results and policy recommendations.

4.1.3 Report on the working group 1.1.1 & 2.2.3 during the ESPON Seminar (22.11.2002)

Indicators and typologies

- Different focus of 111 and 223

  111 focus on developing regions/urban areas

  223 focus on restructuring/declining urban areas

  From policy point of view – 3 strands of policy:

  - areas capable to build up polycentric structure
  - peripheral areas
  - areas and cities in crisis

- Different scales

  Critical issue is the definition of urban areas – common understanding of urban areas

  A common definition of Functional Urban Areas is necessary. Concerning spatial policy recommendation and analysis often exists a conflict between different levels (European, national, regional).

- Indicators/Typologies

  Policy relevance aspect must be regarded from the very beginning – main focus on indicators which are more policy relevant

  Typologies: not starting from the beginning, but use of existing typologies/indicators and look how to adapt them. Thresholds are the crucial points concerning indicators and typologies.

- Definition of polycentrism concept

  A definition of the polycentrism concept is necessary. Two dimensions are important: structure/density and functional links (which does not necessarily correlate with density)

Should polycentric development to be considered an aim in any (geographical) case without limits/preconditions?

Data access

- flows and co-operation activities would be very important data, but lack of statistic data – so, treating within case studies
- work on Nuts III level and full coverage seems to be realistic and possible with DG Regio, Gisco, Eurostat data; all other relevant data not included in these databases – data problems

Maps

The 3.1 map templates are ok, if the comments of the Priority 1 discussion will be included. A third template seems not to be necessary, a flexible handling will be preferred for other levels and case studies.

Neighbouring and Accession Countries

Representatives from Switzerland, Hungary and Slovenia mentioned that they will look for direct contact with Lead Partners in projects they are interested in.
Besides these bilateral contacts the integration can take place through the Monitoring Committee, Co-ordination Unit and the ESPON Contact Points.
Opening and broadening the activities with new resources - also additional case studies (paid by additional money) could be one way to integrate these countries.

2nd IR

A structure for the 2nd Interim Report proposed by the 3.1 project will be welcomed (including a short summary with 5-10 pages).

4.2 The ESPON Project 1.2.*1 Transport services and networks: territorial trends and basic supply* & ESPON Project 2.1.1 *Territorial Impact of the EU transport and TEN Policies*

4.2.1 The ESPON Project 1.2.1 *Transport services and networks: territorial trends and basic supply*

"The fundamental aim of the ESPON 1.2.1 project 'Transport Services and Networks: Territorial Trends and Basic Supply of Infrastructure for Territorial Cohesion' can be developed in three questions: How the transport network may constitute a key factor of a more balanced, more polycentric, more sustainable spatial development? How to develop the accessibility to basic services and to knowledge in order to increase the territorial cohesion? What will be the consequences of enlargement on the preceding objective?

These objectives of the project have to be seen for the background of the main challenge of the ESPON 2006 Programme:

- Identifying the decisive factors relevant for a more polycentric European territory, and the accessibility of a wide range of services in the context or enlargement.
- Developing territorial indicators and typologies capable of identifying and measuring development trends as well as monitoring the political aim of a better balanced and polycentric EU territory.
- Developing tools supporting diagnosis of principal difficulties as well as potentialities from infrastructure network in the field of transport…
- Investigating territorial impacts of sectoral and structural policies.
- Developing integrated tools in support of a balanced and polycentric territorial development.

Communication and exchange between cities and territories takes place via infrastructure networks where resources, goods, humans and information are exchanged. Access to those networks is increasingly becoming a crucial factor for territorial development and cohesion.

The ESDP has highlighted the close relation between the aim of a balanced territory and polycentric development and the policy orientations developing the infrastructure networks. The ESDP has also highlighted in this respect the special role, which could be undertaken by Euro-corridors, global integration zones,

gateway cities and urban poles, well distributed on the European territory, as nodes in the infrastructure networks.

The functioning of networks very much depends on access points: most prominent in that respect are ports and airports, which need to be efficiently linked to land transport modes in line with an organisational network approach. A travel is always multi-modal with the terminal sections: door to door." [3]

"Furthermore, communication and exchange between networks takes place in multi model nodes. Multi-modal points are becoming increasingly important for sustainable transport in order to be able to use the least environmentally unsustainable transport mode possible.

The major ESDP concept of *"parity of access to infrastructure and knowledge",* understood as a guideline promoting a better territorial equity or balance… (e.g. for low density areas, ultra peripheral regions, coastal zones, inlands, mountain areas, transnational co-operation areas) are important issues in that respect. It should make the location parameters of the future more clear, including the relative importance of accessibility to infrastructure networks.

The diverse territory of Europe as well as the present spatial structure (with consideration of the polycentric development) indicates the problem of minimum supply of (public and private) infrastructure capable of providing the basic services required in all regions and to maintain the "service of general interest"... However, a basic supply of services represents only the first and minimum step towards the provision of higher degrees of infrastructure.

The aim of complete equality is unrealistic in Europe because the territories and the histories are different but the equity is possible. Transport networks are an element of this.

The interactions between different infrastructure networks and territorial cohesion should be taken into particular account with regard to the growing importance of some EU Member States as transit countries in an enlarged European Union. In general, this project shall provide input for the territorial impact analysis of TEN policy under ESPON action 2.2.1.

So, the general objectives of the project are:

- To contribute to balanced and sustainable spatial development and territorial cohesion.

[3] ESPON Project 1.2.1, ed., October 2002. *Transport service and networks. Territorial trends and basic supply of infrastructure for territorial cohesion*. *1st Interim Report*. 2

- To contribute to the identification spatial structures of the EU territory, in particular the degree and diversity of physical and functional polycentrism at different geographical scales.
- To define concepts and to find appropriate territorial indicators, typologies and instruments as well as new methodologies to consider territorial information linked to polycentrism, to detect territories most negatively and positively affected by the identified trends with special reference to regions in terms of accessibility, polycentric development, environment, urban areas, territorial impact assessment; particular attention will be paid to areas exposed to extreme geographical positions and natural handicaps in a global or world-wide context.
- To develop possible orientations for policy responses.

For studying these questions and producing recommendations in the field of transport and planning policy, the Transnational Project Group ESPON 1.2.1 “Transport services and network: territorial trends and basic supply of infrastructure for territorial cohesion” is organised around a compact team: CESA (France), INRETS (France), S&W (Germany), MCRIT (Spain), NESTEAR (France) and UMS RIATE (French contact point).Team members have made key contributions to the Study Programme on European Spatial Planning, particularly in the Working Group 1.1 "Geographical Position".[4]

“The chapter has provided an overview on existing indicators describing transport infrastructure and services. Indicators do range from transport infrastructure and service supply via their use in form of traffic volume and flow indicators towards territorial indicators in form of accessibility indicators.

Existing indicators can roughly be classified into two groups:

- Indicators derived from published statistics,
- Indicators derived from modelling.

The two indicator groups are very different with respect to data availability. Indicators derived from published statistics are in most cases not available at the regional level required in ESPON. Here, many indicators are obtainable only at the national level. On the other hand, indicators derived from modelling work haven

[4] ESPON Project 1.2.1, ed., October 2002. *Transport service and networks. Territorial trends and basic supply of infrastructure for territorial cohesion*. *1st Interim Report*. 3-4

been already or can easily be calculated for the desired NUTS 3 level or for links or nodes.

Any indicator presents just a simplified model of understanding and explaining reality; by definition, they just "indicate" certain aspects of the problem or the concept being studied while other aspects remain dark. Successful indicators, rather than trying to explain everything, have to be focused on key aspects, illuminating those aspects more relevant to the problem under scrutiny. Therefore, multiple indicators, as scientifically consistent and policy-meaningful as feasible, are needed to get useful insights.

To be policy-relevant, indicators have to be defined to measure the accomplishment of policy aims, and discriminate properly between different places and between different moments in time, in order to assess the potential impacts of a given policy.

The purpose of the study is on the one hand updating existing indicators and advancing in new indicators scientifically consistent and relevant to contemporary trends on transport, and on the other, gathering a policy-meaningful set of them, in the sense already mentioned. The conclusion for ESPON 1.2.1 is that it should be tried to take advantage of the variety of existing approaches and models and should try to fill indicator gaps in relevant fields. In addition, raster-based maps, time-space maps and chronocarts may be considered as a starting point to develop innovative cartographic methodologies in ESPON 1.2.1."[5]

There is a spontaneous tendency in the transport market to facilitate the access to most interesting destinations so to reduce generalised transport costs, those with higher trip demand, and this encourages more social and economic relations increasing the attractiveness of places. This well-known feedback may result in short-term economic growth but may also increase environmental impacts in more dense corridors while large zones of the territory remain poorly accessible.
On the other hand, transport networks have also been part of national policies aiming to control or give structure or achieve a more balanced territory, for

[5] ESPON Project 1.2.1, ed., October 2002. *Transport service and networks. Territorial trends and basic supply of infrastructure for territorial cohesion*. *1st Interim Report*. 39-40

instance facilitating the access to selected cities or corridors independently of the interest they have in economic terms.

In conclusion, multiple and complementary indicators based on different concepts of accessibility are needed to highlight these questions at European scale. They should be able to provide a territorial reading as accurate as possible of the transport system, which is characterised by the quality of services provided to the different demand segments. This section advances as working hypothesis a number of indicators and suggests methodologies to calculate them. Depending on the final data availability, the production of some of them will not be feasible. In addition, the definition of new and advanced indicators is subject of Work Package 4 which will commence only after the delivery of this report. A final list of indicators will be established in the 2nd Interim Report.

All indicators will be demonstrated for the European Union, the candidate countries plus Norway, Liechtenstein and Switzerland, if possible for NUTS-3 regions and in cartographic form. Indicators will be calculated for two scenarios, the current situation (approximately year 2000) and a reference scenario (completion of Trans-European transport networks, implementation of current policies). Scenarios will be defined based on available research studies by DG TREN of the European Commission.

In line with the categories developed in Chapter 3, the list of indicators includes indicators of the following groups:

- indicators describing the supply of transport networks and services,
- indicators describing the use of transport networks and services,
- accessibility indicators.

As said before, the definition of advanced indicators is a creative and innovative element of the project. Therefore, it is difficult to precisely define all indicators at this stage. It is possible to outline several indicator categories that will probably be included in the final list of indicators. The following preliminary description of the potential indicators does not distinguish between existing and new indicators; the purpose is to give an idea of the final outcome in terms of indicators. It should also be said that this is not a closed list but open to new proposals and amendment.

Accessibility potential as SPESP reference indicator concepts

Accessibility potential has been proposed by the Working Group "Geographical Position" of the Study Programme on European Spatial Planning – SPESP as reference indicator concept (Wegener et al., 2000). Accessibility potential is one of the most common and most extensively tested accessibility indicators. Three kinds of potential accessibility indicators were suggested. The first two measure accessibility to population by road and rail, the third accessibility to economic activity (expressed by gross domestic product, or GDP). Accessibility to population is seen as an indicator for the size of market areas for suppliers of goods and services; accessibility to GDP an indicator of the size of market areas for suppliers of high-level business services. In SPESP, the three indicators have been demonstrated for NUTS 3 regions of the European Union.
The SPESP reference indicators will be used in ESPON 1.2.1 as a starting point. The accessibility potential indicators will be used and developed as follows:

The three SPESP reference indicators will be demonstrated for all European NUTS 3 and equivalent regions.
The SPESP modal accessibility indicators will be developed to a multi-modal accessibility indicator by testing ways of aggregation such as fastest mode and logsum aggregation.
The SPESP modal accessibility indicators will be further developed to an inter-modal accessibility indicator allowing for change of transport mode during a journey.
Results will be presented in numerical and cartographic form for NUTS 3 regions.

Transport infrastructure endowment

Until now, in European studies accessibility indicators have been very often focused on transport infrastructure measurements. The indicators most frequently used are "density of infrastructure" (km of motorways or motorways per surface or number of inhabitants) or "connectivity to transport terminals" (generalised cost to get motorways entrances, railways stations etc.). These indicators are able to capture the capacity of the infrastructure independently from the services actually

provided by transport carriers and their quality, and the utility they provide to fulfil the development opportunities of the region.
The basic data needed to calculate this type of indicators are multi-modal transport networks at European level, precise enough in terms of inter-modal connections and location of transport terminals, with information concerning infrastructural characteristics.
Preparatory work includes update of databases concerning transport terminals and links based on European transport sources (DG TREN Pocket Book, Eurostat, Transport Associations, United Nations) and update of databases with respect to transport infrastructure projects and network connectivities in main terminals and large cities.

Network morphology

Morphological indicators describe features of modal networks and are mainly derived from graph theory or fractal theory.

Traffic volumes and flows

The measure of volumes and flows in and out from a given place to all others already is an indicator of the actual accessibility, not related to the transport system by itself but to the integration of a region in a larger economic area. Actual traffic volumes and flows encapsulate other accessibility elements beyond the transport system such as cultural relations, language barriers, institutional co-operation...
However, flow matrices are not available as such in Europe and only in aggregate terms (work and leisure) for NUTS1. A meta-model able to generate flows between regions based on basic socio-economic data and urban structures may be useful to calculate this concept of accessibility based on changes not in the transport system but on the socio-economic and urban characteristics. For the purpose of the study, flow matrices generated by gravity type models will also be used.

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Travel times and cost

Travel time and travel cost indicator give a good impression of the effort to reach other places.
Travel time and travel cost indicator will be presented in numerical form as well as in maps showing indicator values link by link or isochrones or isocosts for selected origins.

Service provision

Depending on the services provided by transport operators in a given moment, business travellers and tourists, and industries, may or not benefit from the existence of transport infrastructure. Only private transport by car or truck is independent from the services actually provided.
The indicators most frequently used are adapted to specific segments of transport demand, such as "number of efficient opportunities for daily round trips to key destinations" for business travellers, i.e. daily accessibility, or "market area achievable at a given time or cost" (in terms of total population, accumulated GDP...) for industries moving goods.
The data needed are basically schedules from transport operators. Being hardly available this data in practice, it is indispensable to generate a theoretical service database automatically, based on expert criteria and rules, and validate it against some known cases. This procedure may be useful to generate or propose potential services based on alternative scenarios (for transport and territorial policies, market regulations, etc.). Preparatory work for this includes review of existing passenger services for pilot transport operators (airlines, railways...) directly or throughout commercial timetables, review of passenger services between important cities, analysis of freight services.
Proposed indicators are based on the estimation, from main transport terminals, of the following services (frequency, commercial speed and average fare), but do also include the availability of vehicles.
The main composite indicators based on available services will be as follows:

- *Daily accessibility.* Total population accessible from a given city in a given time allowing for business daily round trips by the most effective inter-modal chain.

- *Commuter accessibility.* Total population accessible from a given city in a given time allowing for daily commuting by the most effective inter-modal chain.
- *Market accessibility.* Total market area accessible from a given place at a given time

Indicators will be presented in numerical figures and in maps for NUTS 3 regions.

Quality of service

Actual traffics may reduce significantly the quality of the services provided by operators, especially when they are close to the infrastructural capacity, but also because of the probability of accidents, weather conditions, etc. Indicators such as "congestion levels", "excess of capacity", or "bottlenecks" are commonly used, or the difference in time and generalised cost, between ideal and actual quality of service.

Data related to actual traffics, or congestion for European transport networks, is partially available for certain modes and countries, and estimates are needed to get a homogeneous database useful for strategic studies. Based on this data, a transport forecast model able to assign origin and destination flows to transport multi-modal networks would allow to produce these indicators for different scenarios. Flow matrices, the other type of data needed, are available at NUTS 1 level and below, not resulting from household surveys but calculated from partial national data.

Even though the development of a calibrated equilibrium forecast model for transport in Europe is beyond the scope of this project, a meta-model based on knowledge produce by existing models (model KTEN developed on the 4th and 5th EC Framework Programme) may be good enough for the strategic spatial approach needed. Preparatory work includes review of existing traffics on roads and other modes, integration of traffics forecast in relevant European studies and the analysis of studies on transport bottlenecks.

Results will be presented in numerical form and in maps showing link loads and in maps showing the regional traffic load and regional congestion levels.

Transport externalities

At the same time transport is facilitating social and economic relations and is also generating environmental externalities that reduce and constrain the capability of a given region to attract new activities, as well as to some extend the productivity of the already existing. Accidents, land occupation, and air pollution are the most important strategic impacts of transport in this respect. Others are energy consumption, noise, car disposal, etc. There are a number of estimates of these impacts and their economic cost in terms of per cent of GDP, for the whole Europe and most countries. The calculation of such impacts at aggregate level based on estimates and ratios from existing studies will complement the previously mentioned approaches to accessibility.

Network Vulnerability

Transport infrastructure networks and services are subject to a range of risks with respect to the geographic situation, climatic conditions or human actions which may seriously affect their functionality for the ESPON 1.2.1 will try to address the relatively new field of network vulnerability with a number of indicators describing the exposure of transport infrastructure to potential damage.

Advanced Visualisation

The final category is different from the previous ones, because the focus is on advanced visualisation techniques. Based on previous developments of project partners a range of innovative mapping methodologies will be further developed in order to gain new insight in territorial aspects of transport infrastructure and services.

The current plan for advanced visualisation techniques include:

- *Three-dimensional accessibility surfaces* will visualise quasi-continuous spatial variation of indicators based on small raster cells.
- *Time-space maps* will demonstrate the 'space eating' effect of new transport infrastructure and services.
- *Chronocarts* will display different qualities of different transport modes in three-dimensional representations.
- *Animated map*s will show developments of indicators over time.

- *Hypermaps* will enable the exploring of the map databases to be generated in analogy to the concept of hypertext."[6]

4.2.2 The ESPON project 2.1.1 *Territorial impact of the EU transport and TEN policies*

"ESPON 2.1.1 concentrates on the evaluation of territorial effects of the trans-European transport and telecommunication networks (TEN). However, as agreed on the briefing in Brussels (August 2002) territorial impacts of energy policies will not be addressed in this project. The major questions under this action is how far the TENs provide the right answers for a territorial development as described in the European Spatial Development Perspective (ESDP). The measures proposed in the White Paper "European Transport Policy for 2010: Time to Decide" (COM 2001/370) provides the framework for the subject investigated under this action. Reference is made to the policy options developed in the cross-sectoral approach of the ESDP. The ESDP stresses the need for an integrated approach for improved transport links, makes reference to the polycentric development model, highlights the efficient and sustainable use of infrastructure and refers to the importance of the diffusion of innovation and knowledge. This integrated approach will be followed in analysing transport and telecommunication networks. Any analysis will take into account the principle of territorial balance, the particular problems of peripheral regions and the improvement of secondary networks.

In this framework the goals of ESPON 2.1.1 are to:

- develop methods for the assessment of territorial impacts of EU transport and TEN policies,
- develop territorial indicators, typologies and concepts, establish database and map-making facilities and conduct empirical statistical data analyses,
- analyse territorial trends, potentials and problems deriving from EU transport and TEN policies at different scales and in different parts of an enlarged European territory,
- show the influence of transport and telecommunications policies on spatial development at relevant scales,

[6] ESPON Project 1.2.1, ed., October 2002. *Transport service and networks. Territorial trends and basic supply of infrastructure for territorial cohesion*. *1st Interim Report*. 44-51

- show the interplay between EU and sub-EU spatial policies and best examples for implementation,
- recommend further policy developments in support of territorial cohesion and a polycentric and better balanced EU territory,
- find appropriate instruments to improve the spatial co-ordination of EU and national sector policies and the ESDP,
- provide input for the achievement of the horizontal projects under ESPON Priority 3 (in particular ESPON 3.1).

To meet these objectives the project will make best use of existing research and relevant studies and will build on a strong co-operation with ESPON project 1.2.1. and 1.2.2. concerning infrastructure and telecommunication access, as well as policy impacts addressed under measure 2.1, in order to avoid any overlap. The project will also be conducted in close co-operation with Action 3.1.

The consortium of ESPON 2.1.1 consists of partners from five countries: Spiekermann & Wegener, Urban and Regional Research (D), Free University of Amsterdam (NL), Royal Institute of Technology (S), Federal Office for Building and Regional Planning (D), Politecnico of Milan (I) and University of Kent (UK) under the co-ordination of Christian-Albrechts University of Kiel (D)."[7]

Indicators, data needs and mapping

And specific work package reviews existing indicators of cohesion (equity) between regions in Europe and develops a set of robust and policy-relevant cohesion indicators with respect to regional socio-economic development.

"Starting point of the overview will be the normative literature on welfare measurement at the individual level and the aggregation to groups of individuals (e.g. the population of a region) by means of a social welfare function. This literature provides a general framework that allows to study the possibility of aggregating individual variables (utility, real income, etc) to analogous regional variables, the sensitivity of the outcomes of such aggregation procedures for the way the regions are defined (size of regions, aggregation of basic geographical

[7] ESPON Project 2.1.1, ed, October 2002. *First Interim Report for Action 2.1.1 of the European Spatial Planning Observatory Network ESPON 2006*, 5-6

units to larger regions), the appropriateness of using multidimensional concepts of cohesion (e.g. by using not only the average income level, but also the variation around its mean, unemployment, environmental quality, et cetera), and the possibility of decomposing equity concepts (such as inequality measures) at a higher level (such as the European union) to parts corresponding to lower levels (such as the individual countries).

The review will also deal with the way traditional (aggregate) indicators of cohesion (such as per capita income and accessibility) can be interpreted in this framework. It will make explicit the assumptions that are needed to establish the appropriateness of these indicators in the welfare economic framework used and possibly suggest alternative indicators. Attention will be paid to theoretical consistency and operationality." [8]

Other work package reviews existing methods of strategic assessment of territorial impacts of transport policies used in EU Member States and at the European level for forecasting the territorial impacts of trans-European transport policies and develops forecasting tools of different complexity for different policy analysis needs. These forecasting tools will contain causality analysis, descriptive and analytical techniques of ICT, a quasi-production function model with accessibility based on the extended SASI model and a spatial-equilibrium model of trade and passenger flows based on the extended CGEurope[9] model. Furthermore, there will be carried out an analysis of the impacts of transport and TEN policies on the polycentric connectedness and on overloaded transport corridors taking especially into account the spatial objectives given in the ESDP.

"One approach for analysing and forecasting the contribution of telecommunication infrastructure to regional development is based on a descriptive statistical analysis, such as cluster analysis. These indicators are also calculated in ESPON 1.2.2, from which these data will be supplied. It will be desirable to run the ICT[10]s indicators provided and the territorial indicators in similar equation regressions. In

[8] ESPON Project 2.1.1, ed, October 2002. *First Interim Report for Action 2.1.1 of the European Spatial Planning Observatory Network ESPON 2006*, 66

[9] CGEurope =

[10] ICT =

addition the ICTs indicators could also be included in the SASI[11] model. Other interfaces in these respects are the ESPON projects 1.2.1, 2.1.2 and 2.1.3.In order to analyse the territorial impacts of EU transport and TEN policies, a database of EU transport and TEN policies, the Policy database will be established. The Policy database contains the data describing the EU transport and TEN policies to be assessed: investment or subsidy policies affecting the sequence and time schedule of implementation of individual projects of the trans-European transport networks and non-spatial policies, such as regulatory, fiscal or pricing policies affecting the use of the trans-European and other transport networks."[12]

"There will be a close co-operation with ESPON 3.1 in the definition of standards for the formulation of indicators, a common architecture and standards for the collection of data and for the creation of maps with the aim of creating a unified, integrated European spatial monitoring system. Furthermore, in order to avoid duplication of effort, it will be essential that the transport and TEN networks used in ESPON 1.2.1 and ESPON 2.1.1 are the same and that the accessibility indicators calculated in ESPON 1.2.1 are the same as the ones used in the analyses and models of ESPON 2.1.1.

The empirically derived indicators will be analysed with the aim to identify types of regions which are homogenous with respect to the territorial effects of EU transport and TEN policies, i.e. with similar needs of transport and TEN infrastructure development and/or similar expected responses to EU transport and TEN policies. The indicators and typologies will be presented using GIS-based mapping tools taking account of the map design specification to be issued for ESPON. Maps that will be applied include maps of spatial distributions of indicators by NUTS-3 regions, maps of spatial distributions of changes of indicator values over time by NUTS-3 region. In addition, more sophisticated mapping and visualisation techniques, such as time-space maps and 3D surfaces of indicator values cell will be applied and further explored."[13]

[11] SASI = socio-economic and spatial impact of trans european transport networks

[12] ESPON Project 2.1.1, ed, October 2002. *First Interim Report for Action 2.1.1 of the European Spatial Planning Observatory Network ESPON 2006*, 66-67

[13] ESPON Project 2.1.1, ed, October 2002. *First Interim Report for Action 2.1.1 of the European Spatial Planning Observatory Network ESPON 2006*, 65

4.2.3 Report on the working group 1.2.1 & 2.1.1during the ESPON Seminar (22.11.2002)

Links between the projects

Strong links exist between the accessibility conditions to be examined in project 1.2.1 and regional development impacts of EU Transport and TEN Policies.

Indicators and Typologies

There was general agreement that standard accessibility indicators should be used for project 1.2.1, and socio-economic development indicators for project 2.1.1. However, both groups agreed that existing indicators would not suffice and that new advanced ones should be envisaged e.g.: network vulnerability, etc.

As regards the spatial typologies, the groups agreed on accessibility profiles, regional development types as well as cross typologies common to both groups.

Data Access and Demands

As a starting point, the available data was found to be sufficient. Project teams may nevertheless have to request more specific data (DEM, ICT…) for more advanced studies.

Regarding the cross-validation and harmonisation of results, this was found to be neither necessary nor feasible for raw network-related data. Moreover, the adoption of standard data transfer formats by 3.1 was thought to be potentially problematic and certainly contriving for transport-related projects.

Finally, the groups agreed that specialised software tools for transports and economic modelling (CEG, Flow assigment…) should be used. Full standardisation, however, should only really be possible for administrative maps.

Map-making and cartography

This was by far the most controversial aspect of the working group. There was general consensus on the need for a standard map template.

The current proposal was considered to be a good starting point but certain issues were raised for consideration in view of their high political sensitivity, namely:

- the position of islands overlapping Russia
- the position of ESPON logo covering Morocco

Finally, the possibility of another map template including Mediterranean countries and Russia to the Ural´s was envisaged.

Inclusion of partners

A strong interest to co-operate with neighbouring countries was felt. Project 1.2.1 has already taken preliminary steps to include Switzerland, Slovenia and Hungary. Project 2.1.1 also expressed its interest to include new countries. On their part, neighbouring and accession countries (Norway, Switzerland, Cyprus...) expressed their willingness and interest in co-operating with 1.2.1 and/or 2.1.1.

Co-operation towards the 2nd Interim Report and Networking with other TPGs

It was agreed that co-operation between TPGs would concentrate on defining common reference scenarios, complementary to the specific ones each project will use. TPG 1.2.1 committed to developing basic core accessibility indicators whereas TPG 2.1.1 agreed to advance in its data integration and modelling work. However, no indicators are yet to be expected. Moreover, both teams agreed to exchange specific transport information that could be useful for both projects.

In view of the forthcoming 2nd Interim report, the teams also expect to step-up co-operation with TPG 3.1. They specifically request from that team:

- the gathering of data from EU institutions and its prompt transfer to TPGs
- the adoption of a map standard template
- data format standard setting
- the adoption of consistent reference Scenarios.

4.3 The ESPON Project 1.2.2 *Telecommunication and networks: territorial trends and basic supply of infrastructure for territorial cohesion. The role, specific situation and potentials of urban areas as nodes of polycentric development* & ESPON Project 2.1.*2 Territorial Impact of the EU research and development*

4.3.1 The ESPON Project 1.2.2 Telecommunication Services and Networks: Territorial Trends and Basic Supply of Infrastructure for Territorial Cohesion[14]

ESPON Project 1.2.2 aims to analyse the relationship between telecommunications infrastructures and services and balanced spatial development, and to create a platform with data, indicators, concepts and methodologies upon which future research and policy can build. The first report marks the present status of the work done so far in the TPG.

Emphasis was laid on the clarification of different telecommunication technologies that is of basic importance for the understanding of the recent development and its territorial impacts. Also first patterns of spatial differentiation concerning basic telecommunication facilities have been implemented and a list of relevant indicators has been compiled.

Approach

It is now widely recognised that advanced economies are moving towards an Information Society and that information and knowledge will be key elements in the competitiveness of places and people. This fundamental change in the way in which economies and societies work has potentially profound implications for territorial development. It is still unclear exactly what these changes are and no comprehensive attempt has been made to date or to map the territorial outcomes. A significant body of case study research has, however, been carried out in Europe and elsewhere. What this work suggests is that new territorial patterns are likely to be complex, with both centripetal and centrifugal forces being underpinned by Information and Communication Technologies (ICTs) simultaneously.

[14] Main passages of the text are directly taken from the intermediate report of the Transnational Project Group (TPG) for ESPON 1.2.2 in order to keep authenticity. See for references also First Intermediate Report of TPG.

A number of studies have pointed to remaining territorial disparities with regard to access to these new technologies in Europe. These disparities are obvious between countries. They are also apparent between regions.

The main focus of territorial debates in Europe around new technologies has been regional disparities. This is understandable, but in the largely demand-led, liberalised telecommunications market significant differences appear to be emerging at the finer spatial scale and it is worth noting that there are likely to be substantial disparities *within* regions, though here the evidence tends to be even more partial.

This clearly means that the development of the Information Society has important implications for economic and social cohesion in Europe, understood as cohesion between, as well as within, regions.

Despite the predominately liberal approach to telecommunications adopted by the EU, it long has been the aim of policy makers within Europe to use ICTs to further territorial cohesion by supporting regional and local development and promoting integration and empowerment.

Telecommunication networks can play an important role in compensating for disadvantages caused by distance and low density in peripheral regions. The relatively small market volumes in regions with low population density and correspondingly high investment costs for telecommunication infrastructure can thus lead to lower technical standards and high tariffs, which bring competitive disadvantage.

In line with the thrust of ESPON this section, and indeed the 1st Interim Report of the ESPON project 1.2.2 as a whole, has concentrated on infrastructure and services. It is clear, however, that these can only form one element of an information society regional policy.

Methodology

The key component of WP1 has been a wide and thorough review of existing data, statistical sources and indicators of territorial trends and basic supply of telecommunications infrastructures at the European level. The work draws mainly on official reports from European and international agencies, in particular from the European Commission, Eurostat, the Organisation for Economic Co-operation and Development (OECD), and the International Telecommunication Union (ITU). The ESPON Project 1.2.2 has not attempted to cover infrastructure investment under

TENS as this work is being undertaken under ESPON 2.1.1. The TPG for ESPON 1.2.2 intends to liase with the relevant project partners as well as with initiatives like Benchmarking Regions in the Information Society (BISER) and Statistical Indicators Benchmarking the Information Society (SIBIS), with OECD, Eurobarometer and DG Infosoc to consider the best way of exchanging and synthesising our respective findings in the later stages of the project. The above initiatives all represent 'work in progress'. However, they have suggested indicators that might be useful to the ESPON project, too.

The aim of ESPON 1.2.2 is to uncover and map data at the sub-national level where possible:

- What type of surveys and data gathering exercises have been undertaken on which the project 1.2.2 can draw?
- Do such studies cover Euro 27 plus Norway and Switzerland or only existing member states?
- At what territorial level is that data available – i.e., what level of territorial analysis does existing data reported at the European level allow teh project 1.2.2 to map and explore?
- How comparable are the various sources and data sets across Europe (Euro 27 plus 2) and over time?
- Finally, what kind of indicators are used in these reports and can they be usefully adapted for the purposes of ESPON?

Based on this research work, the TPG results in a preliminary list of indicators fed by sources like the CDI[15] Network Readiness Index, publications of the OECD, the ITU World Telecommunication Indicators and Statistical Yearbooks. Next intention will be to move towards a selection of a smaller number of key indicators either through prioritising certain indicators over others or through the amalgamation of indicators to produce composites.

The concern here is with the possible extension of these indicators to examine territorial variations at the sub–national level. But: It will be crucial that indicators are developed which are meaningful at the sub-national level and have some prospect of being matched by the availability of data.

[15] Center for International Development

Typology and concepts

It has been observed that a 'digital divide' has emerged as we move towards an Information Society, with digitally included and digitally excluded populations. As suggested above this clearly has a territorial component. The concept of the digital divide has been criticised on several accounts. Most fundamentally it has been argued that, in reality, the digital divide really only represents yet another manifestation of deep social divisions which characterise all modern societies. Others have suggested that the divide should be viewed in a more positive light.

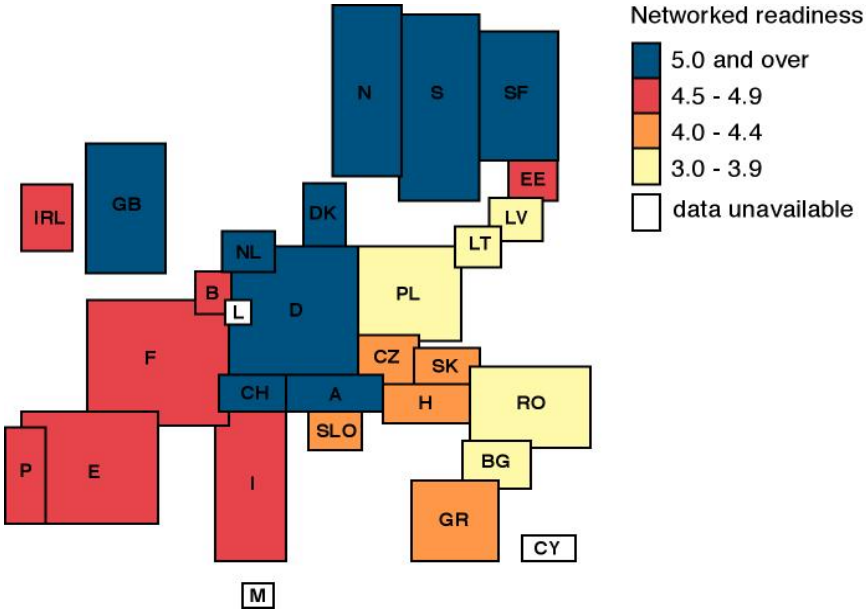
In purely technological terms, which side of the digital divide (or which rung of the digital ladder) an individual or territory is on will depend on access to ICT technologies[16], to levels of digitisation of local exchanges and to the level of bandwidth available to them when using these technologies.

In practice, the degree of liberalisation and the degree of competition in liberalised markets varies. Some contend that there is some way to go before we reach a truly competitive market situation and that competition is inhibited by the power of incumbent providers, together with the attitude of national regulators. In some territories – particularly rural ones – liberalisation appears to have had only a limited impact, with new entrants failing to invest in these 'non-profitable' markets.

One model which adopts this wider understanding of the Information or Knowledge Society is the *Network Readiness* Index created by the Information Technologies Group at the Centre for International Development (CID), Harvard University (see figure 12). The Index is constructed using a range of 'hard' and 'soft' indicators. Network Use is a straightforward measure of ICT. The Enabling Factors Index is more complex and is constructed to reflect the preconditions for high quality Network Use as well as the potential for future Network proliferation. Enabling factors include ICT policy, business and economic environment, social capital and role of governments. The figure highlights some of the territorial differences across Europe at the national level.

[16] Extent descriptions of ICTs are available in the First Intermediate Report of the TPG.

Figure 12: Degree of Network Readiness of European countries (Euro 27 plus 2)



Source: Figure drawn from Network Readiness Index, Information Technologies Group Centre for International Development (CID), Harvard University Mapping: CURDS[17]

Another model is the concept of teledensity as a potential useful concept for ESPON. It is encouraging that it is used to differentiate the situation within countries. It is a useful starting point, but has several limitations such as, first, data is missing for several countries, second, the area covered by the largest city for telecommunication purposes may differ from the definition used for the population of the largest city, third, the binary division of largest city and rest of country gives only a limited picture of territorial differences and more.

Indicators

As noted before, the TPG-report describes the technology of information and telecommunication networks. This is basic knowledge for the development of relevant indicators. In the next step the TPG prepares the following 2 strands to classify these indicators.

[17] More maps are included in the First Intermediate Report of the TPG, referring to the following indicators: network use across European countries, network access, information infrastructure access, main telephone lines per 100 inhabitants, residential main lines per 100 households, telephone subscribers per 100 inhabitants, proportion of households subscribing to Cable TV, estimated PCs per 100 inhabitants, internet users per 10,000 inhabitants, European telecommunication traffic flows and international internet capacity.

Table 1: Classification of Indicators of ICT Supply and Demand

Global indicators Diffusion of and demand for ICT and ICT–services	
1 Indicators for supply	**2 Indicators for demand**
1.1 Development of ICT infrastructure	2.1 Diffusion of ICT and usage of ICT–services
1.2 Prices of ICT services	2.2 Expenditures for ICT and ICT services

Source: Adapted from BISER

The BISER list was used as a starting point and has been amended following an exchange of views with ESPON partners. The amended list appears below in Table 4. It should be stressed, however, that the list represents very much a preliminary effort. Exploratory work is currently undertaken by partners regarding the availability of data at the national and regional level.

Initial research in policy options has already been implemented by the TPG. On this basis, the indicators will be checked due to their policy relevance in the next working phase.

Data Availability

Putting to one side case study-based reports which tend only to relate to small areas of Europe and which use different approaches and methodologies, three main types of survey as potential source for data can be identified:

- First, those that involve interview surveys of households, individuals, or firms; these, in turn, can be divided into those which report on the existing situation and those which are concerned to establish future trends (both can be included in a single survey).
- Second, those which carry out surveys of national regulators, ministries and telecommunications companies regarding the availability of technologies and services in order to build a picture of access and usage.
- Third, reports which draw on a wide range of publicly readily available sources.

As is demonstrated above, to date there is no single approach or methodology for collecting data on the Information Society at the European level. These 'official'

sources described above rely on a range of data sources. Two key sources are telecommunication consultants and industry organisations.

A key task of WP1 of the ESPON project 1.2.2 was to explore the availability of regional data at the European level. As anticipated the TPG was able to find very little comparable data which was collected at or disaggregated to the regional level. The vast majority of studies reported at only the national or European level.

Two reports were found carried out by the polling group Gallup Europe which had a regional component. These documents report on the findings of telephone interviews with SMEs and with households which amongst other subjects sought to find out rates of take up of various telephone technologies and services. It was only possible to uncover part of these reports in the search. They appear to have been a one-off survey and it is not clear whether the sampling frame used was sufficiently robust to allow to draw firm conclusions on regional patterns. This issue will be explored further with the relevant officers in the Commission in WP2 of the project 1.2.2.

The other source ended in the indicator list above with data availability not yet clarified. Therefore an extent data collection requests from European and national agencies is envisaged. Our initial enquiries suggest that most of what we require is not available at the European level, though we will re-approach the relevant agencies in WP2. That means, that the list of indicators will have to be circulated to national statistical agencies and telecommunications regulators. The request seeks to assess whether data for each of these indicators are collected at various territorial levels: NUTS 0, NUTS 1, NUTS 2 and NUTS 3.

Mapping

At this stage of work only nation based maps have been compiled. Basically, these are schematic maps like the one on display as figure n° 12.

4.3.2 The ESPON Project 2.1.*2 Territorial Impact of the EU research and development*

ESPON 2.1.2 Research Project aims to carry out a territorial impact analysis (TIA) of R&D policy within an enlarging Europe. The objectives of ESPON Research Project 2.1.2. are to identify the principal trends, to describe R&D policy within an enlarging Europe, to draw a cartographic picture of R&D in Europe, to develop methods for the territorial impact assessment for R&D policy, as well as territorial

indicators and typologies. Finally specific policy recommendations, integrated tools and appropriate instruments for use in future research and analysis will be defined. Within the project's first working phase, documented in this report, it achieved to outline the conceptual model for the TIA as the main instrument for the project's next steps. Also an outline description of EU R&D policy is given and a consensus on a set of indicators is shown. A first detailed and comprehensive list of the main statistical and geographical data to be collected is provided and the appropriate geographical and technological level required for data collection is being identified.

Approach

On a general basis the TPG draws on the ESDP and the Second Report on Economic and Social Cohesion with the inherent aim „to promote a more balanced and sustainable development of the European territory". Furthermore the TPG refers to the intention of the ESPON programme which focuses on quantitative methods for identifying factors relevant for a more polycentric Europe, development trends in structural problematic-, at the same time potential regions and on tools for a more efficient spatial coordination of sector policies). Withdrawing R&D-application the ESPON 2.1.2 project follows up the objective of "Territorial Impact Assessment of R&D policy" whereby TIA is understood as "a tool or procedure for assessing the impact of proposed spatial development activities against spatial policy objectives or prospects for an area". In more detail, the objectives of ESPON Research Project 2.1.2 are the following:

- Within an enlarging Europe: diagnosis of principal trends, potentialities and difficulties in relation to R&D as well as a description of R&D policy.
- Cartographic picture of R&D in Europe with emphasis on R&D flows at a regional, national and European level.
- Methods for TIA and territorial indicators and typologies to assist in the establishment of policy priorities for a balanced and polycentric enlarged European territory and to recommend specific policies on regional, national and European level with regard to future research and analysis.

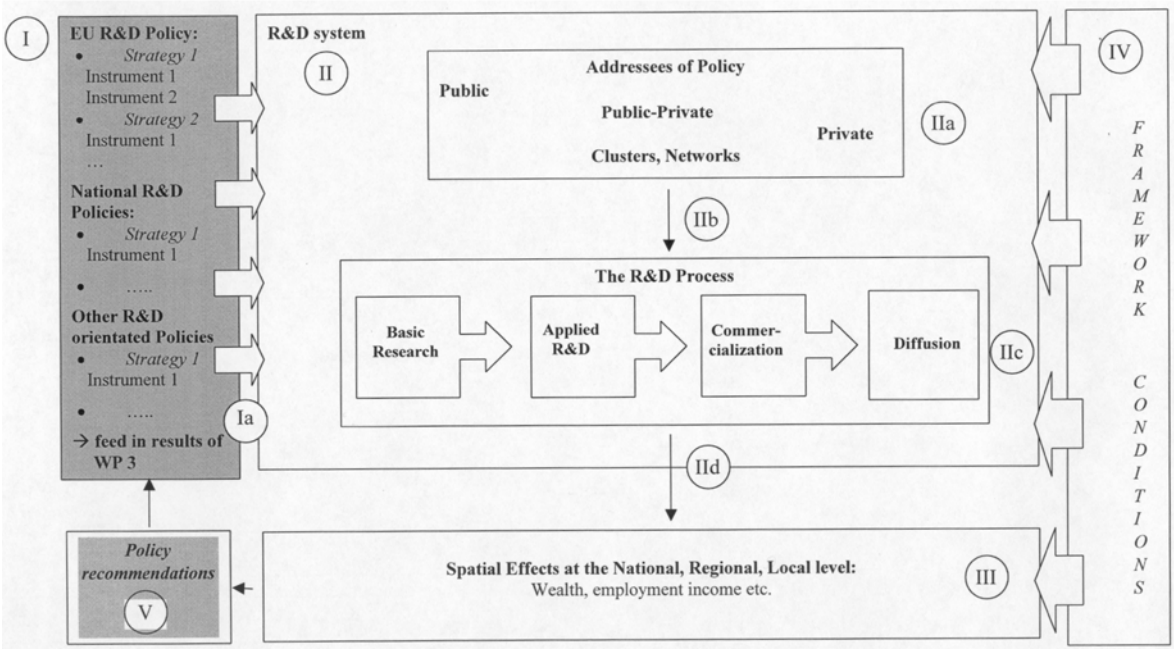
As the critical key task of the TIA the TPG is assessing the establishment of suitable assessment criteria which in the context of the project will be based around the R&D process, the territorial dimension to that process and the policy aims of the ESDP.

To implement TIA a *conceptual model* has been developed which prosecutes essentially to reply to two questions: “how do EU R&D policies impact on the European territory?” and “how do the effects of R&D ‘move’ within this territory?”. It is starting from the working hypothesis:

- *Direct* territorial effects of R&D policy will be most apparent in ‘knowledge-producing’ regions, but the results and wider impacts of these same policies will be felt differently according to the capacity of regions to absorb and exploit the knowledge produced.

The model is based on two main components. On component is the linear model of the innovation process, moving from basic over applied R&D to commercialisation and diffusion with steady presence of territorial impacts, and other component is the standard intervention logic approach, moving from input over output to direct results and wider impacts. Both of them are integrated in the conceptual model of the regional R&D milieu that is underlying the project whereby different questions of spatial dimension stand behind every numeral that is seen in the following figure.

Figure 13: Model of the Interrelationship of R&D, R&D Policy and Economic Development



The model will be explored on two scales. One is the macro level with a focus on input, output and results, and another is the meso level aiming to open up the “black box” by identifying interrelations between input, output, direct results and

wider impacts as well as constraining and enabling factors that affect the diffusion and absorption of R&D.

Methodology

The methodology and work programme adopted by the TGP involve 10 thematic work packages which are structured in four key groups:

- Key group “Background context for the research project” with work packages “Literature review”, “Description of R&D policy at a European and Member State level” and “Compilation of indicators currently available at a European, national and regional level”
- Key group “Development of a conceptual model” with work packages “Development of a territorial impact assessment methodology for the different dimensions of R&D policy”, “Development of indicators” and “Development of database”
- Key group “Implementing the model” with work packages “Data Collection”, “Development of a mapping system” and “Regional case studies”
- Key group “Developing the policy recommendations” with work package “Development of recommendations at a variety of different levels for future policy effort in support of territorial cohesion and the ESDP”

Typologies and Concepts

Indication of the main typologies and specific concepts used in the project:

1) Intended result of the project: Capacity of regions to produce knowledge (K-P) and to absorb/ use knowledge (K-U)
2) Referring to the policy side: ‘direct’ R&D policy (fiscal measures and direct investments) and ‘indirect’ R&D policy (e.g. Policy measures stimulating the use of new technologies in SMEs) effects

Referring to the frame conditions of the conceptual model:

3) Spatial geography (i.e. region as border region, peripheral)
4) Economic performance of the region (unemployment rate, GDP performance)
5) Regional economic structure (size, sectoral mix, ownership structure of companies)
6) Regional institutional split of R&D activity (between Business Enterprise, Government, Higher Education and Private Non-profit Sector)

Referring to once classification (in any) of the typologies elaborated by the project:

- See typologies above which are not yet exactly specified but which are described in a concrete manner in the below cited exemplary indicators.

Referring to classification (in any) of concepts elaborated by that project: Not at that stage.

Indicators

General remarks:

Concerning the territorial level the project proposes a common approach in defining an appropriate statistical 'region', whereby a mix of NUTS II and NUTS III is seen to be most appropriate. On the other hand the TPG signalizes pragmatism if the choice of one scale only would be necessary.

There will be a differentiation between basic (customary) and elaborated (more specific and complex) indicators

Indicators for case studies:

The indicators are not yet concretised by the TPG, but will be based on functional and territorial typologies.

Concerning the question of the policy relevance of each indicator or group of indicators it is to say that not any specification was made yet.

Data Availability

Data bases used so far are by EUROSTAT, EUROSTAT (CIS 2), UNCTAD, OECD (ANBERD), national data sources (especially for candidate countries).

Referring to availability and comparability of data, quality of data, the TPG concludes that most of the proposed indicators are not available at NUTS III or even not available at all. It is planned to use national data sources as listed in ESPON's 'Data Navigator' to supplement the international data sources. On the other hand it is seen that using national data sources will make it more difficult to compare countries and regions as methodologies and definitions might differ between countries.

In principle most of the developed indicators are covered at least in some countries and only two of them completely lack of data. The indicators are available only at different NUTS levels in various countries. Especially the candidate countries show huge data-gaps.

Mapping

Database will be designed using MS-Access 2000 to form the basis of the project's data management system. Remote applications, provided in either Access 97 or 2000, will be used for data entry at the local-level, while providing the capacity for data-upload to the central system, via e-mail transfer. Mapping itself is not further specified yet.

4.3.3 Report on the working group 1.2.2 & 2.1.2 during the ESPON Seminar (22.11.2002)

Links between the projects Before the group went into a detailed discussion about the proposed topics, some more general issues were addressed. First of all both projects questioned the links between each other and it was agreed that only minor links between the two projects seem to exist. Telecommunication and information infrastructure, as it was stated, might have an influence on research and development and vice versa, but right now, the effects are not yet clear. The 1.2.2. project emphasised that there might be stronger links to 2.1.1. Transport and TEN -project.

Indicators and typologies Both projects agreed, that there is no need for a common indicator set. It was said, that it might be even a disadvantage to have common indicators, because by trying to reduce to a common set, shortcomings within the analysis may arise. Although it was said, that occasionally there might be overlaps in the field of some high level indicators. To get a better data base, both projects proposed that it would be helpful to get into contact with the relevant DG´s, this could be initiated by the CU.

About the question of spatial typologies, differences between the projects were detected, the dimensions urban and rural seem to be more important to the 1.2.2. project, but do not matter so much for the 2.1.2 project. Nevertheless, both project recommended multilevel approaches to the spatial perspective.

Data access and demands Both project teams strongly require access to confidential data. Both made clear that certain data on the national level and of course from the private sector is available but not accessible. A solution might lie in the provision of a letter of intent by DG Regio as a door opener. This also could be a task for the CU. Because of the problems of data shortcomings in the more detailed, respectively disaggregated, spatial levels, such as NUTS 4 or NUTS 5,

the trans- European analysis level is a more aggregated one. The working level for the 2.1.2 project for example has to be NUTS 2.

Map-making and cartography Concerning the question of map-making: a consensus existed, that there will be no common mapping between the two projects, referring to the fact that there are only minor links between the topics of the projects. But it was suggested that an extra value could be reached, by joining the results. By Doing so, common patterns could be identified.

Inclusion of partners Both projects emphasised that observers are of course welcomed, but for practical reasons their number should be limited. New full project team members can be accepted. E.g. the preparation of further case-studies could be a real asset. But it was made clear, that new members cannot influence the work that has been done by the TPG´s so far. In any case the inclusion of observers, active observers or new team members should not cause any additional costs.

Co-operation towards the 2nd Interim Report Networking with other TPGs

Because of the weak linkage between the TPG´s, it was made clear, that links to other projects could be more helpful. The projects stated, that they will look for more fruitful links by themselves. Certainly the projects are open for any kind of co-operation with other TPG´s, as long as they are reasonable.

4.4 The ESPON Project 1.1.2 *Urban-rural relations in Europe & ESPON Project* 2.1.3 *The territorial Impact of CAP and rural development policy*

4.4.1 The ESPON Project 1.1.2 *Urban-rural relations in Europe*

The ESPON project 1.1.2 is thematic study dealing with urban-rural relations in Europe. It is based on the assumption that categories of urban and rural, as well as the relationships between urban and rural areas, are useful for analysing the spatial dynamics in Europe. Furthermore, the issue of urban-rural partnerships is closely related to ongoing changes in EU policy-making pointing towards more integrated rural development measures increasingly replacing the traditional support to agricultural production.

The latter aspects illustrate that the focus of the project is on rural areas and urban-rural relations. Thus this project is complementing the ESPON project 1.1.1 addressing mainly urban areas when approaching polycentric development.

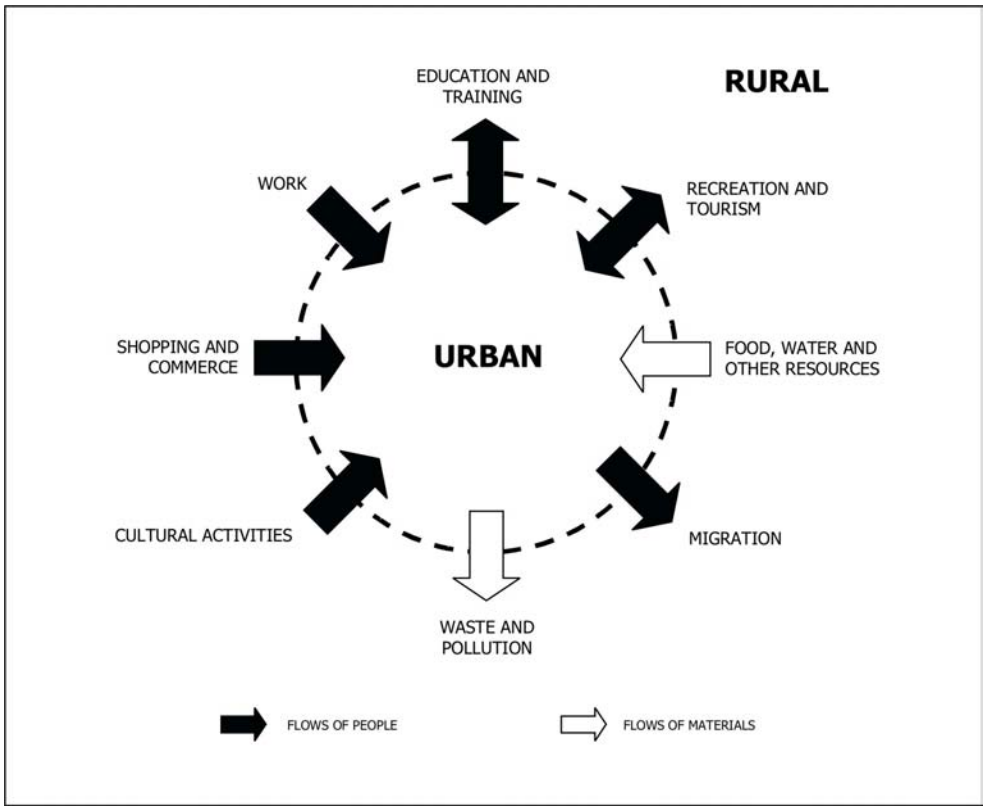
Approaches and Methods

The project takes its point of departure in a thorough discussion of definitions of rural areas and urban-rural relations. However, the work on definitions is not used as basis for the first operational steps, but rather understood as tentative findings to be tested against the European-wide data sets.

During the analysis of existing definitions, a number of aspects have been identified distinguishing urban and rural areas, i.e. population size, population density, economic activity, accessibility and administrative status.

As concerns the overall structure for analysing urban-rural relationships, the analytical framework of the project is formed by physical structures and functional flows characterising/ determinating urban-rural relationships. The approach taken in the first phase of the project emphasises especially the flows of people and materials. It is notified that there are also economic links, involving monetary flow between urban and rural areas, as well as information links. However, analysis of urban-rural relationships as this kind of flows has hardly been done and data is often scarce. Thus, the focus of the project will in the next phase move to the analysis of structures underlying urban-rural relationships. The perspective on flows will mainly be opened via case studies.

Figure 14: Main Flows of People and Materials between Urban and Rural Areas in the West of England



Source: Nadin and Stead, 2000

Typologies and concepts

Before developing new typologies the project set out to evaluate existing ones. In the interim report of the ESPON project 1.1.2 there are two kinds of typologies shimmering through:

- **Urban-rural relevant typologies**

  In this field typologies provided within the framework of the Study Programme on European Spatial Planning (SPESP) and various other sources have been assessed. The next step will be to analyse the categorisations used in existing typologies of policy initiatives.

- **Classification of innovative urban-rural initiatives**

  Also here existing approaches have been assessed. Based on this a first preliminary classification has been developed:

  - Strategic integrated spatial planning aimed at 'regional balance' 'connectivity', 'sustainable development' and holistic approaches to urban-rural relations
  - Physical and virtual accessibility and connectivity
  - Market integration and economic networks/ clusters

- Cultural asset integration
- Social and political networks enabling communication and network building

Indicators (policy relevance)

In parallel to the work on definitions and typologies, the project team has elaborated an extensive list of indicators (see excel file: 1_1_2_indicators_urban rural indicators in Europe.xls of the original study or chapter 4.6 synopsis of indicators). The indictors cover the themes “reorganisation of urban and regional systems”, “land use changes and pressure”, “economic development” and “natural and cultural assets”.

This indicator pool for data requests will be further developed throughout the project. Indicators have been now assigned to three categories serving different purposes:

- step 1: basic indicators for the first tests of the delineation of urban and rural regions;
- step 2: indicators for the quantitative analysis of urban and rural developments and relationships,
- step 3: indicators for the qualitative analysis in case studies.

As the list of indicators is rather comprehensive, procedures for cutting down the list have been considered. Stressing the aspect of policy relevance of the final results, following criteria for cutting down the list have been proposed:

- key issues of the sphere of policy: which of the indicators is more and which one is less relevant for the analysis of urban-rural relationships (the list of key issues was used to check the indicator pool; relevant indicators were marked in green colour)
- another approach to the policy sphere should start from existing EU policies and plans for the post 2006 funding period, addressing rural and urban development and relationships (the report of the WP4 of the project 1.1.2 can be used as a basis for this kind of selection process; at this stage relevant indicators of the pool were marked in yellow colour but the selection was not based on the WP4 work yet)
- A third approach could start from an economic viewpoint and ask for the economic and demographic driving forces which shape the relationships between urban and rural regions.

In addition, one selection criterion must evidently be data availability.

4.4.2 The *ESPON Project 2.1.3 The Territorial Impact of CAP and Rural Development Policy*

This section deals with an evaluation of the impact of European policies dedicated to rural space (policies).

For the ESPON Project 2.1.3 „The Territorial Impact of CAP and Rural Development Policy“, the key issue is that the trends influencing agricultural production and policy do not affect all regions in the same way. A territorial impact analysis is therefore required to identify territorial patterns of different regions. It will also be useful to identify a range of different types of CAP effects (on agriculture, landscape and environment, on the consumers and taxpayers, on culture and communities).

Approaches

The approach is composed of a set of hypotheses presented through different view points.

Hypothesis on CAP/RDP in general:

- The CAP impacts on different farm types tend to be more distinct than between different regions.
- The CAP has the effect of slowing down changes in agricultural structures.
- Structural adjustment is relatively faster in areas of high agricultural potential because of technical bias and the greater market orientation of agriculture in more favoured regions.
- The CAP has side-effects (ecological threats in certain areas, decrease of biodiversity and landscape quality, out-migration, etc).
- Changes in the levels of farm household pluriactivity are more strongly associated with variables reflecting the strength of the local economy than the level of CAP support.
- Changes in the CAP have had less immediate impacts on farm incomes and farm production methods than other shocks to the agricultural sector as weather, livestock disease and exchange rate fluctuations.

- The incidence of the CAP on NUTS III regions is not consistent with the cohesion objectives of the EU with the least prosperous regions receiving less CAP support than their more prosperous counterparts.
- The relative impact of the CAP in remoter rural areas may have been more significant than in accessible rural areas due to the fact that the latter are influenced, amongst other things, by contiguous urban developments.

Hypothesis on direct payments:

- Decoupling of direct payments leads to greater farming flexibility and thus increases the market orientation of farmers.
- The blanket environmental requirements for direct payments have contributed to measurable environmental improvements in the regions.
- Some specific direct payments have had differential territorial effects by retaining in some areas farming sectors which would otherwise have diminished in size. Similarly, dairy quotas have been critical in maintaining dairy production in some Less Favoured Areas, particularly mountain areas.

Hypothesis on agri-environmental measures:

- The impact of agri-environmental measures varies mainly in regard to farm types and regional production conditions.
- The impact of agri-environmental measures is greater in regions with relatively free land markets than in those with less mobile land ownership.

Hypothesis on market regulations and support

- CAP expenditures on market support contribute to the intensification processes of agricultural production. In territorial terms, more favoured regions are able to take greater advantage of these CAP support measures.
- The shift of CAP support towards direct payments and targeted measures has decreased the rate of capital investment in the sector, particularly in regions of high agricultural production potential.
- The shift of CAP support towards direct payments has reduced the extent of risk faced by farmers and may have been more beneficial in regions where climatic conditions and/or growing conditions are highly variable.

Hypothesis on rural development measures

- Rural development measures improve the quality of life in rural areas and thus have helped to reduce the rate of out-migration, particularly in Less Favoured Areas.
- Rural development measures create additional non-agricultural employment, making farm households and rural areas more multifunctional. These have, in turn, helped to stabilise regional incomes and employment.
- Most agricultural structural expenditures are not territorially focussed, and thus their territorial impacts are more variable than those of the more spatially oriented rural development programmes.

Methodologies

In the first stage, analysis will take the form of advanced statistical analysis. The general model will ideally take the form of a Vector Auto-Regressive (VAR) model: $y^k_{it} = A^k\ y^k_{it-1} + X^k_{it}\ ß^k + \mu^k_{it} + v^k_{it,}$ where y is a vector of dependent variables representing alternative possible outcomes of the CAP, for NUTS III area i, year t. Depending on the hypotheses being tested, outcomes might include, for example, the intensity of agricultural production in an area, farm income levels or the extent of farm household pluriactivity. The lagged vector, y_{it-1}, is included to take account of the relative immobility of farming activity with matrix A also reflecting the extent of inter-dependency between dependent variables. X is a vector of possible explanatory variables (land type, climate, farm type and size, land prices, and more generally, per capita GDP in the area, population density and environmental quality indicators etc). Critically, if available, this vector will also include variables representing the incidence of CAP and rural development policy in the area i, as well as variables reflecting national policies associated with agriculture and land use. Superscript k denotes different types of regions or groups of NUTS III areas i, where the latter are classified, for example, on the basis of a rural typology or by farm type, etc.

Although the precise methods for disaggregating the total CAP support to an area have yet to be finalised, the aim is to be able to differentiate between the following types of support: market price support, direct income payments associated with agri-environmental schemes, rural development schemes, and finally, all other types of CAP-related payments to farmers.

The second stage will use two sets of case studies. The first will compare the territorial impacts of different CAP commodity regimes, while the second will concentrate on the processes by which the CAP leads to differential effects in different types of rural areas. Both sets of case studies will be used to explore the extent to which CAP either complements or conflicts with other EU policy instruments in relation to Cohesion and will explore how the CAP interfaces with the concept of polycentric development being promoted through the ESDP. A number of different alternative methods are still being considered for the case studies.

Data availability

Data collection will be developed by several partners in the research group, with overall co-ordination being provided by SAC and IRPUD.

Statistical data will be collected for the time period 1990-2002.

For all listed indicators data will be needed on the lowest geographical level, ideally NUTS III. Where this is not the case, data on (the next) higher NUTS level will have to be taken.

After basic analysis – with raw data – at NUTS III level, more complex econometrics can be carried out on data aggregated according to a regional NUTS III typology (see Typologies and concepts). This will allow more detailed and meaningful comparison with regard to specific conditions in respective regions.

Getting early access to CAP and RDP expenditure data from DG Agri will be crucial for a meaningful analysis of CAP impacts. The project will seek help from the ESPON Co-ordination Unit on how to approach DG Agri in this regard.

Typologies, concepts and indicators.

Typology of NUTS III

- general types of space (types of rural areas differentiated according to general, quantitative issues) and
- special types of space (types of rural areas differentiated according to the soil and land use).

4.4.3 Report on the working group 1.1.2 & 2.1.3 during the ESPON Seminar (22.11.2002)

Common approach to indicators and typologies

- **Indicators :**

The two TPGs are at different stages in identifying indicators.

- 2.1.3 : Indicators will be differentiated into input, intermediate and impact indicators. The former relates to data that describe the conditions in the regions under examination and the financial input of agriculture policy. The intermediate indicators relate to agricultural and non-agricultural economic processes that on combination lead to the economic and environmental impacts of the CAP and Regional development policies.
- 1.1.2 : Indicators to study urban-rural structures and to study urban-rural relationships through flows :
  - basic indicators for the delineation of urban and rural regions
  - indictors for the quantitative analysis of urban and rural developments and relationships

- **Typologies :**

The main issue is to define rural areas. Indeed, for the project on CAP, it is needed to identify rural areas at the beginning of the study in order to measure the impact on each ones whereas for the project on urban-rural relations definition of rural areas is considered as a final achievement of the study.

This difficulty can be partly tackle choosing common case studies or, at least, common area for choosing case studies (both projects are working on a NUTS III basis).

Data access and demands

- 2.1.3 : Data should be available for most indicators. Nevertheless getting *early access to CAP and RDP expenditure data from DG Agri will be crucial* for a meaningful analysis of CAP impacts.
- 1.1.2 : At this point the consortium requests the listed data from EUROSTAT, as far as it is available in relevant database.

The tow TPGs ask for the role of the 3.1 concerning the acquisition of data.

Map-making and cartography

The two TPGs are expecting the 3.1 to deliver common standards in that aspect.

Inclusion of partners from Candidate Countries, Norway and Switzerland

Both TPGs has developed links with accessing countries (ex. Hungary), Norway and Switzerland. These partners could be associated on case studies and as observers.

Networking with others TPGs

It's seems obvious that *links should be developed between 1.1.2 project and 1.1.1 project.*

4.5 Report on the working group priority 1 and 2 during the ESPON Seminar (22.11.2002), Mondorf-les-Bains (Luxembourg

4.5.1 Working group on methodological questions concerning projects under Priority 1 (Territorial development)

Common minimum data set The group started discussion with general remarks on the availability of data and the need of a common set of harmonised fundamental indicators. It must be ensured that all project use at least a minimum set of identical indicators, e.g. the same data on population, area, GDP, persons unemployed etc. Project 3.1 will provide such a set of key data until end of January 2003.

Common definition of urban areas Out of analytical reasons and research questions, some of the projects need a common definition of urban areas. For example the TPG's working on transportation networks will define accessibility between "nodes" which should be compatible with the "towns" used by other TPG's. In this topic project 1.1.1 will do the fundamental research. Considering the projects all being in the analytical starting phase in parallel and this demand relating to first final results of project 1.1.1 it is quiet obvious that there will be just a preliminary solution in short terms. To support the related projects and enable first analytical work the project 1.1.1 agree to provide in a first step a list of towns until end of January 2003.

Map-making and cartography

The attendant teams agreed in a common map design for standard indicator mapping (choropleth map by regions of level Nuts 2 or Nuts 3). There is a general agreement on the presented proposal of the ESPON map design, but some changes are necessary to suit different analytical questions and some demands on representation.

Firstly, it appears necessary to have two differents templates : (1) one general template covering more or less exactly the ESPON area (EU27) with specific map windows for the overseas territories of the Union But the possibility to suppress those overseas territory in certain cases. (2) One specific template covering a a wider geographic context integrating the East and the Mediterranean. This second template will be very usefull for some specific questions (transportation, migrations, …) and for specific political topics (long term prospective, new ESDP, …)

Secondly, it is recognize that some TPG will produce "Non standard" maps which can not follow the previous templates but are of high added value for the program (e.g. 3-D map of accessibility). An agreement is obtained on the facts that those "non standard maps" are not constrained but should try to use some design elements (at least the ESPON-Logo, but eventually some specific colour ranges, …) in order to be easily recognize as "Made by ESPON".

Thirdly, the discussion emphasised an agreement on a ESPON map design for general purposes but without restriction to any specific software. The transfer of data related to map-making will be harmonised but it is not possible to oblige

TPG's to use a specific cartographic software. Accordingly, the TPG 3.1will provide a project including templates, shape-files on different regional level and topographic information for the use in ArcView products until end of January 2003 to any ESPON partner interested for harmonised map-making but research teams are free to use any other cartographic software. In this case they are requested to obtain an equivalent result in terms of maps templates, color design, etc….

Common understanding of typologies

The projects emphasised that a definition of common typologies will not be suitable., but there is a common understanding that typologies are whether territorial partition or categories. Nevertheless it should be usefull to go more in depth about this question of typologies.

Spatial analysis and tools

The projects came to an common understanding on the need of the documentation of spatial analysis tools and models. Within the projects tasks and possibilities they provide documentation of the models and analysis tools used. The EEA offers it's meta data documentation tool for possible use within ESPON.

4.5.2 Working group on methodological questions concerning projects under Priority 2 (Policy impact projects)

The workshop was referring to the projects

2.1.1 Territorial impacts of EU transport and TEN policies

2.1.2 The territorial impact of EU research and development policy

2.1.3 The territorial impact of (Common Agriculture Policy (CAP) and rural development policy

2.2.3 The territorial effects of the EU Structural funds in urban areas

The workshop was started by the moderator with a short outline of the preliminary findings on the issue of "TIA" in the Draft 1st IR ending with a brief review of the projects concerned characterising them by six major features due to TIA (see Table 17 "Review of major features due to TIA designated by the First Interim Report of Priority 2-projects" .in section 5.2.6). As a result of that exercise he concluded that the descriptions of the approaches under Priority 2 (given in the Draft IRs of the respective projects) show a considerable variety of features and

that even this first review makes it hardly imaginable to cover the whole range of sectoral EU policy issues by one assessment methodology.

The time dimension

The general discussion was directly referring to that table and revealed the time dimension lacking in the review. It was emphasised that looking at the past or into the future only as well as time scales (census years, periods) vary considerably. As new options for time reference were mentioned programme periods and accession phases. On the other hand there was assumed to be a strong correlation to state of the art in the different areas of spatial research (e.g. sophisticated models concerning transports, no evidence of spatial incidence for CAP). As a common idea occurred, that in the end all projects should deal with the past and the future, if necessary without designing complete scenarios.
(Thus, the topic of time dimension was taken up in the revised version of the 1st IR).

Discussion on topics

The further discussion led at first to more general topics as

- contradiction between efficiency and equity (> cohesion) in connection with the topic of
- distinction between different levels (integration at one level might cause disintegration at another level)
- objectives are changing over time sometimes rather faster than planning processes take into account
- diverse degrees of abstraction between approaches focusing on different facets of spatial development (e.g. regional policy, spatial planning);
- different territorial dimensions according to the considered sectoral policies

By discussing the last 2 topics the focus of the debate came back to issues more relevant in the topical context of this project. It was stated (against moderate objections by a EC´s representative) that it seems not useful to try to unify divergence between very different approaches (indicators, starting points, methodologies). On the other hand it was acknowledged that at least the EC needs comparable recommendations for the future of its policies, although starting from different states of the art, in the end referring to policy level in all cases. The

formula was born: Different approaches may coexist, but a common view on goals is needed. As an interesting potential “way out” was mentioned a goal attainment assessment as an interesting alternative to the impact assessment approach.

The use of the ESDP

The ESDP was considered of being less a catalogue of precise goals rather than a medium for communication. In this context it was stated that it is up to the EC to take care of operational policy goals when demanding their application in TIAs. Outstanding example: concerning the concept of territorial cohesion, still only a phrase and not developed so far, the projects are faced with the demand of finding proper indicators ...

Finally, the exclusive orientation of final outputs to be achieved until 2006 was questioned, “There is a world beyond that horizon, to be envisaged also ...“.

Some needs for clarification were also mentioned during the discussion:

- about geographic level(s) to consider;
- about the public to whom the outcomes of the work should be addressed.

Concerning the issue of Involvement of partners from "third countries” it was stated that, in general, the number of observers should be limited. In particular, there was considered a possible specific function of them in the context of interpreting case studies.

4.6 Synoptic overview on indicators

Synopsis of indicators						
Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Population						
Total population		1981, 1991, 2001	1.1.1		NUTS 5	Defining urban areas
		2000	1.1.1		NUTS 4 / NUTS 3	Defining strength of functional urban areas
			1.1.2			Reorganisation of urban and rural systems
			1.2.1		NUTS 3	Defining destination size (Accessibilty potential)
			2.2.3			Determination of urban role
	Percentage of national total		2.2.3			Determination of urban role
		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
		annual 1990 onwards	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
		1992-1999	2.2.2		NUTS 3	Defining urban role for territorial impact analysis
Population development		1985/2000	1.1.1		NUTS 4 / NUTS 3	Defining motor of change of strength of urban areas
			1.1.2			Reorganisation of urban and rural systems
			1.2.1		NUTS 3	Defining destination size (Accessibilty potential)
		annual 1990 onwards	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
	Growth of the population by number since (optional: subdivision by gender/age)		2.2.3			Determination of urban development
Population density		2000	1.1.1		NUTS 4 / NUTS 3	Defining mass of strengt of urban areas
		1990-2000	1.1.2			Reorganisation of urban and rural systems
		1970-1999	2.1.2		NUTS 1/2/3	Measuring knowlegde spillover
		1992-1999	2.2.2		NUTS 3	Defining urban role for territorial impact analysis
			2.2.3			Determination of urban role
	population density on littoral areas	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Population by sex		1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
		annual 1990 onwards	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Population by age		1990-2000	1.1.2			Reorganisation of urban and rural systems
	share of persons over 60 years	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	below 20 and over 60 years old	1990-2002	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Natural Development		1980-2000	1.1.2			Reorganisation of urban and rural systems
		annual 1990 onwards	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Commuter		1981, 1991, 2001	1.1.1		NUTS 5	Defining urban areas
	Commuter by origin and destination	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	to work, leisure activities, shopping/needs, education, recrational activities (length, frequency start and destination)	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Migration	migration between urban and rural by age, destination and origin	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
		various years	2.1.2		NUTS 1/2/3	Measuring knowlegde spillover
		annual 1990 onwards	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Life expectancy	Life expectancy	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Educational level of population			1.1.1		NUTS 3	Mapping global and European functions of the cities
	Share of people aged 18-24 with low education	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	% of resident population who have completed lower secondary education (ISCED level 2)		2.2.3			Definition of urban social value
	% of resident population who have completed tertiary education (second stage) leading to a postgraduate university degree or equivalent		2.2.3			Definition of urban social value
Households	size of household - average number of persons	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	number of households - total amount in region/community	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	share of household sizes - percentage of the different household sizes	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	Share of jobless households (national, preferably regional level)	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Social Conditions						
Poverty	Regional poverty rate	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Persistence of poverty (Percentage of the population consistently below the poverty line for three years)	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Average per capita income of poor and non-poor people	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Relation of income of migrants to average income of people in region of origin	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Change of income of migrants after migration	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Average income of employed vs. Unemployed	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	% of households receiving less than half of the national average household income		2.2.3			Definition of urban social value
Crime	Total number of recorded crimes per 1.000 population per year		2.2.3			Definition of urban safety value
	Number of population per 1.000 expressing feelings of unsafety		2.2.3			Definition of urban safety value
Housing						
Real estates	average price for a m² undeveloped real estate	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Housing market	average rent for a m² housing space	1980-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Settlement structure and city systems						
Urban-rural population		1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	Urban region		2.2.3			Determination of level of urbanisation
Population of European Cities		1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Population in agglomerated, medium, rural areas			2.1.1		NUTS 3	Accessing the impact of transport projects and policies
City hierarchy			2.1.1		NUTS 3	Defining accessibility relations

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Spatial composition of urban region	Agglomeration-City network/monocentric-polycnetric		2.2.3			Defining the Nature of urban system
Labour market						
Unemployment rates		1999	1.1.1		NUTS 3	Mapping global and European functions of the cities
		1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Development of Unemployment			2.1.3		NUTS 3	Determination of general economic impacts
Unemployment	coefficient of variation, Gini coefficient	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies - cohesion related
	by age groups	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	by educational level	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Long term unemployment rate	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Share of the urban unemploy-ment in the total regional, na-tional unemployment		2.2.3		NUTS 2	Determination of the nature of the economic base
Total employment		1981, 1991, 2001	1.1.1		NUTS 5	Defining accessibility of urban areas
Employment by sector of activity (NACE)	Employment in Service	1996	1.1.1		NUTS 3	Mapping global and European functions of the cities
		1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
	Share of the urban employment in the total regional, national employment		2.2.3		NUTS 2	Determination of the nature of the economic base
	Employment in Manufacturing and Service	1995-2001	2.2.3		NUTS 2	Determination of the nature of the economic base
	Tourism related Employment	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	Agriculture related Employment	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	Excluding agriculture	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Development of employment	Growth of employment by number since (optional: sectoral subdivision)		2.2.3			Determination of urban development
Employment by qualification		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Employment by profession		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Agricultural employment	annual 1990 onwards	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Activity rates		1998	1.1.2		NUTS 3	Mapping global and European functions of the cities
		1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
Labour Force		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Educational level of labour Forces			1.1.1		NUTS 3	Mapping competitiveness of global and European functions of the cities
		1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
		annual 1990 onwards	2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Development of Employment		1979-2001	2.1.2		NUTS 2	Measurement of regional economic performance
Economic performance						
GDP total	Share of GDP in national total		2.2.3			Determination of urban role
GDP per capita	Purchasing Power Parities	2000	1.1.1		NUTS 3	Mapping competitiveness of global and European functions of the cities
	PPP - Equivalent variation	1981-2001	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Total Euro	2000	1.1.1		NUTS 3	Mapping mass of global and European functions of the cities
		1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
		1977-1996 / 1995-2000	2.1.2		NUTS 3	Measurement of regional economic performance - framework conditions
	Euro - Equivalent variation	1981-2001	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Percentage of the average nationla GDP per capita	1995-1999	2.2.3		NUTS 3	Determination of general social performance
GDP per capita	coefficient of variation, Gini coefficient	1981-2001	2.1.1		NUTS 3	Accessing the impact of transport projects and policies - cohesion related

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Development of GDP	PPP per capita	1985-2000	1.1.1		NUTS 3	Mapping motor of change of global and European functions of the cities
	Euro per capita	1985-2000	1.1.1		NUTS 3	Mapping global and European functions of the cities
	Euro - Equivalent variation	1981-2001	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
		annual 1990 onwards	2.1.3		NUTS 3	Determination of general economic impacts
	Average Growth	1990-2000	2.2.3		NUTS 3	Determination of the economic performance
Development of employment	Growth of GDP since ….		2.2.3			Determination of urban development
Productivity		1995	1.1.1		NUTS 3	Mapping motor of change of global and European functions of the cities
	GDP per employee	1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
		1981-2001	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	GDP per hours worked (alt. Employee)	1970-2000	2.1.2		NUTS 3	Measurement of regional economic performance - framework conditions
			2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Devolopment of Productivity	GDP per occupied person	annual 1990 onwards	2.1.3		NUTS 3	Determination of general economic impacts
GDP per sector		1981-2001	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
			2.1.3		NUTS 3	Determination of agricultural and non-agricultural proccesses
Turnover	tourism, transport and trade		1.1.1		NUTS 3	Defining strength of functional urban areas
	share of export on turnover		1.1.1		NUTS 3	Defining strength of functional urban areas
Income per capita		1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
Distribution of income	ratio of highest 20% to lowest 20% income	annual 1990 onwards	2.1.3		NUTS 3	Determination of general economic impacts
	% of households with less than 50% of national average household income	1999	2.2.3		NUTS 2	Determination of general social performance
Gross value added by sectors		1981-2001	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Net value added in agriculture	net value added in agriculture and forestry	1990-2000	1.1.2		NUTS 3	Land use change and pressure
Agricultural production	import and export of agricultural production	1990-2000	1.1.2		NUTS 3	Land use change and pressure

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Enterprise performance						
Headquarters of top 500 European Companies		2000	1.1.1		NUTS 3	Defining competitiveness strength of functional urban areas
Referenz of top 1500 European Companies		2000	1.1.1		NUTS 3	Defining strength of functional urban areas
Number of European Enterprises	Share on top 500 industry and trade	2000	1.1.1		NUTS 3	Defining strength of functional urban areas
	Share on top 100 transport, bank, trade, advertising, hotels and restaurants, other services	2000	1.1.1		NUTS 3	Defining strength of functional urban areas
Turnover of European Enterprises	Turnover from top 500 industry and trade	2000	1.1.1		NUTS 3	Defining strength of functional urban areas
	Turnover from top 100 transport, bank, trade, advertising, hotels and restaurants, other services	2000	1.1.1		NUTS 3	Defining strength of functional urban areas
Firm formation	firm formation per 1.000 employables	1990-2000	1.1.2		NUTS 3	Measuring economic development -urban regional flow
	balance of newly founded and bankrupt firms	1990-2000	1.1.2		NUTS 3	Measuring economic development -urban regional flow
Business relocation	total amount	1990-2000	1.1.2		NUTS 3	Measuring economic development -urban regional flow
	amounts by direction	1990-2000	1.1.2		NUTS 3	Measuring economic development -urban regional flow
	origin and destination	1990-2000	1.1.2		NUTS 3	Measuring economic development -urban regional flow
Product and service relocation	origin and destination	1990-2000	1.1.2		NUTS 3	Measuring economic development -urban regional flow
Industrial concentration	Industrial territorial concentration activity indicator		2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Education						
University students	number		1.1.1		NUTS 3	Defining strength of functional urban areas

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Number of places in universities and further education establishments per 1.000 resident population		2.2.3			Definition of urban social value
Transport and Accessibilty						
Transport vehicules	Long-distance bus services		1.2.1		NUTS 3	Transport infastructure supply
	Long-distance truck services		1.2.1		NUTS 3	Transport infastructure supply
	Regional and international passenger rail services		1.2.1		NUTS 3	Transport infastructure supply
	Regional and international passenger air services		1.2.1		NUTS 3	Transport infastructure supply
	Short-sea and transcontinental maritime freight services		1.2.1		NUTS 3	Transport infastructure supply
	Number of passenger cars		1.2.1		NUTS 3	Transport infastructure supply
	Number of public transport vehicles by type		1.2.1		NUTS 3	Transport infastructure supply
	Number of goods vehicles		1.2.1		NUTS 3	Transport infastructure supply
Accessiblity	daily and/or potential accessibility		1.1.1		NUTS 3	Defining connectivity of strength of functional urban areas
	by road / rail to population		1.1.2		NUTS 3	Reorganisation of urban and rural systems
	by air to GDP		1.1.2		NUTS 3	Reorganisation of urban and rural systems
Daily accessibility	Total population accessible from a given city in a given time allowing for business daily round trips by the most effective intermodal chain.		1.2.1		NUTS 3	Transport infastructure supply
Commuter accessibility	Total population accessible from a given city in a given time allowing for daily commuting by the most effective intermodal chain.		1.2.1		NUTS 3	Transport infastructure supply

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Market accessibility	Total market area accessible from a given place at a given time		1.2.1		NUTS 3	Transport infastructure supply
	Accessibility potential by road	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Accessibility potential by rail	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Accessibility potential by air	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Multimodal (road, rail) accessibility potential	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Multimodal (road, rail, air) accessibility potential	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Peripherality index; Accessibility measures (to regional centres)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Pyhisical preconditions
Urban internal accessibility	Shares of mode of journey to work(rail/metro, bus, tram, car, cycle, walking) in total journeys to work		2.2.3			Definition of urban internal accessibilty
Transport network	length of transport network by total area		1.2.1			Transport infastructure supply
	Length/density of roads by road category		1.2.1			Transport infastructure supply
	Length/density of railways by railway category		1.2.1			Transport infastructure supply
	Road network	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Rail network	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Air network	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
	Water network	1981-2021	2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Overloded corridors	Road and railway network - traffic statistics per segment or similiar	1981-2021	2.1.1			Accessing the impact of transport projects and policies
Airports	Number of airports		1.2.1			Transport infastructure supply
	Airport		2.2.3			Definition of urban region
	international airports take off, landings, number of passenger, cargo	2000	1.1.1		NUTS 3	Defining connectivity of strength of functional urban areas

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	No. of flights, intercontinental destinations, flights to Eastern Europe and Russia from each urban system		1.1.1		NUTS 3	Defining connectivity of strength of functional urban areas
	Number of departing/arriving flights by destination		1.2.1			Transport infastructure services
Seaports	Number of ports		1.2.1			Transport infastructure supply
	Container traffic in seaports	1998	1.1.1		NUTS 3	Defining connectivity of strength of functional urban areas
	Number of departing/arriving ferries by destination		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
Road	Number of passenger cars		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Number of public transport vehicles by type		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Number of goods vehicles by type		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
Network distance	Ratio euclidean v. network distance (length, cost, time) Indicator of circuitry - curve of edges; detour of path		1.2.1		NUTS 2/NUTS 3	Transport infastructure supply
Link Capacity	Capacity of road		1.2.1		NUTS 2/NUTS 3	Transport infastructure capacity
	Capacity of railway track		1.2.1		NUTS 2/NUTS 3	Transport infastructure capacity
	Capacity of ferry link		1.2.1		NUTS 2/NUTS 3	Transport infastructure capacity
Node capacity	Capacity of road nodes (intersections, tollbooth)		1.2.1		NUTS 2/NUTS 3	Transport infastructure capacity
	Capacity of airport by category		1.2.1		NUTS 2/NUTS 3	Transport infastructure capacity
	Capacity of port by category		1.2.1		NUTS 2/NUTS 3	Transport infastructure capacity
	Capacity of intermodal terminals		1.2.1		NUTS 2/NUTS 3	Transport infastructure capacity
Trains	Fast train station		2.2.3		NUTS 2/NUTS 3	Definition of urban region
	No. of trains between each urban system with time distance < 3½ hrs at average speed >90 km/h		1.1.1		NUTS 3	Defining connectivity of strength of functional urban areas
	High speed railway lines under construction		1.1.1		NUTS 3	Defining connectivity of strength of functional urban areas

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Number of departing/arriving trains by category and destination		1.2.1			Transport infastructure services
Intermodal transport	airports linked by high speed or long-distance trains		1.1.1		NUTS 3	Defining connectivity of strength of functional urban areas
Travel time	average road travel time to the next centre		1.1.2		NUTS 3	Reorganisation of urban and rural systems
	average travel time using combined transport to all centres		1.1.2		NUTS 3	Reorganisation of urban and rural systems
	average speed of linear distance to all centres by rail transport		1.1.2		NUTS 3	Reorganisation of urban and rural systems
	Link travel time by transport mode or multimodal		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Origin-destination travel time by transport mode or multimodal		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
Travel costs	Link travel cost by transport mode or multimodal		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Generalised cost to motorway entrances by road		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Generalised cost to railway stations by road		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Generalised cost to airports by road		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Generalised cost to airports by rail		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Generalised cost to ports and logistic centres by rail		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
	Generalised cost to ports and logistic centres by road		1.2.1		NUTS 2/NUTS 3	Transport infastructure services
Transport quantities	km per person per mode by purpose		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	km per ton by goods type per mode		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	modal split (passenger and freight)		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
Link traffic	Traffic on roads by vehicle type		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Number of trains and passengers on rail links		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	Number of passengers and freight, cars and lorries on ferries		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
Terminal traffic	Traffic volume (passenger and freight) of airports		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	Traffic volume (passenger and freight) of ports		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	Traffic volume (freight) in intermodal terminals		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
Energy consumption and pollution	Consumption of mineral oil products by link and by region		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	Emission of green house gases by link and by region		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	Emission by pollutant by link and by region		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
Transport safety	Number of persons killed by mode		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
	Number of persons injured by mode		1.2.1		NUTS 2/NUTS 3	Traffic volume indicators
Traffic flow	Passenger flows by user type, trip purpose		1.2.1		NUTS 2/NUTS 3	Traffic flow indicators
	Trade/goods flows by type of good		1.2.1		NUTS 2/NUTS 3	Traffic flow indicators
Network vulnerability	Geographic structural vulnerability of corridors		1.2.1		NUTS 2/NUTS 3	Transport infastructure vulnerability
	Climatic vulnerability of corridors		1.2.1		NUTS 2/NUTS 3	Transport infastructure vulnerability
External effects	Information on external effects: congestion, noise, traffic accidents, air pollution		2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Tourism						
Tourist stays	nights by non-residents in hotel or similiar	1998	1.1.1		NUTS 3	Defining strength of functional urban areas
	number of overnight stays of tourists per capita per year	1990-2000	1.1.2		NUTS 3	Land use change and pressure

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	ratio of yearly tourist stays by total resident population	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Tourist capacity	touristicity (tourist capacity) with number of beds in hotels etc. by number of households	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Holiday/Second home recidences	percentage of residences/second homes	1990-2000	1.1.2		NUTS 3	Land use change and pressure
Tourist related employment	share of tourism related employment to totalemployment	1990-2000	1.1.2		NUTS 3	Land use change and pressure
Household oriented infrastructure						
Education	Average distance to primary/secondary school, university	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	space for pupils in secondary school	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	students per capita	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Medical supply	average distance to doctor´s pratice	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	number of beds in hospital per capita	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Public facilities	number shops, banks, post offices etc. within a perimeter of 2 km	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	average distance to town hall	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Infrastructure						
Water supply	number of waste water treatment plants	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	water distribution system	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	water reservoirs	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Waste treatment	waste water treatment	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	municipal waste management	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	hazardous waste management	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
ICT Telecommunication						
Internet & Computer	use of computers, use of internet	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	purpose of internet use, duration etc.	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	type of internet connection	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	knots of wireless lan	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	Internet host density		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Network growth: New Internet hosts added		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Estimated number of Internet Service Provider (ISP's)		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Number of secure servers		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Number of public Internet access points		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Internet access costs (peak, off–peak, low–band, broad–band etc.)		1.2.2			Classification of ICT Supply - Prices of ICT services
	Monthly ISP charge (for 20 hours of usage)		1.2.2			Classification of ICT Supply - Prices of ICT services
	Average price of ICT hardware		1.2.2			Classification of ICT Supply - Prices of ICT services
	Installed PCs per 100 inhabitants		1.2.2			Diffusion and use of ICT-Services
	Diffusion of Internet access technologies by transmission speed		1.2.2			Diffusion and use of ICT-Services
	Households with Internet access		1.2.2			Diffusion and use of ICT-Services
	Internet users (at home/at work/both)		1.2.2			Diffusion and use of ICT-Services
	Percentage of employees using e–commerce–enabling technology		1.2.2			Diffusion and use of ICT-Services

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Access to PCs/Internet broken down by socio–economic variables		1.2.2			Diffusion and use of ICT-Services
	Purpose of online activities from home		1.2.2			Diffusion and use of ICT-Services
	Internet use by businesses		1.2.2			Diffusion and use of ICT-Services
	Enterprises providing Internet services		1.2.2			Diffusion and use of ICT-Services
	Average time spent online		1.2.2			Diffusion and use of ICT-Services
	Number of Web sites		1.2.2			Diffusion and use of ICT-Services
	Internet penetration by enterprise size class		1.2.2			Diffusion and use of ICT-Services
	Businesses with Web sites		1.2.2			Diffusion and use of ICT-Services
	Internet purchases and sales (amount of e–commerce)		1.2.2			Diffusion and use of ICT-Services
	Percentage of individuals using and ordering goods and services over the internet		1.2.2			Diffusion and use of ICT-Services
Telephon	Number of (telephone) access lines per 100 inhabitants		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Percentage of capacity used of main telephone lines		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Digitisation of fixed telecommunication networks		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Faults per 100 main lines per year		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Percentage of households with a telephone		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Composite basket of residential telephone charges		1.2.2			Classification of ICT Supply - Prices of ICT services
	Composite basket of business telephone charges		1.2.2			Classification of ICT Supply - Prices of ICT services
	Fixed telephone call charges		1.2.2			Classification of ICT Supply - Prices of ICT services
	Fixed telephone rental charges		1.2.2			Classification of ICT Supply - Prices of ICT services
	Telephone tariffs: local call		1.2.2			Classification of ICT Supply - Prices of ICT services
Mobile Phones	use of mobile phones	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	planned capabilitiy for UMTS	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	Basket of consumer mobile phone charges		1.2.2			Classification of ICT Supply - Prices of ICT services

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Basket of business mobile phone charges		1.2.2			Classification of ICT Supply - Prices of ICT services
	Cellular tariffs: 3 minute local call (peak & off–peak)		1.2.2			Classification of ICT Supply - Prices of ICT services
	Diffusion of cellular mobile phones		1.2.2			Diffusion and use of ICT-Services
	New mobile subscribers added		1.2.2			Diffusion and use of ICT-Services
	Monthly usage of cellular mobile phones		1.2.2			Diffusion and use of ICT-Services
	Cellular mobile subscribers as a percentage of total telephone subscribers		1.2.2			Diffusion and use of ICT-Services
Backbone	Deployment of fibre optic cable Investments in communication networks by telecommunication operators		1.2.2 1.2.2			Classification of ICT Supply - Development of ICT infrastructure Classification of ICT Supply - Development of ICT infrastructure
	Competition in fixed network infrastructure		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Competition among different networks for Internet access		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Competition in cellular mobile infrastructure		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Broadband penetration rates		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Network growth: New telephone lines added		1.2.2			Classification of ICT Supply - Development of ICT infrastructure
	Fixed to mobile network prices		1.2.2			Classification of ICT Supply - Prices of ICT services
	Price of leased lines		1.2.2			Classification of ICT Supply - Prices of ICT services
	ISDN subscribers		1.2.2			Diffusion and use of ICT-Services
	ICTs network diffusion indicator		2.1.1		NUTS 3	Accessing the impact of transport projects and policies
Cable Television	Cable TV subscribers		1.2.2			Diffusion and use of ICT-Services
Expenditures for ICT and ICT–services	Trade in ICT goods		1.2.2			Expenditures for ICT and ICT–services
	ICT expenditures (as a percentage of GDP)		1.2.2			Expenditures for ICT and ICT–services

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Telecommunications investment		1.2.2			Expenditures for ICT and ICT–services
	Telecommunications revenue per inhabitant		1.2.2			Expenditures for ICT and ICT–services
	Packaged software markets		1.2.2			Expenditures for ICT and ICT–services
	Mobile telecommunications expenditures		1.2.2			Expenditures for ICT and ICT–services
	ICT intensity (=ICT expenditures as a percentage of GDP)		1.2.2			Expenditures for ICT and ICT–services
Energy						
Energy production	share of renewable energy	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
	regional share of energy demand	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Energy consumption	consumption of energy by households (Mio kWh, kWh/hab)	1990-2000	1.1.2		NUTS 3	Reorganisation of urban and rural systems
Agriculture and Land use						
Physical preconditions	Climate zones; length of growing season	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Pyhisical preconditions
	Soil measurement/soil fertility indicators	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Pyhisical preconditions
	Share of mountains; share of slopes not workable by common machinery equipment	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Pyhisical preconditions
CAP - Direct payments	Area payments (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Set-aside payments (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Rare products aids (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Headage payments (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Withdrawals (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Other measures	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
Cap - Indirect payments/market regulations	Price guarantees (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Regional aid (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	(Export) refunds	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
Agri-environmental measures	Percentage of UAA covered by regulation 2078/92	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Percentage of farm benefiting under regulation 2078/92	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
Rural development measures (excluding agri-environment measures)	Payment received by farmers (in €)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Role of SAPARD for candidate countries	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
Rural development programmes	LEADER+	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
	Part of Objective 1 /2 for EAGGF measures	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
Other transfer policies	Other structural funds measures/programmes	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Policy inputs
Agricultural land use	UAA as % of total area	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Proportion of arable land for permanent grassland and pastures, permanent cultures and fallow land	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	UAA per holding	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Number of heads of LSU per holding	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Intensity of land use for agricultural production	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Area of irrigated land (h	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Afforested land (by previous use of land: permanent pastures and meadows, permanent crops (vines, orchards, arable land)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Organic farming area by crop type (arable crops, horticulture, grassland, other)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
Farm structures	Average economic size of holding ratio SGM, expressed in ESU, by number of holdings	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Agricultural Income: FNVA per AWU	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Productivity : ratio of SGM expressed in ESU, related to total labour force expressed in AWU	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Average number of AWU by 100ha	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Average number of AWU per holding	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Number of holdings by farm type (field crops, grazing livestock, granivores, mixed cropping)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Number of holdings by livestock type (cattle, dairy cows, pigs, goats, sheep, other grazing livestock, laying hens, table fowls)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Number of organic farms	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Holdings by management type (owner-occupation, owner-management, tenant)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Agricultural employment	Absolute agricultural employment and share of agricultural employment (if available, by gender of main farm operator)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Evolution of the share of agricultural employment	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Proportion of young farmers in the agricultural sector (<35)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Evolution of the proportion of young farmers	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Proportion of old farmers in the agricultural sector (>65)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Evolution of the proportion of old farmers	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Employment in agri-food industries	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Part-time farming jobs	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Farming jobs combined with non-agricultural gainful employment	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Non-family agricultural labour force	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Share of farm income from agricultural sector	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Agri-tourism employment and share of agri-tourism employment	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Evolution of the share of tourism employment	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
	Evolution of employment in the environmental sector and landscape protection	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Structures and Processes
Agricultural inputs	Water use for agriculture	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
	Chemical inputs	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
	Nitrogen inputs in agriculture by source	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	Nitrogen inputs from livestock manure by livestock type	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
	Nitrogen uptake from crops	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
	Chemical fertilizer inputs in tons of fertilising element	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
Agricultural outputs	Crop production by crop type (tons)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
	Number of livestock by livestock type (cattle, dairy cows, pigs, goats, sheep, other grazing livestock, laying hens, table fowls)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
	Number of certified livestock by livestock type (cattle, dairy cows, pigs, sheep, poultry)	annual 1990 onwards	2.1.3		NUTS 3	Agriculture - Input and Production
Agriculture related impacts	Changes of average farm incomes	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related economic impacts
	Changes of GDP in agriculture and agri-food sector	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related economic impacts
	c) farm closures	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related economic impacts
	Change of employment in agriculture sector	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related economic impacts
Ecologicalisation of agriculture	share of ecological agriculture	1990-2000	1.1.2		NUTS 3	Land use change and pressure
Presence of natural soil	share of sealed areas	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	development of share of sealed areas	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	corrosion areas	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	deforestation areas	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	desertification areas	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	sealed alluvial areas	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	soil profile - % of A and B horizons	1990-2000	1.1.2		NUTS 3	Land use change and pressure
Soil quality	soil pollution by type of pollution	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	waste fields	1990-2000	1.1.2		NUTS 3	Land use change and pressure

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	percentage of soils with good capacity of use occupied by urbanization	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	share of area for soils with good capacity of use	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Land abandonment, urbanisation, economical and demographic growth (in different land-use categories: natural, semi-natural areas, wetlands, water surfaces)	division of territory by land use	1990-2000	1.1.2		NUTS 3	Land use change and pressure
Land use pressure	natural reserves	1990-2000	1.1.2		NUTS 3	Land use change and pressure
	changes of designated land uses	1990-2000	1.1.2		NUTS 3	Land use change and pressure
R & D and regional potential						
R & D personel	percentage of R&D personnel in the active population	1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
	percentage of R&D personnel in total employment	1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
		1981-2000	2.1.2		NUTS 3	R & D input indicators
R & D funds	Direct policies		2.1.2		NUTS 3	R & D input indicators
	Indirect policies		2.1.2		NUTS 3	R & D input indicators
R & D Expenditure	R&D expenditures (% of regional GDP)	1981-2000	2.1.2		NUTS 3	R & D input indicators
	R&D expenditures by Business Enterprise Sector (BES) (% of total)	1981-2000	2.1.2		NUTS 3	Measurement of regional economic performance - framework conditions
	R&D expenditures of Higher Education Sector (HES) (% of total)	1981-2000	2.1.2		NUTS 3	Measurement of regional economic performance - framework conditions
	R&D expenditures of Government Sector and Private Non-Profit Sector (GOV + PNP) (% of total)	1981-2000	2.1.2		NUTS 3	Measurement of regional economic performance - framework conditions
R & D investments	public and private R & D-investments	1990-2000	1.1.2		NUTS 3	Measuring economic development - strength

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Patents	number of patent applications	1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
	Patent applications (per million population)	1989-2000	2.1.2		NUTS 0	R & D Innovation and diffusion
	High-tech patent applications (per million population)	1989-2000	2.1.2		NUTS 0	R & D Innovation and diffusion
	Turnover due to innovating products (% of total turnover)	1996	2.1.2		NUTS 0	R & D Innovation and diffusion
Innovation	location of invention and locations of adaption	1990-2000	1.1.2		NUTS 3	Measuring economic development - strength
Public Privat Partnership	Public-private joint publications		2.1.2			R & D Innovation and diffusion
Foreign direct investments (FDI)	2.6 Foreign direct investment (FDI) (% of GDP)	1995-2000	2.1.2		NUTS 0	R & D Innovation and diffusion
Public Sector						
Public funding	economic, social, ecological effects	1990-2000	1.1.2		NUTS 3	Measuring economic development
	topics, hardware, infrastructure, education etc. objectives	1990-2000	1.1.2		NUTS 3	Measuring economic development
Natural heritage						
Natural reserve	share of area for natural reserves	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	number of species on red list (e.g. NATURA 2000, HABITAT)	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	ecosystemic diversity	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Water ressources	water resource use	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	percentage of aquifer' recharge areas occupied by urbanization	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	share of aquifers' recharge areas	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	recharge of aquifer	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	internal runoff	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Potential of natural reservation	presence of sites with mineral-medicinal springs	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
	presence of extraction areas of non renewable resources	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	rate of beach/cliff area	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Potential for alternativ energy	solar radiation for potential production of solar energy	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	wind indicators for potential energy production	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Cultural heritage						
Cultural sites	presence of cultural sites	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
	concentration of cultural sites	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Urban cultural amenties	Amount of green space available m² per capita		2.2.3			Definition of urban amenity value
	Amount of cultural establishments present, subdivided by type (cinema, museums, theatres)		2.2.3			Definition of urban amenity value
	Number of visits to cultural amenities, subdivided by type (cinema, museums, theatres)		2.2.3			Definition of urban amenity value
	Number of sports facilities present		2.2.3			Definition of urban amenity value
	Attendance to sports facilities per resident		2.2.3			Definition of urban amenity value
Geographical position						
Mountain region			2.1.1			Accessing the impact of transport projects and policies
Sea border region			2.1.1			Accessing the impact of transport projects and policies
Physical situation	Coastal		2.2.3			Definition of urban region
	Mountainous		2.2.3			Definition of urban region
	Plains		2.2.3			Definition of urban region
Central / Peripheral	Border		2.2.3			Definition of urban region
	Central		2.2.3			Definition of urban region
Administrative status	National capital		2.2.3			Definition of urban region
	Regional capital		2.2.3			Definition of urban region
Urban role	Role played in administrative organisation		2.2.3			Determination of urban role

Indicator	Special interest of indicator	Year	Project		Regional level	Thematic area
Enviroment						
Acid input	emissions of the acidifying gases	1990-2000	1.1.2		NUTS 3	Determination of natural and cultural assets
Land and water-related impacts	Soil degradation, quality and soil change	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related impact
	Degradation of landscape quality (and, if possible, landscape diversity)	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related impact
	Water quality	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related impact
Air-related impacts	Gross emission of greenhouse gases from agriculture	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related impact
	NH3 emissions from agriculture (for crops with fertilizers, for crops with manure management)	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related impact
	CH4 emissions from agriculture	annual 1990 onwards	2.1.3		NUTS 3	Determination of agriculture related impact
Urban green space	Amount of green space available m² per capita		2.2.3			Definition of urban amenity value
Emmissions	Number of days SO2 exceeds....		2.2.3			Definition of urban enviromental quality
	Number of days Ozone O3 exceeds..		2.2.3			Definition of urban enviromental quality
	Number of days that NO2concentrations exceed ..		2.2.3			Definition of urban enviromental quality
	CO2 emissions per capita		2.2.3			Definition of urban enviromental quality

5 Review of methodological analysis

5.1 Clarification of concepts

The Mondorf seminar as well as an in depth review of the FIRs highlighted the necessity of a more structured approach of concepts through the whole ESPON project. The draft version of this (former chapter 3.1) section has been developed accordingly, mainly chapters 5.1.3 and 5.1.5. The aims pursued at this stage are:

- to specify and argument the expectations that the TPG 3.1 would express towards the other TPGs for their SIRs;
- to delineate the other tasks of the 3.1 TPG related to the clarification of concepts for next months.

Although the Terms of Reference for 3.1 do not mention concepts among the topics to be handled by the First Interim Report, a clarification of concepts is useful in order to prepare the overview of concepts and typologies that will have to be provided in the Second Interim Report.

When talking about "integrated tools" the project 3.1 means a coherent set of concepts, indicators, typologies, methods and maps. Those elements are intrinsically linked, while having each their specificity. Concepts appear as the most contents-oriented components, and their definition conditions the way the other tools will be conceived and / or used. They also provide a consistency between the various domains concerned by spatial development. For this reason, they can be seen as a major factor of coherence for the ESPON approach as a whole, and for the project 3.1 in particular.

Concepts are abstract representations, which allow to speak the same language and to build as well as to structure knowledge. In the case of ESDP and ESPON, the concepts have a territorial dimension. This dimension is however not present natively at the same degree in all concepts, and it can thus be expected that some concepts to explore in the present framework will require some additional work to translate them in territorial terms, in order to allow them to play their role in the set of "integrated tools" focused on a territorial approach.

Spatial concepts not only ask for formalisation, i.e. a textual description or definition, but they also have to be identifiable and measurable on basis of data, generally quantified, in order to become operational. Indicators allow to make the

link between concepts and data, and to use them in the field of spatial development, be it when assessing situations and trends, when trying to specify more closely some objectives, when evaluating the effects / impacts of some policies, when drawing scenarios or when conceiving political answers.

Spatial concepts should provide a language that can help to communicate between actors in the field of spatial development, and also with actors outside of it. This can already be observed with the concepts of "polycentric development" or "territorial cohesion" for example, which have crossed the boundaries of the field of spatial planning. In order to play this role, spatial concepts must be widely shareable. With its extended range of sensibilities, the ESPON offers outstanding opportunities to build a corpus of spatial concepts that can commonly be agreed upon.

In order to achieve these aims, and according to the co-ordination role played by project 3.1, clarification of concepts is needed in the framework of the project. This requirement indeed figures in the Terms of Reference and has been taken into account in the tender, principally under working package 10.
The following points firstly specify the nature of the task, before identifying the main acknowledged bases and discussing the currently available material. From there, a set of principles to have in mind for the exploration of
concepts and about the methodology to follow are proposed.

5.1.1 Which concepts?

Concepts are mentioned in many parts of the Terms of Reference (ToR) for project 3.1, either alone as "spatial concepts", either associated to typologies as "concepts and typologies for spatial analyses". They clearly appear as components of the integrated tools to produce, along and interlinked with typologies, indicators, analysis methods and maps.
Concepts are also developed more specifically in point iv.A.4 of the ToR ("*Clarification of spatial concepts and territory as a common framework for all ESPON projects*"), which first situate the context before providing two lists of items that should be explored in the framework of project 3.1.
Those lists, which are reproduced in the tender, notably in the description of WP 10 (concepts and typologies), are not presented as "closed". Moreover they figure

in a part of the ToR which "*is not meant to be exhaustive, but to serve the purpose of guiding the tender*". They can thus be viewed as a minimum requirement.

- The first list enumerates 5 concepts, for which the ToR mention that they are in a general way already behind the ESDP and the Structural Funds regulations, and that bases have been built by research carried out under the SPESP:
  - spatial integration,
  - spatial or territorial cohesion,
  - social integration,
  - territorial impact,
  - r-urban.

  The mission defined by the ToR is to clarify and detail them and to define territorial indicators for the measurement of progress achieved towards European (spatial and social) integration at various geographical scales.
- The second list contains 6 items that in fact do not really correspond to concepts on the same foot as the first ones, but rather to notions for which concepts (and indicators) still are to define (to make the distinction they are called "meta-concepts" in this section)[18]. The ToR add a brief description - also reproduced hereunder - to each item:
  - “accessibility”, not only in terms of the various means of transport (air, water, road and rail), but also in terms of information and communications technology;
  - “polycentric development” with reference to potentials and dynamics, particularly in urban poles, which can be explored individually or through strategic co-operation with neighbouring cities or rural territories, and which is relevant at all geographical scales;
  - “environment” in terms of the identification of sensitive sites and areas of natural and technological hazards, as well as areas being assets for spatial development;
  - “urban areas” on the basis of a joint definition of “urban-ness” and the role played by urban areas in the territorial structure;
  - “landscape” in terms of identification of sensitive structures and areas and the role played in a territorial and cultural development context;

[18] Some ambiguity may come from a double use of the word "concepts" in the ToR: "Furthermore the concepts and indicators for the measurement of the following concepts need to be elaborated". Actually reference to the ESPON orientations suggests that the second occurrence of the word should be read as "priority field of research", or maybe more generally, as "dimension", "aspect" or "notion" for example.

- "territorial impact assessment" in terms of defining a concept, which can be used for the measurement of impacts of Community and national sectoral policies and of major infrastructure projects.

Five of these items correspond to priority fields of research assigned to the ESPON by the "Orientations for 2000-2006"[19]. "Landscape" is an item added during the process of elaborating the CIP.

At first glance, one can question the possible overlaps between the two lists, particularly for "territorial impact" and "territorial impact assessment", but also for "r-urban[20]" and "urban areas". Actually, this is not really a problem, as the two lists do not designate items on the same foot. For example, "territorial impact" may be seen as a concept necessary to work on the topic of territorial impact assessment.

Some gaps may also appear in the lists, which is not a real problem either, as the lists are not to be considered as closed and new concepts will probably emerge in the course of the work.

The ultimate criterion is that the resulting set of concepts should be able:

- in a first stage to enhance the ESPON work;
- in a second stage to be useful for Community, national and regional policies, particularly in the field of spatial development;
- in both stages to efficiently complement the other tools.

5.1.2 Existing bases

ESDP

The ESDP first of all provides the context in which all concepts take their meaning, either individually or viewed as a coherent set. In this way it acts as an element of consistency for concepts that can be applied in several sectoral policies and at various levels.

It may also provide some specific elements relative to given concepts such as those presented as the 7 "spatial criteria" (the ESDP specifies definitions that were taken as starting points for the SPESP work). Definitions useful to the exploration of concepts may also be found in different parts of the text.

But the ESDP also contains several undefined notions that play an important role in the spatial vision. Among them some may serve to identify / clarify concepts and/or build typologies. A review of notions whose clarification is needed in order

[19] Version of 15 December 2000.

[20] "r-urban" is interpreted as "rural-urban"

to apply or operationalise the objectives and options of the ESDP may thus be useful, in order to ensure consistency and efficiency of the corpus of concepts and adequate links with the other tools.

SPESP

The first strand of the SPESP concerned the 7 "spatial criteria" previously mentioned, which may be considered as predecessors of the concepts to explore here. The role that they were meant to play was already linked with the development of typologies and scenarios, as stated in the SPESP final report: "*In order to establish a more solid comparative evaluation of territorial strengths, weaknesses, opportunities and threats, better knowledge is needed of spatially relevant criteria. The application of criteria means the attempt to apply common principles or standards for territorial differentiation in all Member States. Such criteria, both individually and in combination, are necessary in order to develop different typologies of areas and to assess spatial impacts of long term European scenarios.*"[21] (page 55).

Only two of the SPESP spatial criteria - spatial integration and social integration - are retained as such in the list of concepts to study according to the 3.1 Terms of Reference. The SPESP final report indeed underlines that those two appear as "new" criteria for which existing material and methods are scarce and which require a further work of conceptualisation.

Territorial cohesion is however also mentioned in the SPESP final report, as a concept linked to spatial integration: "*Even though there is little explicit mention of spatial integration in European documents, the allied concept of territorial cohesion is increasingly used in documents drawn up at a supra-national level, the most prominent example being the Council of Europe*." (page 58)

For the five remaining criteria of the SPESP - geographical position, economic strength, land-use pressure, natural assets and cultural assets - various links can be made with the topics to investigate in the framework of project 3.1: between geographical position and accessibility, and between natural and cultural assets and landscapes for example. The SPESP may thus provide useful elements for those topics.

[21] Bundesamt für Bauwesen und Raumordnung, 2001. *Study Programme on European Spatial Planning. Final Report. Bonn*, Selbstverlag des Bundeamtes für Bauwesen und Raumordnung

The strand of the SPESP centred on urban-rural relations also contains potentially useful elements, particularly for the concept designated as "r-urban".

Other sources

Among the many other sources that may provide elements to feed the work on concepts, some can particularly contribute because they concern the whole European territory (possibly enlarged), they adopt a standpoint at the junction of political and scientific approach and/or their vision is sufficiently open to other sectors to contribute to a multi-sectoral approach. It can be expected that among the references suggested by the Terms of Reference and those identified by the TPGs, some will emerge as such privileged references for concepts. The framework of project 3.1 may be appropriate to discuss an agreed set of references.

5.1.3 Organisation of the work on concepts

What is expected from project 3.1?

The Terms of Reference, the tender and its addendum express coherent expectations toward concepts, some more specifically focused on the concepts themselves, and others - more implicit - about the role they must play in the set of integrated tools to build.

- Expectations toward the concepts themselves are detailed in WP 10. In summary, three tasks are required:
  - to identify concepts for the topics enumerated in the second list of the ToR,
  - to clarify and detail all concepts (those identified in the course of the first task, those defined in the first list of the ToR and others that would emerge in the course of the work),
  - to identify indicators for all of them[22].

  The ToR of other TPGs also mention at least some of the listed concepts and "meta-concepts" (see table 1). This indicates that project 3.1 must play its co-ordinating role by bringing together the results of the other TPGs in order to build a coherent set. It may also have to complement them for the aspects that particularly require a multi-dimensional vision.

[22] This task will probably consist in making a selection of relevant indicators among the many proposed by the TPGs, rather than defining new ones inside the 3.1 project.

- Concepts should also be closely interrelated with the other tools, particularly with:
  - typologies, which are a part of WP 10 as well. Spatial concepts may be used to build typologies, and typologies may help clarifying spatial concepts. But in some cases, specifying the limits between the two tools and their respective role might be delicate, as will be shown further;
  - indicators, which are more specifically handled in WP 7. Indicators rely most of the time on some explicit or implicit form of one or several concepts. In order to achieve consistency between the approaches, it will be necessary to exchange information and opinions, on one hand about the (implicit) concepts on which the indicators are based, and on the other hand about the indicators that are envisaged to reflect the concepts.

All those tasks require a preliminary clarification of the terminology used in the reference documents, not only to identify and specify concepts, but also to clearly situate their links with the other tools.

Contributions from the TPGs

- ***Expectations expressed in the Terms of Reference***

Although the Terms of Reference of all projects mention the development of concepts among their "general objectives", specific expectations regarding concepts differ significantly from one project to the other. The following table, based on the annex to the programme complement, gives an idea of this variety. It must be kept in mind however that some parts of the programme complement, relating to projects of the later rounds, are explicitly presented as "*preliminary, incomplete, finalisation when project will be tendered*".

Table 2: Requirements of ToR regarding concepts

Project	Overview of concepts required		Concepts to explore
	in FIR	in SIR	
1.1.1	-	First	polycentrism / polycentric spatial development social cohesion / segregation urban-ness
1.1.2	First	Detailed	urban area rural area urban-rural relationship r-urban area functionally independent / entangled areas
1.1.3	First	-	spatial discontinuities and barriers
1.1.4	*No detail about contents of reports*		-
1.2.1	Preliminary	First	parity of access to infrastructure and knowledge accessibility / connectivity effects of networks inter-modality
1.2.2	Preliminary	First	parity of access to infrastructure and knowledge accessibility / connectivity effects of networks inter-modality[23]
1.2.3	*No detail about contents of reports*		information society
1.3.1	Preliminary	First	-
1.3.2	Preliminary	First	-
1.3.3	*No detail about contents of reports*		culture cultural heritage
2.1.1	-	-	territorial impact analysis
2.1.2	-	-	territorial impact analysis
2.1.3	-	-	territorial impact analysis
2.2.1	-	First	territorial impact analysis
2.2.2		First	territorial impact analysis
2.2.3	-	-	territorial impact analysis
2.3.1	*No detail about contents of reports*		-
2.3.2	*No detail about contents of reports*		-

- For all projects of priority 1, the SIR must go further than the FIR in matter of concepts. This indicates that in this regard, the 3.1 First Interim Report should help to prepare the 2nd Interim Reports by providing elements of clarification and consistency.
- For projects of priority 2, the requirements concern only one concept and are expressed differently ("conceptualisation of a territorial impact analysis" applying to the concerned domain). This reflects the different focuses and approaches defined for the two priorities. The Terms of Reference indeed mention that projects of priority 2 have to take into account concepts developed in the frame of priorities 1 and 3. More specifically, all Terms of Reference for

[23] This concept was mentioned as relevant for energy networks, but project 1.2.2 is now focused on telecommunications (while energy networks should be handled in a new project for which ToR are not yet available).

projects of priority 2 dealing with assessment of Community policies refer to the concept of polycentric development as one against which the concerned policy must be assessed. From this standpoint, clarification of concepts should be done having in mind that they should also address the issues explored inside priority 2.

- Correspondence between the concepts and "meta-concepts" to explore by TPG 3.1 on the one hand (listed here above) and by the other TPGs on the other hand is limited:
  - of the five listed concepts, only two - social integration and r-urban - are mentioned as concepts to explore by the other TPGs; spatial integration, spatial or territorial cohesion[24] and territorial impact are not explicitly mentioned, even if the terms might appear more or less frequently in the text of the ToR; this might probably be explained by the multi-sectoral dimension which makes it difficult for a thematic project to fully address such concepts; this also underlines the role of project 3.1 regarding those concepts;
  - four of the six "meta-concepts" - accessibility, polycentrism, territorial impact assessment and urban area - are mentioned as concepts to deepen; the absence of environment and landscape might be explained by the different focus proposed by the ToR for the projects most concerned by those concepts, i.e. 1.3.1 and 1.3.2 (DPSIR method, work on indicators essentially based on previous or current research);
  - several concepts are added: rural area, urban-ness, urban-rural relationship, functionally independent / entangled areas, spatial discontinuities and barriers, parity of access to infrastructure and knowledge, connectivity, effects of networks, inter-modality, information society, culture, cultural heritage.

    Most of those concepts actually present obvious links with some of the concepts or "meta-concepts". Their diversity also emphasises the need to reflect about a framework for concepts, which should allow taking into account their different "hierarchical levels" or conceptual interdependencies (e.g. cultural heritage vs. culture, urban-rural relationship vs. urban area / rural area, territorial impact assessment vs. territorial impact). In this

[24] All ToR refer to territorial cohesion as a notion whose discussion has started in the Second Cohesion Report, but they do not mention specific requirements regarding its exploration as a concept.

perspective, the distinction made here between concepts and "meta-concepts" could probably be revised and adapted.

- Several "concepts" have to be studied by more than one TPG: parity of access to infrastructure and knowledge, accessibility / connectivity, effects of networks, inter-modality and territorial impact analysis. Workshop on Priority 2 projects in Mondorf has highlighted a particular need for harmonisation in the last case.
- Finally, the ToR include terms which are not explicitly presented as concepts but might be considered as such, or at least as lying on the border between concepts and typologies. The following table lists examples of such cases, where notions could be considered either as (sub-)concepts and/or as components of typologies. They are generally mentioned in the ToR in relation with a (meta-)concept.

Table 3: Selection of potential concepts / components of typologies appearing in the ToR

(Meta-)concept	Related item
accessibility	Eurocorridor
	gateway
	harbour city
	hub
	mainport
parity of access to infrastructure and knowledge	coastal zone
	inland (= island?)
	low density area
	mountain area
	transnational cooperation area
	ultra peripheral region
polycentrism	Eurocorridor
	gateway city
	metropolitan region
	motor region
	urban development pole
	urban functional region
	zone of global economic integration
urban area	industrial cluster
	intermediate city
	metropolis

- ***Inputs from the First Interim Reports***

Despite the limited explicit requirements of the Terms of Reference relative to concepts in the First Interim Reports of the first round of projects (two projects out of eight are supposed to deliver a "preliminary overview" and one a "first overview" on concepts), those actually contain substantial material on this topic, mainly because work on other tools such as indicators, methods and typologies has implied some work on underlying concepts. But in this regard the First Interim

Reports reveal a wide variety of approaches, which was already perceptible in the tenders. The following table is an attempt - with an unavoidable margin of interpretation - to illustrate this diversity.

Table 4: Place of concepts in FIRs

Project	WP focused on concepts in the tender	Section of FIR explicitly focused on concepts	Concept(s) explicitly used in FIR as basis for
1.1.1	WP1, WP2	**X**	indicators, methods?[25]
1.1.2	WP1	**X**	indicators, methods
1.2.1	-	**X**	indicators, methods
1.2.2	-	-	indicators
2.1.1	-	-	indicators, methods
2.1.2	-	-	indicators, methods
2.1.3	-	-	indicators
2.2.3	-	-	methods

The provided material enlightens some issues that will have to be taken into account in the perspective of integrating the approaches of the various projects and of clarifying the links between the concepts and the other tools.

- The meaning of the concept as a tool is not quite obvious. One of the reasons is probably the polyvalence of the term "concept" itself, which has potentially more different meanings than "indicator" or "typology" for example.
  - A first difficulty is to make a distinction between the meaning referred to in section 5.1.1 and a meaning designating rather a method or an approach, which is also used in the ToR as well as in the tenders and FIRs.
  - Even when the term "concept" seems used in the FIRs with the meaning referred to in section 5.1.1, it may designate a large variety of items, which is to some extent linked to the diversity of concepts mentioned in the ToR. The following table, although not taking into account a case where a heading "concept" applies to a list of elements of different levels, gives a good illustration of this variety.

[25] Although concepts are significantly present in this FIR, the link with the other tools is not obvious (proposed tools seem rather based on implicit concepts).

Table 5: Items mentioned as concepts in FIRs

accessibility	government	public service
advanced network	Information Society	R&D
broadband	institutional capacity building	rural area
cohesion	multi-level governance	social capital
core-periphery	network	teledensity
dedicated rail freight network	network readiness	territorial competition
digital divide	open co-ordination	territorial impact assessment
digital ladder	parity of access to infrastructure and knowledge	transeuropean network (TEN)
equity	polycentric development	tri-partite contract
European Research Area (ERA)	polycentrism / polycentricity	urban area
governance	Producter Support Estimate (PSE)	urban-rural relationship

- The logic linking together the concepts with the other tools to integrate (especially indicators and typologies) varies from one TPG to the other.
  - Some approaches explicitly integrate a conceptual clarification, while others start from an inventory of indicators, methods and/or typologies (for example on basis of reviews of existing literature).
  - Even when concepts are explored, there are not necessarily explicitly linked to the indicators, methods and/or typologies proposed.
  - In some cases, indicators, methods and/or typologies seem to be built on implicit concepts, in the sense that notions are explicitly used as bases and may be defined / discussed, but are not presented as concepts. The following table presents a selection of such cases.

Table 6: Selection of implicit concepts in FIRs

competitiveness of urban area
connectedness
connectivity of urban area
economic / regional development
European Functional Urban Area (EUFA)
inter-modality
knowledge (production, absorption, diffusion)
mass of urban area
motor of change (urban area)
multi-modality
territorial / spatial impact / effect

All proposed typologies seem to be based on implicit concepts (none seems explicitly linked to notions presented as concepts).

- When approaches explicitly refer to concepts as a basis (mainly for indicators), they show significant differences in the "level" of concepts, as illustrated in the following selection.

Table 7: Selection of concepts taken as bases for other tools in FIRs

accessibility
advanced network
agriculture
broadband
cohesion / equity
network readiness
overall labour force
physical preconditions
population
teledensity

- It may finally be observed that for some concepts to explore in the framework of the 3.1 project there is little material provided by the FIRs. This is particularly the case for trans-sectoral concepts such as "spatial integration" and "spatial / territorial cohesion". "Spatial integration" is mentioned in only one report, whereas "spatial / territorial cohesion" is mentioned in all reports, but neither defined nor discussed as a concept in any of them (even in those where it appears in the title of the project).
  This might be considered as coherent with the ToR, which - as previously noted - seem to leave their exploration to project 3.1. But in the future, more exchange with thematic and policy-impact projects on those topics will probably be needed, in order to ensure that the multi-sectoral concepts to define can have a role of reference and can contribute to consistency of the whole ESPON programme.

Preceding observations emphasise the need to rapidly agree on:

- the meaning of "(spatial) concept" in the context of the present work;
- the priorities in the exploration of concepts;
- the articulation with the other tools;
- the role of the different partners.

The proposals made under the two subsequent headings should be considered just as a first basis for discussion inside TPG 3.1 and with others TPGs.

5.1.4 First proposals of principles to handle concepts

- Identification of concepts

  A (spatial) concept should:

  - be clearly identifiable (expressed unambiguously within a few sentences);
  - have a clear territorial dimension;
  - have political relevance with regard to the ESDP, regional policy and/or other policies with a territorial dimension;
  - be "appropriable" (significant in different contexts);
  - be on a similar foot with other identified concepts (neither much more general nor much more specific).

- Clarification / detailing of concepts
  - links, overlaps, borders between concepts should be identified and if needed specified;
  - the exploration should tend toward operational translations (e.g., indicators maps, typologies, scenarios, policy proposals) without over-simplification.
- Implications for the identification of indicators
  - concepts should be expressed in relative terms when relevant and appropriate, without losing the global consistency;
  - redundancy of indicators between concepts should either be avoided or be acknowledged and taken into account.

5.1.5 Proposals toward a methodology

The following points aim to identify a number of tasks required by the common work, based on the principles proposed in 5.1.4. The approach is determined by the aim to make the best use of the inputs from all TPGs. The order in which the tasks are listed does not necessarily imply a chronological succession of operations, as some tasks might be carried on in parallel, or better, interact with each other. The way to organise work between the TPGs could be discussed once a methodological basis is commonly agreed.

- Identification of concepts
  - Identification of relevant elements in the ESDP (which concepts need to be further defined in order to operationalise the ESDP?);
  - Review of all concepts explicitly or implicitly referred to by the TPGs;[26]

[26] This task is under way on basis of the available FIRs. It will be complemented and updated on basis of further material, notably FIRs of new projects, opinions of TPGs and SIRs.

  - Identification of possible other concepts to be explored by the projects not yet under way (e.g. on basis of the ToR);
  - Identification of possible "missing links" (e.g. "parent" concepts whose clarification is needed in the first place in order to ensure consistency);
  - Definition of a provisional list of concepts on basis of this compilation, through a selection according to the agreed principles.
- Clarification / detailing of concepts
  - Establishment of a bibliography of relevant sources, if possible with assessment of their relevance, in order to provide a common reference;
  - Identification of different uses/users and contexts of the concepts;
  - Delineation of each concept by confrontation with the other concepts;
  - Identification of possible fuzzy parts that should be further discussed.
- Identification of indicators
  - Compilation of a first list of provisional indicators based on those identified for each concept;
  - Identify possible inconsistencies, overlaps and gaps and suggest solutions.

The whole set of results should be discussed among all partners (inside TPG 3.1 and in the other TPGs) in order to take into account various contexts and sensibilities while tending toward a common vision. The forums of the 3.1 Extranet provide a tool for discussion inside 3.1 TPG which can complement a more systematic and "formal" approach. But whatever the means, discussion and the synthesis work that will follow need a transparent and interactive approach in order to foster a common appropriation of the corpus of concepts. The MC should indeed be presented with a set of concepts which delivers a genuine convincing power, taking into account the diverse sensibilities of Member States regarding key spatial concepts.

A questionnaire addressed to all TPGs could give the opportunity to implement some steps of the method proposed above.
The questionnaire could include a part common to all TPGs and a part specific to each one, taking into account the quite different situations they encounter.
The questionnaire could ask the TPGs their opinion on the proposed principles to handle concepts enumerated under 5.1.4.
Questions could also be asked about:

- the role the partners see for the "concepts" tool in their work (particularly in relation with the other tools);
- the meaningfulness for their work of a proposed list of concepts (e.g. the (macro-)concepts to explore in the framework of 3.1, other concepts identified in the ToR / FIRs, concepts emerging from the ESDP);
- the "implicit concepts" that they think they could make more explicit in view of the SIR;
- other concepts which they consider relevant in the context of their work;
- their perception of multi-sectoral concepts such as spatial integration, spatial / territorial cohesion, territorial impact.

This would help the 3.1 TPG to build a first list of concepts and to start their clarification. Results of this work would be submitted to the TPGs for feedback. The whole material would be used to produce the section on concepts for the SIR.

5.1.6 Spatial Analysis for political decision

A theoretical and methodological approach

The originality of spatial analysis is to combine methodological and theoretical approaches in the analysis of the spatial distribution of social phenomena.

- Spatial analysis can be firstly defined as a set of statistical, mathematical and cartographic tools which can be applied to geo-referenced databases.
- Spatial analysis can also be defined as a set of approaches, concepts, models and theories which can be applied to the description and the explanation of spatial organisation of societies at various scales.

Spatial analysis and statistical analysis

The analysis of regional structures in Europe especially in respect to economic, social or territorial cohesion need the identification or spatial or structural phenomena and developments. The support and advancement of regional policies will be enhanced by a transfer of the results of regional analysis into a more spatial related view. This could be done by regional statistical means, that could be done also in an interesting and a more theoretical and methodological point of view by the tools of spatial analysis.

- In statistical analysis, in the beginning the relative location of spatial units could be of less importance and the indexes which are produced do not introduce

any information about the relationship between the regions or places. The statistical index like the standard deviation or the Gini index applied to population and GDP is a statistical approach which does not take into account the relative location of rich and poor regions. But in a spatial view with the help of regional distribution such approaches can describe socio-economic structures over clusters of territorial units and taking account the spatial structures and its implications indirect

- In spatial analysis, the location of places (contiguity, connexity, distance, political affiliation) is taken into account in the theoretical concept and is the basis for the analysis of regional inequalities. Specific concepts like peripherality or polycentrism are directly connected with spatial analysis models and tools (measures of accessibility, potential, spatial interaction, rank-size rules, …).

Spatial analysis and innovative cartography

The best representations for the analysis in a spatial context are maps. That applies to spatial analysis in all sense.

But spatial analyses *is not cartography* and most innovative tools developed recently in this field are generally not available in GIS

Only in the very final *spatial analysis ends in maps and can propose new measures or new concepts* for the cartographic representation of accessibility (e.g. chronocarte), spatial integration (e.g. map of discontinuities), polycentrism (e.g. multi-scalar smoothing methods).

Spatial analysis and prospective tools

Many theoretical models used in the field of spatial analysis are based on the observation of relatively simple empirical rules like the gravity models (decrease of the intensity of flows with distance) or the spatial diffusion model (diffusion of innovation by contiguity or by urban hierarchy). Even if those models are not perfect and should be completed by additional variables when applied on specific situations, they provide an important basis for territorial prospective.

- **Spatial analysis can develop simulation models** which can be calibrated on past situations and used for prognosis on future trends. For example, it is possible to examine how the barrier effects and discontinuities between the boundaries of the actual 15 member states of the EU have been reduced during the last 30 years, in order to try to make a prediction about the future evolution of borders with candidate countries.
- **Spatial Analysis can also produce parametric models** for the exploration of various political scenarios. For example, the calibration of a good accessibility model based on the actual transportation network will provide the basis for the simulation of the effects of various scenarios of new transportation infrastructure.

Spatial analysis and the clarification of political concepts

It has often been observed that "*science measures something before to know what is exactly measured, which is defined at the same time*" (J. Ullmo). It may be transposed to the process of clarification of political concepts in the SPESP and the ESPON Programme. In many cases, the scientists which are asked by policymakers to propose measures of "polycentrism" or "territorial cohesion" do not know exactly what is the exact meaning of those political concepts.

- **Spatial analysis can help to formalise political concepts** because it proposes a wide set of models. For example, the political concept of *polycentrism* can be linked to spatial interaction models, central place theory, accessibility indexes, … More practically, spatial analysis can also help the policymakers to make a better choice through a multiplication of possible points of view on the same indicator. For example, the classical GDP/inh indicator can be transformed into (1) a deviation to European mean, (2) a deviation to national mean (3) a deviation to the mean of neighbouring region and it is possible to derive from those deviations a typology of European regions subject to various economic constraints - and contradictions - according to the levels of economic redistribution.
- **But the conformance of or alignment with political concepts and spatial analysis tools sometime is difficult to realise**. In many cases, it appears that the tools proposed by researchers are too complicated or complex for an efficient use in political action. It is important to find a compromise between what would be the better index (from a scientific point of view) and what can be

efficient for political action (which can mean simplicity and clear understanding by all actors). The *Human Development Index* established by the UN is a good example of such a compromise.

A dictionary of spatial analysis tools connected with a dictionary of political concepts

If we want to secure the knowledge produced by the ESPON projects, it is important to organise a network of experts and to propose the establishment of a dictionary and common library of tools and models of spatial analysis used in the ESPON Program.

- **An ESPON Dictionary of spatial analysis tools** is relatively simple to develop. It would be a simple presentation (in standard form) of the spatial analysis tools used and developed by the ESPON research teams. It would not be possible to use directly the tools (if the teams do not deliver a copy of their software) but it could be possible to share a common knowledge.
- **This dictionary of tools should be connected with a dictionary of political concepts** in order to reduce the gap between scientists and policymakers. It would be very useful to have an electronic web version of the two dictionaries with a system of links (e.g. The political concept of polycentrism could be connected with spatial analysis tools like accessibility measures, network analysis, multiscalar smoothing method, …).

Towards an ESPON Spatial Analysis System

A preliminary version of an ESPON Spatial Analysis System could be established if we limit our ambition to some basic but very useful functions.

- **The Hypercarte Project** proposes to realise an experiment on the feasibility of this system in the framework of ESPON 3.1 (*see. 4.2.4*).

5.2 Territorial Impact Assessment - a certain tool or a whole kind of tools?

5.2.1 The ´European biography´ of the Issue Territorial Impact Assessment (TIA)

Territorial Impact Assessment has a rather long **national tradition** mainly in Germany (under the legal procedure called *Raumordnungsverfahren)* and in Austria (as a tool applied without legal framework under the term *Raumverträglichkeitsprüfung*). In addition it can be recognised in similar procedures under different names in Portugal, Walloon region of Belgium and in the way Environmental Impact Assessments are used in Finland as well, by considering broader social and economic impacts as well (CREUE Newcastle, ECOTEC).

All this practice has in common applying the tool TIA for different kinds of projects and sometimes certain kinds of plans. TIA in the national tradition is assessing the impact of proposed single spatial development measures against the integrated spatial policy objectives or prospects for an area. In principle, TIA includes all aspects of spatial planning whether they are environmental, social, economic or cultural in their impact. In this respect it reflects clearly the ´double approach´ of spatial planning in general which is on the one hand the prospective and comprehensive shaping of a certain area by plans and on the other hand the ad-hoc judging of project-related effects on spatial structure (F. Schindegger).

The first time the **European Spatial Development Perspective** (ESDP) puts the tool TIA into a European context. It addresses TIA at several territorial contexts and recommends application

- as an instrument for spatial assessment of large infrastructure projects (Option 29)
- coastal areas, mountain areas and wetlands ... (Option 42)
- water management projects (Option 52)
- cross-border TIAs (rec. after para 178)
- and in particular the use of cross-border territorial impact assessments (rec. after para. 178[27])

However, it should be stressed here that still all the recommended applications are concerning projects, newly for cross-border and transnational ones.

Later on TIA had become a topic of the **ESDP Action Programme**. In the course of implementing this programme the UK delegation had taken responsibility for the

[27] see European Spatiaol Development Perspective, 1999 by the European Commission

topic and organised a **Conference on Territorial Impact Assessment** in late October of 2001 in Louvain la-Neuve (Belgium). Main results were (1) an overview on the variety of features and applications of relevant assessment procedures at local, regional and national level. In particular, the close relationship to the Environmental Impact Assessment (EIA) and the Strategic Environmental Assessment (SEA) was revealed. As one first step for implementation of the ESDP recommendations mentioned above also a specific application of TIA to transnational projects under the term Transnational Territorial Impact Analysis[28] (without a new legal regulation, neither at the European nor at the national level) was suggested.

Table 8: Comparative review of assessment

	Topic of assess-ment	Spatial level	Fields of discipline and politics	Subject of assess-ment	Function referring planning process	Participants	Legal frame	Obliga-tion
TIA (so far)	Impacts on spatial struc-tures	local, regional, transnatio nal, recommen ded by ESDP	infrastructure, settlement expansion, tourism/leisure	projects	project evaluating	responsible companies, public authorities, experts, (public)	no European regulation, partly national regulations	not directly (only in permis-sion proce-dure)
EIA	Environ-mental impacts	local, regional	waste, energy, infrastructure, tourism/ leisure, economy	projects	evaluating individual projects	responsible companies, public authorities, experts, public	EU-directive	yes
SEA	Environ-mental impacts	regional, national, trans-national	waste, energy, infrastructure, water management	plans, pro-gramme, policies	project developing	responsible companies, public authorities, experts, (qualified) public	EU-directive	no

Source: F. Schindegger (2001): Prospects for further work on TIA, report to the Conference on TIA, 26 October 2001, Louvain-la-Neuve, not yet published

(2) Concerning the future application at the European level the analysis of the different practices using TIA so far was concluded as follows:

- Implicitly the ESDP uses TIA as a tool for assessing the impact of projects but there is no reason why suitable approaches should not be developed for assessing the impact of plans and programmes and even, potentially, policies – such as the impacts arising from the accession process

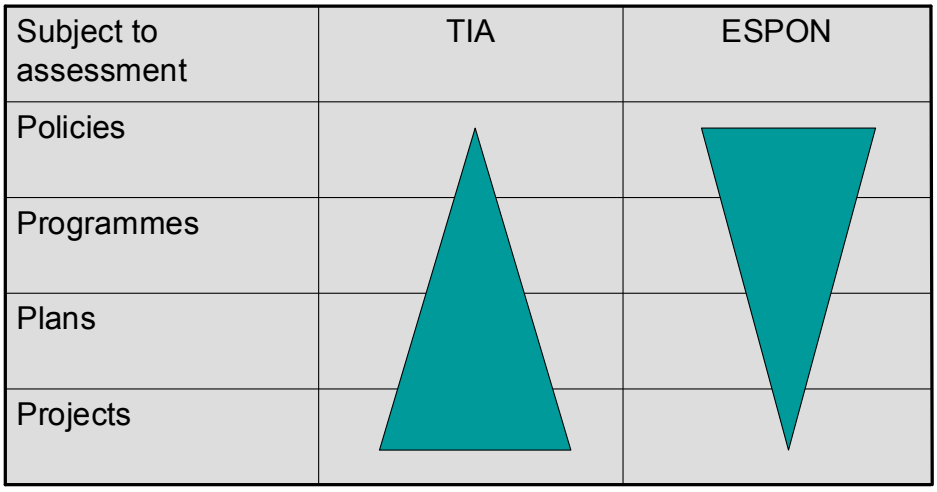
[28] the corresponding German term is *Raumwirksamkeitsanalyse*

- Current techniques are not sufficient to meet the challenge presented by the desire to consider the spatial implications of different policy interactions.
- Any discussion of TIA should differentiate between the TIA of projects and TIA of plans and programmes
- Whilst it would be possible to advocate a TIA procedure in addition to existing EIA and SEA procedures it may be more fruitful to consider extending the existing procedures to cover social and economic impacts
- A common framework ... may result in a sustainability assessment process that covers programmes and projects, all effects (environmental, social and economic) and the interactions between activities and space over specified time periods. Sustainability Assessment would be explicitly considered as a planning and management tool.
- This might be taken forward through EU regulation but it would be simpler to extend existing good practice and develop more robust approaches through partnership and co-operation. One mechanism for this could be, for example, through the INTERREG III B Community initiative

(A. Healy, ECOTEC, Author of a submission on TIA to the CSD, not yet published)

(3) Another main input – which obviously is closest to the topical context here – was given at that conference with special reference to the **ESPON programme**. An outlook to the programme (in drafting stage at that time) showed where different measures refer to "TIA" and drew attention to the different coverages of ESPON and TIA.

Figure 15: Coverages of TIA and ESPON



Source: T. ESER (2201): Territorial Impact Assessment - the view from the ESPON, report to the Conference on TIA, 26 October 2001, Louvain-la-Neuve, net yet published

Looking now closer to the ESPON 2006 Programme concerning references to the assessment issue shows rather implicit ones within some activities of Priority 1 (dealing with “spatial effects of ... demographic trends and migration”, “networks, transport and telecommunication services”, “technical and natural hazards”, “cultural heritage and identity”). It goes without saying that analysing this variety of “spatial effects” is far beyond what is understood by an assessment procedure judging the impacts of defined policy interventions against certain goals.

Rather explicitly TIA – but in a rather mixed (not to say confusing) way – the terms *assessment* and *analysis* are mentioned within some activities of Priority 2: Policy impact projects: “The core task of this priority will comprise to find a common approach on why the spatial and territorial dimension matters to all policies.” The programme defines as objectives (among others) “to show the influence of sector policies on spatial development at the relevant EU scale ...”

“to develop methods for the territorial impact *assessment* of sectoral policies primarily at EU level, but also at the national level such as transport, CAP, R&D, and major infrastructure development, and find appropriate instruments to improve the spatial co-ordination of EU sector policies”

This demand really touches the issue of planning assessment techniques in the narrower sense. In detail the programme defines by the “actions” rather different objectives:

- 2.1.1 Spatial diversification by the infrastructure policy of TENs: “... Conceptualisation and elaboration of a territorial impact *analysis* for TENs which takes special consideration of the following points: ...“
- 2.1.2. Spatial effects of the EU R&D policy: “ ...Conceptualisation and elaboration of a territorial impact *analysis* for R&D policy with special consideration of the following points: ...“
- 2.1.3 Spatial effects of the EU Agricultural Policy: “Conceptualisation and elaboration of a territorial impact *analysis* of CAP with special consideration of the variety of rural areas in Europe in terms of environmental and climate conditions, population density, employment and farm structure, accessibility, peripherality and degree of intensive farming.“
- 2.2.1 The territorial effects of the Structural Funds: “Conceptualisation and elaboration of a territorial impact *analysis* for Structural Funds and Phare/Tacis/Meda programmes with special consideration of the following points: ...“

- 2.2.2 The effects of Structural Funds in urban areas: “Development of a methodology for an impact *analysis* at EU scale”

Finally, the task description of the project *3.1 Integrated tools for the European spatial development* demands:

- “territorial impact *assessment* in terms of defining a concept which can be used for the measurement of Community and national sectoral policies and of major infrastructure projects.”

It is hardly imaginable that this really is achievable or even reasonable to pursue. In order to clarify the question by what kind of TIA these very different requirements could be met a very short view to the main elements of assessment tools may be useful.

5.2.2 Defining elements of assessment tools

Figure 16: defining elements of assessment tools - GOALS

Goals (achievement of which is to be assessed)

Economic - Social - Territorial - (new)	Cohesion	aims
Economic - Social - Territorial -	Integration	(= processes towards aims)

Figure 17: defining elemnts of assessment tools - CRITERIA

Criteria (for measuring goals´ achievement, examples)

GDP per capita	(> cohesion)
Employment	(> economic/social cohesion)
Income	
Male/female employment	
Population change	
Educational level	
Specific relations/exchanges between territories, eg migration, commercial links, cultural relationships, institutional relations, accessibility	(> territorial cohesion)

Subject matters (to be assessed)

Policies

Programmes

Projects

Modes of treatment

Analysis	↓	↓	observing/detecting
Assessment			estimating/measuring
Evaluation			valuing/judging

... concerning territorial development policy interventions

Analysis: examining implementation (input)

Assessment: " impact (output and result)

Evaluation: " achievement of goals

5.2.3 Different assessment models

The "application for Europe" of the tool TIA by the ESDP and the Action programme as well, is addressing projects, including "transnational projects. The extension of the meaning of the term "Territorial Impact Assessment" to programmes and policies happened only later on within the ESPON 2006 Programme.

Table 9: Different subject matters - different modes of treatment

Different subject matters – different modes of treatment

	Projects	Programmes	Policies
Analysis		**E S P O N 2 0 0 6**	
Assessment	**E S D P**		
Evaluation			

Table 10: Important differences

Important differences

Projects	**Programmes/Policies**
Area of concern due to the area of effects (local, regional, transnational)	Area of concern defined by territorial responsibility (national, transnational)
Physical subject matters in detail as:	Conceptual subject matters as

Projects	Programmes/Policies
power stations national parks transportation links/networks cable cars and ski-stations dumps shopping centres	Structural Funds Objective 2 – programmes CAP Rural Area Programmes
Different alternatives (eg in locations) to be compared (at least with the ´zero-option´: no intervention)	One policy/programme being executed
Direct interventions into the spatial system by a certain location	Indirectly influencing a whole spatial system by several interventions in the total area (eg by subsidising)
Impacts to be analysed comprehensively incl. such as on land use accessibility environment employment economic outcome etc	Impacts concerning respective policy and programme goals declared
Usually strong knowledge about direct cause-effect-relations between intervention and impacts, and inter-relationships between different areas of concern as well, comparatively more easily measurable, more likely by quantitative indicators	Usually weak knowledge about Indirect relations between input, output/result and impact, within a complex system sometimes difficult to explore (lacking experience and theory), more likely by qualitative indicators *take into consideration*: actually needed is a forecast of the area affected with and without intervention.
Public participation	No public participation

5.2.4 Intermediate conclusion

(1) So far, the Territorial Impact *Assessment* approach was mainly exercised concerning projects (may be in future including cross-border and transnational ones). Whereas the ESPON Programme seems to introduce the Territorial Impact *Analysis* approach concerning programmes and policies, although sometimes using the term *assessment* in this context, too!

(2) The two tasks can not be covered by one methodological model

(3) In order to avoid confusion there should not be used the same acronym for the two different tools

(4) One way to avoid further confusion could be to use consequently the terms ***Project-TIA, Programme-TIA*** **and** ***Policy-TIA***, whereas the "A" may stand for assessment or analysis what would have to be indicated case by case

(5) Minimal requirement to describe methodology of analysis/assessment:

- Programme or policy
- Goals/criteria against analysis/assessment is carried out
- Geographic incidence
- Kind of interventions/measures
- Measuring by qualitative and/or quantitative indicators
- Using input and/or output indicators
- Using or not a ´zero-option´ (future without intervention for comparison, resp. as reference)
- Description by a logical diagram

5.2.5 References to TIA in the First Interim Reports under Measure 2

The methodological sections of the First Interim Report treated below show a considerably varying perception and application of Territorial Impact Analysis approaches.

Action 2.1.1 Territorial impacts of EU transport and TEN policies

The First Interim Report gives a first outline on the methodologies proposed for assessing the territorial impacts of transport policies and investments. Presented are at first methodologies addressing specific issues, such as the Causality Analysis of regional production and accessibility, and the assessment of territorial impacts of ICTs.

Thereby, the main ICTs territorial impacts are presented as twofold (and maybe intertwined):

- the role of ICTs on regional employment and income growth, giving rise to two different possible scenarios: regional (and sub-regional) convergence vs. divergence, referred to as the *spatial economic impact*;

- the role of ICTs on relocation of productive and residential activities in favour of more remote and less accessible locations, which is labelled the *spatial relocation impact*.

The expected results applying the methodologies proposed for the measurement of these impacts allow to measure the role that ICTs play on regional or subregional performance, and to explain the territorial concentration of industrial activity by ICTs (among other explicative variables).

Also more complex models, i.e. the quasi-production-function approach measuring the impact of EU transport and TEN policies by accessibility indicators and a spatial computable general equilibrium model of trade and passenger flows incorporating product diversity and monopolistic competition, are described.

As a quasi-production-function model the SASI model developed in the 4th RTD Framework Programme SASI project and updated and extended in the 5th RTD Framework Programme IASON project will be used. It is a recursive simulation model of socio-economic development of regions in Europe subject to exogenous assumptions about the economic and demographic development of the European Union as a whole and transport infrastructure investments and transport system improvements, in particular of the trans-European transport networks. For each region the model forecasts the development of accessibility, GDP per capita and unemployment. In addition cohesion indicators expressing the impact of transport infrastructure investments and transport system improvements on the convergence (or divergence) of socio-economic development in the regions of the European Union are calculated.

The SASI model differs from other approaches to model the impacts of transport on regional development by modelling not only production (the demand side of regional labour markets) but also population (the supply side of regional labour markets), which makes it possible to model regional unemployment.

Furthermore, there is presented a first outline of a methodology to evaluate the impacts of transport and TEN policies on the polycentric connectedness and on overloaded transport corridors taking especially into account the spatial objectives given in the ESDP.

The impact analysis described so far is primarily devoted to measuring effects on a regional scale, while – beyond that – the ESDP focuses also on interregional connectedness at different levels. Hence, it is considered desirable to evaluate the

impacts of TEN measures on the quality of connections between a prescribed set of centres within different levels of the hierarchy of central places.

The analysis will be operationalized by a systematic and structured selection of abstract links that connect places within the polycentric hierarchical system of centres all over Europe. These links of different levels of service can be weighted and scaled by two factors: the quality of accessibility today compared to an average standard level and on the other hand the classification of the connected regions in a typology reflecting their economic strength respectively structural problems. At last the TEN projects are examined regarding their contribution to improve these links.

Regarding sustainable use of infrastructure in urbanised regions a special analysis of *overloaded transport corridors* is considered desirable, even though data might not be available. Therefore, an approach is proposed which is based on concepts designed and carried out to complement the cost-benefit analysis methods in the review of the Federal Transport Infrastructure and Investment Plan (BVWP '92). This method should be adapted and modified to the European scale and the ESDP provided that its approach turns out to be practicable.

Action 2.1.2 The territorial impact of EU research and development policy

Rather different to the transportation area with its comparably high developed modelling experience the analysis of research and development policy regarding the spatial dimension has to start from a lower level of analytic performance. Therefore, the First Interim Report refers at first to the elaboration of criteria around

- the R&D process
- the territorial dimension to that process
- the policy aims of the ESDP

The R&D process is traditionally viewed as an activity moving from basic research through applied research to commercialisation and general diffusion, including feedback loops at various stages in the process. Dissemination of results can occur at any stage, eventually causing territorial effects.

To assess the territorial effects of R&D policy (direct and indirect), an understanding is needed 'where' things happen, from initial policy inputs through to the final impact, in so far as this is possible. For this reason a standard intervention logic approach has been adopted, which moves from input, through output to results and finally impact. The actual process of research activity and

subsequent diffusion and impact is likely to include a more complex set of interrelationships. This pattern of interrelationships and knowledge flows occurs within a form of “black box” (between policy input and impact).

An important component in assessing the territorial effect of R&D policy is an understanding of the capacity of a region to produce and absorb new knowledge. The latter might be seen as reflecting innovation capacity within a region. The direct territorial effect of R&D policy may be strongest in knowledge-producing regions, but the practical results of this activity will be dependent upon the capacity of regions to absorb knowledge, and the links that exist with knowledge-producing regions.

The capacity of regions to produce and absorb knowledge is affected by a number of different factors or “Framework Conditions”. These form the territorial dimension to the study and the impact assessment methodology is aimed at informing and understanding of this.

A literature review will provide *a priori* theoretical input on the factors that influence R&D diffusion and absorption, as well as the relationship between R&D and technology transfer (parts of the ‘R&D process’) and regional economic performance. The case study work will test these theoretical assumptions, through in depth analysis of the processes occurring within the ‘black box’.

The results of this work will allow to make more general judgements about:

- the relationship between regional ‘Framework conditions’ and a region’s capacity to produce and absorb knowledge and;
- the relationship between R&D (input) and regional performance (results and impacts).

This work should enable the production of a list of criteria relevant to assessing the territorial impact of R&D, which will in turn inform the policy recommendations to emerge from the study.

Four dimensions regarded initially as being part of the framework conditions are thought to be appropriate in assessing the territorial effects of R&D policy:

- Spatial geography (i.e. is the region a border region, peripheral)
- Economic performance of the region (unemployment rate, GDP performance)
- Regional economic structure (based on size, sectoral mix and ownership structure of companies)

- Regional institutional split of R&D activity (between Business Enterprise Sector, Government Sector, Higher Education Sector and Private Non-profit Sector)

At the scale of the EU 27+n, a typology of regions will be established, taking into account the above factors and assessing which are the knowledge-producing regions and which the knowledge-absorbing regions.
Finally, the First Interim Report stresses the interest in similar typologies, perhaps using similar dimensions developed by other projects.

Action 2.1.3 The territorial impact of (Common Agriculture Policy (CAP) and rural development policy

Again different is the approach to the issue of TIA within the area of CAP and rural development policy. It is starting with initial hypotheses on the territorial impact of the CAP as e.g.:

- the territorial impact of CAP is mainly determined by the different farm structures of the regions (e.g. different size, management, production orientation of farms)
- The CAP has unintended side-effects, including ecological threats in certain areas (e.g. water quality, erosion), decrease of biodiversity and landscape quality, and out-migration from intensively farmed areas etc. These negative effects have a significant territorial dimension.
- Changes in the levels of farm household pluriactivity are more strongly associated with variables reflecting the strength of the local economy than the level of CAP support.
- The incidence of the CAP on NUTS III regions is not consistent with the cohesion objectives of the EU with the least prosperous regions receiving less CAP support than their more prosperous counterparts.
- The relative impact of the CAP in remoter rural areas may have been more significant than in accessible rural areas due to the fact that the later are influenced. amongst other things, by contiguous urban developments.

Any analysis in this area is facing the wide range of economic, social and environmental contexts within which farmers operate across Europe, including the ten candidate countries in Central Europe. Of particular note in this context is the

relatively high dependence of these ten countries on agriculture as a source of employment, and the relatively low productivity of the sector. Another significant issue is the fact that CAP does not constitute one uniform policy but can be separated into various strands of policy measures which might show quite different (and sometimes opposing) spatial effects. Finally, the absence of a realistic counterfactual or "without CAP" scenario means that the method has to focus on the way in which changes in the CAP have impacted on areas across Europe.

Against this background, and, given the time span available for the project, a two-stage method is proposed. In the first stage (year 1 of the project), analysis will take the form of advanced statistical analysis to assess the extent to which changes in the CAP are associated with observable changes in the economic, social and environmental conditions in areas at the NUTS III level or equivalent. The second stage (year 2 of the project) will use, primarily, case-study methods to explore in more depth the causal relationships between CAP and rural development policy and certain apparent outcomes of policy, focussing, in particular, on how these are differentiated across space.

The territorial impact analysis will use a case study approach and will be part of the second stage. It will be based on a general description of the CAP which will examine the territorial character of the instruments themselves.

Several CAP/RDP[29] measures have strong territorial characteristics, in being applicable, at different rates, or at all, in various parts of the Community. In some cases (e.g. sugar quotas), the spatial element is restricted to Member State level, with complete freedom of action within national borders; in others, such as Less Favoured Areas (LFAs) or Objective 1 areas, there are more detailed geographical specifications.

The Less Favoured Area system was the first explicitly regional or territorial element of the CAP, introduced in 1975 to allocate additional payments to farmers in certain regions in the Community. LFA classification affects direct payments and rural development measures. Similarly, the boundaries defined for the old Objective 1 and 5b areas, and new Objective 1 areas have territorial implications for the effects of EU Rural Development Policy, including the LEADER schemes.

The non-legislative territorial aspects of the CAP/RDP can be assessed within a spatial context in a number of alternative dimensions, including the degree of

[29] Rural development policy

'rurality' (using the OECD classification of regions), accessibility, cohesion as well as areas of more or less habitat value.
Finally the First Interim Report mentions the territorial aspects of CAP/RDP reform proposals, e.g. the Mid Term Review and arising from the WTO Agenda.

Action 2.2.3 The territorial effects of the EU Structural funds in urban areas

Also this project has its own and individual approach. The First Interim Report states that the conceptual model providing a framework for territorial effects of Structural Funds in urban areas should look forward in making hypotheses for the better functioning of Structural Funds in urban areas in the future, rather than trying to look back and do an evaluation of the past.
The territorial effects of the Structural Funds are conceptualized at two levels.

- There is a pan-European dimension, which broadly relates to the distribution of Structural Fund expenditure in urban areas
- There is a more local effect, which relates to the distance over which Structural Fund interventions in urban areas are transmitted

The model to be applied builds on both of these aspects. They form the two spatial dimensions to the work programme. The territorial dimension will also need to be considered on two levels. There will be the direct effects of actual Structural Fund expenditure coupled with the indirect effects that this expenditure induces. Inter alia, this may be related to travel to work areas, supplier linkages, or the catchment areas of targeted interventions.
The Factors influencing the territorial dimension can be assessed at two levels:
A *pan-European typology* of urban areas, based on six principles:

- the level of urbanisation
- the geographical position of the urban area: peripheral, border, mountainous, coastal, etc.
- the nature of the urban area: metropolitan, agglomeration, etc.
- the economic base of the urban area: manufacturing, services, etc.
- the economic performance of the urban area: unemployment, amenity value, etc.
- the social performance of the urban area: social cohesion, income distribution, etc.

An *urban-level assessment* of critical factors influencing the territorial 'spread' of structural fund interventions, to be explored through case study analysis, and potentially including:

- Accessibility and linkages with external areas
- Labour market role and surrounding travel to work area
- Governance arrangements
- Size and form of the urban area
- Scale and focus of interventions

The conceptual model is not 'fixed' in time, but is rather a dynamic and evolving framework at this stage of the study and will be developed on an iterative basis according the outcome of research at European, Member State and case study level.

5.2.6 Preliminary conclusion

It is obvious that the descriptions of the approaches under measure 2 mentioned above show a considerable variety of features which seems to be caused more or less already by the different nature of the subject matter. They belong rather to the type of *Analysis* than to *Assessment* and rather to the policy- than to programme-type (see 5.2.4). However, sharp distinctions are hardly possible and may be occasionally possible only ex-post. The following table compares the projects concerned by seven major features due to TIA.

Finally, even this first review is confirming at the same time that it seems hardly imaginable to cover the whole range of sectoral EU policy issues by one assessment methodology. The conditions for such a "general model" are lacking at least due to two reasons:

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

Therefore, for the time being efforts should go rather towards achieving more transparency of description of the individual approach along minimum standards of methodological information and using a common non-confusing terminology, in

order to launch a more effective methodological communication between the different areas of policy analysis and assessment.
The recommendation below concerning evaluation techniques could be helpful in that context.

Recommendation:

MEANS Collection: Evaluating socio-economic programmes, 6 volumes, edited 1999 by the European Commission

Volume 1 Evaluation design and management
Volume 2 Selection and use of indicators for monitoring and evaluation
Volume 3 Principal evaluation techniques and tools
Volume 4 Technical solutions for evaluation within partnership structures
Volume 5 Transversal evaluation of impacts on the environment, employment and other intervention priorities
Volume 6 Glossary of 300 concepts and technical terms

Table 11: Review of major features due to TIA designated by the First Interim Report of Priority 2-projects

	2.1.1 Transport & TEN policies	2.1.2 R&D policy	2.1.3 CAP & Rural policy	2.2.3 SF in urban areas
Dimension of impact ➢ *What is effected?*	Economic/social performance correlated to accessiblity of regions	Regional capacity to produce and absorbe knowledge (innovation capacity)	Farm structures Unintended side effects with significant territorial dimension	Urban areas
Territorial dimension ➢ *Territorial units of observation*	Assignment to NUTS 3	NUTS 0, selected NUTS 2/3	NUTS 3 Selected rural areas	NUTS 3 Selected urban areas
Measured (assessed) topic	Regional convergence vs. divergence of employment and income growth Relocation of productive and residential activities	Relationship between framework conditions and innovation capacity Relationship between R&D input and regional performance (results and impacts)	Farm structure Agricultural structure Spatial components (territorial incidence) of CAP and RDP	Pan-European typology of urban areas where policy interventions are occuring (macro scale) Critical factors influencing the territorial effects of SF in urban areas (meso level)
➢ *Describing indicators*	Cohesion indicators showing disparities concerning economy, population and labour market	Inputs Outputs Framework conditions (geography, ec. performance, ec. structure, institutional split)	Inputs/preconditions Processes Outcomes (socio-economic, environmental impacts)	Indicators classifying the territorial dimension of urban areas No input indicators designated
Criteria for examination ➢ *Facing what goals?*	Polycentric connectedness and overloaded corridors	No goals referred to	Cohesion objectives	Polycentric development
Technique of analysis ➢ *How to make it*	Simulation model Classifying regions	Hypotheses tested by case studies	Hypotheses tested by case studies	Hypotheses tested by case studies Classifying regions

	2.1.1 Transport & TEN policies	2.1.2 R&D policy	2.1.3 CAP & Rural policy	2.2.3 SF in urban areas
Time dimension ➢ *Learning from the past – shaping the future?*	Modeling future options Lacking reference to actually implemented policies	Producing knowledge about functioning of system No reference to future options	Analysis of present system Marginal reference to proposals for changes within CAP	Lacking designation of reference to actual programme implementation No reference to future options
Format of outcome ➢ *How result looks like*	Typology of (all) regions	Single types of regions	Single types of regions	Typology of (all) regions Single types of urban areas

6 ESPON data base and cartography

6.1 Principle of data integration – common standards

6.1.1 Regional statistical data and indicators

The success of ESPON depends largely on the possibility of a joint use of the analytical results of the single ESPON projects. Especially the integrated use of ESPON indicators and empirical data requires a coherent data structure both related to indicators and GIS.

To make the ESPON data base manageable it actually should consist of ESPON-generated indicators and in case taking into account the use of related raw data. The ESPON data base must be seen as a spatial indicator base using the official statistics of the statistical offices of the European Community, the Member States and other European countries as well as of other sources. It will not and cannot be part of the system of official statistics within the Community.

To ensure comparability and provide for integration there must be an agreement on the structure of the basic data and the need of a unique documentation of the data files. The provision of indicator definitions implies the need for a one to one relation between geo-references and data. The use of a unique data format and software base will guarantee data transfer and the integration of the data and will also ensure independent research at the same time.

Any data used in ESPON should have a documentation concerning origin of data, time reference, regional reference, author, source of data and variable description. Furthermore, related to indicators there must be a description of the calculation algorithm, the statistical computation. Concerning geo-data the kind of geo-processing and a description of data used should be indicated.

Each contribution to the ESPON regional statistical data base must include two types of information:

- the set of actual regional indicators and data,
- the set of meta information and documentation of the indicators and data.

This information should be provided in two files, the ‘data-file’ and the ‘meta data file’.

The data file of the regional data should always include the related geo-reference. To ensure a potential combination of EU-related data (Eurostat) and of national data the regional reference should include a regional ID based on EU and international nomenclature (NUTS) as well as a regional ID based on national systems and moreover the name of the region in international notation.

Indicator and variable names should be short and associative related to the topic. Furthermore it is helpful to have information on the year and the NUTS level represented. There should be no blanks or dashes within the name to prevent transfer problems between different systems or programs.

Figure 18: Example for Data set NUTS level 3

NUTS_ID	NAT_ID	REG-NAM	POP_99_N3	DENS_99_N3
BE232	42000	DENDERMONDE	186,3	543,9

The meta data file includes all the information necessary for the identification of indicators and data.

Figure 19: Example of Meta data set and documentation

		POP_99_N3	DENS_99_N3
S	ESPON Project	1.1.1	1.1.1
S	Source of data	Nordregio	Nordregio
S	Author	Kai Böhme	Kai Böhme
S	Regional reference	NUTS 3	NUTS 3
S	Time reference	1999	1999
S	Frequency of data	Yearly 1.January	Yearly 1.January
S	Origin of data	Eurostat - Regio	Eurostat - Regio
S	Variable name	Population 1999	Population Density 1999
S	Variable description	Annual average Population in 1000 (1999)	Inhabitants per km² (1999)
S	In case: indication/ Source of use		
P	Theoretical Postulate	Indicator – Representation - Correspondence	Indicator – Representation - Correspondence
Q	Calculation algorithm	(Population 1.1.1999 + Population 1.1.2000) / 2 / 1000	Annual average population 1999 / Area 1999
R	Characterisation According DPSIR of the EEA		
R	Policy Relevance	Policy option relevant (i.e. ESDP)	Policy option relevant (i.e. ESDP)

SPQR
S: sample data description
P: theoretical postulate
Q: quantifiers used
R: policy relevance
see chapter 6.3

DPSIR

D: driving forces, adapt their behaviour to these more or less restrictive conditions,
P: pressures which may be positive or negative
S: state of the environmental components affected by pressures
I: impact on the environment as a whole in overall improvements or deterioration
S: society's response which is expressed by means of signals and reflected in political measures.

Data and meta data should be provided in separate files, saved under the same names with the related appendix, e.g. to indicators concerning polycentrism:

- Polycent_1_1_1_data
- Polycent_1_1_1_meta

To ensure data transfer between the projects, the potential use of different analytical software and to enable easy data integration a low technical standard would be the most appropriate. Therefore the "dbf" format should be used.

6.1.2 Geographical data

In the area of spatial planning, the political decision is classically based on the computation and mapping of regional indicators and indexes in the framework of territorial units (administrative divisions). This approach suffers from some weaknesses and there is a growing interest having an alternative way producing indexes in a continuous spatial framework, generally based on grid systems.

The advantages of geographical databases based on a regular grid of information

Some basic advantages of GRID oriented databases for European Spatial Planning are:

- **Useful information for the ESPON is produced and delivered on regular grid basis** (Corine Land Cover (EEA) or the UNEP-GRID (UN) e.t.c). With GIS it is possible to transform this grid based information into regional indexes, but this transformation is generally related to a degradation of the accuracy of information.

- **Selected topics of interest are better described by continuous maps than by administrative maps.** This is obvious in the case of point based environmental data, but it is also true for many other families of indexes like those related to accessibility or settlement structures.
- **Data transformations are much more easy with GRID based data.** When information is collected on a regular grid (with geographical co-ordinates of position), it is very easy to aggregate information at upper geographical levels and to propose multiscalar analysis of spatial distributions. By this the opportunity arises, for instance, to examine polycentrism by transformation of the distribution at various levels of aggregation.
- **Better combination of heterogeneous information with GRID based data.** Changes in territorial divisions, that not necessarily correspond to the fields of political actions, hamper the construction of a coherent database for administrative units. It is much more easy to propose harmonised databases in a long term perspective when using a regular grid system. This will be important for the building of political scenarios where it might be necessary to combine a wide set of information during a long period of time.

The problem of the choice of an ESPON reference grid

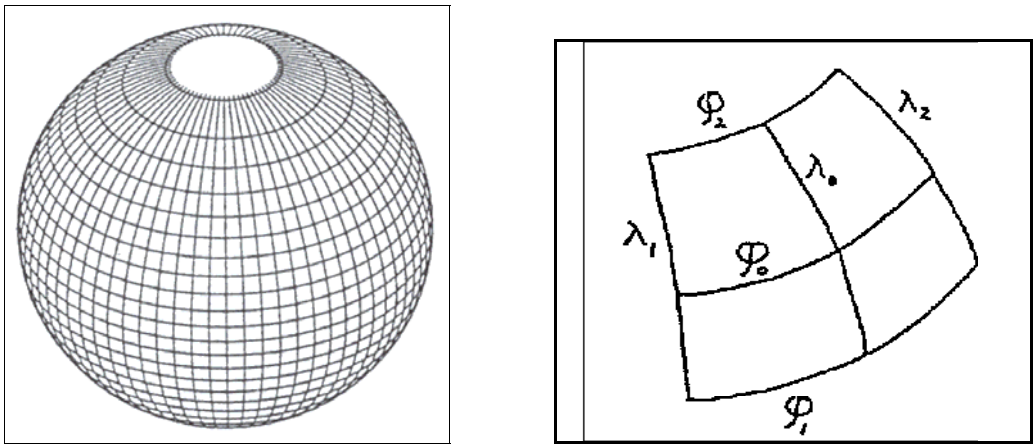
Despite their many advantages, the GRID information systems are actually not commonly used for political decisions. One of the basic problems to be solved is the lack of harmonisation of the various grid systems used by researchers or data producers. The ESPON program has thus to decide very quickly which reference grid will be chosen for the period 2002-2006.

A regular grid, based on a division of space after a geographical projection of Europe, has many practical advantages. As the grid is established after the projection, it is very easy to produce maps and to compute spatial analysis models with raster oriented GIS. It is the solution generally chosen by statistical agencies (EEA) or by researchers on accessibility (INRETS, Spiekermann & Wegener,). The main problem hereby is that the geographical projections used by the agencies or researchers are not generally the same and that the precise location of grid points can be different, even if the same projection is used.

Therefore a regular grid based on a division of the earth's surface without projection will be a better solution in a long term perspective. Following a proposal

of W. Tobler & Z. Chen (1986) the use of a system of *Authalic Grid* for the establishment of a hierarchical grid of cells of equal surfaces will be appropriate covering all the earth, and especially Europe. This system is very simple and powerful because it is based on a regular division of each grid cell of one level into four smaller cells of lower levels (*quadtree*) and can produce fully compatible grids at any level of geographical resolution

Figure 20: Principle of Authalic Grid with Quatree hierarchy (Tobler & Chen, 1986)



Comment : Latitude (φ) are transformed into authalic latitude (φ'= sin φ). It is now easy to divise the Earth surface in "squares" of equal surfaces defined by equal longitude (λ) and equal auphalic latitude (φ'). Each cell can now be divided in four cells of lower levels following the same principle and we obtain an hierarchical system of hierarchical grid based on quadtree.

Cartographical standards for maps derived from grid databases

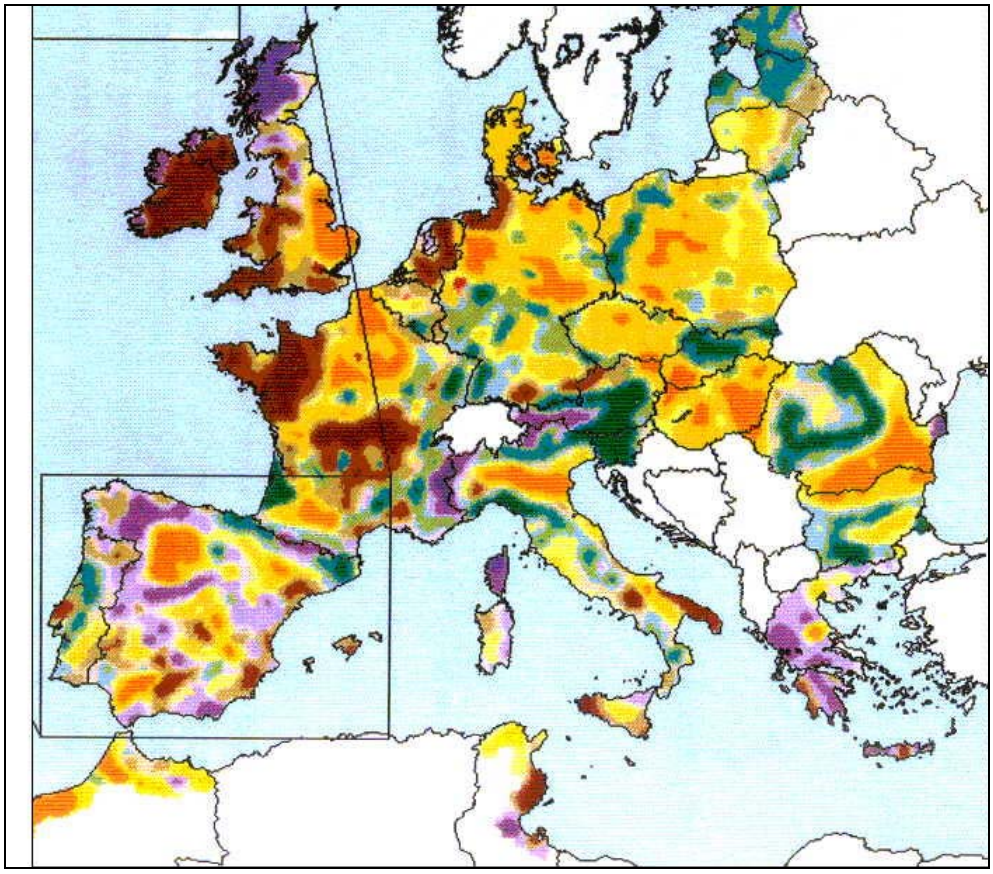
Grid databases offer the opportunity to develop innovative forms of mapping in the framework of the ESPON program (contour maps, 3-D maps, physical models).

Contour maps and other grid based cartographic presentations could furthermore easily be integrated in the future ESPON map design with the help of the ArcView and ArcGIS tools.

Standardisation of smoothing methods and spans of neighbourhood: For a better comparison of maps, it could be useful to define some standard smoothing methods like the gaussian solution developed by the Hypercarte Project (**Grasland C., Mathian H., Vincent J.M., 2000)** and used by statistical institutes (INSEE, EEA). It is also necessary to precise some standard spans of neighbourhood (degree of generalisation) like the EEA has applied the Gaussian smoothing method to land cover (CORILIS project). If we want to compare results

of different smoothing methods it is necessary to use the same method and the same spans.

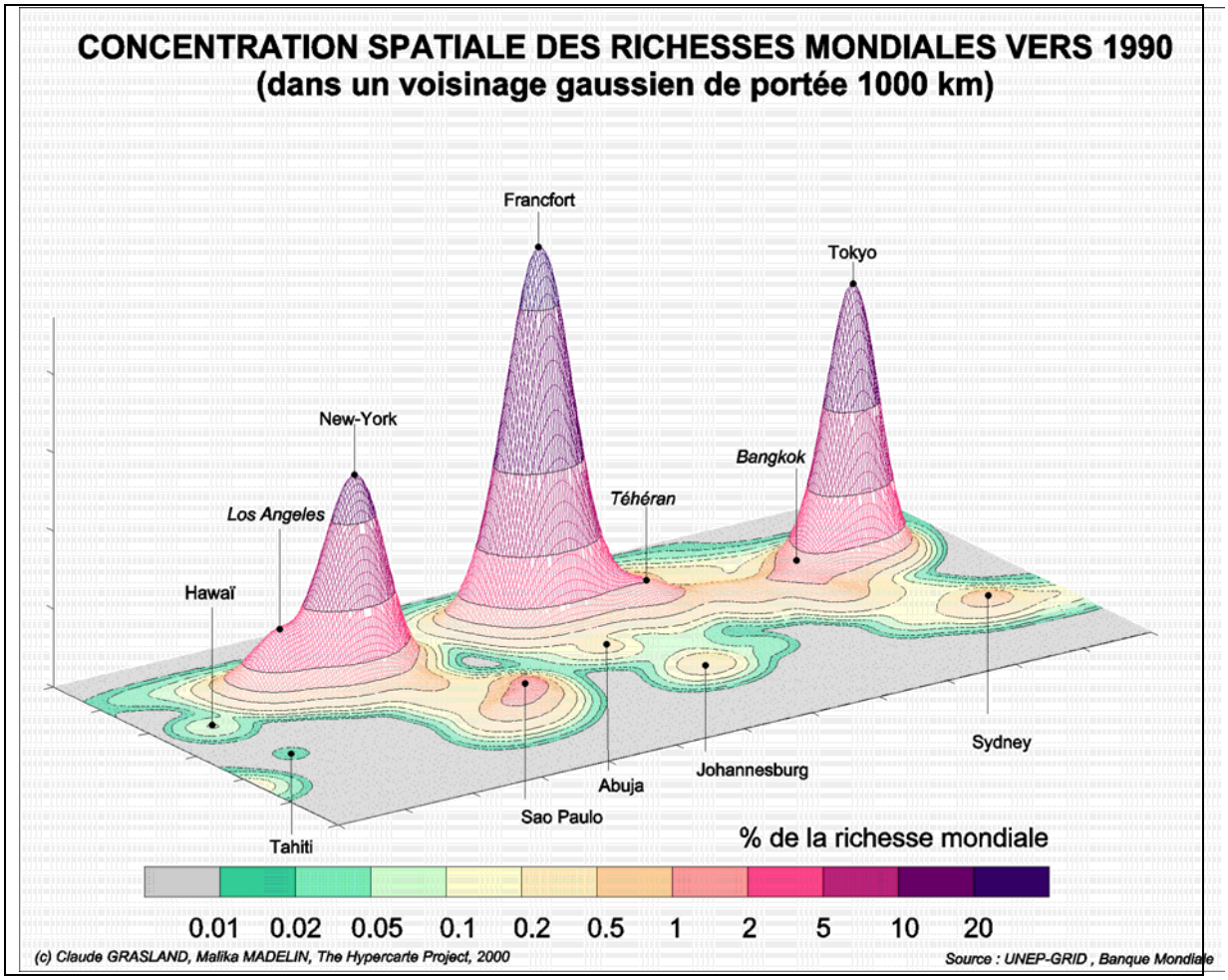
Figure 21: Smoothed distribution of dominant land cover types in Europe with Gaussian method (span 50 km)



Source : CORILIS, 2000, Ifen-GIM.

Standardisation of spatial framework and view orientations for 3D-maps is also a very important issue if we want to compare easily 3D-maps produced by various TPG's (accessibility, population distribution, etc.). According to the form of the distribution of peaks it is not always obvious to choose one standard orientation (which can hide interesting details). Alternative to paper reports, it should be interesting to explore the advanced mode of interactive visualisation of 3-D maps like virtual reality or physical models (GIS objects rapid prototyping) of GIS objects developed by W.D. Rase (2001) in the BBR.

Figure 22: World Distribution of GDP in 1995 in a Gaussian neighbourhood of 1000 km



Source : Grasland C., Madelin M., 2001, "L'inégale répartition de la population et de la richesse mondiales", Population & Sociétés, Mai 2001, n° 368, 4 p.

6.1.3 Network data

Network data difers from GIS in the sense that it contains a graph topology (features are connected as a nodes and links, and on the top of these other objectes such as centroids, connectors, routes, services...). A graph is just a binary structure where each link is connected to two, and only two, nodes so routing (shortest path algorithms) and other graph theory algorithms can be applied.

In Europe, a number of transport graphs have been developing by different institutions (Road Federation, UCI, DG TREN), companies and universities (NESTR, S&W-IRPUD, Mcrit, CESA, among many others). To these graphs, different data is attached as attributes and different graph segmentation and data models are used. Compatibility is not always assured, but a niminum common

referene data is available from GISCO transport coverages (despite its limitations as a graph).

One exercise in the ESPON is assuring if not compatibility in terms of raw data, harmonisation in terms of indicators being calculated. But it should be possible on demand and going to support other partners to provide raw data in blank shape. Therefore a transfer format for network data should be commonly used, thinkable could be the format of .E00-files, used i.e by GISCO.

6.2 GIS , cartography and visual communication

6.2.1 GIS Standards and Common Map Design

The GIS Standards and Common Map Design will be the central part of the ESPON data-base with the possibility to combine and integrate regional statistical data, geographical data and regional coverage to enable:

- calculation and combination of regional indicators
- geo-processing
- visualisation

ESPON GIS and Data

To guarantee the practicability and taking into consideration the EU member states' character and the idea of networking of European research institutions, institutes and universities, 'ESPON GIS and Data' will be implemented as a centrally co-ordinated and managed data network (ESPON 3.1).

The network must speak the same language (software) and the participants should follow and implement the general rules of data handling (see 4.1.1).

On agreement the co-ordination project (ESPON project 3.1) provides the general standards and ensures the final integration of the elements.

In respect to the common use of ESRI products in Geographical Information Systems the common software of the ESRI GIS will be **ArcViev GIS 3.X** for all partners actively involved and working with and generating indicators. Potential users of Arc GIS (ArcView 8.2, ArcInfo 8.2 with ArcMap) are free to use this

surrounding but should keep in mind the need of export in the ArcView GIS 3.X format of shape-files.

For others (users of GIS information only) there will be a possibility to visualise and extract information to a limited extent by **ArcReader**, a new ESRI product.

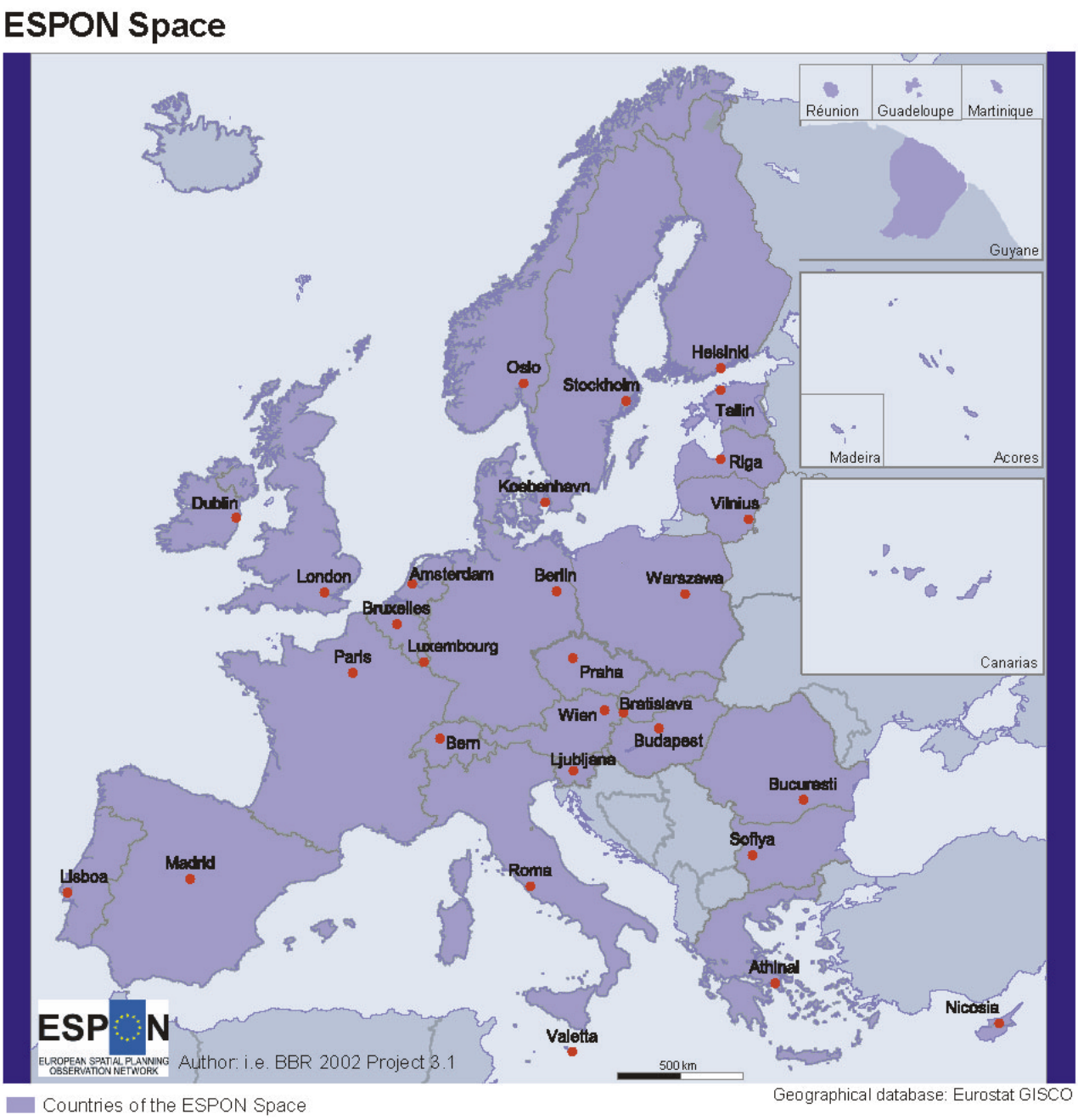
The Concept

Presenting analytical results of projects through maps will be one way in which the ESPON program will visually communicate with the political and scientific world as well as the interested public. Maps should be recognised as 'ESPON products' and the presentation of project results should contribute to the "visibility" of ESPON (without neglecting individual authorship). Therefore it seems appropriate to establish an ESPON corporate (carto-) graphic design.

The map design will consider existing graphic symbolisation of the ESPON – program and will ensure the recognition of the partners.

Concerning the cartographic layout, the fact representing spatial phenomena must be considered using a cartographic equal area projection.
The process of EU enlargement after 2004 requires a new cartographic and less EU15-centric view on Europe. Including EU15, the Accession Countries, Switzerland and Norway, the ESPON-Europe should be centred a bit more to the east compared to the currently used EU15 maps.

Figure 23: The ESPON Space



In the ESPON mainly dealing with spatial data the cartographic projection used should respect the mapping of equal areas. This is respected using the Lambert equal area azimutal projection. A projection commonly used for maps of Europe.

The “ESPON Europe” stretches roughly from a longitude of 10 degree West to 40 degree East. The middle of this map is 15 degree East, and lies about the river Oder in the Polish-German border area.

In co-operation with the other partners the co-ordination project provides:

- a general ArcView Project with a special ESPON map design to ensure a corporate cartographic identity. It will include:
- an ArcView Shapefiles Set for different regional levels (NUTS) and general topographic information (cities, rivers) and
- a set of geo-references of different regional levels.

This will be distributed in ESPON for further use in compliance with the general concept.

It must be discussed and elaborated within the ESPON process in which way specific projects might contribute general geographic information to this set.

The cartographic representation should consider cartographic conventions concerning i.e. choise of colour associative to the presented topic.

6.2.2 Web based GIS

Aim - scope

The development of an Internet application for the diffusion through maps of the spatial indicators of the TPGs results is of major importance. This task will satisfy: the specific needs of the inter-project visual communication (within ESPON 2006) and the transfer and dissemination of the results of spatial analysis and indicators, through an integrated spatial tool.

In an interactive way, users of different institutions and territorial levels may visualise the results the ESPON 2006 project groups have elaborated. The use of this tool will facilitate the internal exchange and production of knowledge through web-based networking inside the ESPON and will serve – through the online promotion of the ESPON results – as a multiplier of this knowledge to the public.

Basic functions

The basic function of the interactive GIS concerns the production of customised thematic maps (by regions and countries) based on the statistical data once it has been validated and properly documented. The interactive GIS will also provide graphics and reference maps with geographic features and networks (e.g.

transport networks, situations and topographic information). The user will be able to use basic mapping functionality like:

- *Querying spatial and attribute data.* Build new queries or run predefined queries to derive specific information.
- *Image rendering.* Takes a snapshot of the view that the user created of the available geographic layers and save it in different image format (e.g. jpeg).
- *Create buffers around features* (e.g. point, lines).
- *Data extraction.* Request, under permission, real geographic or statistical data.
- *Pan and Zoom* the map's extent.
- *Changing measurements and display units*.
- *Measures distances* on the map.

Maps and graphics, once produced, can be easily cut and pasted to text editors to be included in reports or to graphic design or multimedia applications for presentations. User friendliness and easy interactivity will be the basic design criteria.

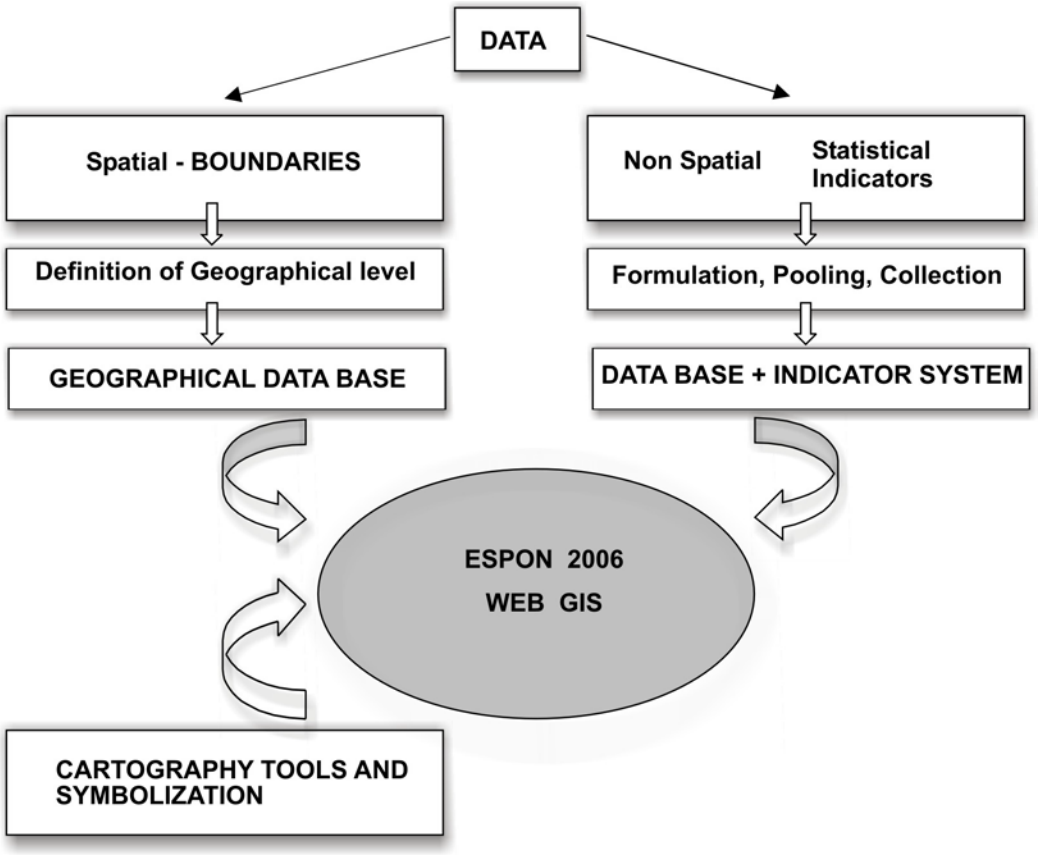
Prerequisites

The interactive (via internet) spatial analysis tool will be elaborated by using as prerequisites the output of the following geographical and statistical data bases:

- A geographic data base (boundaries of NUTS II mainly and in some cases of NUTS III).
- A relational data base containing indicators and associated data.
- A common cartographic base for the creation of map outputs.

The following diagram indicates the inter-relation and connection of the above tasks.

Figure 24: ESPON web based GIS



Web architecture – technical specifications

The internet-based GIS platform will be ArcIMS 4 which runs in a distributed environment and consists of both client and server components. This allows us to build the platform centrally and deliver a wide range of maps and data.

For the client level custom HTML and Java Scripts will be used to modify the look and make it user friendly. The HTML will be used in order to access maps and tabular data. The user will be able to interact with maps and attribute displays (for a specific geographical layer: NUTS II) through a simple but powerful set of GIS tools. For more sophisticated GIS functionality Java will be used. Finally, in order to modify map configuration files (e.g. change the appearance of map features), ArcXML language will be used at the server level to communicate between client viewers and ArcIMS server

6.2.3 ESPON Hyper Atlas

The *ESPON Hyper-Atlas* is a specific application realised for ESPON 3.1 by a French research group of the CNRS established in 1996 and called *The Hypercarte Project*.

The Hypercarte Project

The purpose of the *Hypercarte Project* is to create interactive production tools for the representation and cartographic interpretation of spatial phenomena. It takes into account the particular nature of these phenomena (such as mobility) as well as the extreme complexity of the social and political demands which can be directed to a statistical cartography. The concept of "*Hypercarte*" is based on the central hypothesis that any spatialisation of a social-economic phenomena can be the subject of an infinite number of representations according to their intrinsic nature, and/or according to the hypotheses of the map designer and/or according to the objectives, demands, skills or even faith in the end.

The working program of the Hypercarte Project which has been successfully applied during previous work (CD-ROM " 6 billion people"; study of the SPESP on the accessibility in Europe) consists in establishing a continuous dialog between three dimensions that are implemented by three specialised teams involved in the project.

- **The theoretical problems set by the spatial analysis and the cartography of the social phenomena** constitute the first working axis which is under the responsibility of the *UMR 8504 Geographies-cities*, in partnership with the other teams or the research networks in social sciences.
- **The computer problems set by the development of automatic cartographic modules on a Web server** are under the responsibility of the team of data processing and parallel calculation (*ID-IMAG*) which has to build an infrastructure of real-time calculation of maps derived from a theoretical tool (see Figure 23). These parameterised maps may be virtually infinite according to the objectives and the user demands. The goal is to build an infrastructure of calculation, pre-calculation and intermediate storage capable of answering a high stream of demands without storing all the possible maps which is impossible a priori.

- **The computer and cognitive problems set by the access to virtually infinite information and by the heterogeneity of the potential users** fall under the expertise of the team of information system (LSR-IMAG) which has to design an information system able to quickly deliver to users maps according to their specific needs, while checking if this information is not source of ambiguities or errors of interpretation on behalf of the user. It is thus necessary to discover the profiles of the users, either by their explicit specification or by tracking user requests.

Theoretical and methodological background

The theoretical and methodological research work of the ESPON part of the Hypercarte in defining basic cartographic modules, that are procedures and types of analysis of the distribution of a social-economic phenomenon presenting specific formal characteristics on the spatial side. At this level of analysis, we do not try to study precise indicators (density of population, unemployment rate, wealth per capita) but to define sets of reproducible social indicators in a large number of situations (part of a sub-population in a population of reference, allowance of a resource for a mobile population, distribution of a stream of events in a population or a sub-population, etc.) and to track down the types of queries which can be asked in these types of situations (study of disparities, of accessibility, of discontinuities, multiscalar study of the distributions). In a more precise way, the current work is organised around two packages corresponding to the fundamental opposition between discrete approach (territoriality) and continuous approach (accessibility and spacing).

- **The Multiscalar Territorial Analysis (MTA)** package is related to the production of maps observing the distribution of social activities within the limits of one or several territorial divisions that are supposed to be relevant to the respective phenomenon. It will be decomposed into more specific sub-modules concerning the study of the hierarchical phenomena of fitting (e.g. deviation of a territorial unity in relation to the various territorial divisions at higher levels), phenomena of territorial neighbourhoods (e.g. discontinuities between contiguous territorial units), classifications taking into account neighbourhoods (e.g. regionalisation combining similarity and constraint of contiguity) and finally

innovative maps of territorial divisions in two dimensions (e.g. anamorphous) or in three dimensions (e.g. Tobler's picnophylactic method).

- **The module of Multiscalar Spatial Analysis (MSA)** will concern on the distribution analysis of social phenomena in a continuous space released from the initial limits of territorial stitches by means of procedures of smoothing with various spans (see Figure 2). It will contain sub-modules of stock distribution analysis (e.g. quantity of accessible population according to the distance), of rate analysis (e.g. average, heterogeneity or pressure gradient of the intensity of a social phenomenon for a certain hypothesis of neighbourhood) and other analysis such as the comparison of the intensity of the phenomenon to two levels of neighbourhood. As in the former case, more specific cartographic tools will be designed to represent the social phenomena in two or three dimensions.

Other modules will be implemented later, notably modules taking into account the presence of urban networks or transport systems and the space-time dynamics which consider problems in each of the previous modules.

Application of Hypercarte results to European Spatial Planning: The ESPON Hyper-Atlas

The concepts developed by the *Hypercarte Project* will be very useful for the development of new tools for territorial planning on various scales. Many methods developed by now have been used not only by researchers but also by statistical institutes (EEA, Eurostat, IFEN, INSEE) or by territorial planners (smoothing methods, discontinuity analysis, multilevel territorial analysis, …). But in many cases, it appeared difficult to generalise the use of those new methods because no standard software was available (e.g. discontinuity analysis) or because the computation time was too costly (e.g. smoothing methods applied to Corine Land Cover or Nuts 5 level).

For this reason, the members of the *Hypercarte Project* will develop a specific application of selected spatial analysis tools dedicated to the European databases which will be analysed by the TPGs in the framework of the ESPON 2006 program. Beyond web-based GIS the aim of the **ESPON Hyper-Atlas** is to offer an efficient and easy access to some fundamental spatial analysis tools to all members of the ESPON projects and to produce added value to the work performed by all other ESPON TPGs. The Hypercarte project will propose a set of standard tools which can be easily and quickly applied to all indicators introduced in the ESPON database.

Timetable of the ESPON Hyper-Atlas

December 2002: Adaptation of the Hypercarte modules to the specific structure of the ESPON database. Definition of spatial units, spatial levels, typologies, contiguity tables, distance matrices etc. to be introduced for the implementation of spatial analysis modules.

June 2003: Implementation of the modules **ATM1** - **multiscalar deviation analysis** (position of a region according to various territorial neighbourhoods**)** and **ATM2 - discontinuity analysis** (computation and map of divergences between contiguous regions) on a preliminary set of variables (GDP, Population and Unemployment on Nuts 2 or Nuts 3 level). Presentation of a prototype and validation by other members of ESPON.

Sept 2003: Final version of ATM1 & ATM2. Beginning of development of the module *ATM3 - policy objective analysis* (simulation of regional allocations of European funds according to various combinations of criteria and various scenarios of political enlargement).

Dec 2003: Final Version of ATM3. Development of the module *ASM1 – multi-scalar smoothing methods based on physical distance.*

June 2004: Final version of the module ASM1. Development of the module *ASM2 - multiscalar smoothing methods based on functional distances.*

Figure 25: Objectives of the Hypercarte Project

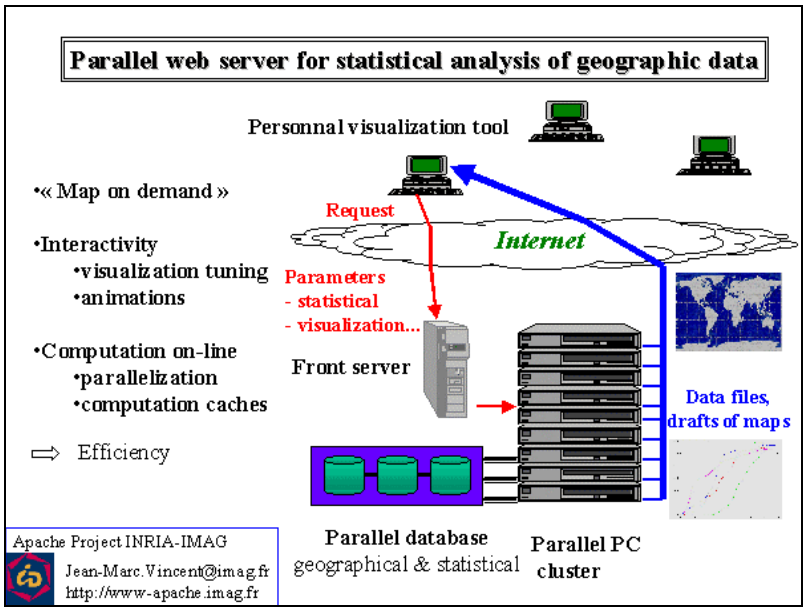
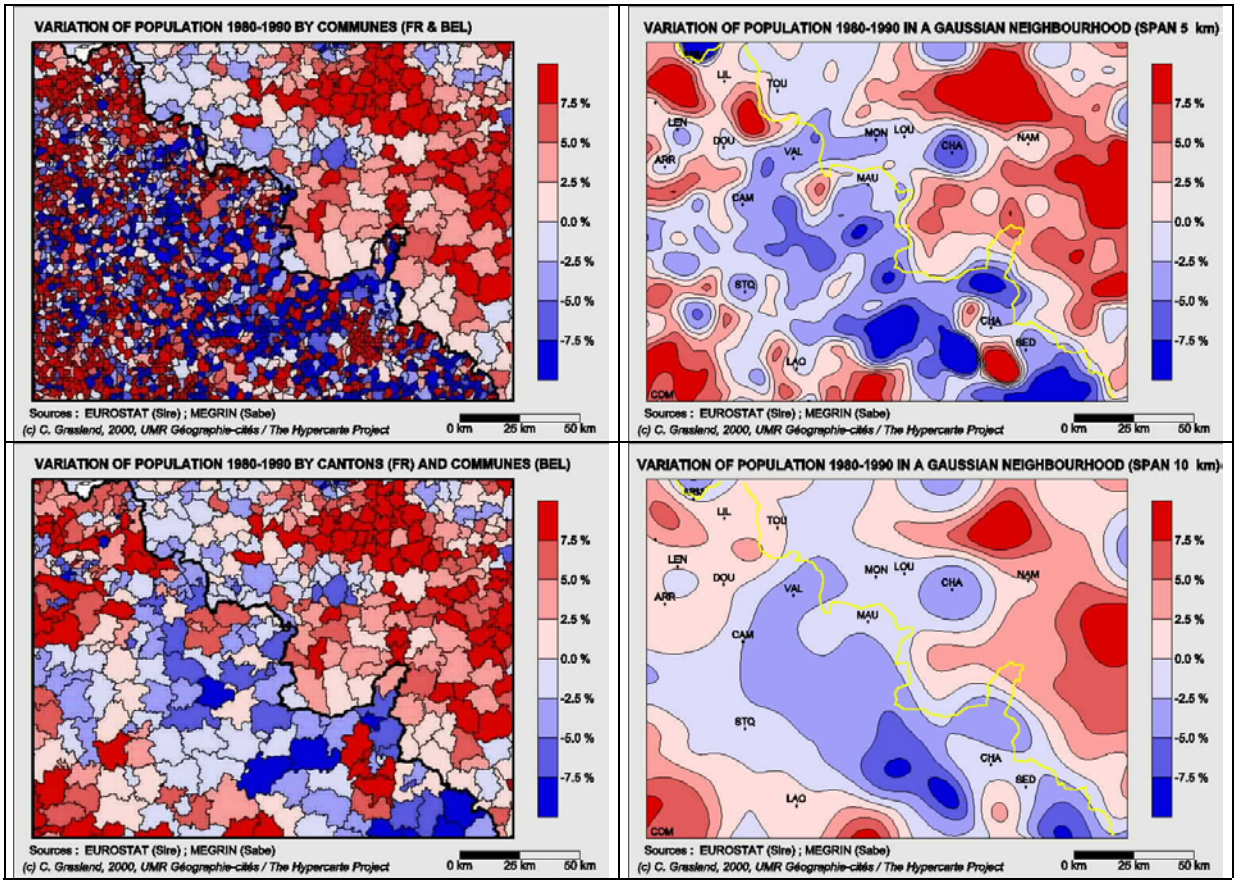


Figure 26: Example of Hypercarte application to cross-border regions (FRBE)



6.3 ESPON data networking and integrated data base

In combination with the provision of general tools and standards (ArcView shapefiles or ArcView-related formats, unique tables, same layouts and references) the transfer of data and the use of data by other partners will be guaranteed and the integration of a combined data base will be possible. Geographical data can be included for analytical and visualisation purposes.

From a database integration point of view considering the thoughts of data formats (see 4.1 for more complete reference), the necessary standards assuring compatibility refer to:

- The electronic format in which indicators are actually stored
- The documentation attached (or metadata) to be recognised

On electronic formats, the follwing ones are adopted for the common repository:

- DBF, MDB and XLS for alfanumerica data, stuctured in relational tables with geographic features coded accoring the general framework
- SHP for geographic data
- JPG, BMP for raster images and pictures

Concerning metadata, the documentation will ensure in one single page for each indicator to be included in the repositiry, structured according to the "SPQR pedigree form" (developed on the spotlightsTN EC Research Project) being as follows:

- S Sample data description (units, years o period, sources of the data used to produce the indicator)
- P Theoretical Postulates (literature and references supporting the formulation of the indicator)
- Q: Quantifiers used (precise description of the mathematical formulation and numerical algorithms used)
- R: Policy Relevance of the results obtained according to ESDP policy aims.

According the construction of ESPON as a network of research projects the ESPON data base will work in the same way. Each project partner possessing or generating spatial indicators provides the relevant indicators and the related raw (background) data for the network. In return each project partner has access to all data of the other partners. On demand each partner provides the information asked for by other projects.

Within the data network of ESPON centrally organised data co-ordination ensures the 'trade' and transfer of the data, formally regarding the compliance with the 'rules'. This 'data wholesaler' collecting and providing data for the ESPON network with the support of by all other projects will be established within ESPON project 3.1.

Data requirements within the ESPON network and to the outer world, requests and provision will be centrally focused and spread. The data co-ordination project formulates the data demands to the outside (Eurostat, DG, etc.) to avoid confusion within the ESPON and potential disturbance outside.

By this the ESPON data base consists of the central core out of which every partner could serve himself with the information needed. The single ESPON projects use subsets of the ESPON data base for their analyses and presentations. Any relevant changes in these subsets should always be re-integrated into the central ESPON database.

The central data base in itself provides the opportunity to export specific common data formats on demand. Therefore it must be especially related to regional-statistical data and indicators open, flexible and transportable in case one partner might have a complete update of the data. The storage of these data within the SPSS-system could be the most appropriate.

7 Additional activities of the ESPON project 3.1

7.1 Integrating Accession and Neighbouring Countries

ESPON project 3.1 tries to integrate the Accession Countries (ACs) as well as Neighbouring Countries (NCs) to facilitate common views on the spatial development trends and policy issues in an enlarging European Union. It should help to bring in the knowledge and specific views of ACs into the ESPON results and allow exchange of experience between the 3.1 TPG and experts of the ACs and NCs.

All the ACs as well as the NCs have been invited previously to participate in ESPON 2006 at the programme level. Adressees are the Accession Countries Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic, Slovenia, further Romania, Bulgaria and Turkey, as well as the Neighbouring Countries Iceland, Norway and Switzerland, further Croatia, Bosnia-Hercegovina, FRY, Macedonia, Albania, Russia, Belarus, Ukraine and Moldova.

However, with respect to the ESPON Programme the process of full participation is already taking place. It was announced at the ESPON Seminar in Luxembourg on 21st and 22nd of November 2002, that Slovenia, Switzerland and Norway are already full members of the ESPON network, Hungary is just in the formal procedure. Malta, Latvia and the Czech Republic have joined as Observer Countries. Within the overall ESPON budget, additional funding will be provided for the participation of those countries.

This means that representatives of the ´additional ESPON Programme member states´ as well as of the ´observing countries´ may join TPGs on their own choice. It is an open question whether some more countries will become full members or will gain observer status and some will not participate in an active role at all.

ESPON Contact Points" (ECPs) are envisaged to be established in the ACs, but still it is not clear in which ones.

What the participation could look like in practice has not been agreed yet. It is clear, however, that projects will not change their work programmes and budget outlines because of the added partners. Several project (lead) partners made clear at the seminar that they would welcome observers, under the condition that their number would be limited and that there would be a structured approach as to how they could participate.

ESPON project 3.1 will try to address all the ACs and the NCs at the level of project 3.1, independent from their formal status of participation at the programme level, as far as it is possible with the amount of money reserved for project mentioned and the available capacity of work.

The networking and promotion strategy for the integration of the ACs and NCs will include regular information about progress and results of ESPON activities for delegated experts in order to being able to take their experiences and views into account . In addition, this can be considered a proper preparation for the full and smooth integration in case, and at the date of accession of the countries to the Union.

The *networking activities* concerning Accession and Neighbouring Countries within the context of the ESPON 3.1 project will be started by a first list of main contact persons in the ACs and NCs will be elaborated by contacting the Co-ordination Unit and the "ESPON Contact Points" in ACs. This first list will be supplemented by suggestions of project partners. Depending on whether the new partners will name scientific institutes as ECPs for there respective country, either these ECPs and/or other interested spatial development experts will be invited to act as

observers in the ESPON 3.1 project. This *"External Expert Group"* should meet at least twice during the project period. The final list will be co-ordinated with the Co-ordination Unit.

The 3.1 Intermediate Reports will generally be accessible at the home-page of the ESPON programme. This can be taken as basis for *the discussion of the 3.1 Intermediate Reports* also by the External Expert Group The group will be invited to *two meetings (work-shops),* which should serve as exchange of experience and discussion platform for the ESPON 3.1 TPG (beyond possible members and/or observers from ACs and NCs). The direct involvement and dialogue should guarantee a high quality of results for the ESPON 3.1 project and thus for the whole ESPON Programme.

The first work-shop should take place between the 2nd and 3rd Intermediate Report, maybe in April/May 2003, to being able to include the results in the 3rd Intermediate Report. Apart from the involvement of ACs´ and NCs´ delegated experts in several TPGs (and thus, their possible participation also in the ESPON Seminars) the work-shop should facilitate the dialogue on the more general issues concerning the ESPON Programme. It should deal with specific thematic, political and methodological issues concerning the enlargement and neighbouring areas in the context of the ESPON 2006 Priorities and Measures. Therefore, the External Expert Group will receive in advance key questions to focus the discussion on these issues and topics.
The second work-shop should take place between the 3rd Interim and the Final report with regard to the time schedule of the overall project.

One option for locating and timing the work-shops could be also to organise it in connection (but apart from it) with the ESPON Seminars to come.

The results of the two work-shops will be utilised and find their precipitation in specific chapters on the issues ACs and NCs and the procedure of enlargement in the 3.1 ESPON Intermediate Reports to come.

7.2 From analysis to policy recommendations

The analytical work carried out under the framework of ESPON, involving spatial analysis tools, cross-sectoral approaches, descriptions of current trends and spatial impacts of various policies, is intended to result in recommendations for future policy-making supporting the aims expressed in the ESDP-document. Thus it will be necessary to translate the analytical results into punchy policy messages.

Policy recommendations are embedded in a reference framework. In consequence the elaboration of policy recommendations needs to consider carefully -

- objectives which are explicitly of implicitly envisaged,
- underlying spatial concepts and spatial development paradigm and
- (spatial) typologies describing the thematic matter involved in order to see the analytical base.

The overall work with the elaboration of policy recommendations will involve two complementing approaches.

On one side, this part of the project will be based on the work of the various other ESPON projects. Drawing on their reports and - bringing together the policy recommendations explicitly or implicate expressed in their work will allow to give a first comprehensive overview. In doing so the formulation of policy recommendations relies on high-quality inputs by the other ESPON projects. Therefore it is necessary that each single ESPON project reflects upon the direct policy relevance of its scientific contributions and formulates policy recommendations deriving form its work. Acknowledging that a number of studies need to rely on case studies, the choice of single cases needs to be considered carefully concerning Europe wide conclusions to be drawn in each single study. As the policy recommendations are to address EU 27 (+2), the European dimension is the most important point of reference. An appropriate balance between thorough scientific work, including detailed case study, and comprehensive European policy recommendation is necessary for the overall success of ESPON.

On the other side, policy recommendations can hardly be elaborated as desktop research. Thus the main emphasis will be on a process-oriented approach to filtering and reformulating this first comprehensive overview. In this respect it is important to keep in mind that European spatial development policy is an

interdisciplinary field of policy-making, drawing on a broad variety of cultural differences. Therefore, a multinational team reflecting different European policy cultures and professions will handle the work. As part of the process-oriented approach, policy recommendations will be subject to external quality management involving key persons outside the project-sphere of ESPON:

- The proper of reflection of the situation in EU accession and neighbouring countries will be guaranteed by the involvement of sparring partners from Candidate Countries.
- In general, sparring partners within public administration in various countries will provide the opportunity to test- as well as to discuss policy relevance and acceptance of recommendations.

A suitable solution might be to actively involve the ESPON Monitoring Committee as reference group commenting on the work regarding policy recommendations. The half-yearly ESPON symposiums might be a useful arena for organising such feedback processes. Certainly, also the feedback from the various ESPON projects will be asked for in this context. Anyway, as a result of the broad spectrum of aspects to be covered, it would also be possible to complement these general feedback processes with a more flexible approach. This implies that key persons holding specific policy-knowledge are identified whenever needed and either are asked to comment on a certain document. This will however, only be in addition to the active work with the ESPON Monitoring Committee.

In addition to those overall aspects of the approach to formulating policy messages deriving form the knowledge generated under the framework of ESPON, there are a number of general issues to be considered.

It is intended to distinguish between recommendations addressing different levels of policy making (regional, national, European). Furthermore, it is planned to distinguish between short and long-term strategies reflecting on the one hand structural changes and on the other hand process/actor related changes.

Experiences have shown that the visualisation of spatial policies is a challenging task. Nevertheless, this work is of importance with regard to the spreading/success and understanding of policy aspects. Thus, visualisation of policy relevant findings deriving from ESPON research tasks should be further strengthened.

Finally, there remains the question of timing of this work within the overall ESPON schedule. Mainly it is intended to work towards two deadlines: the pre-third final report phase during which tentative recommendations will be presented and the pre-final phase during which final recommendations will be presented. The ESPON symposiums between those two reporting phases will be crucial for the dialogue with the ESPON Monitoring Committee.