ESPON

EUROPEAN SPATIAL PLANNING
OBSERVATION NETWORK

In search of territorial potentials

Midterm results by spring 2005

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The content of this document is based on the results of applied research provided by the transnational teams of researchers taking part in the ESPON programme. As such, the maps and their corresponding texts do not necessarily reflect the opinion of the ESPON Monitoring Committee.

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FOREWORD

The European Spatial Planning Observation Network (ESPON) is set up to support policy development and to build a European scientific community in the field of European territorial development. The main aim is to increase the general body of knowledge on territorial structures, trends and policy impacts in an enlarged European Union. The ESPON programme began its applied research activities in 2002.

By 1 April 2005, 15 of the 30 ESPON projects have provided their final results. This constitutes an important milestone for the ESPON programme as a substantial new body of knowledge on the trends, policy impacts, imbalances and potentials within the European territory can now be communicated to and discussed by practitioners, scientists and policy makers.

All of the applied research undertaken within the ESPON programme addresses the territory of 29 European countries including the 25 Member States of the EU, the two EU accession countries of Bulgaria and Romania, and Norway and Switzerland.

This second ESPON Synthesis Report is based on the most recent reports from Transnational Project Groups that have worked, or are currently working, on themes of territorial development or on cross-thematic activities within the ESPON programme. The transnational teams of researchers must all be acknowledged for their contribution. Information about partners behind each project is available at www.espon.lu/network. The present synthesis report draws on all of these projects to provide an integrated discussion of territorial development issues, although the report does not provide summaries of each project.

This report was drafted by the ESPON Coordination Unit, supported by an editorial group including Jacques Robert (project 3.2/Scenarios), Peter Schön (project 2.4.2/Integrated analysis) and Thiemo Eser (ESPON Managing Authority). The ESPON Monitoring Committee and the network of national ESPON Contact Points also contributed with valuable comments. Furthermore, in relation to the production of the maps in particular, the team was ably supported by Volker Schmidt-Seiwert.

The results of the ESPON programme are disseminated in an open and transparent fashion in order to continually nourish the discussion on findings and methodologies related to territorial development, both in the European research community and in the political sphere. Reports such as this one represent an attempt to summarise results of the ESPON programme at a certain point and should not be considered final, particularly where new and innovative methodologies have been employed integrating results from different projects.

The ESPON website at www.espon.lu provides extensive information on the actual progress of the ESPON programme, giving visitors the opportunity to consult in detail the individual project reports that provided the basis for this second ESPON Synthesis Report.

Please note that the report does not necessarily express the opinion of the ESPON Monitoring Committee and its members.

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SETTING THE SCENE

The purpose of this second ESPON report is to synthesise and communicate some of the most recent results on basic structures, dynamics and policy impacts in support of ongoing European policy developments related to the European territory. The report intends to contribute to the process of carrying through the re-launched Lisbon strategy and to improving the regional competitiveness as well as to the objective of territorial cohesion and cooperation by displaying the regional diversity of important framework conditions for exploring and exploiting the variety of territorial potentials within Europe.

In policy terms, Europe is debating a stronger territorial focus for its policies. The basic goal of a balanced and harmonious EU territory has been developed by the Member States and the Commission within the European Spatial Development Perspective, ESDP (1999), leading to commonly agreed policy orientations opting for better territorial balance and polycentrism, improved regional competitiveness, access to markets and knowledge as well as the wise management of natural and cultural resources. Taken together, the policy orientations call for the development of the European territory along the lines of a decentralised development model, which can counteract the ongoing geographical concentration of many sectors of European society in the Pentagon and in highly urbanised areas. The long-term ambition is to see a European territory with many prospering regions and areas, geographically well spread, and all playing an important economic role for Europe and providing for a good quality of life for their citizens. Awareness is therefore rising of the 'added value' of considering the territory as a unit of analysis and as basis for policy making, an approach that is likely to stimulate a better coordination of sector policies. This is visible at local and regional level and has as well been embarked upon by some EU Member States and in the context of transnational cooperation between several countries and their regions.

The re-launched Lisbon Agenda sets out an overarching strategy for a sustainable development of the EU, with the clear objective of creating a competitive knowledge-based European economy while at the same time ensuring a sustainable future for European citizens. The revised strategy, centred on growth and jobs, was adopted at the Spring Summit on 23 March 2005. The main goal is to provide sustainable welfare for all citizens living in the European Union, including the creation of attractive areas for business development and for daily life. Although the Lisbon Strategy has no explicit territorial dimension, one of its three main priorities calls for Europe to be made an attractive area in which to invest and work. This priority includes considerations relating to access to markets and the provision of services of general interest as well as to factors relating to the creation of a healthy environment for enterprises and families. Although European regions possess development potentials that may contribute to general competitiveness, not all of these potentials are however related to the knowledge-based economy as promoted by the Lisbon Strategy.

The implementation of the Lisbon strategy and of future Structural Policies will take place in regions, in national territories and at European level. Therefore, a key question for policy makers at different levels is to explore, identify, understand and select potentials for development within their own territory in order to contribute effectively to this overall European strategy.

The current Treaty mentions the notion of territorial cohesion. The new Constitution for the European Union, currently in the process of ratification, includes territorial cohesion as an objective for the further development of the Union. In this respect, a territorial dimension has been proposed for the conception of Structural Policies after 2007. The Commission has as well proposed European territorial cooperation as an objective for Structural Funds interventions 2007-2013 in support of territorial cohesion within the European Union.

The EU Member States endorsed a territorial agenda for Europe at their informal meeting on 29 November 2004 in Rotterdam. Ministers highlighted at this meeting the importance of adding a territorial dimension to the Lisbon and Gothenburg Strategy and the importance of the concept of territorial cohesion, which together with economic and social cohesion are mentioned in the new European Constitution as objectives of the Union. They also endorsed the preparation of a document on the state and perspectives for the development of the European territory, addressing the common territorial challenges and the 'added value' of a better coordination of territorial impacts of sector policies.

The current results of the ESPON programme provide information, enabling a better understanding of the framework conditions necessary for identifying and mobilising the territorial capital of individual regions and of larger territories across Europe. ESPON has not convened in depth research on the detailed potentials of regions and larger territories across Europe, such as an investigation into the detailed knowledge of local/regional productive systems, which are an important element of territorial potentials. This kind of analysis has basically to be done in a 'bottom up' process involving the expertise in the region or territory in question. In addition, the level of geographical detail in European data sets does not allow the ESPON programme to study regions or larger territories in such detail.

Current findings are conveyed to policy makers and practitioners in order to nourish strategies for the development of regions and for cooperation within larger territories. To this end, the variety of thematic indicators displayed on European maps in this report is intended to provide a rather comprehensive picture of existing conditions for the promotion of development in individual areas and regions of the European Union. This may support the process of exploring development potentials and the definition of their specific role or speciality in contributing to the Lisbon strategy and to a sustainable development. As such, the new approach adopted combining a number of territorial indicators, presented in the report, enlarges and complements the explanatory value of the key economic indicators, such as GDP per capita, which are currently used in relation to Lisbon and the Structural Funds.

More applied research activity on territorial trends, policy impacts, imbalances and development potentials is necessary to deepen further the understanding of the territorial dimension of European development and cooperation. Further analytical progress on methods and tools will continue within the current ESPON programme until the end of 2006. As however the EU Ministers for Spatial Development and the European Commission, at the their meeting in Rotterdam in November 2004, launched activities in support of a continuation within an ESPON II programme, applied research and monitoring of territorial trends and policy impacts may continue even after 2006.

Potentials within territories

European policy development touches upon two central concepts, cohesion and competitiveness. An often expressed dichotomy between cohesion and competitiveness, reflecting the widespread opinion that reducing disparities is incompatible with improvements in global competitiveness, has recently been challenged at political level by Ministers responsible for spatial development. Competitiveness and cohesion objectives are not necessarily considered contradictory in a territorial perspective. Indeed, exploring and exploiting "untouched" and underused territorial potentials and capital, in particular through territorial cooperation arrangements, might be able to improve the competitiveness of an area and at the same time contribute positively to objectives of territorial balance and cohesion.

Different regions can show their competitiveness in different fields by drawing on different types of territorial potentials. In addressing the issue of territorial potentials it seems recommendable to take stock of four basic elements:

- Territorial specialisation in the European context is inevitable, as each individual area does not possess the same type of potentials.
- The global competitive situation has to be considered, viewing Europe and its areas, regions, cities and larger territories as competing at a world scale. A positive development in one area of Europe does no longer necessarily implies that another European area will loose out.
- The understanding of trends and policy impacts on territorial development can be used as a tool in identifying possible territorial potentials and for deciding upon the most efficient policies and the governance mechanisms best able to exploit them.
- The conditions for promoting and exploiting territorial potentials often differ when viewed from a European, transnational, national or regional/local perspective. A search for potentials and policy initiatives, therefore, should carefully reflect the various geographical scales by using a three level approach.

Two types of investigations are necessary to tackle the issue of territorial potentials:

- Exploring territorial potentials has to do with perception and selection by the policy makers involved in developing an area, region or larger territory through spatial as well as sector policies. Potentials will also to a large extent be defined by praxis and by initiatives taken by private actors. Understanding the nature of territorial potentials requires detailed knowledge of the economic base of the region or area in question, knowledge on the enterprises present, their specialisations, skills and human resources in the labour force, etc.
- In addition, it is necessary to understand the framework conditions, the basic factors for development of the economic sector and for improving an area's attractiveness for investments, such as access to markets and ICT and business related services. Moreover, knowledge of factors such as the supply of services of general interest, access to nature and culture heritage is essential for the further sustainable development of settlements and the improvement of daily life.

The ESPON programme can contribute to a better understanding of the diversity of framework conditions and to the identification and exploitation of territorial potentials by presenting regionalised findings related to territorial infrastructures, trends and policy impacts within the European territory.

European diversity of territorial specialities

The diversity within the European territory has been studied in the ESPON programme using a variety of approaches. In this report the results of two approaches are present: A simple integrated approach (Part 1) and a thematic approach (Part 2). Detailed findings are available in Part 1 and 2 respectively. The following statements serve to give an overall impression of key findings related to main structures of the European territory as well as to current thematic and strategic priorities.

Europe is in some aspects moving towards more territorial cohesion, and a more balanced development. In other aspects, the increasing competition between locations leaves it rather uncertain, whether cohesion objectives will be met, or whether further geographic concentration will be the result.

The **Pentagon area** in the European Urban System tends to remain the economically and functionally dominant area. However, there are indications that some metropolitan areas and cities beyond the Pentagon perform well in the context of global competition moving Europe towards a more polycentric situation at European scale. The growing importance of major urban areas outside the core of Europe, such as Madrid, Dublin, Stockholm, Warszawa or Budapest, suggests that a further strengthening or continuation of such developments may lead to a more balanced territorial development in Europe. Indeed, the combined picture of the economic strength and economic growth of regions shows a rather balanced or polycentric picture of economically successful regions across Europe.

The traditional **core-periphery pattern** can be observed in a number of thematic analyses. However, more differentiated patterns seem to be emerging. The combined accessibility analysis is the only area included in this report with a clearly visible core periphery pattern. In a number of thematic fields the strength of Northern Europe, i.e. Ireland, UK, Denmark, Norway, Sweden as well as Finland is visible, which contributes to distorting the familiar core-periphery pattern by giving more weight to the Northern part of Europe. This is the case for several indicators related to the Lisbon strategy, to the labour market performance, to the level of naturalness as well as to figures for R&D.

Indeed, **rural areas and urban-rural relations** are important features for territorial balance, in particular at national and regional level. Endogenous economic potentials for development are present in rural areas. However, European wide a large variety of circumstances or framework conditions for the development of rural areas exists. This includes factors such as the level of restructuring of the economic base, the proximity to larger cities, the presence of medium sized and smaller cities as well as the endowment of natural and cultural assets. Currently, a more traditional urban-rural pattern appears in the field of infrastructure and the supply of services of general interest.

All regions dispose of development potentials. However, some regions have better preconditions for achieving the goals of the **Lisbon Agenda** than do others. In

particular with regard to the 5 Lisbon indicators selected in this report, high performance levels are not only confined to the Pentagon, but are also present in the more sparsely populated Northern Europe. Regions with the greatest challenge in terms of catching up are in general located in Eastern Europe. Framework conditions for a good Lisbon performance are not necessarily linked to the level of urbanisation.

Related to **innovation capacity**, research and development expenditure is currently highest in regions close to the Pentagon with some additional enclaves of regions in the north and south of Europe. At national scale the highest level of expenditure within countries can normally be found in the capital region, while R&D intensity varies considerably between regions, often concentrated to a small number of regions near the capital region. A territorial picture of knowledge-based Europe is rather balanced in particular with regard to university students, giving reasonably good access to higher level education in all parts of the European territory.

Access to knowledge and information, in particular borne by telecommunication infrastructures, shows that the roll-out of different telecommunication solutions to a large extent are reflecting the national diversity of cultures and priorities. Commercially driven broadband favours areas of high population density. Potentials linked to ICT endowment are in particularly advantageous in proximity to and within metropolitan areas.

Accessibility by road, rail and air, based on a combination of 5 indicators, reassembles a clear core-periphery pattern with the best accessibility potentials mainly for the Pentagon and the area to the east, including Berlin and Praha. Increasing traffic demand will justify new investments and might in the long run increase the accessibility to areas outside the Pentagon and to rural areas. The increase of road transport generates, however, additional pressure on nature areas and environment.

Population decline in Europe leads to increasing competition between different areas to retain their existing population or to attract new people. Analysis undertaken on demographic aspects addresses the issue of possible concentration or polarisation trends. It seems that particular (major) urban areas and "pleasant" retirement areas have the best potential to attract people. Despite a rather positive outlook for the countries bordering the Mediterranean Sea, a number of these countries face particular challenges relating to current demographic developments. In general, this type of competition increases the challenges for rural areas and also some urban areas that are less successful in maintaining their demographic base. Even major cities such as Berlin or Praha show signs of belonging to the latter group of urban areas.

Natural and technological **hazards** are profoundly affecting Europe, its citizens and the economic potential of regions. Changes in dry spell lengths as an effect of climate change might cause the greatest increase in the frequency of natural hazards, i.e. in floods, drought and forest fires, in the southernmost areas of Europe. One should not forget, however, that the human ability to exacerbate natural hazards through "artificial surfaces", straightening of rivers etc. offers the potential for minimising hazards risk through preventive measures. For natural

hazards the more peripheral areas of Europe often exhibit lower recurrence levels. The new EU Member States seems in general to be less exposed to hazards than the old ones.

Measuring nature areas in term of their **naturalness**, as expected, the lowest scores are mainly found in urban areas. However, many urban areas and larger urban agglomerations exhibit the same degree of naturalness as their surrounding areas. In general, the less densely populated areas in Scandinavia result in correspondingly high scores as regards naturalness. With regard to **cultural heritage**, such assets are a major territorial development potential in particular in urban and coastal areas.

Renewable energy sources such as wind and biomass are a potential source of electricity in many EU countries, in particular Ireland and Latvia. Solar energy is paradoxically relatively weakly exploited in southern European regions.

Competition between territories is a basic driving force ensuring regional competitiveness. Competition is however becoming increasingly global. In many cases, therefore, in exploiting territorial potentials it seems necessary to include the global context focusing on a functional specialisation as regards the global competition. Considering **Europe in the world**, over the past 50 years, Europe's share of the world's population has declined. Despite substantial economic progress in the same period Europe's share of the world's GDP has also declined, however with positive evolution in Spain and Greece in this respect.

Enhancing **territorial cooperation** can support the release of underused potentials and contribute towards territorial balance at European, transnational, national and regional scale. This calls for a European model of cooperation to ensure that territorial capital and potentials is being used in an optimal fashion. Territorial cooperation between neighbouring territories offers the potential to increase regional competitiveness, explore synergies and comparative advantages by providing a larger and more functionally integrated territory, a higher population mass and a shared labour market. Similarly the larger, inter-connected territory can cross thresholds in scale so achieve provisions of important facilities that enhance business attraction and also quality of life for residents. Such a model can in principle be applied to larger as well as smaller territorial contexts, such as urban-rural partnerships, urban clusters/networks of neighbouring cities inside Member States or across borders.

Actors at local and regional level, in particular, seem to possess the best options for identifying and using territorial potentials. This can be done for an individual area as well as facilitated through territorial cooperation, though it should be complemented by territorial knowledge provided at European level. Territorial cooperation naturally includes both rural and urban areas, thus offering the potential to avoid any counter productive competition between neighbouring cities, rural areas and regions. This might in addition provide the basis for new partnerships.

At European scale, territorial cooperation could provide for larger and more integrated functional urban regions and support a **polycentric development at European scale**. Cooperation between functional urban areas within 45 minutes

reach (commuting distance) offers the opportunity to strengthen or develop new competitive profiles. In total, 23% of such integrated areas would actually go beyond national borders calling for transnational cooperation. Conducted between neighbouring Metropolitan regions, territorial cooperation may have the potential to strengthen the profile and specialisation of larger territories within Europe and provide zones of global significance beyond the Pentagon. This option seems particularly interesting distant from the European core area. The current ESPON results offer initial ideas on such larger metropolitan clusters by mapping the functionality of the European Urban System. However, more in-depth analysis at European level is still needed as well as knowledge and initiative from metropolitan regions.

The key findings of the ESPON projects are, in principle, based on scientifically recognised statistical and analytical methods. However, as noted previously, further methodologies for integrated territorial analysis will be explored and discussed in order for the European scientific community to progress further in this field.

Territorial impacts of EU sector policies

Many policy interventions affect territorial development in different ways. Mostly the territorial implications are unintended side effects of sector policies, mainly designed to attain sector objectives as efficiently as possible. It is one of the basic assumptions of the ESDP, that spatial development policy, or territorial thinking and awareness in sector policies, can profoundly contribute to a better, less costly and more efficient implementation of policy orientations for territorial development. However, this requires coordination and assessment.

Territorial impact assessment of policy interventions should offer insights on how various policies are affecting territorial development and to what degree synergies or contradictions exist between the policies, once they are implemented in a region or a larger territory.

The first territorial impact studies carried out by ESPON illustrate that in most cases territorial effects of European policies are unintentional as the majority of EU sector policies do not include a territorial dimension. In addition, a multitude of indirect or intangible impacts can also be seen to exist. For a few selected fields of EU sector policy some initial conclusions on territorial impacts are available:

- EU Regional Policy contributes to territorial cohesion. Structural Funds and Pre-Accession Aid affect territorial development via (a) the geography of spending, (b) the type of intervention funded and (c) indirect and intangible effects occurring from the procedures and principles applied. In particular the latter seems to be important in achieving territorial cohesion.
- EU Transport Policy, favours generally a balanced territorial development through the TEN and TINA projects. The projects in the new EU Member States contribute to accessibility and growths, but favour the central regions, which are already in a relatively good position. Secondary networks are largely national concerns, but deserve attention in order to spread the benefits from European infrastructure investments and to support a balanced development at national and regional scale.
- Common Agricultural Policy (CAP) has no explicit territorial aims, and works largely against the territorial aims of balanced development. The financial

assistance favours core areas more than the periphery in Europe. The Rural Development part of the CAP does however support cohesion objectives.

– EU Research and Development (R&D) Policy are felt most strongly in the wealthy core regions of the EU, where the effects of the Framework Programmes are the highest and a large amount of R&D activity is concentrated. However, there are signs that less developed regions are catching up. Considering the Framework Programmes and the Structural Funds together appears to offer a strong potential for synergy in relation to Lisbon goals and territorial objectives.

Behind these results lies an approach to developing a tool for Territorial Impact Assessments that considers the various European policy fields studied by the ESPON projects. The progress made has produced innovative results; however, the experience is that more methodological work is necessary on tools for territorial impact assessment.

One lesson learned is that the design of an assessment tool needs to be somewhat tailor-made for each sector as the way various sector policies operate and affect territorial development differs. The initial progress made, however, includes a list of common minimum requirements that should be applied in all assessments.

Another lesson worth noting is that the territorial impact assessments conducted so far are merely ex-post. In only a few cases territorial impacts have also been assessed ex-ante. Based on the experience of ex-post assessments, a feasible priority for ESPON II could be to develop robust instruments for ex-ante appraisals of territorial impacts.

The current level of progress indicates promising appraisals reflecting the territorial dimension of the aims of the Lisbon agenda. In particular indicators reflecting the aims of Lisbon will be further explored before the end of the first ESPON programme.

The use of ESPON results

ESPON results are generated from a European perspective with the aim of providing compatible information about all European regions. Covering a European territory of 29 countries in the applied analysis sets a limit to the detail level of such insights on individual regions and larger territories, due mainly to limitations in European datasets.

For policy makers and practitioners, in different policy sectors and at different administrative levels looking at ESPON maps, the challenge is to extract the larger territorial context and get inspiration for including a territorial dimension in further policy development.

The ESPON results and maps for the first time provide information on trends and policy impacts based on indicators for all European regions; this has two main advantages:

– Setting a framework for searching for territorial potentials, untouched and/or underused, that can assist regions and larger territories to contribute to the Lisbon objectives and to an improved level of regional competitiveness while also supporting cohesion and a better territorial balance.

– Giving the possibility to consider the city, region or area in question in a larger territorial context. It seems increasingly necessary to include a European and, in some cases, even a global perspective in strategies and decisions on the development of territories. This can uncover comparative advantages in relation to neighbouring cities, regions and territories and provide a basis for an added value through a territorial cooperation.

The ESPON projects have as far as possible been based on existing European wide regionalised data, which have been collected for statistical regions (the so called NUTS areas) with the largest possible detail. This may mean that diversities within regions can go unnoticed, in particular for statistical regions of large geographical size.

Future challenges for applied European territorial research

Further development of the scientific findings and networking will take place within the current ESPON programme in order to progress as far as possible towards excellence in applied European Territorial Research. However, the thematic coverage of the 30 projects envisaged had to be selective rather than comprehensive.

More efforts will be put into the conceptualisation of territorial potentials, functional specialities of cities and regions, etc. The aim here being to constantly improve the knowledge base for policy development, in particular defining core indicators and developing further the analysis based on combined indicators towards a more integrated view on individual territories.

The capacity for integrated territorial analysis will be further developed including a variety of feasible methodologies that can be used in different types of analysis.

Territorial impact assessment of sector policies will be developed as far as possible by integrating and synthesising the lessons learned from the number of ESPON projects addressing territorial impacts. It is the ambition to come as close as possible to defining the best ways to assess different EU sector policies and to establish common minimum requirements that all assessments should include. The foundation should then be laid for providing assessment tools that can strengthen a territorial dimension in the programming of sector policies.

Before the end of the first ESPON Programme many more final ESPON results will be made available. Only half of the ESPON projects envisaged have thus far completed their applied research.

The communication strategy of the ESPON programme includes a far reaching dialogue as well as further ESPON publications. In particular, by the end of the programme in 2006, an ESPON Report integrating all results of the first ESPON programme will be published as well as an ESPON Report summing up the scientific progress made, establishing a scientific platform for further applied research on European territorial development within an ESPON II programme.

PART 1
VIEWS ON THE REGIONAL DIVERSITY IN EUROPE

At their informal meeting in Rotterdam (November 2004), the ministers responsible for spatial development considered the territorial diversity of Europe as a strategic factor. They stressed that territorial challenges require a coherent approach to the development of the EU territory that takes account of its diversity and observed that the diverse potentials of EU regions have not sufficiently been taken into account so far in the Lisbon Strategy. Furthermore, they expressed the need for greater coherence between EU policies, which have a territorial impact, and the need for those policies to take better account of Europe's great territorial and cultural diversity as an EU potential.

The ESPON programme has so far delivered a number of contributions highlighting the diversity of the European territory in a number of fields, namely, settlement patterns, economic performance, demography, naturalness, hazard risks, accessibility etc. In this respect, this chapter highlights a number of general considerations pertinent to the main structures of the European territory that should be a reference when interpreting the findings of the ESPON projects in search of territorial potentials to exploit, and when examining the maps produced. The same main structures have been used, where relevant, to filter the key findings presented in this report.

Part 1 reports on the current state of progress in analysing and presenting the European regional diversity. A series of territorial development indicator combinations will be presented in order to provide an integrated picture of the territorial state of the European Union and, in particular, its regional diversity in a series of important topics relating to policy development.

1.1 Main structures of the European territory

The European territory is characterised by some main structures and patterns. Firstly a number of general distinctions between different types of territories can be made, which provide the preconditions for the analysis of ESPON findings. A closer look at current settlement and economic growth patterns allows for more differentiated insights. Indeed, both aspects trigger a series of questions demanding a more integrated view of territorial development.

Main types of territories and policy responses

The European territory consists of a continental land mass and a set of offshore islands and includes a number of structural elements that will be used to guide the analysis and assessment of ESPON findings and results including the following:

– The territory of the European Union has recently been enlarged, increasing its area by 34% and adding more than 74 million European citizens, which politically calls for a spatial integration of a new EU 25 space.
– The Union displays an obvious core-periphery pattern. The concentration of activities and people the Pentagon (i.e. the area cornered London, Paris, Milano, München and Hamburg), sees this area producing around 46% of the GDP of the European Union, while hosting just below 32% of the EUs citizens on a little less than 14% of the European territory. European level

policy orientations increasingly call for polycentrism and better territorial balance in order to support lagging regions as well as for greater efforts to better link the periphery to the core by improving the European transport infrastructure.

– The European Urban System is an important infrastructure and a historical legacy including a large number of cities and towns with important roles as 'engines' or 'assets' in territorial development. Each however has a different role depending on size, functionality and location. Policy orientations here include cooperation between cities in order to explore comparative advantages and synergies. In a European perspective this may include Global Integration Zones beyond the Pentagon (i.e. the cooperation of neighbouring Metropolitan urban regions), as well as European Gateways providing links to the wider World.
– The historic division of space in rural and urban areas considers each to have an independent role in development. These categories need however to be increasingly understood as 'integrated territories' as the level of interrelations and exchange increases, while employment in the primary sector declines. In particular, many rural areas have endogenous potentials for development. In addition, when we look at medium and small cities in rural territories, partnerships with neighbouring urban areas are now seen as a way of increasing both development potentials and growth, and thus providing important motors for development.
– The patterns and shape of the European territory and the diversity of climate introduces specific territories for consideration such as islands, mountains, coastal areas, etc. Regional and structural policies to support such areas as an integrated part of development of regions.

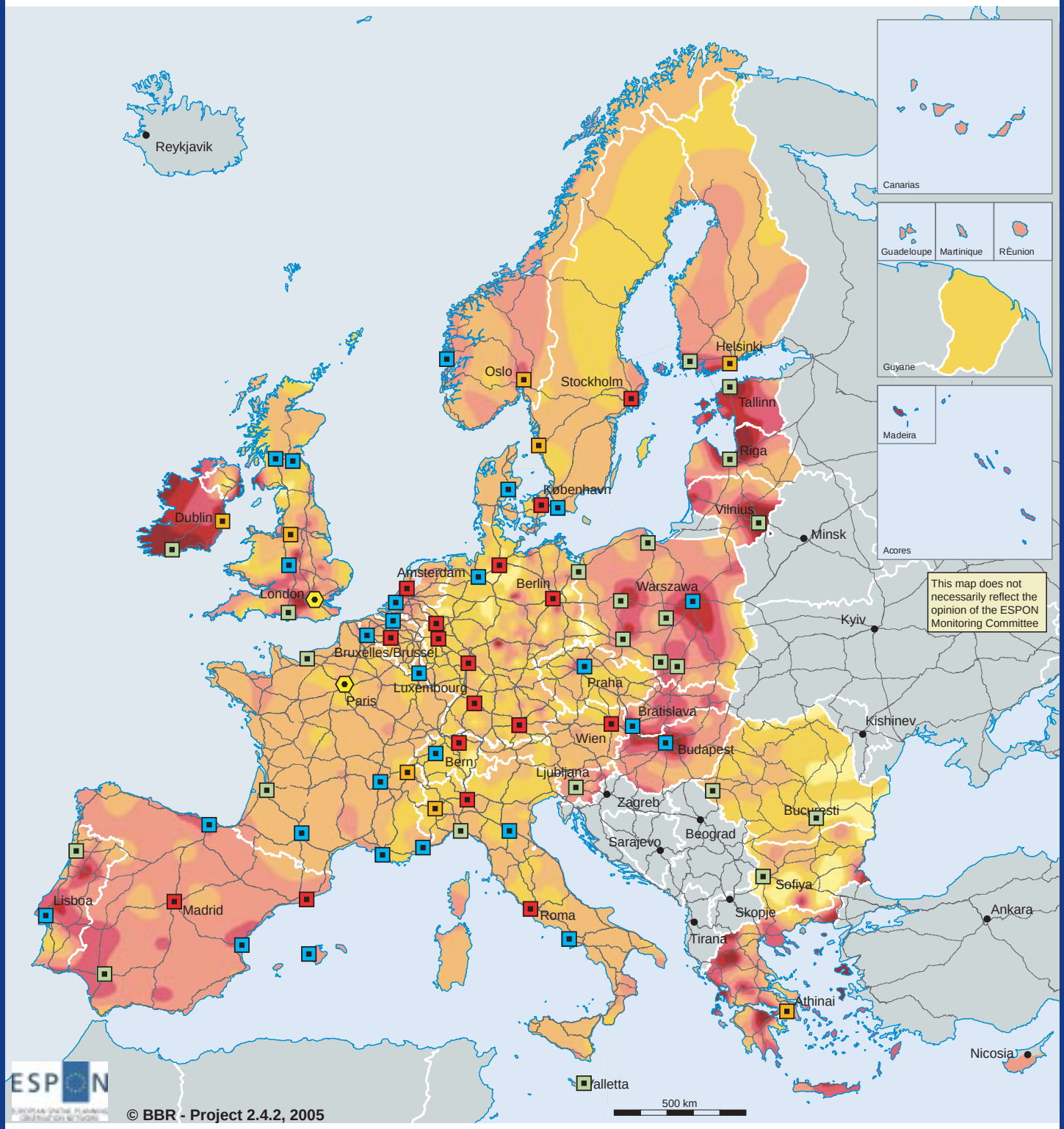
Insight on the European Urban System

These territorial patterns are reflected in the settlement structures, i.e. the distribution of population, buildings, and infrastructure in a territory. The location of smaller, medium-sized and larger cities is characterized by long-term stability and inertia, gradually influenced by investments, location decisions and migration tendencies. This is also related to the question of economic hotspots and the pattern of distribution of GDP per capita.

ESPON has made a contribution to the understanding of the European Urban System, and in particular to the role that different cities undertake in relation to European territorial development. As such, the classification of the European urban system into 1595 Functional Urban Areas (FUA) within the 29 countries has been an important step in understanding the inherent potentials within the European territory. The classification complies in each Member State with the national situation in defining travel to work areas. The analysis of these functional urban areas across Europe reveals however a considerable concentration in the core of Europe.

The most powerful functional urban areas measured by demographic mass, competitiveness, connectivity and knowledge base are considered as Metropolitan European Growth Areas (MEGA). These MEGAs are then further classified in accordance with their performance in respect of the above-mentioned criteria.

Main economic structures of the European territory



Average yearly development of GDP per capita in Purchasing Power Standards 1995-2002 in percent*

- to below 2
- 2 to below 4
- 4 to below 4
- 6 to below 6
- 8 to below 8
- 10 to below 12
- 12 and more

*Switzerland, Norway and Bulgaria 1995 to 2001; Romania 1998 to 2001

Metropolitan Growth Areas

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

Highways of European level

Regional level: NUTS 3

Origin of data: GDP:Eurostat, MEGA: ESPON 1.1.1 Nordregio

Source: ESPON database

Many of the strongest MEGAs are located within the Pentagon. The MEGAs that can provide a similar level of functionality beyond this core area are Madrid, Barcelona, Roma, Wien, Berlin, København and Stockholm. A second category is comprised of MEGAs that are relatively large, competitive and often have a strong knowledge base, but tend to be weaker, either in terms of the number of inhabitants or accessibility. To this category belong Helsinki, Oslo, Düsseldorf, Genève, Wien, Köln, Manchester, Athinai, Dublin and Göteborg.

A third category of MEGAs with lower competitiveness and accessibility levels is led by four of the strongest cities in the new EU Member States, namely, Praha, Warszawa, Budapest and Bratislava. The close proximity of some of these potential MEGAs (e.g. Edinburgh and Glasgow in Scotland) does however point to the existence of potential for cooperation and joint regional development.

Cities belonging to the fourth and weakest MEGAs category, scoring rather low on all four criteria, are exclusively located outside the Pentagon.

Relating the MEGAs to the growth of GDP per capita over the period 1995-2002 shows that many weaker MEGAs are located in regions with the highest growth rates. Examples here include Cork, Tallinn, Riga, Vilnius, Turku/Åbo and Sevilla, as well as most MEGAs found in Poland. Together with "potential" MEGAs, e.g. Budapest, Bratislava, Warszawa, Lisboa or Valencia, which are also placed in areas with high economic growth, the general picture shows a European territory with significant potential to develop MEGAs outside the Pentagon. This may be a crucial development contributing to policy orientations of a more polycentric European urban system with competitive economic growth areas located outside the core of Europe.

This picture of nodes or hotspots in terms of settlement patterns is however interesting only if the linkages between them can be illustrated. In particular, the proximity to transport nodes and the accessibility of information determines the endowment of places and regions that enables specific activities, including cooperation and competition, to occur between different regions. Looking at infrastructure network building, particularly in terms of road and rail transport, density levels are at their highest within the Pentagon. This core-periphery pattern becomes even more pronounced when considering road traffic levels.

The natural and cultural heritage is an additional territorial dimension that deserves attention in any discussion of territorial patterns. They constitute an important potential for further economic development in many regions. Therefore, the right balance between use and protection is a precondition for the effective and sustainable use of such potentials.

At a European scale, major large natural areas are concentrated in the northern periphery and in some mountainous areas. At the regional and local levels, all areas have natural assets that can be used for development purposes, although these areas are often rather fragmented in some regions. The territorial distribution of cultural heritage, such as heritage sites, museums etc., varies depending on the resource type in question. There is a tendency for heritage resources of the immovable type and for museums to be clustered in coastal and urbanised areas.

All these aspects come together in the territory when applied as unit of analysis. This again suggests the need for a more integrated view on how the various aspects interact in the development of a territory. With the Regional Classification of Europe, ESPON is moving towards such an integrated approach.

1.2 Regional Classification of Europe

The ESPON programme has produced a broad range of specific new knowledge in different thematic fields, some of which will be presented in more detail in part 2 of this report. In addition to this, it was felt that there was a need to have a more condensed summary overview of the regional situation across Europe. In order to achieve this, the need to overcome the concentration on single indicators was identified, along with the need to construct and analyse more complex combined indicators for providing a more complex summary picture, adding new insight and thus complementing the well-known pictures gained by single indicators.

Although this is a still ongoing task (with final results to be expected end of 2005) first results will be presented in the following chapters of part 1 in order to stimulate the discussion on this challenging task from the beginning.

The key for the first results presented is a new method developed by ESPON, the Regional Classification of Europe (RCE). The basic idea behind that is the generation of combined indicators for a series of thematic fields on the basis of an additive combination of single indicators. Single indicators only represent part of the picture thus delivering a rather selective and incomplete view on specific topics. Through multivariate analysis, integrating different aspects, represented by different indicators, simultaneously, more comprehensive pictures of regional situations can be drawn and new perspectives be opened. To give an example, complex strategies like the Lisbon strategy refer to the interplay of various single aspects like employment, R&D expenditure, productivity, education level and others. To draw a summarised regional picture of where European regions presently stand with regard to the Lisbon goals, each of the above mentioned single indicators can only represent one aspect of the whole, Only a combined indicator can give us an impression on the overall regional situation with regard to Lisbon.

To keep the method as transparent as possible combined indicators were constructed by adding the (standardised) values of single indicators (using equal weights for each indicator). This takes into consideration that the "strongest" regions (e.g. in terms of Lisbon) are those that simultaneously meet the different challenges (like high level of employment and high level of R&D expenditure and high education level etc.). This makes an additive construction of the combined indicator the appropriate method to be applied in this case.

In technical terms, the standardisation of the single indicators is needed to measure all indicators on the same scale; this was done by using z-transformations which give all indicators the same mean value (=0) and the same standard deviation value (=1). The second step needed is polarisation whereby positive values indicate

positive characteristics and vice versa. Thereafter the single indicators are summed up and this sum is then divided by the number of indicators. Each single indicator is given the same weight in this process.[1]

Eight thematic fields have been analysed according to this methodology using a total of 37 indicators. The following maps present some findings based on this methodology, the texts provide necessary background information for the reading of the maps and some additional insights based on the data behind the maps.[2]

Regionalised Lisbon performance

There are various ways in which a region can hope to achieve the aims set out in the Lisbon agenda. Good performance in terms of productivity, employment and R&D as well as possession of a highly educated population are often considered as important means for increasing competitiveness. The five indicators selected for the combined indicator partially reflect the 14 structural indicators used in reports of the European Council for monitoring the achievements vis-à-vis the Lisbon Agenda.[3] This combined indicator is an attempt to produce a regionalised analysis of some of these indicators, taking into account the limited availability of regionalised data for all 29 countries. Thus far, ESPON has not been able to obtain regional data for all 14 indicators.

The map combines the following five indicators:

– Productivity:
  GDP per capita employed in 2002 is used as an indicator to illustrate productivity in a region.
– Employment rate:
  The number of employed persons in relation to the total population between the ages of 15 and 64 in 2003 is used to illustrate the employment rate.
– Expenditure on R&D:
  The total of R&D expenditures expressed as a percentage of GDP in 2001 is used as indicator of the strength of R&D (in total terms).
– R&D Business Enterprise Sector:
  The number of researchers in the Business Enterprise Sectors (BES) as a share of the total employment in 2001 is used as an indicator for the strength of R&D in relative terms.
– Educational level:
  The number of highly educated people in relation to the total number of educated people in 2002 is used to illustrate the educational level of a region.

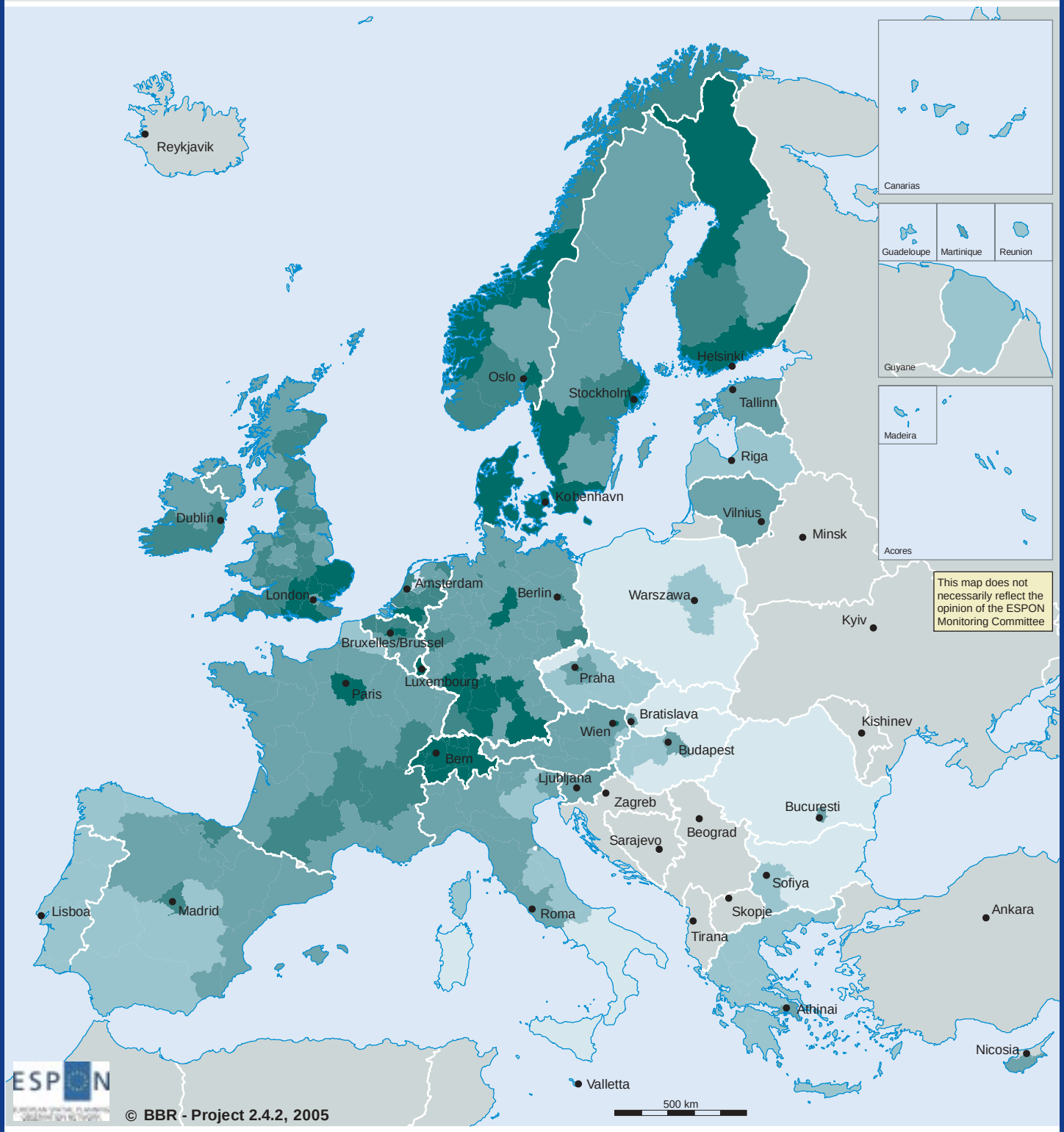
[1] *The classes used in the maps have been calculated on the basis of mean value and standard deviation:*
- *Highly below average: from minimum up to mean value - 1,16 standard deviation*
- *Below average: from mean value - 1,16 standard deviation up to mean value - 1/2 standard deviation*
- *Average: mean value ± 1/2 standard deviation*
- *Above average: from mean value + 1/2 standard deviation to mean value + 1,16 standard deviation*
- *Highly above average: from mean value + 1,16 standard deviation to Maximum*

A fact sheet explaining methodology more thoroughly is available on the ESPON web site

[2] *European maps for each of the 37 indicators can be found on the ESPON web site.*

[3] *The 14 indicators used are GDP per capita in PPS, Labour productivity, Employment rate, Employment rate of older workers, Educational attainment (20-24), Research and Development expenditure, Comparative price levels, Business investment, At risk-of-poverty rate, Long-term unemployment rate, Dispersion of regional employment rates, Greenhouse gas emissions, Energy intensity of the economy and Volume of freight transport.*

Regionalised Lisbon performance



Degree of regionalised Lisbon performance as an aggregate of 5 indicators:

- Productivity (GDP per person employed 2002) +
- Employment rate (Employed population / population aged 15-64 2003) +
- Expenditure on R&D (Expenditure on R&D / Total GDP 2001) +
- R&D Business Enterprise Sector (BES R&D personnel per 1.000 active person 2001) +
- High educated population (Highly educated population / total educated pop. 2002) +

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

This indicator set represents a mixture of information on the pre-conditions of regional production in respect of competitiveness and regional innovation capabilities. Productivity is, like labour costs, one of the main indicators related to the regional economic production orientated conditions. The rate of employment indicates the rate of supply and demand in the labour market in relation to employment policy. The R&D and education indicators are 'knowledge-society oriented' highlighting the importance of R&D in the regional economy as well as the contribution of the private sector and the regional potential of a qualified labour force. The combination of these factors provides a picture of regions that are relatively successful when it comes to competitiveness in terms of the Lisbon Agenda goals.

The picture of the combined indicator shows the highest competitiveness levels – in Lisbon terms – to be in the main metropolitan and industrial centres across Europe, however without those industrial regions that are in the process of restructuring.

Those regions with good performance levels in all of the indicators that comprise the combined Lisbon performance indicator are mainly located in the core of Europe and in the Nordic countries.

In addition to a number of areas in the Nordic countries, a group of regions in North-West Europe, mainly centred on the UK (and in particular, South-East England), the Central Netherlands and Northern Belgium achieved the highest Lisbon performance level. Another group of highly performing regions stretches more or less from Oberbayern (DE) to Midi-Pyrénées (FR), including Switzerland. Isolated hotspots such as Paris, Braunschweig and in some respects also Ireland and Madrid complete this regional perspective.

Industrial regions in need of restructuring such as the Ruhr area (DE) or those regions with similar problems in northern England are obviously missing from this list. Notable also is the absence of the high performing regions (in addition to Madrid) in Spain and Italy.

This map combines highly productive regions like London, Brussels, Luxembourg, Zürich and Nordwestschweiz (CH), with regions of high R&D importance such as Braunschweig, Stuttgart, Oberbayern (DE), Västsverige (SE), and Pohjois-Suomi (FI) and regions with low unemployment rates like Berkshire, Bucks and Oxfordshire, Bedfordshire and Hertfordshire (UK), the Åland Islands and Vestlandet (NO) or Stockholm (SE).

Given the additive construction of the combined indicator that is produced by the aggregation of both low and high values for the single indicators. Such areas are e.g. Estonia, Latvia, Lithuania or Praha, which are actually performing much better in terms of employment rates and education than in the remaining three indicators, where they tend to exhibit a rather weak level of performance. To what degree the average performance in the combined indicator caused by above average performance in these two single indicators can be viewed as 'potential' however requires further investigation.

In addition to the wider European picture, a series of national pictures also emerge from the analysis. In this respect, while some countries such as Portugal or Greece exhibit

little or no regional disparities in terms of the combined Lisbon indicators, others such as Germany, France and Sweden in particular show rather large disparities.

Key findings:

- The focus on the importance of high productivity and high R&D levels illustrates that some regions have better preconditions for achieving the goals of the Lisbon Agenda than others.
- Areas showing high performance levels in terms of the Lisbon indicators are not only located within the Pentagon but also in the more sparsely populated North of Europe.
- There are East-West and North-South dimensions to the general picture. Regions with the lowest Lisbon performance levels are exclusively located in the East, thus underlining the East-West dimension. Regions with the highest performance are located in the North (Swiss regions are the most Southerly regions in this class) thus underlining the existence of a North-South dimension.
- The general picture in terms of the combined indicator shows highest competitiveness levels - in Lisbon terms - in the main metropolitan and industrial centres of Europe. The old industrial regions currently in the process of restructuring are however not part of this group. In addition, a number of less urbanised areas also exhibit high performance levels. This underlines the fact that performance levels in relation to the Lisbon goals are not necessarily linked to the level of urbanisation per se.

Economically successful regions

GDP per capita is one of the main indicators used in measuring the wealth of a region or when discussing European Cohesion Policy. Current debates illustrate that it is not only the absolute value of GDP per capita however that is of interest, but also its dynamics and development rate.

The map combines the two indicators:

- Wealth:
  GDP per capita 2002 in purchasing power parity.
- Economic Growth:
  The change in GDP per capita between 1995 and 2002 is used as an indicator of the dynamics of economic performance.

The indicator combining wealth and the development of wealth is thus able to highlight economically successful regions. In respect of actual economic strength levels, the GDP per capita measure indicates the situation of the regional economy. This "classic" European indicator is used to identify the least favoured region within the Union related on the national level to the Cohesion funds and on the regional level to Objective 1 of the structural funds. The convergence process itself is targeted more by the GDP growth indicator.

The combined indicator presents a rather balanced picture of Europe with a polycentric distribution of economically successful regions. This dissolves the usual core-periphery and/or East-West perspectives.

In general, the data exhibits a rather scattered European picture with the South Eastern Part of the Baltic Sea Region (Estonia, Latvia, Lithuania, but also Southern Finland and the region of Stockholm) as well as Ireland and larger parts of North West Europe showing good combined figures for GDP per capita and GDP growth.

The particular reasons for any region to be considered 'economically successful' obviously differ. In the old EU Member States, in the main, high GDP per capita values characterised such success, while in the new EU Member States high growth rates have a decisive role.

In the old EU Member States plus Norway and Switzerland, the highest GDP per capita values are found in the centres like London, Brussels, Luxembourg, Hamburg, Oslo, Paris (Île de France), Wien, Zürich and Frankfurt. In general however, the highest values in terms of the development of GDP are to be found in the new EU Member States and in and some regions of the old EU Member States.

Regions like Mazowieckie (PL), Közép-Magyarország (HU), Bratislavský (SK), Bucuresti (RO), Estonia and Latvia have the highest values in this respect, while in the old EU Member States regions such as Border, Midlands and Western as well as Southern and Eastern (IE) and Voreio Aigaio (GR) show similar gains. The growth rates of the new EU Member States are generally rather higher than in the older EU Member States due to level effects, This economic development underlines the growth potentials of certain urban centres and some of the other regions in this area.

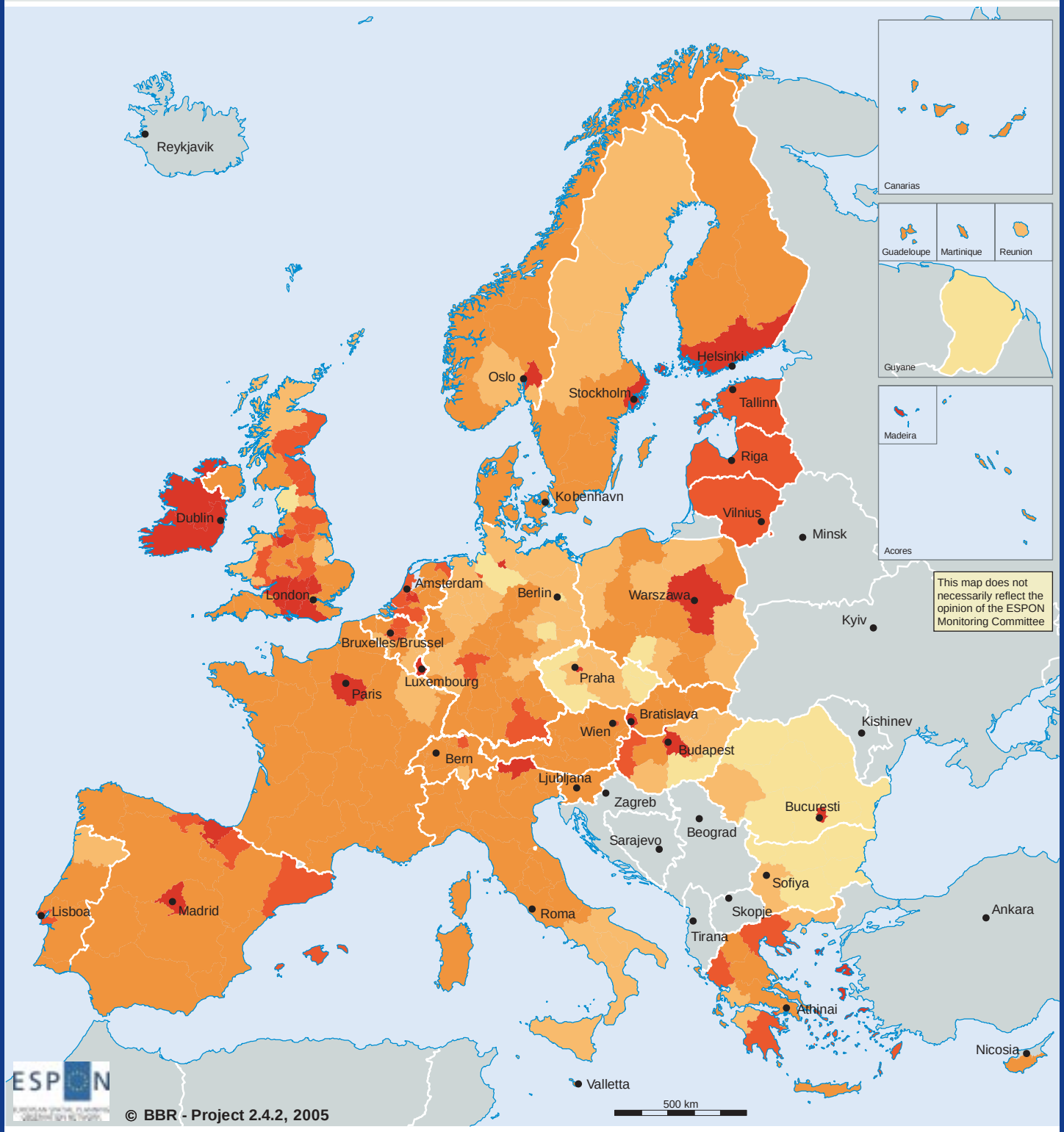
In relation to the European average, low growth rates in some of the old EU Member States result in a more differentiated spatial pattern. In this context a more obviou North-South divisions appears in both Sweden and Germany, in the latter simply adding to the traditional East-West division. In Spain the concentration of growth potentials in the main economic centres is obvious, whereas this is not necessarily the case in Greece.

The combined indicator also shows that there are considerable disparities within countries, this is most obviously the case in the UK, and is visible also in Romania and in the Czech Republic. In all three cases the capital areas are considerably stronger than the other regions of the country. At the same time these three countries also have regions that are among the weakest in European terms as regards this combined indicator.

Key findings:

- Combining economic size and economic growth shows a rather balanced or polycentric picture of economically successful regions in Europe.
- The West still has the stronger economy, but the East is catching up through higher growth rates.
- The economic growth of the major urban centres throughout Europe underpins their importance for the development potential of regions and larger territories.
- The highest regional disparities are to be found in the UK, Romania and the Czech Republic.

Economically successful regions



Degree of economic success as an aggregate of 2 indicators:

– GDP (GDP per capita in PPS 2002) +
– GDP growth (Growth in GDP per capita in PPS 1995 - 2002 in percent) +

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

Labour market efficiency

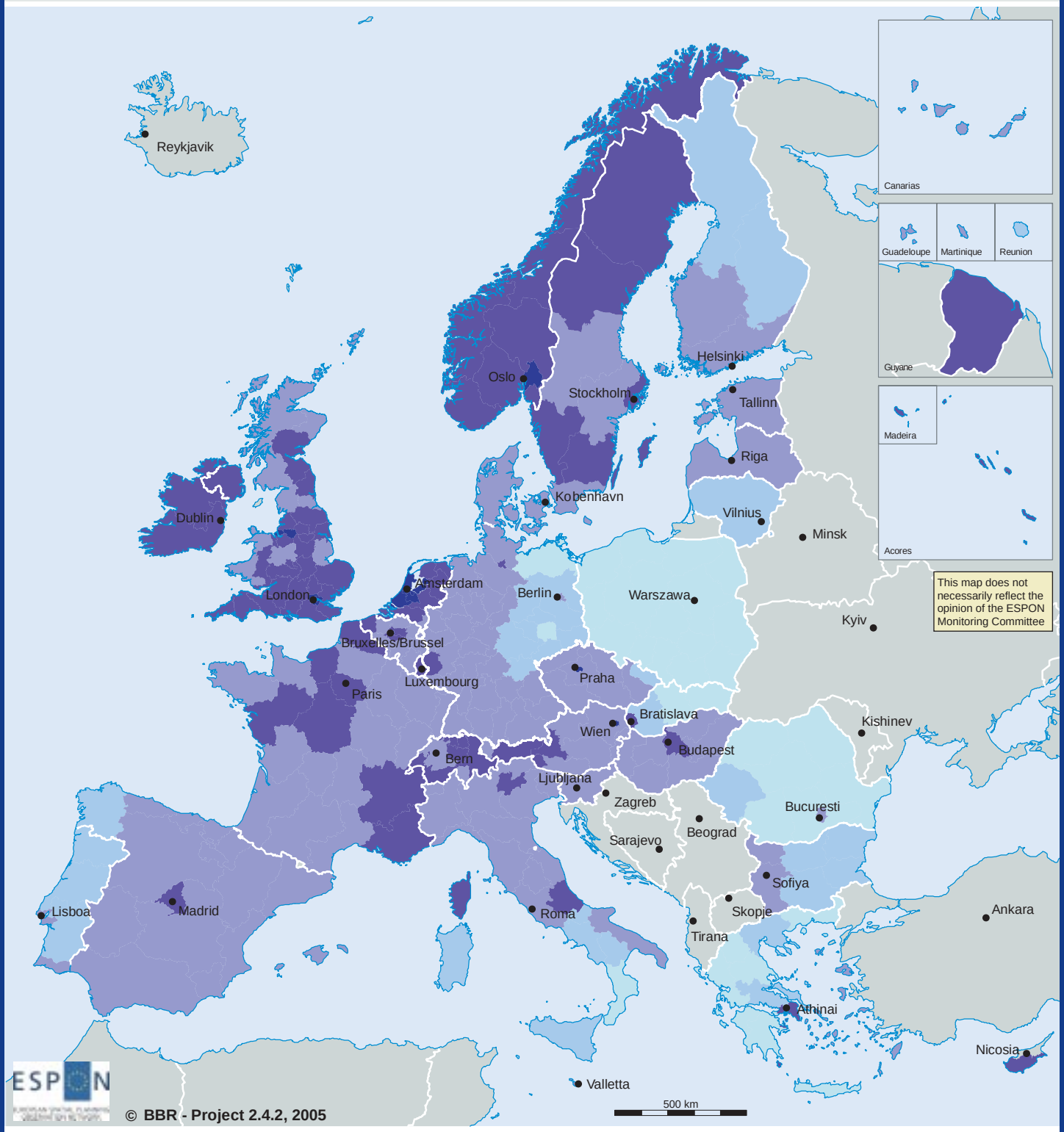
The status of the labour market is currently being widely debated. Moreover, the future perspectives of an aging labour force and declining population figures push the debate towards considering the likely size of the available labour force in future. Last but not least, indications of the likely sectors of employment are also of interest.

The map combines the following seven indicators:

– Unemployment:
  The unemployment rate of 2003, i.e. the number of people unemployed as a percentage of the labour force (the total number of people employed and unemployed), is used here (with high unemployment being considered as negative).
– Development of unemployment:
  The change in the unemployment rate between 1999 and 2003 is used to illustrate to what degree the situation in the labour marked has improved (with increasing unemployment being considered as negative).
– Youth unemployment:
  The number of unemployed people in the age bracket 15 to 25 (per 1,000 inhabitants) in 2003 is used as an indicator for youth unemployment (with high youth unemployment being considered as negative).
– Labour force replacement ratio:
  The population aged 10-19 in relation to the population aged 55-65 is used to illustrate the degree to which people entering the labour market can replace those leaving it within the next few of years (with high ratios being considered as positive).
– Employment density:
  The number of persons employed per square-kilometre in 2003 indicates the density of employment opportunities (with a high density being considered as positive).
– Employment in the tertiary sector:
  The number of people employed in the service sector as a share of the total employment in 2003 is used to illustrate the regional importance of the more service-oriented labour market (with high shares of tertiary sector employed being considered as positive).
– Employment in the primary sector:
  Employment In the fields of resource extraction and agriculture as a share of the total employment in 2003 is used to illustrate the regional importance of the declining primary sector (with high shares for primary sector employment being considered as negative).

After measuring the economic output (GDP) and economic preconditions in respect of the Lisbon strategy, this set of indicators looks into the regional labour market and sector structure. Different unemployment aspects are covered here, including developments within the last few years, as well as youth unemployment, which in relation to the labour force replacement indicator tracks the job prospects of the young. The structural components of the economy target the identification of regional potentials in the service sector and potential disadvantages due to the particular mix of sector representation. In so doing, the combined indicator provides an overview of the efficiency of the labour market.

Efficiency of labour markets



Degree of labour market efficiency as an aggregate of 7 indicators:

- Unemployment (Unemployment rate 2003) -
- Development of unemployment (Change of unemployment rate 1999-2003 in percentage points) -
- Youth unemployment (Unemployed < 25 years per 1.000 inh. 15-<25 years 2003) -
- Labour force replacement ratio (Population ages 10-19 / population ages 55-64) +
- Employment density (Number of persons employed per km_ 2003) +
- Employment in tertiary sector (Share of total employment 2003) +
- Employment in primary sector (Share of total employment 2003) -

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

The combined picture shows the most efficient labour markets to be in the North, particularly in the North Western European area - stretching from Ireland to Northern Finland and down to Northern France and Benelux. In addition however the Alps area is also rather strong in this respect. Otherwise there seems to be a rather polycentric pattern with some scattered peaks outside the Pentagon such as Madrid, Sardinia, Budapest, Malta and Cyprus. These areas, as well as the Czech Republic, Estonia, Latvia and Hungary, where the labour market situation is comparable to large parts of the core of Europe, are however the exceptions from the general rule of East-West disparities as regards the combined labour market indicator.

The positive combination of these factors, particularly low unemployment rates and employment in the tertiary sectors, obviously determines the above average regional setting of labour market efficiency. In this group there are in particular regions in the Netherlands and Ireland, Norway and in the UK and Switzerland, as well as in some northern and southern regions of France.

The combination of high unemployment rates and high increase of unemployment is also significant for the regions of Eastern Slovakia, Greece, Poland and Romania, and particularly in the latter, which is exacerbated by low levels of tertiary sector employment and the above average dominance of the primary sector.

The combined indicator shows the highest disparities to be within Spain, followed by the UK and Greece, while Ireland, Sweden, Norway, the Czech Republic and Poland are characterised by low regional disparity levels. Countries with only one NUTS II region are not considered here.

Key findings:

- The indicator shows that rural and urban, as well as central and peripheral regions can have efficient labour markets. This is perhaps best illustrated by France and Italy with regard to rural-urban questions and Cyprus, Norway, northern Sweden, Scotland and Guyane with regard to peripheral questions.
- In the new EU Member States the situation remains less favourable with Budapest, Malta and Cyprus being the only exceptions.
- Areas at the outer fringes of Europe seem generally to be disadvantaged (e.g. Portugal, Southern Italy, Greece, large parts of Bulgaria and Romania, Poland, Latvia and Northern Finland) as compared to more central areas, with Northern Europe, Malta and Cyprus and the outermost peripheries being exceptions here.
- The greatest disparities in labour market efficiency are observed in Spain, the UK and Greece.

Accessibility

Accessibility is one of the most important indicators used to describe the territorial aspects of transport systems. The quantity and quality of a region's infrastructure endowment, as well as distance (travel time) to population and/or economic centres play an important role here. The accessibility indicators reflected here have been developed in order to cover these aspects: the opportunities to be reached (population, GDP or income, in this case population) weighted by the effort in terms of distance, time or cost. Thus, an accessibility indicator describes the relative location of an area and illustrates the benefits that accrue to households and firms in an area in terms of the available transport services.

The map combines the following five accessibility indicators:

- Potential accessibility by road:
  This indicator describes the potential accessibility of an area only considering road transport.
- Potential accessibility by rail:
  This indicator describes the potential accessibility of an area only considering rail transport.
- Potential accessibility by air:
  This indicator describes the potential accessibility of an area only considering air transport.
- Time to market meso-scale:
  This indicator is based on the accessibility at the meso level by rail and road, weighted by population.
- Time to market macro-scale:
  This indicator is based on the accessibility at the macro level by rail and road, weighted by population.

The combined indicator illustrates accessibility in respect of the whole of Europe and beyond, as well as to smaller transnational economic integration areas. The accessibility levels by road, rail and air transport were each considered, with air not being as prominent as road and rail. Thus the indicator presents an accessibility level that probably reflects every day reality for most Europeans, who mainly travel by road and rail and mostly within their surrounding larger territories, not across all of Europe.

As air transport is only considered in one indicator whereas rail and road are each considered in three indicators, the emerging picture presents a clear core-periphery pattern. The combined indicator shows the highest accessibility levels to be in a central European area consisting of parts of the Netherlands, Belgium, Germany, France and Switzerland, while the core nuclei outside this contiguous area are London Paris, Hamburg and Berlin.

The regions with accessibility levels above the European average enlarge this core area. The areas with above average accessibility more or less resemble the Pentagon, extending however further to the East until the German-Polish border, and including Praha, parts of Austria and large parts of Northern Italy. Indeed, the South East of England, Northern Germany, the region of Praha (CZ), the Rhônes-Alpes (FR), Oberösterreich (AT) and the North of Italy show, in combination with already existing nuclei in the North of England, Wien and Bratislava, the main orientations and potential connections within an enlarged Europe in this respect.

The European periphery is restricted to a small number of regions with disadvantages in accessibility not only on a European scale but also on a meso scale relating to internal questions over accessibility issues. Indeed, according to this combined indicator, Bulgaria, Cyprus, Denmark, Estonia, Finland, Greece, Ireland, Latvia, Lithuania, Norway, Portugal, Romania, Spain and Sweden do not have a single region that is above average in terms of European accessibility. Clearly France is the country with the most significant regional disparities. followed by the UK and Spain.

Key findings:

- The accessibility pattern exhibits a clear core-periphery pattern. The best accessibility potentials are mainly located within the Pentagon, though they do extend a little further east to include Berlin and Praha.
- There are a number of particular metropolitan areas that exhibit better accessibility than their surrounding areas, such as Paris, Madrid and Praha.
- In terms of accessibility, France, the UK and Spain exhibit the most significant disparity levels.

The challenges posed by the population profiles

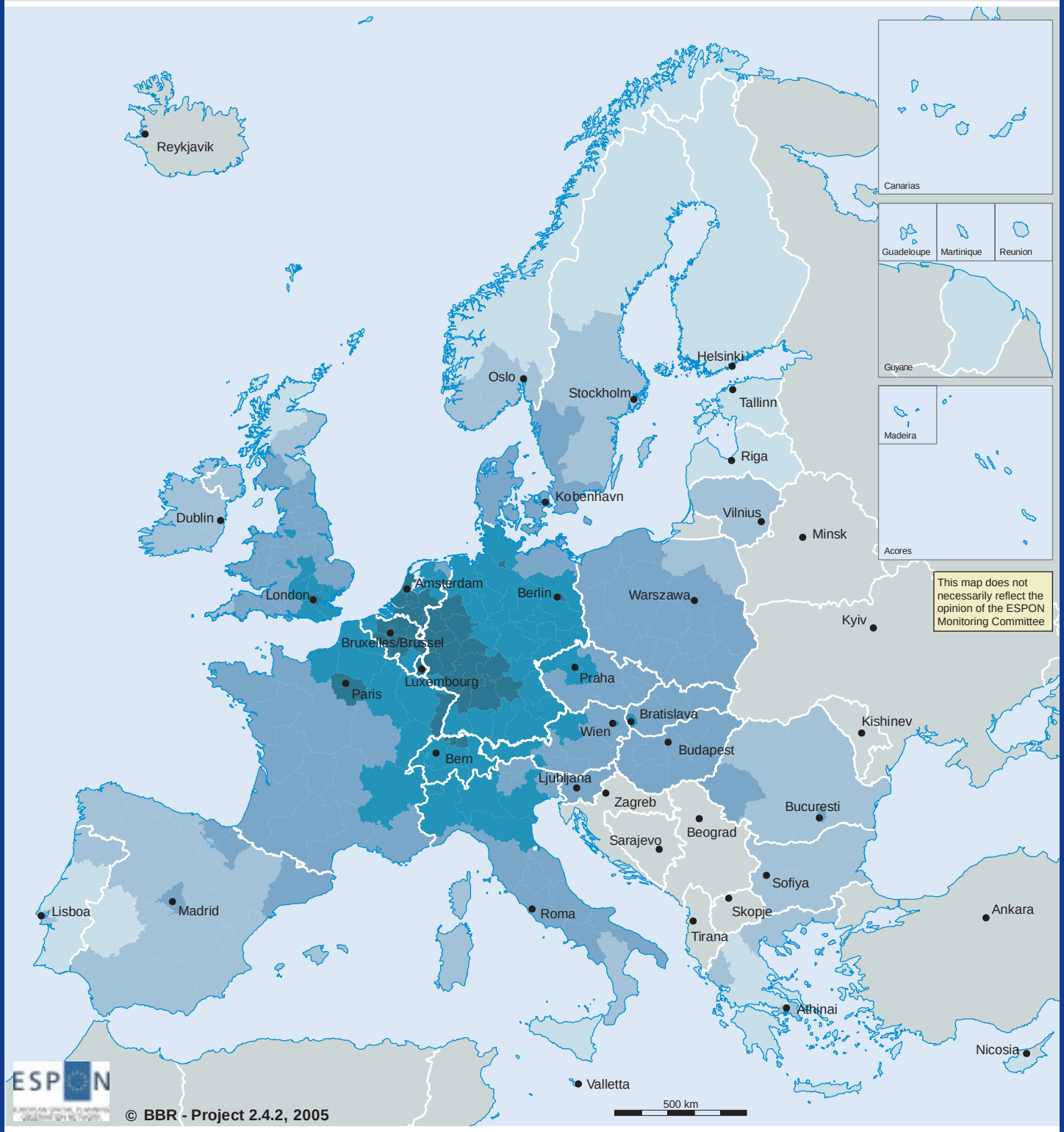
Regional demographic development is composed of natural components (e.g. births and deaths) and migration. Natural development and migration are both affected by the regional age structure while they themselves affect the future age structure. Given the current tendencies in terms of European-wide population decline, accompanied (and partly caused) by the gradual ageing of whole (regional) societies, demographic components have recently become an important issue in the public and political debate in many European countries and regions. This debate is mainly directed to the many problems that may be caused now and in the future by a shrinking population, i.e. decreasing population densities. This results in the need to adapt infrastructure and, mainly in sparsely populated regions, problems in maintaining a minimum standard of regional infrastructure. Moreover, this also raises the issue of the costs and needs of an ageing society.

The map combines the following four indicators:

- Population density:
  The number of persons per square-kilometre in 2002.
- Ageing:
  The share of population older than 65 years.
- Natural growth potential:
  The modelled number of people aged 20-29 in 2020 in relation to the people aged 20-29 in 2000 is used as an indicator for the potential of a region to sustain their population size (not considering migration).
- Population growth:
  The change in population between 1995 and 2000 in percent indicates the recent population growth, i.e. the surplus of births and deaths and out- and in-migration of a region.

Ageing, unbalanced population development in respect of depopulation and regional concentration are the fields that are spatially analysed here, with this

Accessibility



Degree of potential accessibility as an aggregate of 5 indicators:

- Potential accessibility (By road) +
- Potential accessibility (By rail) +
- Potential accessibility (By air) +
- Time to market meso-scale (Accessibility by rail and road, weighted by pop.) -
- Time to market macro-scale (Accessibility by rail and road, weighted by pop.) -

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

indicator giving a picture of the challenges presented by such population profiles. The selected indicators represent these topics and also include the potential of reproduction.

Population development has to be seen as a dynamic system with many feedback loops. Deeper insight can only be gained by sophisticated regionalised European population models (cf. also chapter 2.1). The four selected indicators can however provide some measure of insight into the actual regional differentiation of demographic processes though they cannot compensate for the lack of regionalised European population models.

The map gives a combined overview of the regional demographic problem indications resulting from low population densities, a high level of ageing population, low regional reproduction potential and/or recent population losses. In this view, most of the demographic problem regions (classified as "well below average") are located in the old EU Member States, mainly in parts of southern Portugal, northern Spain, central France, Eastern Germany, northern Italy, and the Peloponnisos in Greece.

The regions below the European average are characterised by population losses, such as in the Eastern Germany, the Northern regions of Spain, the North of Sweden, Estonia, Latvia and/or a distinct above average share of elderly people as it is the case in northern and central Italy, Greece, central France and selected parts of the new EU Member States.

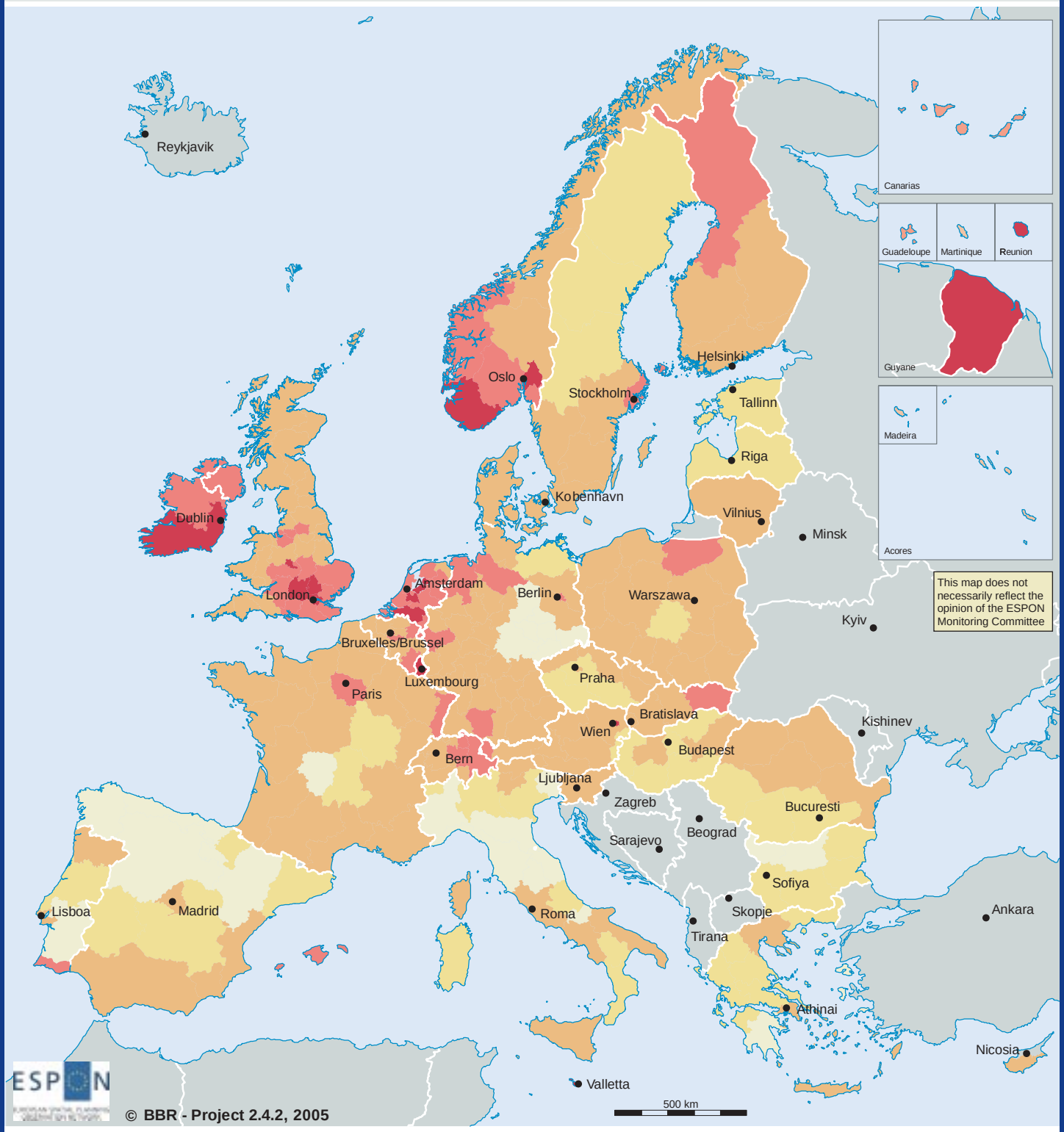
There are however some regions in Europe that, in relation to the selected indicators, seem to be less affected by regional demographic challenges. Some large metropolitan areas (e.g. Paris, London) belong to this category as do a band of regions stretching from South East England via the Netherlands to northern Germany, some patches of southern Germany, northern Switzerland and Alsace (FR). This situation is also very pronounced in Ireland and in southern Norway. The positive situation of the Baleares (ES) and Algarve (PT) is mainly the result of significant population gains.

The most significant regional disparities for this combined indicator can be found in Spain, France, the UK and the Netherlands. The most cohesive countries on the other hand are Ireland, the Czech Republic and Hungary.

Key findings:

- Large parts of the Mediterranean and of the Southern European countries exhibit particular challenges in relation to demographic development that are in the main connected to ageing and emigration.
- In contrast to this, some Mediterranean areas favoured by attractive landscapes and climate may gain population. Examples are The Algarve (PT) and the Baleares (ES)
- Regions with good economic performance and/or high economic growth rates tend to show more positive demographic features than others.
- Peripheral and rural areas can show positive demographic developments as illustrated by the situation pertaining to Guyane.

Challenges of population profiles



Degree of population profile challenges as an aggregate of 4 indicators:

- Population density (Number of persons per km_ 2002) +
- Ageing (Share of population in the ages over 65 in percent) -
- Reproduction potential (20-29 years in 2020 per 20-29 years in 2000) +
- Population growth (Change 1995-2000 in %) +

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

Naturalness

Territorial development is related to the question of land use, i.e. how a territory is actually used. In general, three types of land surfaces can be distinguished. Land use and the naturalness of land, i.e. the absence of the human forming of surfaces and landscapes is important in relation to the natural heritage. A high degree of naturalness can thus be an asset for territorial development.

The map combines the following three indicators:

– Artificial surfaces:
  The share of man-made or artificial surfaces of a region is used as an indicator for the relative size of the built-up area (high shares of artificial surfaces are considered as negative).
– Natural surfaces:
  A territory's share of natural and semi-natural surfaces is used to illustrate how much of the land has not been turned into man-used areas (high shares of natural surfaces are considered as positive).
– Agricultural intensity:
  The output/input ratio of agricultural production is used as an indicator for the intensity of agricultural land use (high agricultural input/output ratios are considered as negative).

This indicator describes the current situation of land use in respect to the human formation of the landscape and natural preservation. In addition to the demand on land related to settlement, industry and traffic networks and facilities, an indicator of agro-industrial land-use is included within the context of the intensity of agricultural use. The combination of these indicators gives us a general picture of the naturalness of an area.

The share of the total land use that a certain type of land use has in a region is a decisive component in this indicator. This implies that the delineation of NUTS II regions influence the picture, as there are cases where a NUTS II region just includes the urban centre of an agglomeration (e.g. London) and others where it includes the urban area plus its surroundings (e.g. Madrid), which affects the share of artificial areas.

The map shows clearly that the natural areas are concentrated in the northern periphery and in some mountainous areas, with both areas exhibiting conditions that are generally less favourable for agriculture.

Depending on their internal structure and on the concentration of the settlement areas, the urban areas are obviously the least natural areas, with the lowest naturalness scores being seen in London, Brussels, the West Midlands, Merseyside (UK), Hamburg and Wien. Other urban areas such as Madrid, Barcelona, Dublin and Warszawa also show similar degrees of naturalness as their surroundings though this may be as a result of the delineation of their NUTS II area.

In areas such as Groningen, Zeeland (NL), West Vlaanderen (BE), Essex and Lincolnshire (UK) the high proportion of artificial surface is accompanied by the lowest European values for naturalness. With the intense use of land seen here this type of region is generally dominated by agriculture.

Naturalness

Degree of naturalness as an aggregate of 3 indicators:

- Artificial surface (Share of total area, Corine) -
- Natural surface (Share of total area, Corine) +
- Agriculture intensity (Output/input ratio) -

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

In the southern regions of Europe, particularly in Italy and Greece, intensive agricultural usage results in low average values in respect of the land use indicator. Genova and Liguria (IT), the Ionnia Nisia, Dytiki Macedonia and Peleponnisos (GR) have the highest regional values in this respect.

The greatest disparities with regard to naturalness are to be found in the UK, which has the lowest and the second highest numeric values of the entire ESPON space. Belgium and Austria also exhibit rather large disparities.

Key findings:

- Naturalness is dominant in the northernmost parts of Europe and in some mountainous areas.
- Although the lowest degrees of naturalness are to be found in urban areas, not all urban areas show lower degrees of naturalness than their rural surroundings. Indeed, some of the larger urban agglomerations show the same values as their surroundings.
- There is little difference between Western and Eastern Europe in this context.
- The greatest disparities in naturalness within countries are observed in the UK, Belgium and Austria.

Hazards, risks and recurrences

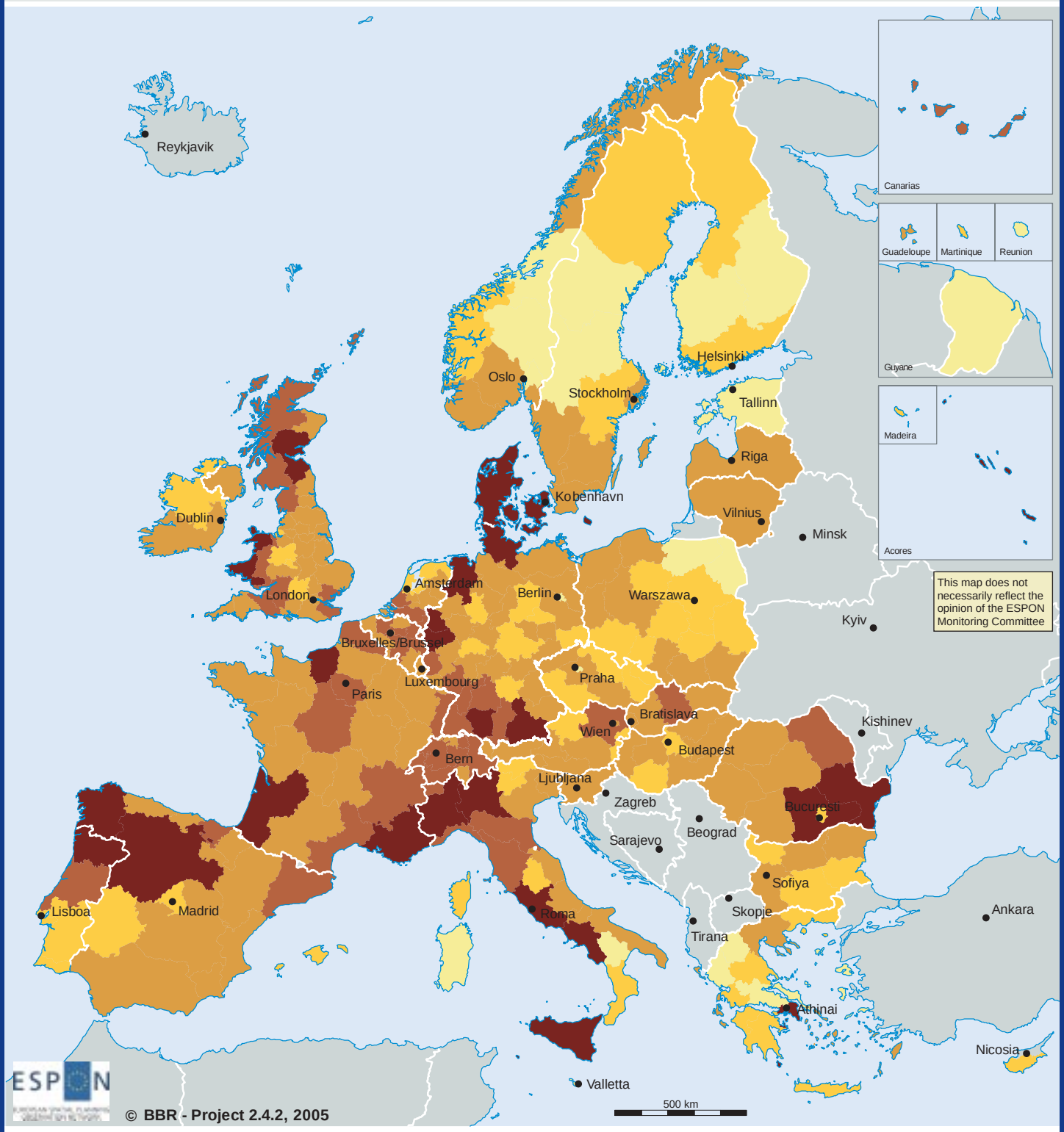
Generally, a hazard is an unexpected or uncontrollable event of unusual magnitude that threatens human activity or people themselves. An assessment of hazards follows regarding (a) the risk they produce, based on their probability and damage extent, and (b) the possibility of spatially locating these hazards.

The map combines the following types of natural and technical hazards:

Natural hazards:

- Flood events:
  Floods are high-water stages where water overflows its natural or artificial banks onto normal dry land. The frequency of river floods in the time span 1987-2002 has been used as indicator.
- Winter storms:
  Winter storms are the result of differences in temperature between the polar air masses and air temperatures in the middle latitudes during autumn and winter. The storm hazard is represented according to the probability of occurrence.
- Earthquake hazards potential:
  Earthquakes are seismic movements of the earth's crust caused by tectonic activity. The peak ground acceleration data from the Global Seismic Hazards Assessment Project was used to produce earthquake maps.
- Volcanoes:
  A volcanic eruption is the arrival of solid products at the Earth's surface in the form of either the explosive ejection of fragmented material, or the effusion of initially liquid lava. Known volcanoes with eruption dates within the past 10,000 years, the number of eruptions and their intensity, are taken as indicators.

Hazards exposure



Degree of hazard exposure as an aggregate of 7 indicators:

- Flood events (Regional average number of flood events) -
- Winter storms (Probability of having winter storms) -
- Earthquake hazard potential (Mean value of grid points inside NUTS 2 boundaries) -
- Volcanoes (Number of all volcanoes in NUTS 2 area) -
- Forest fires (Number of fires 1998-2002) -
- Risk of radioactive contamination (Distance from nuclear power plants) -
- Oil hazards (Average of 3 indicators: harbours, pipeline, refineries) -

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

– Forest fires:
  A forest fire is any wildfire or prescribed fire that burns forest, grass, alpine or tundra vegetation areas. A combination of vegetation zones and observed forest fires has been used to provide indicators here.

Technological hazards:
– Risk of radioactive contamination:
  The nuclear power plant hazard indicator follows a synthetic approach. It is based on the existence of nuclear power plants, the amount of reactors and the capacity of the plants.
– Oil hazards:
  The indicator is based on the main European maritime oil terminals, refineries, storages tanks and pipelines, and on the assumption that the larger an oil terminal is, the higher is the hazard level. The same principle accounts for refineries and pipelines.

The combined indicator shows the sum of these seven hazards, and includes the most important ones, particularly as regards natural hazards, where the spectrum of previous significant occurrences that defines the regional involvement is covered. The indicators on technological hazards cover the main aspects of potential rather than actual threats through the strengthening of regional awareness. As no region is affected by all of them, the areas with the highest hazard exposure are mostly characterised by the interaction of two or three hazard types.

The map of the combined indicator shows that in almost all parts of Europe, there are regions with high hazard exposure. Such areas are however exposed for different reasons.

An example of such a composition of individual hazards would be the northern parts of Spain and Portugal, where forest fires and earthquakes are the main components contributing to the hazard exposure of the area. These two hazard types are, in this area at least, of such a magnitude that they significantly outscore the figures for other hazard types, thus ensuring that this area scores highly in terms of hazard exposure. The same is true for Sicilia and costal Italy, particularly in the area south of Roma, which potentially faces earthquakes, forest fires and volcanoes. In Denmark, the bordering German region and Scotland, winter storms and oil hazards are the main hazards placing these areas in the most hazardous grouping. Regardless of the actual combination of hazards, their simple accumulation means that these regions are at risk.

In an attempt to tie all of this information together one can see that there are three larger areas that are most exposed. The first stretches from Cataluña (ES) across Provence Alpes Côte d'Azur (FR) along the Italian west coast and down to Sicilia, the second consists of large parts of Switzerland, southern Germany and some areas of the most western part of Germany, the last is concentrated in the eastern part of Romania. In addition, there are Denmark and some spots in Northern Germany and the Bay of Biscay, the west coast of England, Scotland, the North of France, Belgium and Denmark and large parts of Portugal and Spain. Furthermore, there are some hazard hot spots in North-eastern Austria and Hungary.

The distinct geographic distribution of the most exposed regions highlights areas that are affected by different phenomena related to natural and technological hazards. Natural hazards impact most on the regions of Portugal and Spain as well as across the west Mediterranean arc, in regions such as Norte (PT), Galicia (ES) and Açores (PT) - with the highest values relating to forest fires - and Sicilia, Campania and Lazio (IT) as well as Notio Aigaio (GR) in relation to volcanic activity. The regions most exposed to earthquakes are to be found in Greece. Western European regions have the highest values in terms of winter storms. The Western and Southern part of Germany and the linked regions of Switzerland, as well as the regions of northern Romania have the highest indicator values related to flood events.

With regard to natural hazards, regional disparities within countries vary considerably. Whereas most countries appear to be rather cohesive, Italy has both the region most potentially at risk and the third 'safest' region in Europe, while Portugal and Spain also show considerable regional disparities.

The regions most affected by potential technological hazards are harbour regions and major centres of the oil industry in Denmark, Eastern Scotland and the regions Provence-Alpes-Côtes d'Azur (FR), Lombardia (IT) and Weser-Ems (DE) while in relation to nuclear hazards those regions in the vicinity of nuclear power plants are obviously at risk.

For technological hazards, the disparities within countries are generally broader than for natural hazards, with the greatest disparities being found in France, Germany and Italy.

Key findings:

- In particular with regard to natural hazards the more peripheral areas of Europe often exhibit lower recurrence levels.
- The new EU Member States seem to be less exposed to hazards than the old ones.
- Within countries the greatest disparities regarding technological hazards are to be found in France, Germany and Italy.
- With regard to natural hazards, the greatest disparities within countries occur in Italy, Portugal and Spain.
- Spatial patterns of hazard exposure may be perceived as an issue for territorial cohesion and European solidarity.

Spatial concentration

The notion of spatial concentration at this stage includes and combines indicators relating to settlement structure and to the process of population concentration, as well as to GDP levels within the EU regional context.

The map combines the following four indicators:

– Population and settlement structure:
  The share of population in agglomerated, densely populated or rural regions is used as an indicator for settlement structure.
– Functional Urban Areas:
  The presence of functional urban areas in a region is taken as an indicator for current settlement structures.
– Concentration of population:
  The change of a region's share of the EU27+2 population in the years 1995 to 2000 is used to illustrate where population concentration is occurring.
– Concentration of GDP:
  The change of a region's share of the EU27+2 GDP in the years 1995 to 2000 is used to illustrate where economic concentration is occurring.

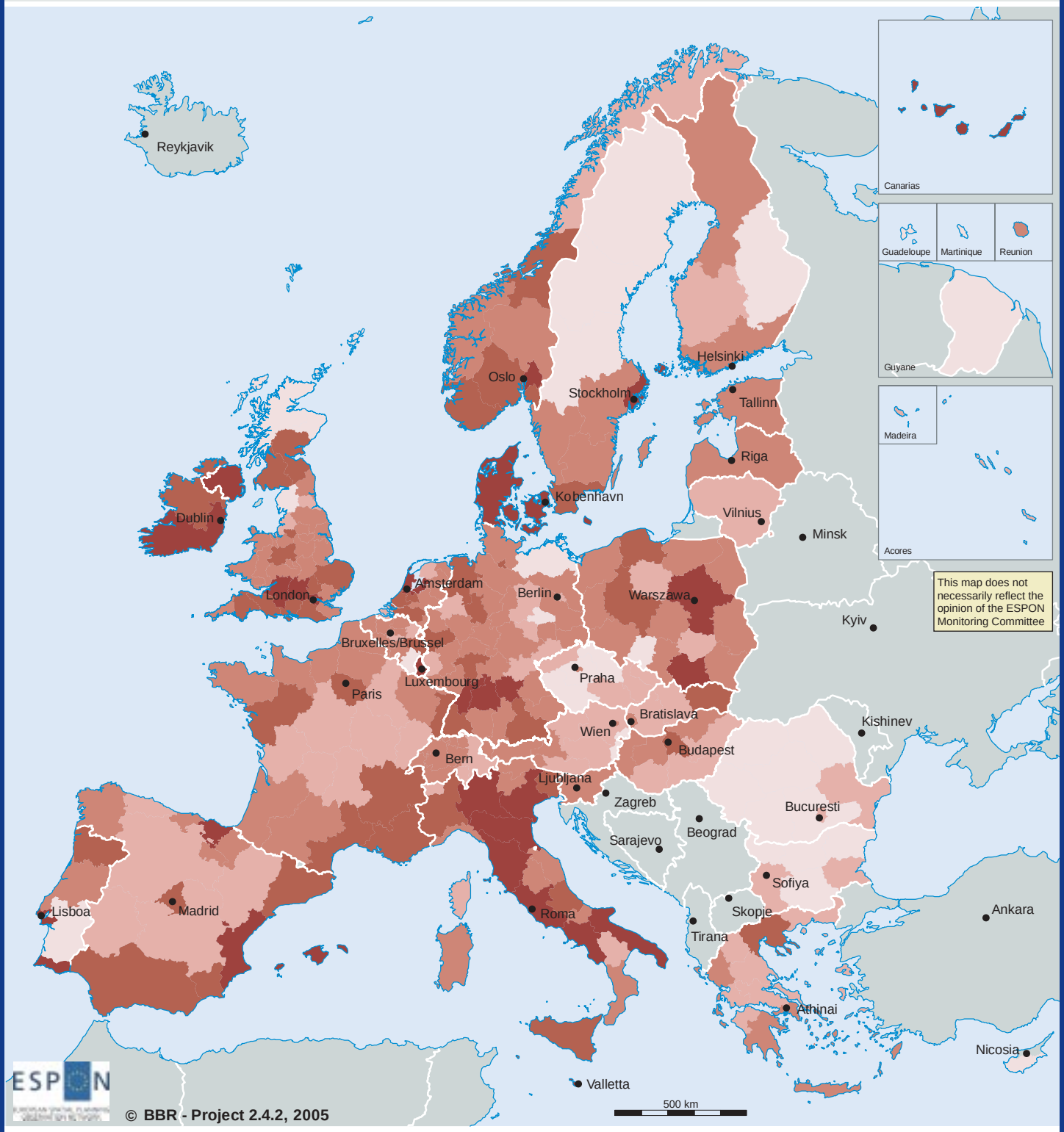
The combined indicator includes a consideration of the twofold aspect of the spatial structure. The first aspect covers the kind of settlement structure (related to the existence of important centres and the population density) and the role of functional urban areas (FUA) in the regional context. The second covers the spatial concentration process of population and GDP, targeting the identification of imbalances and opportunities in European spatial development. Thus the combined indicator illustrates spatial concentration in Europe.

The map reaches beyond the purely morphological structure, placing the regions in terms of their growing or diminishing importance within the European spatial representation. The 'well above average' regions are those that gain both in demographic and economic respects, i.e. they are potential points of polarisation/development. These areas are predominantly situated in major agglomerations or densely urbanised regions.

At the European level, four larger territories can be identified as the main areas of spatial concentration. The first runs along the Mediterranean coast from the Algarve (PT) via Spain, France and Italy to Sicilia. The main concentration areas within this belt are the Algarve (PT), Valencia (ES) and large parts of Italy. A second such belt runs from Ireland via England and parts of Scotland through Northern France, including Paris, along the channel coast to the Netherlands, Northern Germany, Denmark, Southern Sweden up to Stockholm and mid Norway. The third area is a more concentrated area almost linking the two belts mentioned above. It is concentrated on the Southern Benelux, Western – and in particular South-West Germany and Eastern France. Another such area is to be found in Poland, with hotspots in Warszawa, Southern Poland and Eastern Slovakia. In addition to these rather transnational agglomerations, smaller concentration areas such as the regions of Thessaloniki, Bilbao or Norte in Portugal also exist.

This picture challenges the core-periphery pattern of the urban system as presented by the MEGAs. Indeed, it shows that some of the weaker and more peripheral

Spatial concentration



Degree of spatial concentration as an aggregate of 4 indicators:

- Settlement structure (Count of types with population=0) -
- Concentration of population (Change of region's share of EU 27+2 pop. in percent) +
- Concentration of GDP (Change of region's share of EU 27+2 GDP in percent) +
- Functional Urban Areas (Share of population living in FUA) +

- Below average
- Moderately below average
- Average
- Moderately above average
- Above average

Regional level: NUTS 2

Origin of data: ESPON 2.4.2 BBR, own calculations

Source: ESPON database

MEGAs are increasing in importance, and thus may contribute to a more balanced spatial development. Examples of this development include Glasgow, Edinburgh, Cork, Dublin, Lisboa, Valencia, Roma, Warszawa and Oslo. These are the areas that are important points in the European morphological structure and which are increasing in their importance.

In contrast to these areas, there are also those that have lost 'weight' due to their poor regional development. These are usually regions that are actually not as strongly related to the structure of settlement or the urban system. They include more or less densely populated and rural areas as well as city regions, which need to redefine and find their position in the European spatial system. Berlin is a case in point here.

In addition to these pronounced disparities at the European level, considerable regional disparities can be seen to exist in almost all countries, with the most obvious ones being in the Netherlands, Norway, Portugal and Sweden.

Key findings:

- The overall picture on spatial concentration exhibits a rather diverse picture with the potential for more polycentric development at the European level being built on the promotion of some centres outside the Pentagon.
- Major agglomeration areas are to a large extent reinforcing their position.
- Coastal areas in the Mediterranean, and in the North and Irish Seas are major areas of spatial concentration.
- Some agglomerations, such as Berlin, and in particular rural areas more generally, are losing 'weight' and need to work on their spatial positioning.
- Disparities within countries are most visible in the Netherlands, Norway, Portugal and Sweden.

This chapter explores in more detail some of the themes touched upon in the previous chapter. For this purpose the results of all the current ESPON projects have been synthesised under nine thematic headings:

1. Demographic sustainability,
2. Urban potentials and urban-rural relations
3. Accessibility to transport and ICT
4. Innovation and research development
5. Natural hazards and influences of climate change
6. Energy, natural and cultural heritage
7. The territorial impacts of EU sector policies
8. Governance
9. Demographic and economic trends in a world-wide perspective

Each theme is supported by one or two maps providing some measure of insight into its related territorial dimensions. The accompanying text will discuss territorial developments at different geographic scales – from the regional and national, to the European and partly global levels – in addition to addressing differences between different types of territories, as e.g. between more urbanised or more rural ones.

The various thematic reviews provide additional knowledge of the territorial situation in Europe related to the current policy debate and priorities. There is a clear relationship here between the inertness and uniqueness of territorial assets and potentials and the wish to progress toward harmonious and balanced development. In order then to evolve specific potentials for each region and for larger territories one option is to cooperate in a wider territorial context in terms of identifying the comparative advantages that could provide synergies and 'added value'.

2.1 Demographic sustainability

Demographic development is one of the main challenges when it comes to the future organisation of society, the labour force and competitiveness as well as territorial cohesion. The integrated picture presented in chapter one has already outlined some of the general tendencies, which will be further elaborated upon in this chapter. The main focus here then is on the structural dimension of demographic developments in Europe. In the last chapter of part 2, the demographic development of Europe is portrayed in a global perspective.

Demographic development relates to two factors in particular, natural population change and migration, each of which exhibits different spatial patterns.

Natural Population Change

Natural population change is determined by the birth and death rates. The birth rate is a function of the age structure and (age specific) behaviour. Decreasing fertility rates will affect the age structure causing imbalances. Accordingly, these two aspects need to be considered when discussing the natural growth potential of an area as well as the dependency ratio, i.e. how many younger and older people are to be supported by the working population.

Long-term tendencies regarding stable and declining populations can be uncovered

by looking at both structural and indirect indicators (i.e. the share of children, the share of population older than 65, the labour force replacement ratio, the post-active dependency ratio, aged people vs. young people and change and natural population growth). Each indicates the various structural demographic effects of depopulation, as well as the demographic dynamics at work and future demographic potentials.

Decreasing number of children

The indicator selected for this synthesis report is the share of children (0-14 years old) in the total population. The map concentrates on a differentiated picture of those European regions with a share of children below the European average (Europe 29 average = 17,2%) uniting all regions above this average in one class and differentiating the regions below this value in three distinct classes. The share of children is the most interesting single indicator that gives us a picture of likely future demographic changes in a region and the depopulation processes that are not only directly caused by the fact that larger cohorts are followed by smaller ones, but which will even be reinforced when these smaller cohorts reach the childbearing age themselves. However, more recent changes such as the (drastic) decline in total fertility rates in many parts of Eastern Europe are not reflected in this map.

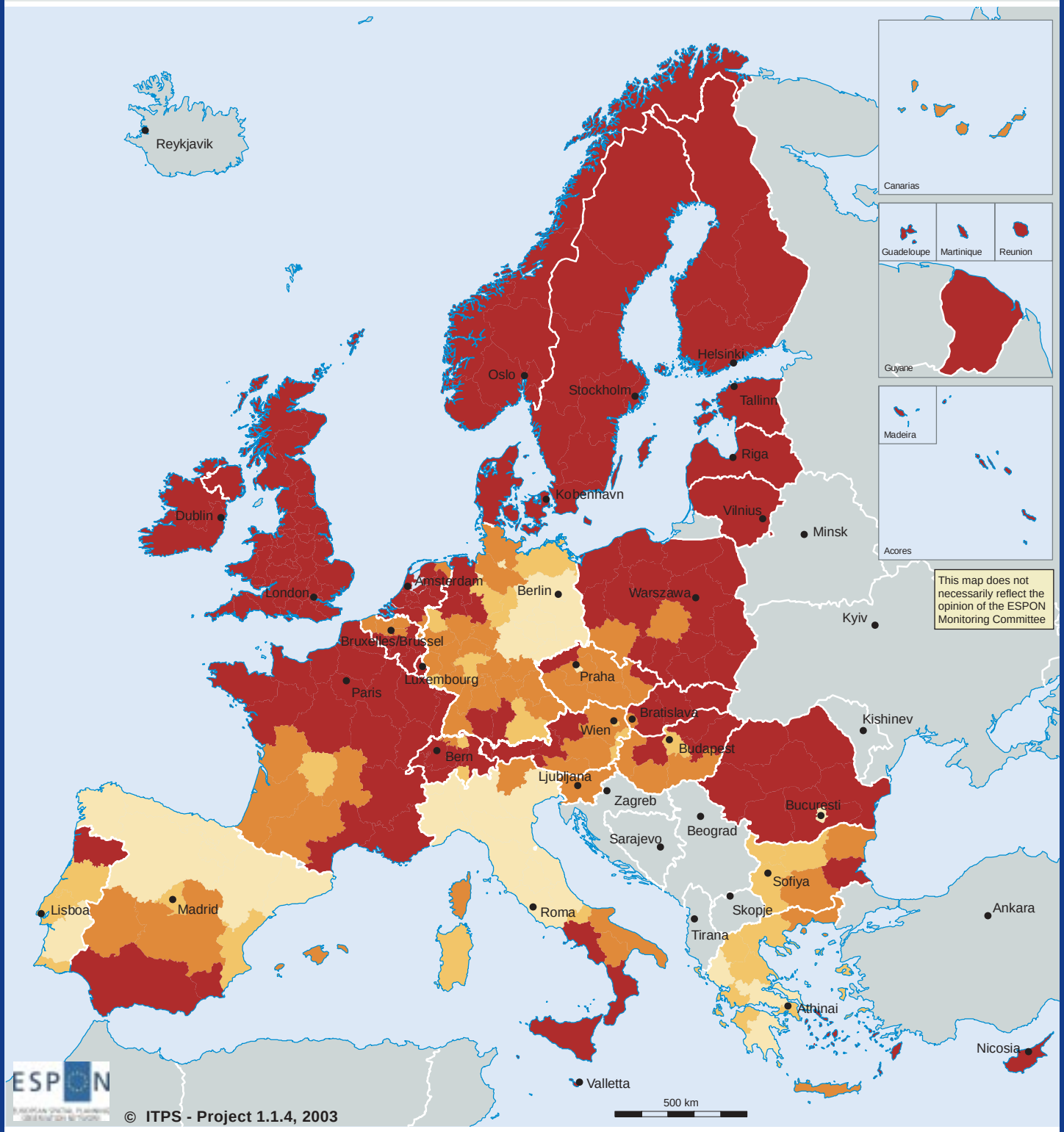
The regions with the most negative deviations from the European average regarding the share of children (below 14,4%) are mostly located in northern and central Italy, northern Spain, Eastern Germany, Greece, and Alentejo (PT). In the UK and Ireland, in Estonia, Latvia and Lithuania and in the Nordic countries, all regions are on the European average or "better", as are most of Poland, Slovakia, Rumania, Belgium and the Netherlands as regards the number of children expressed as a percentage of total population. The former East German case is related to a rapid fertility decline after the reunification of Germany and to migration to the former West Germany. Similar trends will show up in many other new EU Member States in the near future. For both the Italian and Greek regions with a particularly negative position according to this indicator, one may probably seek explanations in previous demographic occurrences, as these regions generally have a strong positive migratory balance that greatly influences the population distribution by age groups.

Migration

With regard to regional population development, migratory movements will continue to be more important in future than natural population development. Under the condition of the general downward trends of birth rates, expansive regions are dependent on a continuous inflow of people in the future otherwise depopulation will be a fact. Immigration from other parts of the world cannot however provide the solution, as the number of immigrations needed would be unrealistically high. Just to maintain actual population levels, the European Union would need an immense number of immigrants each year (between 750,000 now and 2.7 million by 2050). While even more immigrants would be needed in the near future if the goal was to maintain the labour force (though such numbers would decrease by 2050).

From a regional perspective it can be seen that metropolitan areas are the most attractive areas for external immigration and internal migration, while there are also, in addition, tourist areas that have become areas of immigration due to their high quality of life, attracting retired persons (grey-migration), followed by people

European children, 2000



Share of persons aged 0 - 14 years in % of total population, 2000

- 10.4 - 14.4
- 14.5 - 15.8
- 15.9 - 17.2
- 17.3 - 34.2

Regional level: NUTS 2

Origin of data: EU25: Eurostat, NO and CH: National Statistical Offices

Source: ESPON database

from poor countries. In short, young people migrate to large urban areas and people in their later middle-ages move to areas with pleasant surroundings. These migration flows will however be at the cost of other regions, which are to a growing extent threatened by depopulation.

Key findings:

- Europe faces demographic changes, mainly through declining birth rates and strong cohorts of elderly people, resulting in decreasing population numbers and an ongoing ageing of the population.
- The population decline can, at least not in the short to medium term, be fully compensated for by growing numbers of immigrants or by growing birth rates.
- Under these circumstances the competition between regions for population and labour is set to increase in the future.
- There is a trend towards further European regional concentration with regard to attracting different population groups (economically active population, grey-migration, etc), which provides severe challenges to those regions that are not attractive either economically or in landscape- and climate-related terms.
- The main challenge for European spatial development policy is to provide a platform for the development and exchange of innovative strategies to cope with the consequences of demographic change rather than pretending to be able to influence the demographic dynamics themselves.

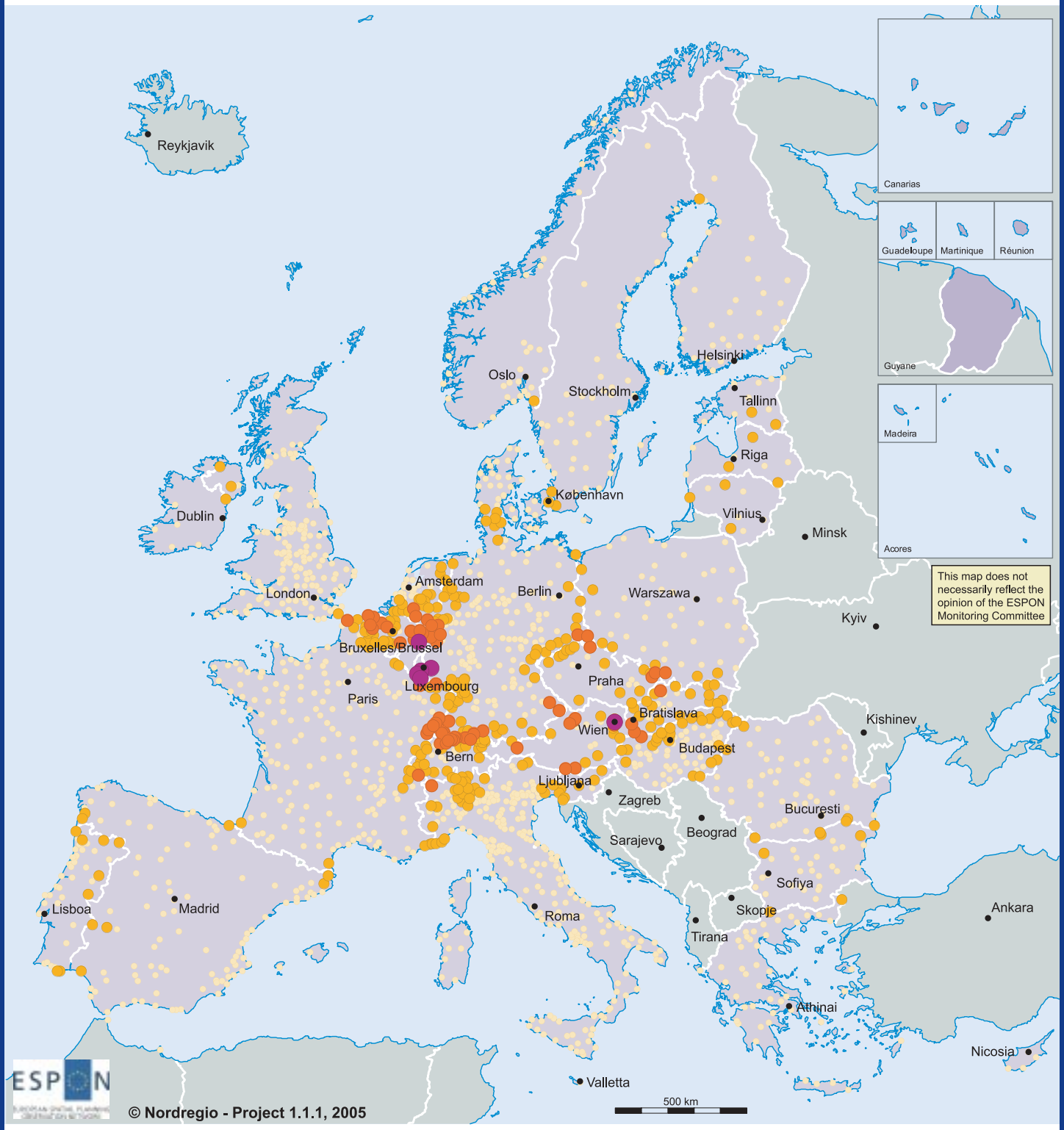
2.2 Urban potentials and urban-rural relations

Spatial Development Policy goes well beyond physical planning. The physical and morphological elements of space and territories that are visible as settlement patterns, transport networks, urban structures etc form the basis from which spatial analyses and spatial policy emerges. For instance, these physical structures shape the core-periphery patterns that have dominated debate for decades although it should be noted here that other structures such as functional specialisation may actually be more important than physical settings.

The morphological picture of Europe shows up imbalances and disparities at all geographical levels. In particular this relates to the urban structure at the European and national levels, the reinforcement of these imbalances through current demographic trends, and developments in rural areas. In addition to these disparities, there are also a number of territorial potentials which can be identified, in particular potentials for functional urban areas to strengthen their functional specialisation by creating large cooperation areas or integration zones. There are also multiple development potentials for rural areas, which are mainly to be found in their functional specialisation and in the utilisation of their natural and social potentials rather than their size, issues that may actually also be of interest also to urban areas.

In what follows the focus will be placed on three topics, namely the European urban system, urban-rural patterns in Europe and European border regions. In all three, functional urban areas and their wider sphere of influence play a major role.

Potential transnational urban regions



Number of countries within 45 minutes commuting distance of a functional urban area (i.e. Potential Urban Strategic Horizons, PUSH):*

- 4 country
- 3 countries
- 2 countries
- 1 countries

transnational PUSH

- ESPON countries
- ESPON areas not included in the analysis

Origin of data: Nordregio. ESPON NUTS 5 datase;
RRG: PUSH delineation

*** Vatican, San Marino, Monaco, Liechtenstein and Andorra not included**

Source: ESPON database

The European Urban System

The basic elements of the European urban system are functional urban areas, defined on the basis of travel-to-work areas. The European ranking of the functional urban areas (developed by ESPON) takes into consideration the number of inhabitants (demographic mass), as well as the European accessibility of these areas, their importance as centres of public administration and of private decision making, plus selected aspects related to their functional specialisation, i.e. their importance for higher education. An analysis of the functional urban areas in Europe revealed a considerable spatial concentration of these within the core of Europe. The picture of Europe is dominated by Metropolitan European Growth Areas in the core, i.e. a Pentagon defined by the area between London, Hamburg, Munich, Milan and Paris. Taking a broader approach, some potential for future global economic integration zones can also be seen in areas currently outside the core of Europe. For this, cooperation in particular in the area of functional (socio-economic) specialisation/profiling is a vital element. Naturally, such cooperation needs to come from the local and regional level and should centre on elements of functional competition and complementarity. Focusing on functional profiling rather than on population size, a number of broader global economic integration zones could in this way further develop their key competences thus potentially contributing to increasing the global competitiveness of Europe rather than engaging in a battle over the distribution of population within Europe.

Urban-Rural patterns in Europe

As regards the need to increase polycentric development at the European level, the stronger regional integration of functional urban areas and their surrounding is required. In this context one can refer to the Potential Urban Strategic Horizons (PUSH), i.e. larger functional entities comprising those municipalities that are within 45 minutes reach (commuting distance) of a city. Within this time-distance, daily commuting may take place. It will however only occur insofar as the PUSH contains a matching supply and demand of labour. Increased integration and cooperation may help to transform the PUSH into enlarged functional entity comprising both urban and rural areas.

This provides for an integrated view of the urban and rural areas within one region. Indeed, it is increasingly difficult to take rural and urban functions apart. There are currently ongoing processes of ‘rurbanisation’, where the physical environment loses qualities that were traditionally associated with urban and/or rural settings.

Seeing Europe through urban-rural-lenses, one can observe that nearly four fifths of the GDP of the ESPON space is produced in slightly more than one fourth of the territory under high urban influence. Regions with low urban influence and medium or low human intervention, count for 53% of the total territory but only 20% of the total population and 16% of the GDP. These figures are based on a European wide classification of rural and urban areas established by ESPON[4]. At the European level, urban areas with predominantly high population densities can be seen to stretch

[4] *This classification is based on two main dimensions reflecting the inter-dependence of rural and urban areas: (1) the degree of urban influence is defined according to population density and a European ranking of the urban centres according to their functional importance, (2) the degree of human intervention as defined by the actual land use, i.e. the relative share of artificial surfaces and of agricultural land in a region. The classification includes 6 categories resulting from the crossing of these two indicators.*

along a corridor running from Northern England through the Benelux countries and Western Germany to Northern Italy and partly down the Italian coasts. A Second East-West oriented corridor stretches through South-east Germany, along Southern Poland and the northern areas of the Czech Republic into Hungary.

The level of diversity across different types of rural areas is significant, but interestingly, the share of agricultural land use is nearly constant in all 6 classes in the urban-rural typology, except for the most rural type. This means that agricultural land is also available in the most urbanised areas of Europe, which is an advantage both in terms of local food production and recreation.

European Border Regions

Returning to the European urban system and to the question of enlarged integrated functional urban areas, an interesting topic here is the potential of such areas to develop relationships, bonds and ties over national borders. In the context of the ongoing enlargement process, a number of border regions will gain the potential to set up dynamic functional relationships with new neighbours.

When considering the nature of an integrated European territory, one can see that on numerous occasions, PUSH areas can be developed beyond national borders. Indeed, 23% of European cities´ PUSH areas cross a national border, and can thus be considered as potential transnational functional urban areas. As becomes obvious from the map, these are mainly concentrated along borders stretching from the Benelux countries to Northern Italy, but also along those situated between Slovenia, Hungary, Slovakia and Poland. The relatively large proportion of such cross-border PUSH areas thus illustrates the potential for transnational initiatives promoting territorial development.

It must however also be taken into account the fact that there are various types of border areas in Europe. An initial analysis of border regions focusing on the new EU Member States has led to some interesting typologies. One of these typologies addressed the issue of cross-border disparities and interaction. Concentrating on the new EU Member States and Accession Countries, the regions of Latgate (LV), Gdanski and the surrounding region (PL), Moravskoslezský Kraj (CZ), Banskobystreický Kraj (SK), Vas, Zala, Nograd and Borsod-Abauj-Zemplen (HU) and Giurgiu (RO) are considered as border regions with a high potential for reducing high cross-border economic disparities. A large number of transnational activities are "forerunners" of integration in terms of the flows of cooperation efforts, twinning schemes and/or capacity building measures. The potential for ‘bottom-up’ efforts at the regional and local levels is therefore significant.

Key findings:

- The emergence and consolidation of alternative global integration zones beyond the Pentagon requires a significant degree of cooperation between cities and regions at the various levels, including also, in a number of cases, cooperation at the transnational level.
- The 'bottom-up' process of territorial cooperation focusing on functional profiles, also involving the establishment of larger functional urban areas across national borders will further enhance competitiveness opportunities.
- Functional specialisation, taking into account comparative advantages in terms of development potentials, is an option particularly for rural and small functional urban areas.
- The availability of agricultural land and open spaces even in the most urbanised areas is an advantage for both local food production and recreation.
- Regional level cooperation supports polycentric development at the regional level.

2.3 Accessibility to transport and ICT

In chapter one an integrated picture on accessibility was presented, bringing together information on road, rail and air transport. The current chapter will discuss in the main the changes in transportation flows expected over the next 15 years, mainly on the basis of the outcomes of the TEN-STAC Study, and their impacts on accessibility. Following the ESDP, accessibility is not only addressed as physical transportation but also within the context of the issue of ICT, which is now fully integrated into the debate.

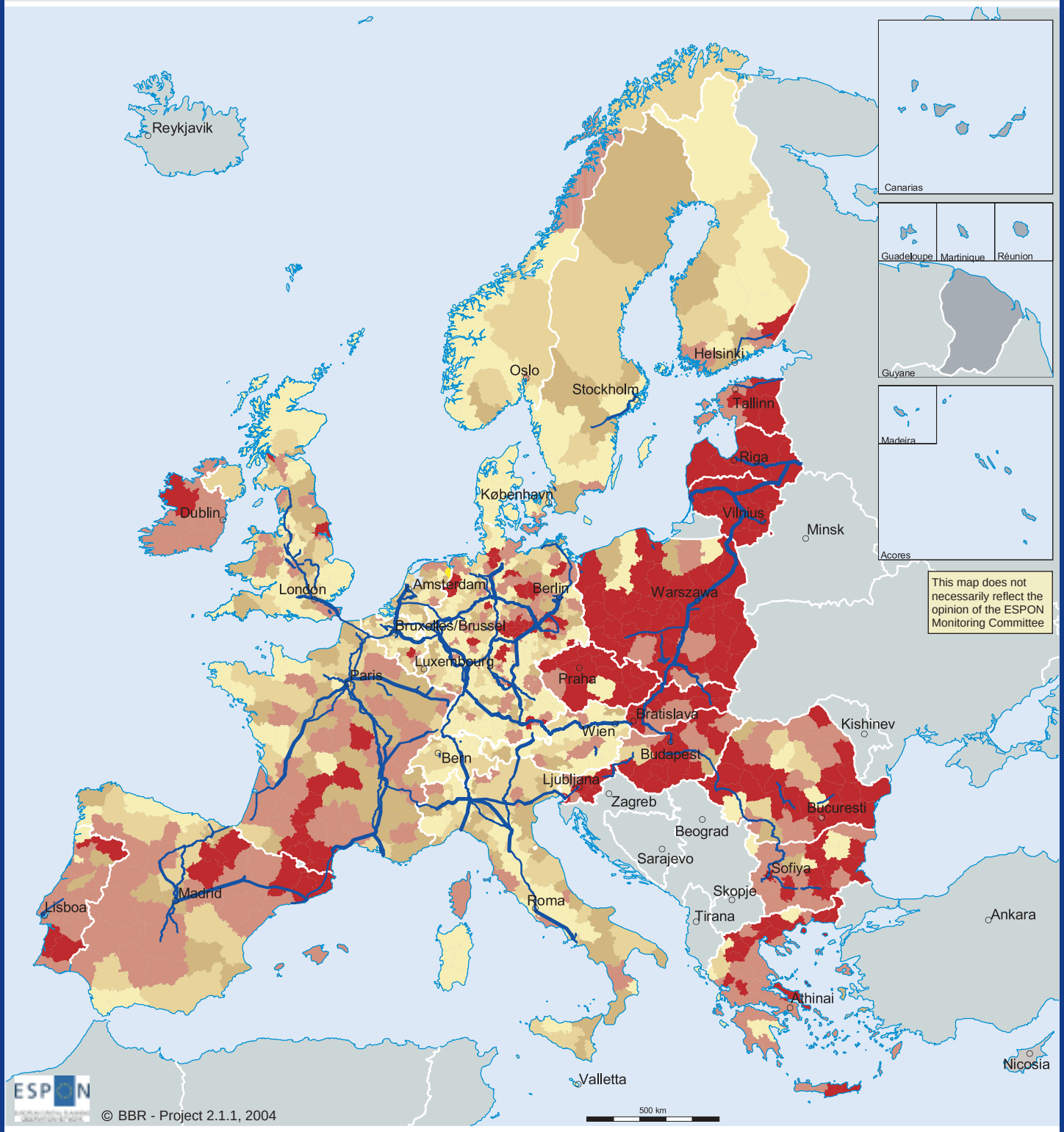
Accessibility in Europe – changing pictures

Increasingly overloaded transport corridors in the context of changing transportation flows are becoming an important issue for accessibility. Estimates exist (European+ Scenario of the TEN-STAC Study)[5] that show that road passenger flows for the year 2020 in comparison to the base year 2000 will have grown by almost 43% (ESPON space without Cyprus). At the same time, in the context of very ambitious investment programmes, the rail transport flows of passengers are increasing disproportionately. The rail passenger flows will have gained about 78%, with rail freight transport rising by about 113% by 2020.

The map shows which areas in Europe will experience an above-average increase in road transport and which railway lines will have to cope with markedly increasing transportation flows. The picture illustrates that the distribution of transport flow volumes interacts with the spatial structure of Europe. The spatial interactions that generate traffic concentrate on urbanised regions and on networks between major centres. They do however pass through rural areas, which then act as the carriers of transportation infrastructure.

[5] *The European+ Scenario is based on the assumption that the European White Paper measures are applied, in particular the ones on trans-European Network and on specific infrastructure projects, and that in addition, accompanying measures are undertaken. All infrastructure projects, which are planned to be finalised in the year 2020, are included.*

Scenario for change in transportation flows, 2000-2020



TEN-STAC base year 2000 vs. European+ scenario 2020

Regional change of vehicle unit kilometres travelled

- up to 25 %
- 25 % up to below 33 %
- 33 % up to below 43 %
- ----- ESPON space average
- 43 % up to below 70 %
- 70 % and more

Markedly Increasing Railway Transport Flows

- 2.5 up to 5.0 million passengers or 10.0 up to 20.0 million tonnes
- 5.0 up to 7.0 million passengers or 20.0 up to 30.0 million tonnes
- more than 7.0 million passengers or more than 30.0 million tonnes (per year, difference 2000-2020)

Origin of data: NEA Transport research and training, TEN-Stac Scenarios, Traffic Forecast and analysis of corridors on the Trans European Transport Network

1 vehicle unit equals 1 car or 0.5 bus or 0.5 truck

Source: ESPON database

The Pentagon currently has approximately 39% of the kilometres travelled (by all types of road vehicles) across almost the entire ESPON space. Until 2020, in the context of the European+ Scenario, this share will decline to around 29% because of higher growth rates outside the Pentagon. Moving from the European to the regional picture, average transportation flow densities occur inside the Pentagon that are even higher than in the most urbanised regions.

Looking also at a lower geographical scale, it becomes clear that there are two overlying core-periphery patterns (in terms of accessibility), a European one and a national one. The national pattern generally developed as it did because spatial interaction is much more intense within countries than between them. Hence, not only regions in the European periphery but also regions in the periphery of their respective national markets suffer from increasing transportation costs, because their interaction with the market is more dependent on transportation than that of more central regions. This also goes some way to explaining the disadvantages suffered by border and coastal regions. Unsurprisingly, urban regions are currently more burdened by the load of traffic. Rural areas will however increasingly take over more of the load. Rural areas will see a higher increase than urban areas. Indeed, the highest increase in transport flows, i.e. 67% is to be expected in rural areas with medium human intervention. For the other rural areas the increase in transportation is expected to be 45% for areas with low human intervention and 58% in regions with high human intervention. As regards urban areas, the increase in transportation is expected to be lower than in rural areas, i.e. 50% in urban areas with low human intervention, 37% in urban areas with medium human intervention and 36% in urban areas with high human intervention.

As noted previously, accessibility is not only about transport but also about access to information and knowledge. When it comes to information and communication technologies (ICT), the picture however becomes more complex, as it is very different for each technical solution. Spatial patterns depend on technical solutions, which reflect in the main national differences in telecommunication cultures, e.g. Finland and Sweden have high communication and computing cultures, the Czech Republic, Greece, and Italy have high voice communication cultures, Denmark and the Netherlands have high computing cultures and France and Germany have rather low telecommunication cultures (with respect to both voice and Internet). These national specificities remain crucial in understanding territorial differences across Europe. Cultures are an important input to understanding the different ways in which territories enter the Information Society/Age. In terms of ICT moreover there are disparities between metropolitan, urban and rural areas. Generally speaking, such disparities are more pronounced for the leading edge technologies (broadband technologies and Internet backbone networks) than for the more mature technologies (fixed voice telephony, mobile telephony, personal computers and the Internet). It is not surprising however that the currently most commercially developed forms of broadband technologies are following a hierarchical roll-out pattern, with areas of high density population being served first. It has however to be emphasised that telecommunications is an exceptionally fluid sector where things change rapidly. Thus the picture presented today could be rather different from that existing tomorrow.

Key findings:

- Good transport accessibility is certainly an important factor in exploiting territorial potentials. Transport flows will however significantly increase over the next 15 years, and traffic congestion, in particular of road networks, will increase. In this respect, proximity, particularly close to major railway links may improve the territorial potentials of areas.
- The increase in road transport levels beyond the Pentagon and in rural areas more generally generates increasing pressure on the environment. Increasing traffic demand will however justify new investments, which may indirectly increase the accessibility of these areas in the long run.
- The potentials in respect of ICT endowment are particularly advantageous to metropolitan areas.
- The utilisation of specialisation potentials deriving from territorial ICT cultures can contribute to the strengthening of comparative advantages in international competitions.

2.4 Innovation and Research development

Part 1 introduced a map on the 'Lisbon performance' levels of various regions, taking into account a number of indicators. This included information on the share of highly educated inhabitants and expenditure in the field for Research and Development (R&D). The current chapter elaborates further on issues related to innovation capacity and human capital as assets for global competitiveness. The issue of education in particular regarding the location of universities will be addressed here. Furthermore, considerations will be made of the location of R&D expenditure in relation to major centres in the European urban system.

Centres of knowledge

In the analysis of the European urban system presented earlier in this report, knowledge "production" was one of the key criteria used in selecting and ranking functional urban areas in Europe. Knowledge "production" is measured as the number of students at institutes of higher education. From a European perspective, in the majority of countries, the capital city appears to be the most important node in this regard. It can be argued that knowledge production makes strong poles even stronger, which is an important feature when identifying growth poles beyond the Pentagon.

At the same time, the national system of universities has, in most countries, a rather polycentric structure, which makes for a rather balanced territorial picture of knowledge-based Europe. Today many large and important universities are located in functional urban areas away from the capital cities. In general, the density of higher-level education institutions is naturally higher in more densely populated areas.

Austria, Belgium, Finland, Greece, Ireland, Italy, Latvia, Lithuania, the Netherlands, Portugal, Romania, Sweden, Slovenia and the UK in particular are characterised by polycentric urban systems in knowledge terms.

Research hotspots in the European urban system – in relative terms

The number of university students was one criterion for identifying and classifying functional urban areas in Europe. It therefore comes as no surprise that there seems to be a close relationship between the most important functional urban areas, the Metropolitan European Growth Areas (MEGAs), and the regional importance of R&D.

The map displays two dimensions. The regional coverage illustrates the R&D expenditure as the share of GDP and the number of researchers in the Business Enterprise Sector (BES), calculated as a share of the total employment in a region. The inserted Metropolitan European Growth Areas, classified due to their role in the European urban system, show the European urban areas of global importance as well as strong, potential and weaker cities/urban areas of European importance.

Besides Global Cities (e.g. the strongest MEGAs), the European Engines (the second strongest MEGAs) are mainly situated in regions with an above average importance in terms of research and development. One interesting finding here however is that MEGAs, particularly those in the new EU Member States, are situated in the regions with the best R&D scores, such as Praha, Bratislava and Budapest. Dublin, Göteborg and Lyon are in a similar situation in their countries.

Some important MEGAs in the old EU Member States do not rely on a high importance of R&D. This is the case in Athinai and Roma, which display rather more cultural and administrative than economic functions, and similarly with Barcelona, which has conventional industries, culture and tourism. However, even less strong MEGAs such as the region of Midi-Pyrénées (FR) with Toulouse and the region of Skåne (SE) with Malmö can improve their performance based on the regional importance of R&D.

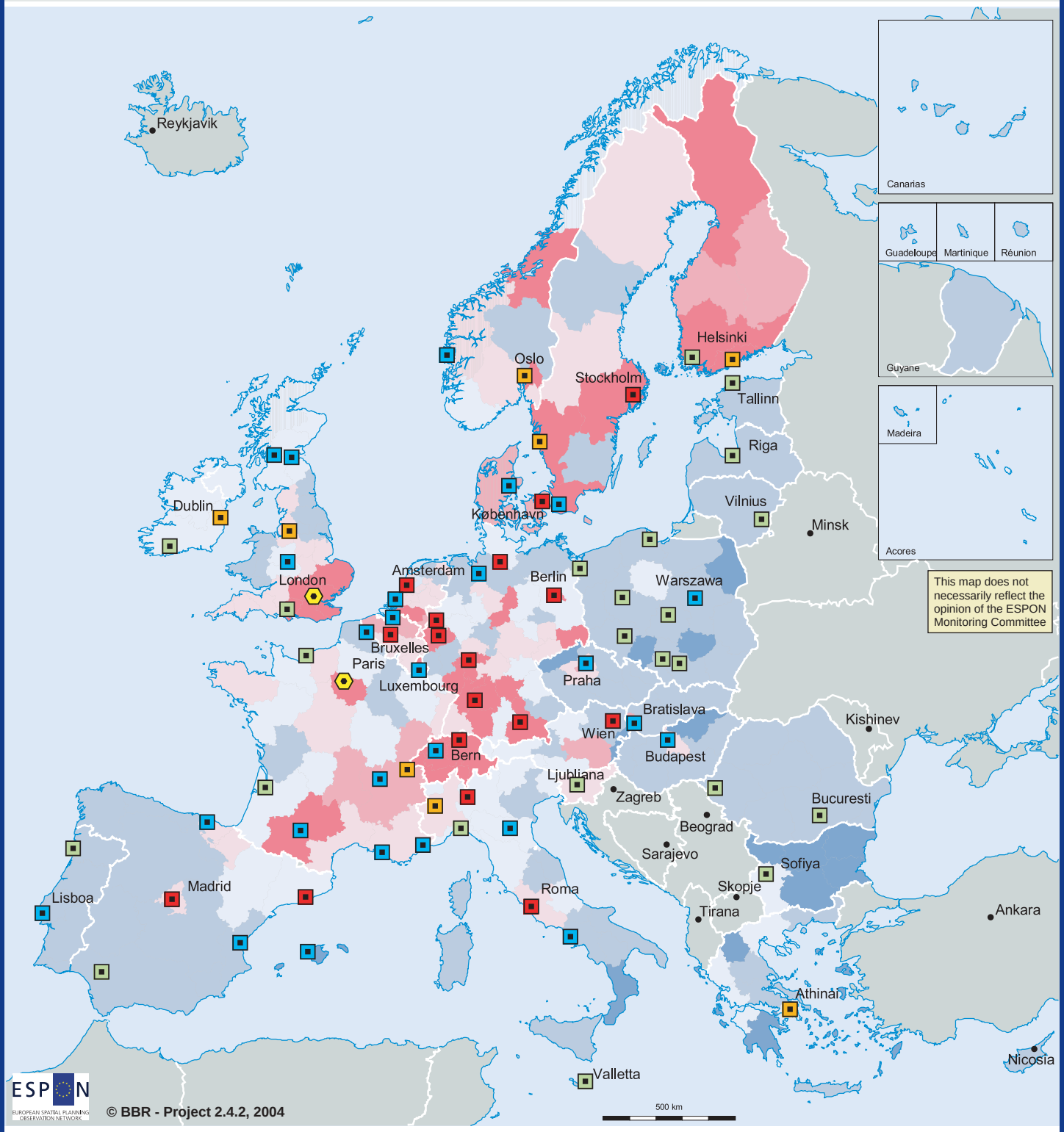
National diversity in the concentration of R&D – in absolute terms

Expressed as a percentage of GDP, Gross Domestic Expenditure on R&D (GERD) is often used as an indicator of the overall R&D intensity of a country or region showing the relative emphasis put on R&D activities within a given economy. However, the absolute level of R&D expenditure is equally important in order to assess the R&D effort.

The R&D intensity varies considerably between regions within individual countries and is often concentrated in a small number of regions, often near the capital city. The regional variation in R&D intensity is particularly high in Germany, with an exceptionally high R&D intensity for Braunschweig, and in Finland. Regional diversities are also pronounced in several new EU Member States particularly in the Czech Republic and in Poland.

The concentration of R&D expenditure in the capital regions in absolute terms is particular visible in countries such as Austria, the Czech Republic, Finland, France, Hungary, Greece and Portugal, where the "top" regions all account for around half of national R&D spending. In France, 45% of national R&D expenditure is concentrated in Ile de France (the region with the highest R&D expenditure of any European region in absolute terms), compared with a figure of 10% for Rhône-Alpes, the region with the second highest levels of R&D expenditure in France.

Research and Development importance and Metropolitan Growth Areas, 2002



Degree of importance of research and development as an aggregate of 2 indicators: *

- Low
- Below average
- Moderately below average
- Moderately above average
- Above average
- High

*Additive combination of standardised R&D indicators: expenditure of R&D, and personnel in BES as percent of total personnel.

Metropolitan Growth Areas

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

Regional level: NUTS 3

Origin of data: TAURUS, BBR project 3.1 for R&D; Nordregio project 1.1.1 for MEGA's

Source: ESPON database

Key findings:

- A territorial picture of knowledge-based Europe is rather balanced as the national systems of universities in most countries display a rather polycentric structure, with many large and important universities located in functional urban areas away from the capital city.
- The strongest MEGAs are situated in regions with a strong R&D profile.
- The highest level of R&D expenditure, within countries, can normally be found in the capital region, while R&D intensity varies considerably between regions, and is often concentrated in a small number of regions near the capital region.
- Universities and higher education institutions are attractive for the development of MEGAs as well as for regional innovation, in particular through cooperation with the productive sector.
- Strong MEGAs with a weaker R&D profile generally strive to develop further R&D activities.
- Weaker MEGAs with a strong R&D profile have the potential to strengthen their economic base.

2.5 Natural hazards and influences of climate change

Part 1 presented maps combining indicators for natural and technological hazards. This chapter looks in more detail at some of these hazards as well as at their interrelations. The focus here is on how the change precipitation patterns, as an effect of climate change, affect hazards. With regard to policy development related to territorial cohesion and development at the European level, hazards such as floods, droughts and forest fires currently seem to be of particular interest.

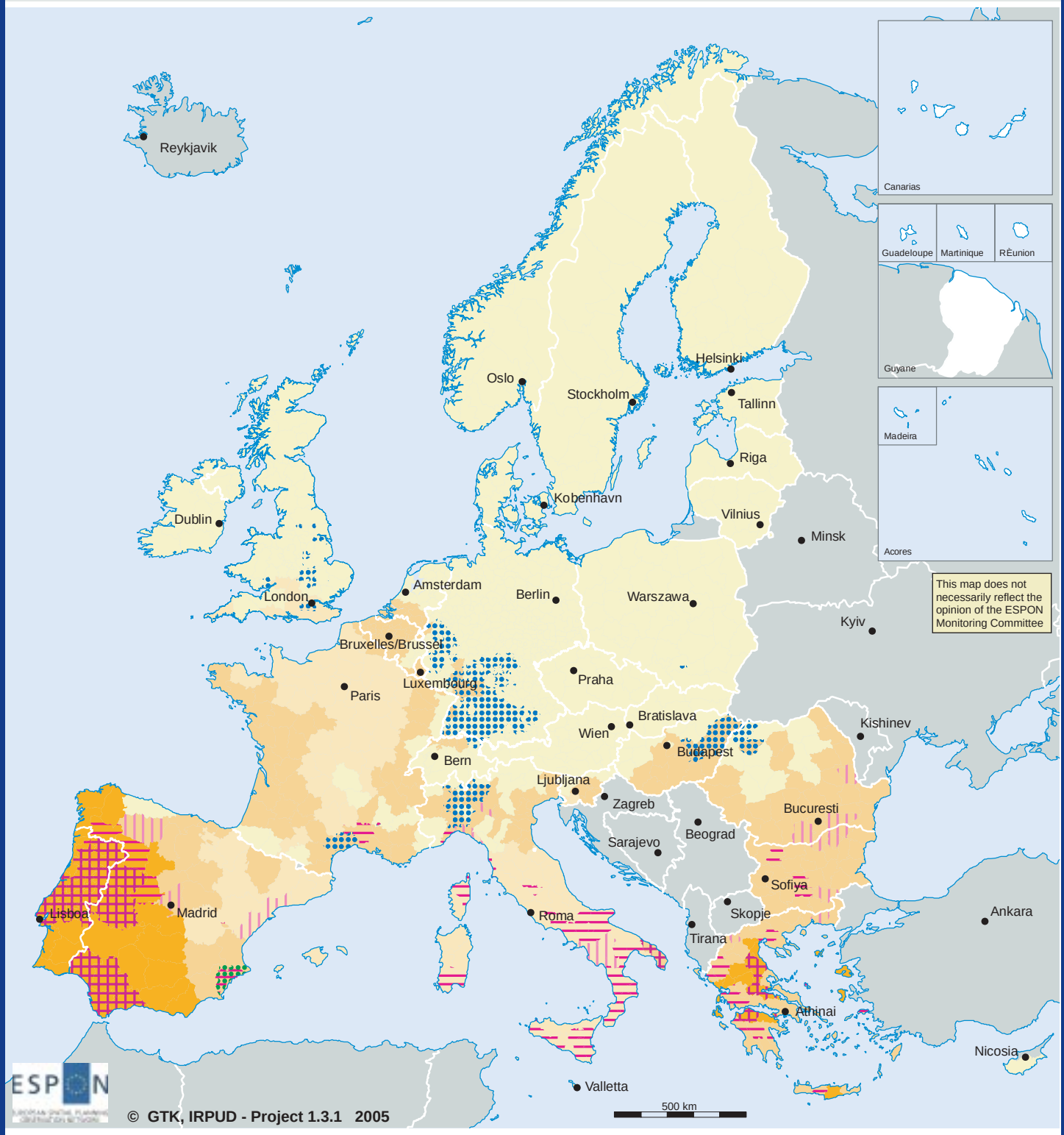
River floods

River flooding emerged as an increasing problem in respect of the built environment once human intervention began to change, straighten and even relocate river beds with their natural flood-prone areas while at the same time settling in low lying areas close to rivers. Increased soil sealing also leads to a higher flood hazard level, as rainwater runs off directly into the streams and the water mass inflow to rivers is no longer delayed by natural soil retention.

The applied research undertaken within the context of ESPON has aggregated large river floods in Europe, based on the frequency of floods during the time period 1987-2002. The regional flood recurrence for this 15-year period is reproduced on the NUTS 3 level (administrative boundaries of regions).

The analysis shows that the highest amount of large flood events between 1987 and 2002 are concentrated in North-Western Romania, South-Eastern France, Central and Southern Germany and in the east of England. Even though this kind of analysis is not usable as a flood-prone area analysis, as it displays past events without simulating possible future events, it does portray a representative picture of the flood hazard. Some evidence for this can be seen in the floods that hit southern France in 2004, as the flood hazard map depicts this area as one with a high flood recurrence level.

Impacts of changes in precipitation on floods, droughts and forest fires



Change of dry spell length affecting drought potential[1]

- very small increase
- small increase
- moderate increase

Change of dry spell length affecting forest fires[2]

- very high impact
- high impact
- moderate impact

Change of precipitation pattern affecting flood hazards[3]

- increase
- decrease

- Regions with no impact or decreasing impact
- no data

[1] Connection between precipitation change and flood hazard. Only the highest hazard intensities (4 and 5) are considered.

[2] Connection between increasing long dry spells (The Prudence project model database) and forest fires hazard. Only the highest hazard intensities (4 and 5) are considered.

[3] Connection between change of dry spell length (The Prudence project model database) and drought potential , based on precipitation deficit recordings 1904 -1995.

Regional level: NUTS 3

Origin of data: Large flood areas © Dartmouth Flood Observatory; Flood areas © ESA Earth observation Earth online
Forest fires years 1997 2003: ESA ;
Biogeographic regions: EEA
The Prudence project model database; ARIDE final report (2001)

Source: ESPON database

Droughts

The 2003 drought in Europe accounted for almost one third of the economic losses due to natural hazards. Droughts and long dry periods have led to serious power failures in Europe and in consequence to great economic losses in terms of the industrial sector, tourism and (inland water) transportation. Most drought assessments concentrate their analysis on the effect on the surrounding vegetation while seeking to estimate the economic losses of agricultural production. Drought risk analysis should however also take into account the likely effects on the production industry and the service sector. The share of agriculture in European countries measured in GDP is well below 5%, in most countries even less than 3%. This underlines just why drought impacts on the secondary and tertiary sector are so important.

In Europe, the man-made impact of droughts is considerable. There are several examples of water resource mismanagement, relating to, for example, the over pumping of aquifers, the sealing of areas increasing surface runoff and restricting groundwater recharge, overuse of water in dry areas and intensive agriculture.

Hydrological droughts are shortages of precipitation, surface and sub-surface water supply. The inhomogeneous topography, climate and vegetation of Europe suggest the utility of using hydrological droughts to compare the drought potential at a European scale.

The analysis exhibits interesting patterns in raising issues of hydrological droughts on the European territory. For example, Norway has problems with water deficiency because the country's economy is strongly dependent on hydropower. Even though Norway contains some of the rainiest places in Europe, small negative deviations in precipitation can lead to energy problems because the water reservoirs are not refilled appropriately. Another interesting point here is that Eastern European countries, apart from having experienced the highest number of floods over the last 15 years, have also experienced the greatest problems with droughts over the last hundred years. Areas in southern Europe that are usually associated with droughts, such as parts of France and Italy, appear to suffer less dramatically in this analysis. The reason for this lies in the stronger local effects of such agricultural droughts.

Forest fires

Forest fires (wild fires) can cause considerable damage in environmental terms, e.g. by the destruction of fauna and flora, as well as potentially causing human casualties. They also have serious economic implications on forestry and often on infrastructure and private property.

Forest fires are natural phenomena (e.g. self ignition, lightning, etc.) that are of importance for the natural living process of a forest. They act as a natural cleansing process for forests, as e.g. excessive dead wood is burnt. The suppressing of forest fires can lead to the production of excessive biomass and dead wood leading to unnatural conditions, which again can lead to even more catastrophic forest fires.

The amount and density of observed forest fires gives a good overview of the geographical distribution at the European level, though the short-term nature of the observation period does not allow for detailed conclusions on the actual hazard on the

regional level. The vegetation zones, which are regulated by climate and the relief, play a major factor in the physical potential of forest fires. A combination of these factors leads to a valuable overview on the forest fire hazard on a European scale.

The forest fire hazard analysis shows that the areas with the highest potential for forest fires lie in Portugal and Western Spain (i.e. in the western part of the Iberian peninsular), and partly also in Romania and Bulgaria. The high risk of forest fires in Central-Northern Portugal and in North Western Spain probably relates to local habits of 'slash and burn' practices that are dangerous in combination with a high potential for forest fires.

Climate change – the influence of dry spell length

In the debate over natural hazards, climate change and its consequence take a prominent position. Future climate change can be expected to affect both the frequency and intensity of natural hazards, and thus also to influence discussion on risk management in terms of all climate-induced natural hazards. Climate change comprises changes in weather variables such as averages and extreme events in temperature, precipitation/rainfall (incl. snow cover) and wind. These three elements in turn influence other aspects such as e.g. dry spells.

An initial regional typology showing natural hazards, which might be influenced by climate change, focuses on three selected hazards, e.g. droughts, floods and forest fires. In the case of droughts, the assumption is that longer dry spells lead to an increase in the potential for droughts to occur, while shorter dry spells decrease this potential. The flood analysis depicts those areas with a modelled increase in precipitation and a consequent increasing flood hazard. Regions with less modelled precipitation therefore show a decreased flood hazard. In the case of forest fires it was also assumed that longer dry spells lead to an increase in the risk of forest fires occurring.

The effect of a change in dry spell length on the drought potential analysis shows that areas with a very high drought potential such as those in the Iberian Peninsula would be expected to see an increase in this type of hazard. Other areas with a higher hazard level are also modelled to expect an increase (e.g. South Eastern Europe). Meanwhile, selected areas in eastern and central Europe may face a small increase in the drought potential, while some areas in northern Europe and in the Baltic region could see a decrease in droughts. Some of the areas with the highest flood hazard levels in Central and Eastern Europe show an increase in the flood hazard level, according to modelled increases in precipitation over these areas, while a decrease in the flood hazard level occurs in one small area in the Mediterranean based on a modelled decrease of precipitation. The highest increase in precipitation is modelled for northern Europe, though this area does not currently exhibit a high flood hazard level. In the case of forest fires the assumption that longer dry spells lead to an increase in this hazard type show a similar pattern to those connected to the drought potential. The Mediterranean vegetation zone is assumed to bear the highest increase in the forest fire hazard level, while some areas in central Europe may exhibit a small increase here.

The analysis of selected hazards shows that the southernmost areas of Europe face the highest increases in natural hazards – due to the change of dry spell lengths – occurring as an effect of climate change. This is only partially correct however, as

not all natural hazards have been taken into account. A change in wind patterns or an increase in extreme events may lead to a considerably higher hazard level for winter storms and storm surges. Moreover, the effects of increased precipitation on landslides and avalanches have also to be assessed at the local level. Therefore this analysis presents only a first attempt to deal with this topic, and as such, more research is needed in order to come to a better understanding of the scenarios and their impact on the European territory.

Key findings:

- The greater number of large flood events between 1987 and 2002 were concentrated in North-West Romania, South-East France, Central and Southern Germany and in the east of England. Changes of dry spell lengths, as a consequence of climate change, affect areas differently.
- East European countries, apart from having experienced the highest number of floods during the last 15 years, have also experienced the greatest problems with droughts over the last hundred years.
- The highest reoccurrence of forest fires is in Portugal and in Western Spain, as well as in Romania and Bulgaria.
- Changes in dry spell lengths as - an effect of climate change - may cause the greatest increase in the frequency of natural hazards, i.e. floods, droughts and forest fires, in the southernmost areas of Europe.
- The human ability to exacerbate the impact and effects of natural hazards (artificial surfaces, straightening of rivers etc.) at the same time also offers the potential to minimise hazards risk through the provision of durable preventive measures.
- A more precise knowledge of hazards recurrences and risks offers the potential to minimize the risk and improve readiness.

2.6 Energy, natural and cultural heritage

Energy is an important issue, with European society in general remaining highly dependent on energy, while at the same time energy resources becoming scarcer. In addition, energy has an important environmental dimension as it significantly affects the environment. For this reason increasingly renewable energy sources are exploited. The environment and cultural heritage are becoming increasingly important locational factors influencing the attractiveness of areas for both businesses and families, and by extension therefore the territorial development of such areas. This point is underlined in the ‘Gothenburg Agenda’, which is closely related to the Lisbon Agenda goals. Natural and cultural assets constitute important potential assets for further economic development in many regions. The right balance between use and protection is thus a precondition for the effective and sustainable use of such territorial potentials. This chapter will however only briefly touch upon these issues, focusing instead mainly on the issue of energy, which is closely related to the question of how to use and sustain our environment as well as our natural resources.

Energy

The issue of energy is complex. This text touches upon three aspects (a) the European dependency on energy (fossil fuel) imports, (b) the sensitivity to changes in energy prices, and (c) the potential for using renewable energy sources.

As a whole, Europe has become less dependent on imported energy, as its dependency rate has improved from 1990 to 2002, moving from an overall self-sufficiency ratio of 60.9% in 1990 to one of 64% in 2002. This figure is however significantly influenced by the role of Norway, which produces 9 times more energy than it consumes. The smaller European countries as such reveal severe levels energy dependence (i.e. Luxembourg, Cyprus and Malta produce less than 2% of their energy needs through their own domestic resources), while a further five European countries (Belgium, Spain, Ireland, Italy and Portugal) have resources sufficient only to produce barely 25% of their energy needs.

Depending on the efficiency of the use of energy, the sensitivity to changes in energy prices varies. The old EU Member States use 50% more energy than the new EU Member States, but producing one Euro of income in the old EU Member States takes only 30% of the energy needed to do so in the new EU Member States. Accordingly, the new EU Member States are, in general, more liable to suffer negative impacts from a rise in energy prices, mainly because of the high energy intensity of their industrial processes and the low energy conservation levels of their building stock. Germany, Austria, Ireland and Greece seem to be well placed regarding possible energy price shocks, despite the fact that the reasons for this may be substantially different: basically, favourable climate and light industries in Greece, and energy efficient use in the others.

Classifying regions according to both their sensitivity to price change (above or below the European average), and to their level of self-sufficiency (above and below average), results in a fourfold typology that may be helpful in designing policies addressing such dependency questions:

- Low sensitivity to price change and low self-sufficiency. The majority of the old EU Member Stats have a relative low sensitivity to price changes and low self-sufficiency (all regions of Portugal, Spain, Ireland, Sweden, Finland, Germany, Austria, Belgium, Greece and most of Italy, as well as parts of France).
- Low sensitivity to price change and high self-sufficiency. Regions with low price sensitivity and high national self-sufficiency are located in the UK, Denmark and Norway (actual net oil exporters). These regions have fewer problems with their energy self-reliance and may contribute positively to the development of other European regions.
- High sensitivity to price change and low self-sufficiency. At the other extreme there are regions mainly located in Latvia, Lithuania, Hungary, Slovenia, Cyprus and partly also in France and Italy, which are simultaneously both highly sensitive to price changes as well as being located in countries with a low level of self-sufficiency.
- High sensitivity to price change and high self-sufficiency. One can also conclude that mainly regions in Poland, the Czech Republic, Romania and Estonia, are characterised by low dependency, but high sensitivity to price shocks.

The increased use of renewable energy sources contains a certain level of potential to overcome the problems of dependency while also influencing price changes. The proportion of electricity generated by renewables in 2002 varies markedly across Europe. In Ireland, the UK, Benelux, Germany, Poland, the Czech Republic, Estonia, Lithuania, Hungary, Bulgaria and Greece renewables account for less then 10% of electricity production. In Norway, Latvia and Austria on the other hand the figure is more than 60%.

The undoubtedly considerable potential to increase the use of renewable energy is not however equally distributed across Europe:

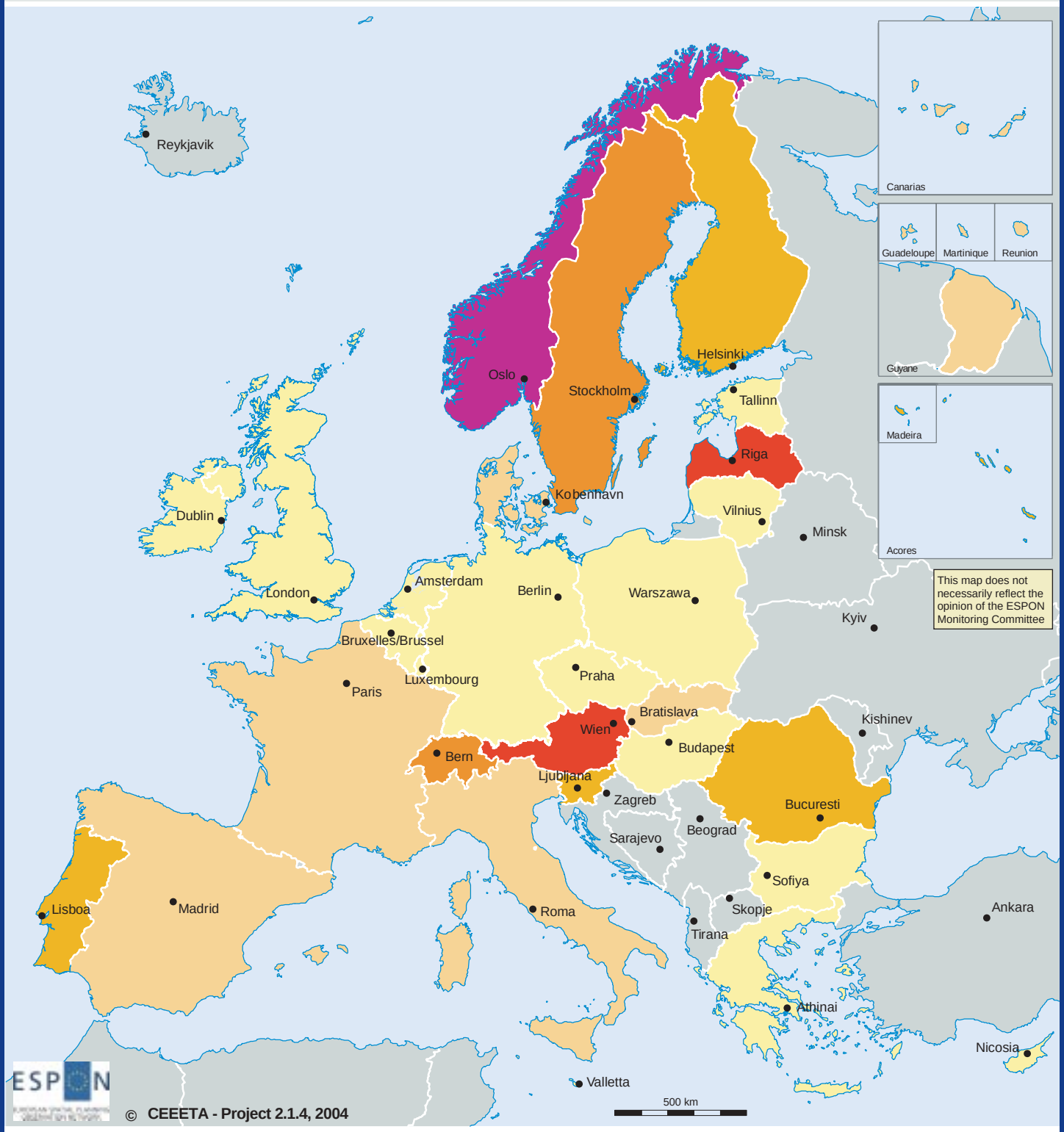
– Wind energy potential is particularly relevant for Norway and Ireland, but also important for Greece, Sweden, Portugal, Spain and the UK. It was once thought remarkable that wind energy could provide any more than a negligible contribution to energy production, though in some cases now its potential comes close to that of the total amount of electricity consumed (Norway and Greece) or is able to provide half or more of the total electricity consumption (Ireland). In the majority of cases, the potential level is up to 60% of total electricity needs. This does not however reflect the actual potential of wind energy because, for technical reasons, there are limits to the penetration of renewables in terms of electricity production. Depending on the technical characteristics of the network, wind energy can therefore, it is now argued, represent a maximum of 20 to 30% of the electricity produced.
– Biomass is another important energy resource that is abundant in Europe. Although almost half of the countries studied have low potential per capita (less than 9,5 PJ per year and million persons), such as Italy, Poland, the Netherlands, Germany, UK and Belgium.
– Solar energy mainly favours the southern European regions (although it is comparatively less exploited there), though technological evolution is increasingly also making this renewable energy source accessible to a larger number of northern regions.
– Hydro-energy currently represents a large part of the output of renewable energy sources, though most of the potential for such developments along Europe's rivers and in mountain areas has already been exploited. The potential for further exploitation does however exist in coastal areas (tide-related hydro-energy).

Given their decentralised nature, renewable energies can have a very positive impact on local job creation and revenue generation, in particular in rural and remote areas, through the use of natural endowments (biomass, wind, solar radiation). Moreover, the production of renewable energies relates well general concerns over the environment and with our natural heritage, both in terms of the decline in CO_2 emissions and as regards land use (agricultural production of renewables).

Natural heritage

The fragmentation of the natural heritage of an area is the result of ongoing development processes, which leave Europe with a natural heritage consisting of many small 'disconnected islands' surrounded by other human-dominated types of land use. These fragments of natural and semi-natural habitats are often not able to support the survival of species' populations in the long run, particularly in respect of their size, isolation and the species´ ecological characteristics. Indeed, the

Electricity generated by renewables, 2002



Electricity generated by renewables in 2002, in %

- 0 - 9
- 10 - 19
- 20 - 39
- 40 - 59
- 60 - 79
- 80 - 99

Regional level: NUTS 0

Origin of data: Eurostat, DGET

Source: ESPON database

size of coherent semi-natural areas as well as the distance between different sites of this type is crucial for the maintenance of our natural heritage.

Today, apart from specific locations in the east of France, in Germany and Poland, the continental region consists, on average, of 20-50% of highly fragmented semi-natural areas. Less fragmented semi-natural areas are to be found in Finland and in the European mountainous regions in Spain, the Alps, the Carpathians, Greece and Scotland. At the same time, most fragmented nature is located in Ireland, Southern England, and the north western coastal zones of France, Belgium, the Netherlands, Germany and Denmark. The most fragmented semi-natural areas stretch from coastal zones inward along major rivers, i.e. the Loire, Seine, Po, Elbe and Danube.

This fragmentation is mainly caused by relatively high development pressures in two fields. On the one hand there is the progress of economic activities leading to urbanisation and its related infrastructure, which is the main driving force in many regions in the UK, Belgium and the Netherlands. Population density and demographic developments as well as different traditions in urbanisation and favoured settlement patterns moreover contribute to the role urbanisation plays in fragmenting semi-natural areas. On the other hand there are areas that see increasingly intensive agricultural usage, which is the main driving force in many regions in Ireland, the UK, France, Belgium, the Netherlands and Denmark. Generally, ongoing intensification of agriculture is one of the main threats in the large continental regions.

Cultural heritage

In a similar way as with the issue of natural heritage, our cultural heritage and assets represent an important factor of the "quality of life" of the territory, offering significant opportunities for regional development. More and better cultural opportunities mean more recreation, higher land values, more enterprise, more "aware" citizens, and ultimately a more "sustainable" level of development, where economic growth objectives are "tempered" by a greater balance in the public realm and equity in the distribution of resources.

The spatial distribution of cultural heritage resources varies depending on the type of resources. Heritage resources of the immovable type and museums are mainly clustered in coastal and urbanised areas. At the same time, access to cultural resources is potentially more problematic in heavily urbanised areas where use pressures are higher. Libraries are an expression of the pursuit of spatial balance and access to culture among regions within a country and are more evenly distributed throughout the territory than other immobile heritage resources.

Excessive tourist pressure threatens to prevent the access of local people to their own heritage and cultural assets, thus representing an element of the disruption of stakeholdership and ultimately further endangering the preservation of the assets in question. In addition, heavy economic pressure from tourism is likely to alter the social mix of the territory through "crowding out" effects, coming to alter the "cultural identity" of a given place. The concentration of cultural assets however also provides a strong element in the attractiveness of the territory, which is likely to work as a magnet for visitor flows. These turn out to be an important development

asset for the territory – producing tourism-related jobs and income while also contributing to 'branding.' They are however also a potential source of disturbance to the physical integrity of the cultural assets (through the intense use of resources).

Key findings:

- Renewable energies such as wind and biomass in particular are a potential source of electricity in Ireland and Latvia, but also in Norway, Portugal, Spain, Austria, Bulgaria and Romania and even Greece and Denmark.
- The higher availability of some renewable energies such as wind, solar and geothermal sources in a number of regions is likely to create local jobs.
- Cultural assets are a major territorial development potential for urban and coastal areas, but also for a number of rural areas.
- Solar energy is paradoxically relatively weakly exploited in southern European regions.

2.7 The territorial Impacts of EU sector policies

Various national and European policies affect territorial development in Europe. In order to assess how policies such as the Structural Funds, the Common Agricultural Policy, Transport or Research and Development policies influence territorial development, ESPON conducted a number of Territorial Impact Assessments of these policies. This chapter outlines the initial results of these attempts focusing mainly on EU regional and agricultural policy.

Regional Policy

In both the past and current programming periods, European regional policy was comprised mainly of the Structural Funds, as well as various instruments of Pre-Accession Aid, such as PHARE, PHARE CBC, ISPA and SAPARD.

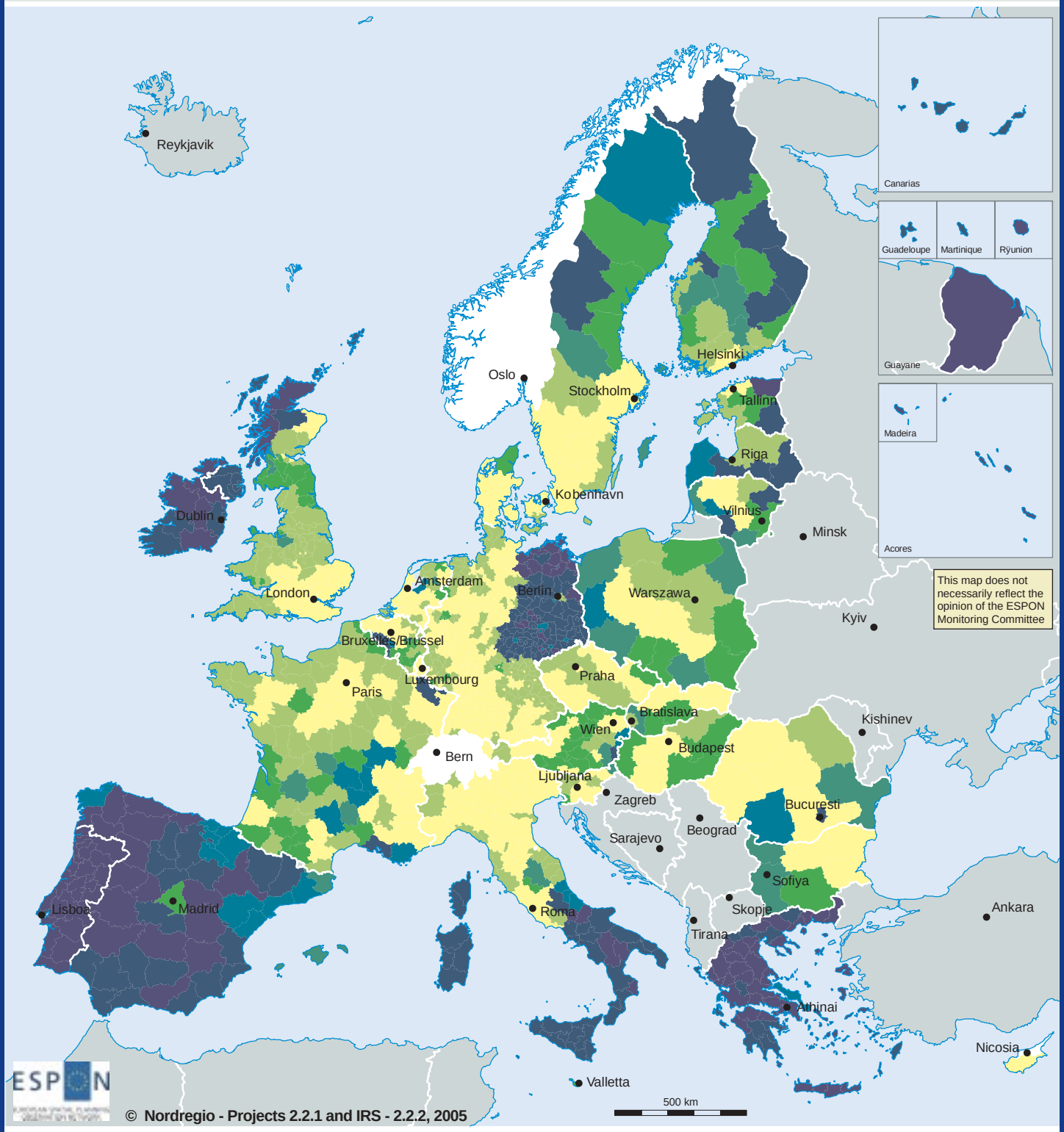
The studies show that these instruments can contribute to territorial cohesion, though they often do so in a rather unintentional manner, with the various lines of causality being obfuscated by a number of external intervening variables. This is particularly so of pre-accession aid, as these funds do not explicitly address territorial objectives. Furthermore, their impact is also shaped by the financial volume and types of activities financed through such interventions. The efficiency of management and delivery systems is however a major factor here. The map illustrates the macroeconomic potential of the Structural Funds and of Pre-Accession Aid, by illustrating the spending of these funds as a share (%) of the regional GDP in Euro in 1999. For this, the share of the spending in 1999 has been calculated as an annual average of the total spending in a region during the past programming period for the Structural Funds and selected years for pre-accession aid. The map shows that the Structural Funds outrange Pre-Accession Aid in quantitative terms, as well as that the majority of regions with the highest shares were Objective 1 or 6 regions.

Of these instruments, the Structural Funds are by far the largest in terms of financial volumes. Although, in total, the regional policies implemented through the Structural Funds represent the second largest budgetary share of the EU budget (second only to agriculture), outside the Cohesion countries (Ireland, Greece, Portugal and Spain) the funds are relatively limited when compared to other forms of investments. In 1999 Structural aid in the 'old' EU Member States constituted, on average, some 0.28% of the total 'old' EU Member States GDP while pre-accession aid on the regional level in the new EU Member States and Accession Countries amounted to an average of 0.17% of the total GDP of all these countries. The territorial impact of the money spent is partly determined by the actual location of the supported action and partly by the action itself.

The geography of spending allows us to draw some initial conclusions on the existing potential for achieving territorial impacts. Specific attention has here been given to the potential impacts on polycentric development and territorial cohesion. The following text highlights some of these aspects, highlighting, which types of territories have benefited from which type of Structural Funds assistance between 1994 and 1999 respectively and pre-accession aid between 1998 and 2000:

– 17% of the Structural Funds went to areas that can be viewed as already strong nodes in the European polycentric system. About 30% went to areas strengthening the European polycentric pattern, while 12% were spent on areas that in the long run may contribute to polycentric development at the European level. The lion's share however (41%) went to regions that are unlikely to show up in an European polycentric pattern. As regards pre-accession aid, most funding went to regions other than those enclosing a MEGA, thus implicitly supporting polycentricity. In Bulgaria and Romania however the capital cities also received relatively high pre-accession aid, which in the main was due to the existence of a few large-scale transport infrastructure projects.
– The correlation between Structural Fund spending on the one hand and increasing cross-border economic cohesion (i.e. decreasing economic disparities between neighbouring regions) on the other seems to be fairly strong. The largest per capita spending occurred along such borders where relative economic growth was positive on both sides of the border. This concerns both the cases with increasing as well as decreasing disparities, though spending was higher along those borders with increasing cohesion. In many new Member EU States spending levels are relatively high in border regions due to the importance that PHARE CBC funds there. While there is no precise pattern, CBC funds largely concentrated in regions bordering the old EU Member States and to a lesser extent in regions neighbouring other new EU Member State regions.
– As regards the fields of intervention, direct contributions to spatial development aims are mainly visible in the field of accessibility. 23% of the old EU Member States' population have a potential accessibility by rail that is less than half of the old EU Member States average, while obtaining 68% of the total Structural Fund budget related to productive infrastructure. Regarding potential accessibility by road, those percentages are very similar, 24% of the population of the old EU Member States have a potential accessibility by road equal to or lower than half of the old EU Member States average while receiving 66% of the total budget. This implies that the Funds have important potential in the area of promoting accessibility.

Structural Funds and Pre-accession aid spending as share of GDP, 1995-99



Annual average Structural Fund (EU15 1994/95-99), PHARE, PHARE CBC and ISPA spending as a share of regional GDP in Euro (1999) in %

- up to 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.6
- 0.6 - 1.2
- 1.2 and more
- no data

Regional level: NUTS 2: BG, CZ, HU, MT, PL, RO;
all other countries NUTS3

Origin of data: National data collection by Nordregio and IRS, Eurostat-Regio

Source: ESPON database

– For all 73 NUTS 2 regions where Structural Funds spending per capita was higher than that of the old EU Member States average, the median employment increase was 1.4% annually, while for those regions receiving less funding than the EU average, the corresponding increase was only 1.0 per annum. While in the new EU Member States and Accession Countries most regions with MEGAs had an above average performance in respect of GDP per capita developments independent of their pre-accession aid allocation, this is not however the case to the same extent for unemployment developments. Furthermore, a comparison of typologies reveals that these impact indicators do not evolve in similar directions in a large number of regions. Thus, cohesion objectives may be achieved in terms of one indicator while the other impact indicator indicates negative or contrary developments.

Important qualitative effects have also been identified. The type of intervention also influences territorial development and determines the potential for achieving leverage effects. At the regional level, the strongest effects occur as a result of direct programme measures addressing local/regional traffic-infrastructure and economic specialisation. By favouring 'bottom-up' approaches to policy-making and delivery, they contribute to the strengthening and empowerment of regional and local levels of governance. They are both (a) cushioning the adverse effects of investment or disinvestment decisions, and (b) speeding up investment decisions. Furthermore, in the case of pre-accession aid, such institutional effects turned out to be of particular importance.

In addition, the Structural Funds exhibit considerable leverage effects on national regional policies implying that they actually have a wider range of indirect effects. This relates in particular to Greece, Ireland, Italy and Spain. The connection between the actual volume of funding and the national management and delivery systems seem to suggest that the effects on the more qualitative aspects of specialisation and governance are also of importance, as the Structural Funds also exhibit learning and empowerment effects in terms of national level regional policy. For the new EU Member States, additionally, it can be observed, that the regional allocation of pre-accession aid does not only follow different spatial objectives in different countries but also evolves over time within some of the countries in new directions.

The Common Agricultural Policy

In aggregate terms the Common Agricultural Policy (CAP) works against the ESDP objectives of balanced territorial development, and does not support the objectives of economic and social cohesion. As such, the CAP appears to favour core areas more than it assists the periphery of Europe.

Correlation analysis suggests that total CAP Pillar 1 support does not support territorial cohesion, with higher levels of CAP expenditure per ha. of utilisable agricultural land being strongly associated with the more prosperous regions. Direct income payments appear to support cohesion objectives but are dwarfed by the marked price support element of Pillar 1 (56% of total agricultural support). This conflict with cohesion objectives is not surprising, since Pillar 1 has never been a 'cohesion' measure. The Rural Development Regulation is a cohesion measure. Nevertheless, though our evidence on Pillar 2 is more mixed, expenditure under the Rural Development Regulation does not appear to support cohesion objectives either.

The LEADER Community Initiative is the programme most closely related to the concept of integrated rural development, providing a multitude of good and bad examples of rural development under different contexts. Beyond the economic sphere the programme is important for other spheres of rural life and policy, due to its multi-sector and integrative character.

During the LEADER programme period, evidence has emerged of an increasing level of rural development 'know-how' and an improved capacity for partnerships to deliver programmes for rural development. Local Action Groups no longer predominantly see themselves as providers of local funding on a project-by-project basis, which often resulted in a "scatter gun" approach to development. This change to a programme driven approach has enabled Local Action Groups to manage and target resources in a more effective and pro-active manner.

European policies such as regional and agricultural policies but also transport and research policies have territorial implications. These policies can both contribute to achieving territorial cohesion and to the strengthening of territorial potentials explicitly and implicitly. As these policies are in the main not drafted in relation to territorial development aims, the territorial implications can of course also counteract these policy aims.

Indeed, without spatial coordination and a spatial development perspective there is the danger that policy interventions may be contradictory, inefficient, and more costly. A study financed by the European Commission has shown that non-coordination can be costly and can lead to less efficient policy results and contradictory policies.

The Territorial Impact Assessment of policies highlights the potential to improve the coordination of policies and strengthen synergies in their territorial implications.

Key findings:

- The Structural Funds and Pre-Accession Aid have the potential to contribute to an improved use of territorial potentials in particular with regard to local development, but to a certain degree also with regard to the European spatial development patterns.
- The Common Agricultural Policy has, the potential, only to a minor extent, to contribute to territorial cohesion aims. Rural Development Regulations and the LEADER programmes however show that it is possible.

2.8 Governance

Good governance is increasingly recognised as an important factor in creating favourable development conditions and exploiting potentials. Governance is basically about cooperation and coordination between levels of government (vertical), between sector policies (horizontal), between territories and between governmental and non-governmental actors. Good governance might in principle support territorial cohesion by providing integration and coherence between fields of competences, sector policies and spatial development approaches creating the conditions for collective and harmonised action.

Governance in EU policies

Governance processes play an important role in European regional policies as well as in other sector policies. The Structural Fund programmes undoubtedly have an impact on governance approaches in Europe. By favouring 'bottom-up' approaches to policy-making and delivery, they contribute to the strengthening and empowerment of the regional and local levels of governance. This also involves facilitating local-level dialogue through the implementation of horizontal partnerships and by the creation of sub-national and often local organisations with specific functions associated with Structural Fund implementation. Thus governance measures have importance for local and regional spatial development action.

This process is also supported by the EU Community Initiatives, as they share, in different ways, the same consciousness about the change from a "government perspective" to a "governance perspective". This means the attempt to define new forms of policy-making, more coherently related to the institutional changes that have occurred in the last decade. INTERREG, URBAN, LEADER and EQUAL all refer to forms of governance, which are usually explicitly related to the local context, to the territorial milieu and to its networks of actors.

LEADER II is seen as being both efficient and effective. It proved to be adaptable to the different socio-economic and governance contexts and applicable to the small-scale area based activities of rural areas. It could therefore also help 'lagging' regions and vulnerable rural territories. LEADER activities included and conveyed responsibility to local partnerships, linking public and private institutions as well as the different interests of various local actors to a common strategy. A profound change from a passive to an active attitude among many local actors was often achieved in this context.

In the INTERREG III Community Initiative, 'territorial governance' is seen as a form of coordination among the relevant institutions at different territorial levels and with a wide range of actors coming both from public and private sectors, as well as civil society (horizontal and vertical coordination). INTERREG projects contributed both to learning and awareness raising at the regional level in relation to territorial policy orientation and options defined at the European level, i.e. in the ESDP.

As well in relation to the implementation of the re-launched Lisbon (and Gothenburg) Agenda, governance processes play a vital role in identifying and further exploiting local and regional development potentials. Therefore, governance processes provide a potential to improve the conditions for regional development creating a synergy from the application of European policies.

Governance in general, and measuring governance

Governance is a complex issue. It involves working across boundaries within the public sectors as well as between the public, private and community sectors, and across different levels, with partnership and networking the keys to success.

Governance at the local or regional level also comprises the capacity to (a) integrate and shape local/regional interests, organisations, social groups, as well as (b) to represent them to external actors, to develop more or less unified strategies in relation to the market, the state other cities or other levels of governance.

Both the understanding and the capacity of governance vary across the European territory. Approaches to measuring these differences have to be based on indicators related to several important aspects of governance:

- Existing institutional settings, including government structures, form the framework conditions for governance processes. Aspects covered here are the satisfaction with the actual government and the numbers of public employees. Transnational and cross border activities can be seen as examples of 'trans-scalar' activities, i.e. openness towards other EU countries.
- Governance in the economic domain might be captured by the number of regional clusters, being itself an expression of network activities, usually including many different private/public actors. E-government can be seen as an approximation to new forms of governance, in the sense of new information and communication techniques. The regulatory burden index is composed of institutional arrangements, e.g. between state, capital and labour.
- The governance indicators in terms of civil society work towards participation, trust, and information & communication patterns. The 'attachment to region' indicator can best be understood as an indicator of 'decentralisation'.
- Space might be captured through the use of functional urban areas. The procedural aspect however may best be captured with indicators on 'flow' characterising relations and exchange between different regions. In addition the governance of functional urban areas addresses the interdisciplinary and multi-level composition of actors involved in governance processes and draws on the capital available in a region, in relation to intellectual, social, political, material, cultural and geographical preconditions.

The challenge of measuring governance will be further explored within the ESPON programme in order to provide a more nuanced picture of the governance of territories in Europe.

Key findings:

- The governance culture of European countries is far from uniform. The distinctive regional/national cultures may challenge, but also offer specific opportunities in terms of territorial cooperation on the basis of comparative advantage.
- Governance processes offer the opportunity to make EU policies more efficient, and are often key in uncovering endogenous, untouched and/or underutilised potentials for territorial development.
- Governance is a prerequisite for territorial cohesion as it can reconcile competitiveness and cohesion, and define a sustainable development path.

The total number of applied research projects that will be carried through by the ESPON programme until the end of 2006 has reached 30. That is 11 more than originally envisaged. As such, the knowledge base in respect of territorial cohesion and cooperation at the European level will, by the end of 2006, have made substantial additional progress.

The themes studied from a territorial perspective already cover a large number of important processes and policies with an impact on territorial development. Basically, the need to attain a better understanding of territorial trends and impacts of EU policies has been at the core of this exercise. Based on these studies, ESPON is making substantial progress in respect of enriching the understanding of regions and larger territories, their imbalances and potentials. Through combining the findings of individual projects the complexity and diversity of different regions and larger territories becomes clearer. In addition, the ESPON programme will ultimately deliver several spatial scenarios, which will be able to further nourish the policy debate.

Efforts to build a European scientific research community in the field of territorial development have reached a stage where more than 130 institutions from different parts of Europe and from within different academic fields now take part. An ESPON scientific platform is taking shape, including methodologies for spatial analysis and impact assessment, core indicators and typologies, as well as an ESPON Database and tools for the making of European-wide maps.

The scientific platform will be further developed, including the following efforts:

- The conceptualisation of territorial potentials and functional specialities of cities and regions, etc. will be further advanced.
- The capacity for monitoring territorial developments as part of a 'knowledge base' for policy development will be improved by the definition and selection of core territorial indicators.
- The methodological basis for integrated territorial analysis will be further developed towards a variety of feasible methodologies that can be used in different types of analysis.
- Tools for territorial impact assessment of sector policies will be developed as far as possible based on the lessons learned from those ESPON reports addressing territorial impacts.
- The ESPON Database will continuously expand with regionalised data sets provided by the transnational teams of researchers carrying out ESPON projects.
- Innovative mapping methods and cartographic illustrations will be further developed in support of the communication of key findings.

Interaction with academics outside the ESPON programme will be further strengthened in October 2005 at the first ESPON scientific conference being held in Luxembourg. Discussions at this conference will be devoted to methodological questions, including methodologies for integrated territorial analysis.

The dialogue with regional and local practitioners and policy makers has already begun, and will continue with the assistance of members of the Monitoring

Committee and the network of ESPON Contact Points. The first transnational seminars have also been held, and several more are currently in preparation.

Interaction with the transnational processes and cross border activities under the Interreg III programme have already been programmed for 2005-2006 in a partnership with the INTERACT programme. The intention is at several seminars to provide a broader European dimension to the development of projects within INTERREG programmes, hopefully stimulating new ideas for future projects. Moreover, the dialogue should influence the further progress of European applied research by pointing to specific themes in need of further knowledge in respect of territorial dynamics.

This second ESPON Synthesis Report constitutes an important means of communication for the ESPON programme. It is an integral part in the ESPON strategy for the communication and promotion of activities for the final phase of the first ESPON programme that the Monitoring Committee has recently decided. A number of activities at European and transnational level designed to complement the above-mentioned dialogue are envisaged.

Further ESPON publications are envisaged as well. In particular, by the end of the ESPON programme in 2006 the plan is to publish an ESPON Report integrating all of the results of the first ESPON programme. Under consideration is to report on progress made in building spatial scenarios and progress on tools for territorial impact assessment as well as publishing an ESPON Atlas based on key maps from all 30 ESPON projects. Finally, an ESPON Report summing up the scientific progress made will be published, thus establishing a scientific platform for further applied research on European territorial development in an ESPON II programme.

ESPON Transnational Project Groups:

This report is based on the work of the transnational project groups working on ESPON projects:

1.1.1 The role and specific situation and potentials of urban areas a nodes in a polycentric development
1.1.2 Urban-Rural relations in Europe
1.1.3 Enlargement of the European Union and the wider European perspective as regards its polycentric spatial structure
1.1.4 The spatial effects of demographic trends and migration
1.2.1 Transport Services and networks: Territorial trends and basic supply of infrastructure for territorial cohesion
1.2.2 Telecommunication services and networks: Territorial trends and basic supply of infrastructure for territorial cohesion
1.3.1 The spatial effects and management of natural and technological hazards in general and in relation to climate change
1.3.2 Territorial trends of the management of the natural heritage
1.3.3 Impact of cultural heritage and identity
2.1.1 Territorial Impacts of EU Transport and TEN polices
2.1.2 Territorial Impacts of EU Research and Development Policy
2.1.3 The territorial impact of CAP and Rural Development Policy
2.1.4 Territorial trends of energy services and networks and territorial impact of EU Energy Policy
2.1.5 Territorial impacts of European Fisheries Policy
2.2.1 Territorial impacts of Structural Funds
2.2.2 Territorial impacts of the "Aquis Communitaire", Pre-Accession Aid and PHARE/TACIS/MEDA Programmes
2.2.3 Territorial impacts of Structural Funds in urban areas
2.3.1 Application and effects of the ESDP in Member States
2.3.2 Governance of urban and territorial policies from EU to local level
2.4.2 Integrated analysis of transnational and national territories based on ESPON results
3.1 Integrated tools for European spatial development
3.2 Spatial scenarios and orientations in relation to the ESDP and EU Cohesion Policy
3.3 Territorial dimension of the Lisbon/Gothenburg Process
3.4.1 Europe in the world

More detailed information on the single projects, the lead partners and their teams is available at the ESPON website (www.espon.lu).

www.espon.lu

The European Spatial Observation Network (ESPON) is set up to support policy development and to build a European scientific community in the field of territorial development. The main aim is to increase the general body of knowledge about territorial structures, trends and policy impacts in an enlarged European Union. The ESPON programme commenced in 2002.

The purpose of this second ESPON Synthesis Report is to stimulate a dialogue on latest ESPON findings. A part of this dialogue you are welcome to state your views and proposals by e-mail to info@espon.lu

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