THE ESPON 2006 PROGRAMME:
SELECTED FINDINGS ON POLYCENTRISM IN EUROPE

Thiemo W. Eser, ESPON Managing Authority, Ministère de l'Intérieur et de l'Aménagement du Territoire, Direction de l'Aménagement du Territoire, 1 rue du Plébiscite, L-2341 Luxembourg, Thiemo.Eser@mat.etat.lu

Paper prepared for the Tenth Conference on Urban and Regional research by the Committee on Human Settlement of the United Nations together with the Council of Europe's European Conference of Ministers responsible for regional Planning (CEMAT) 22-23 May 2006, in Bratislava.

1. Introduction

The ESPON is the European Spatial Planning Observation Network. This is an applied research programme in the field of territorial development related to EU Structural Funds. It was started in 2002, co-financed by the European Union Community Initiative Programme, Interreg III and the 25 EU Member States plus Norway and Switzerland. The aim of the programme is to provide policy-makers at European national and regional level with systematic and new knowledge of territorial trends and impacts of policies that affect regions and territories within Europe, a knowledge which can directly support formulation and implementation of policies. Being an information tool for policy development for all EU member States and the European Commission the ESPON programme is established outside the traditional research programmes of the European Commission. Altogether researchers in more than 130 institutes all across Europe are involved in the applied research and established network activities. ESPON Contact Points in 25 countries serve as links to national communities of practitioners and researchers.

The following chapters offer some ESPON results of research on polycentrism in ESPON programme by different projects groups. The text and maps are mainly taken from ESPON Briefings 1 and 2 and the ESPON Synthesis Report 2 as well as form the Final Report of ESPON report 1.1.1.. All full reports and credits to the individual authors are available on the ESPON internet site www.espon.lu.

2. Main (economic) structures

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.

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 introduce 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.

2. 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. (see map 1)

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.

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.

3. Administrative functions

Administrative functions have a significant role to play in polycentricity. Administrative cities have a strong public sector service role. These services have to be available in all parts of the country, and regional capitals are evenly distributed in each country. The strong hierarchy of urban systems is often due to the development of administrative functions. However, a strong administrative role does not guarantee a good position in the urban network when competition between FUAs is tightening. The FUAs position has to be supported by other functions as well. The current European picture is a result of different national systems. Capitals are the main nodes of the European administrative system. In federal states (e.g. Germany and Austria) provincial capitals as administrative centres have a strong position in the national systems (see map. 2).
The administrative system is polycentric and favours polycentricity, in comparison to the mass function of FUAs, in Austria, Finland, France, Greece and Portugal. The administrative structure is monocentric, in comparison to mass function of FUAs, in the Czech Republic, Spain, Italy and Poland.

4. Knowledge functions

The knowledge function is measured as total the number of students in higher education institutes within each FUA (see map 3). In all countries the capital city is also the most important node in this regard. It can be argued that knowledge makes strong poles even stronger, which is an important feature when identifying growth poles beyond the Pentagon. On the other hand, the university system in most of the countries favours polycentricity. Even though the main node is in a capital city, it is usually the case that many other large universities are located in other FUAs. The general picture of knowledge-based Europe is very balanced. Important nodes are evenly distributed to all parts of Europe, and within most of the countries as well. The density of higher-level education institutes is naturally higher in more densely populated areas.

The knowledge-based urban system favours polycentricity particularly in Austria, Belgium, Finland, Greece, Ireland, Latvia, Lithuania, the Netherlands, Portugal, Romania, Sweden, Slovenia and the UK. The knowledge-based urban system is more monocentric than one would expect on the basis of settlement structures in Switzerland, Cyprus, Denmark, Hungary and Italy.

5. Regional Cooperation

As described in chapter 2 the 76 most powerful functional urban areas measured by demographic mass, competitiveness, connectivity and knowledge base are defined as Metropolitan European Growths Areas (MEGA). Many of the strongest MEGAs are situated in the core area or Pentagon defined by London, Hamburg, Munich, Milan and Paris. Outside this core area, Madrid, Barcelona, Rome, Vienna, Berlin, Copenhagen and Stockholm can currently provide this high level of functions. Dense urban networks, which subsequently could develop into highly integrated regional polycentric systems are, however, found in a wider area, circumscribed by Manchester, Berlin, Venice, Genoa and Paris stretching further towards the east, in particular including MEGAs such as Prague, Bratislava and Budapest. (see map 4).

Outside this dominant area a number of functional urban areas have a certain potential to challenge the predominance of the Pentagon, including cities such as Athens, Dublin, Helsinki, Oslo and Gothenburg. Among the several important capital cities and major urban areas in the new Member States, Warsaw currently shows the best potential in this regard. A wide range of cities however have the potential to increase their demographic mass through increased cooperation with neighbouring areas, forming polycentric urban areas. Basically, territorial cooperation between neighbouring cities can improve their position in the European urban system based on a joint exploration of comparative advantages. Such strategic cooperation, including a greater number of inhabitants in the polycentric urban area, makes it possible to attract or establish a higher level of services. The use of this cooperation model can, in principle, support a better territorial balance and polycentric development.

Polycentric integrated areas will often have a European ranking that is different to each of the individual functional urban areas within it. Analysing the difference between the European ranking of the individual functional urban areas and that of the corresponding integrated area illustrates the real potential of regional polycentric cooperation to enrich and better balance the system of functional urban areas.

The map highlights the potential synergies from cooperation between neighbouring cities measured as the difference between the ranking of the individual cities and ranking of the joint polycentric area. The coupling of cities is based on their proximity.

Cities located in the arc stretching from the UK Midlands via the Ruhr-district to Northern Italy, with some extensions into Hungary, the Czech Republic and Slovakia can most easily increase their European standing by establishing regional polycentric cooperation patterns. Outside the core of Europe, there are a number of regions with high demographic potentials, such as the Ostrava-Katovice area, the areas around Dresden- Prague-Wroclaw and Vienna-Nitra-Budapest, and, more moderate, the Mediterranean axis from Valencia to Naples, and the Atlantic coastline from Lisbon to La Coruña. At a more regional/local scale, potentials can for example be identified in the Glasgow-Edinburgh region, as well as around Lyon and Nantes in France. In contrast, the relative large distances between the major cities in the Northern Peripheries, in central Spain outside Madrid, as well as in parts of Greece, Bulgaria, Romania and the Baltic countries would appear to increasing the challenges inherent in such efforts at territorial cooperative attempts in these more peripheral regions.

The analysis reveals opportunities and contrasts in the potentials for improving the comparative position of urban areas across Europe. More research effort is needed to be able to see functional development potentials in greater detail, which can nourish strategic territorial cooperation. Integration on the basis of proximity is only one of several preconditions. Note here should also be made of the fact that networking seems to play an important role in enabling areas and cities to activate their potentials and territorial capital successfully.

6. Major urban areas, their accessibility and significant profiles - Global Integration Zones

Territorial cooperation involving regions and cities is an important means for making better use of endogenous potentials and creating added value for the partners involved. Cooperation can either be based on proximity or profiles. Bottom-up interests and activities are crucial to making cooperation work. However, European-wide analysis of regional proximity and overall comparative advantages can stimulate interest and establish a background for cooperation in a larger territorial context.

Interest in cooperating with actors outside “your normal” territory depends on many things. Proximity is important, especially for cooperation within a regional and cross-border context. Functional specialisation and influence are more decisive aspects when considering options for transnational cooperation.

The map 5 brings these two aspects together by putting a strong emphasis on the main metropolitan regions in Europe, the so-called Metropolitan European Growth Areas (MEGAs). As background is shown the accessibility to the nearest MEGA by looking at the travel time, i.e. minutes a truck would need to make the trip. On top is shown the functional importance with regard to the six functions of each MEGA of global, European or transnational significance. The functions considered are transport (i.e. traffic levels at the main airports, and the number of tons handled at major container harbours); higher education (i.e. number of students), decision-making (i.e. its share of top 1500 companies in Europe), administration (i.e. the highest level of public administration located there), tourism (i.e. number of beds) and industry (i.e. billion of gross value added, GVA). The selection by significance implies that not all cities hosting one or several of these functions, e.g. a university, are represented in the map. The method is currently not considering functions across national borders, which affects a number of Swiss cities as well as other cross-border urban functional regions across Europe.

With regard to the proximity to the nearest MEGA, the analysis shows that within an enlarged core area of Europe, from most regions the closest MEGA can be reached

(by truck) within three hours or less. This enlarged core area is roughly characterised by the cornerstones Dublin, København, Helsinki, Vilnius, Warszawa, Budapest, Roma, Paris and London. Outside this area the proximity to the nearest MEGA is often considerably higher. In particular in Northern Scotland, large parts of the Nordic Countries, Romania, Greece and Southern Italy the travel time by truck to the nearest MEGA can exceed five hours.

In addition the functional characteristics of MEGAs show that only 14 MEGAs (out of the 76 in Europe) are of European or transnational importance with regard to all six functions assessed. These MEGAS's are mainly located outside the core of Europe (which could indicate a certain level of complementarity between MEGA's within the core). The 14 are Lisboa, Madrid, Roma, Athinai, Budapest, Wien, Warszawa, Helsinki, Stockholm, Oslo, København, Amsterdam, Bruxelles and Dublin. Smaller MEGAs are often only of European or transnational significance with regard to one or two functions. In Poland, industrial and higher education functions mainly characterise smaller MEGAs, whereas in France tourism and universities are the main functions, while in the UK it is particularly higher education that stands out in the smaller MEGAs.

Proximity to neighbouring regions and/or the nearest MEGA may stimulate thoughts about possibilities for expanding territorial cooperation. However, thorough consideration should in particular be given to functional aspects and comparative strengths, which could be explored through territorial cooperation, being it in larger geographies and/or between MEGAs. Both complementarity and competition are important factors in shaping a spirit of cooperation between areas. A strategic choice of themes for cooperation is often defining where cooperation ends and competition prevails.

It could be argued that there is a special challenge in forming Global Integration Zones in various parts of Europe, with real scope to strengthen territorial cohesion. MEGAs in cooperation could be the driving force for such initiatives of territorial cooperation, creating growth and jobs. The spatial situation of specific territories such as islands, especially the small island nations of Malta and Cyprus, is significantly different from that of continental territories.

7. Conclusion

The short overview on selected results of the ESPON programme indicates the methodological challenges in the fields of research on polycentrism and how to address theses challenges. Some clear pattern of polycentrism in Europe could be identified. The following main messages of the observations presented in political terms should be highlighted: (i) Polycentrism is a phenomenon appearing on various levels and should be addressed mainly on the three levels European, transnational-national and regional; (ii) in the wake of the globalisation polycentrism has to be also seen in the international context, (iii) the active development and cooperation in particular of cross-border polycentricism patterns is producing added value which should be activated and better explored.

In the context of the CEMAT it would be interesting to extend the research on a larger territory which represents one of the ambitions for the next phase of the ESPON 2007-2013. More and further in depth findings are available free of charge on the ESPON site www.espon.lu.

MAP 1: Urban System and economic growth

Metropolitan Growth Areas

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

— Highways of European level

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

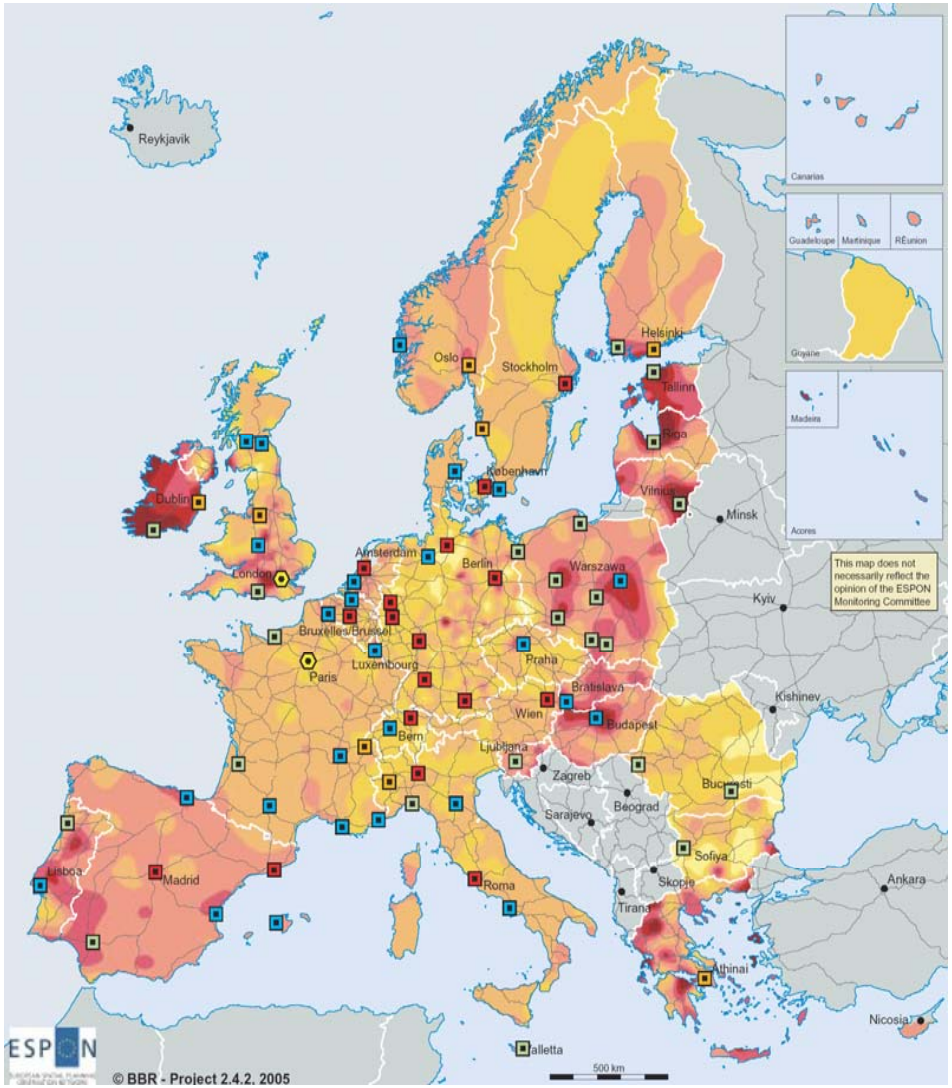
*Switzerland, Norway and Bulgaria 1995 to 2001; Romania 1998 to 2001

© EuroGeographics Association for administrative boundaries

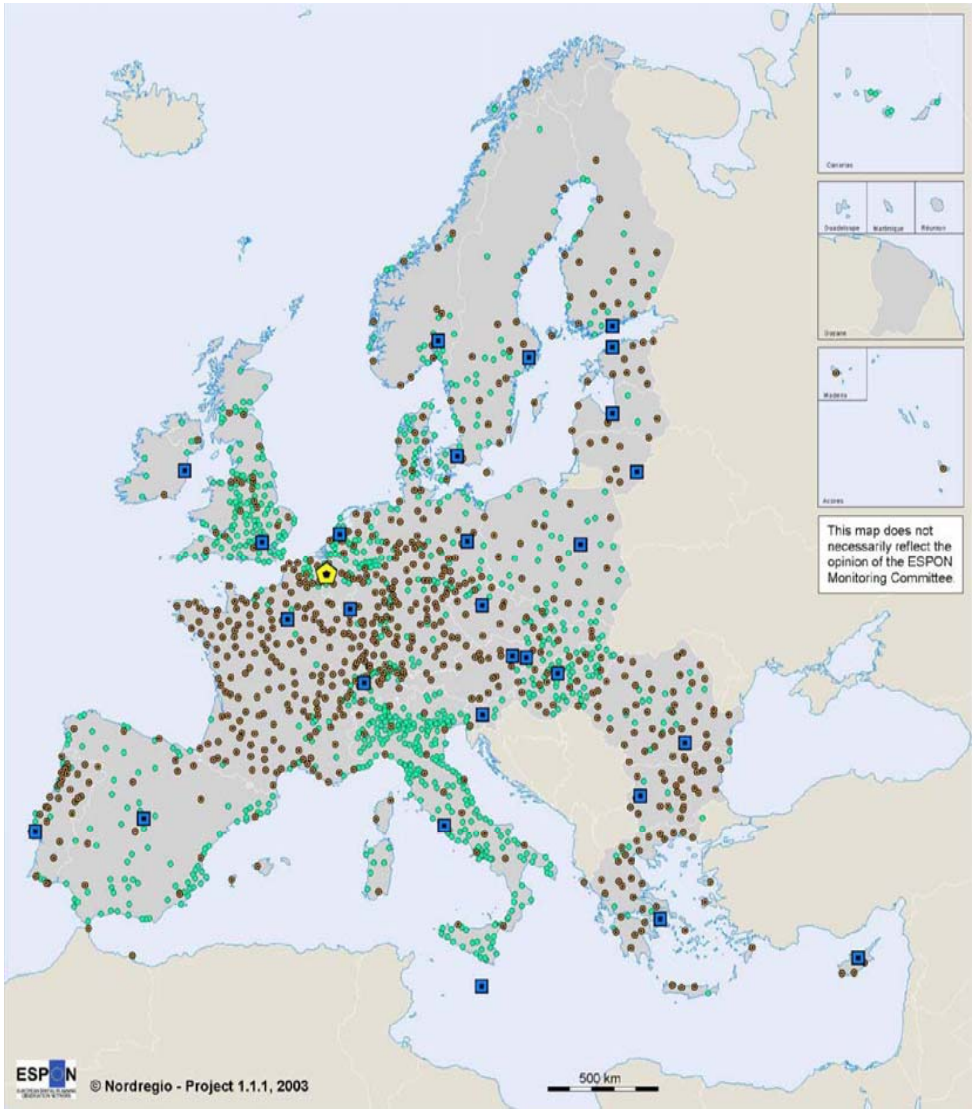
Regional level: NUTS 3

Origin of data: GDP Eurostat, MEGA: ESPON 1.3.1 Nordregio

Source: ESPON database

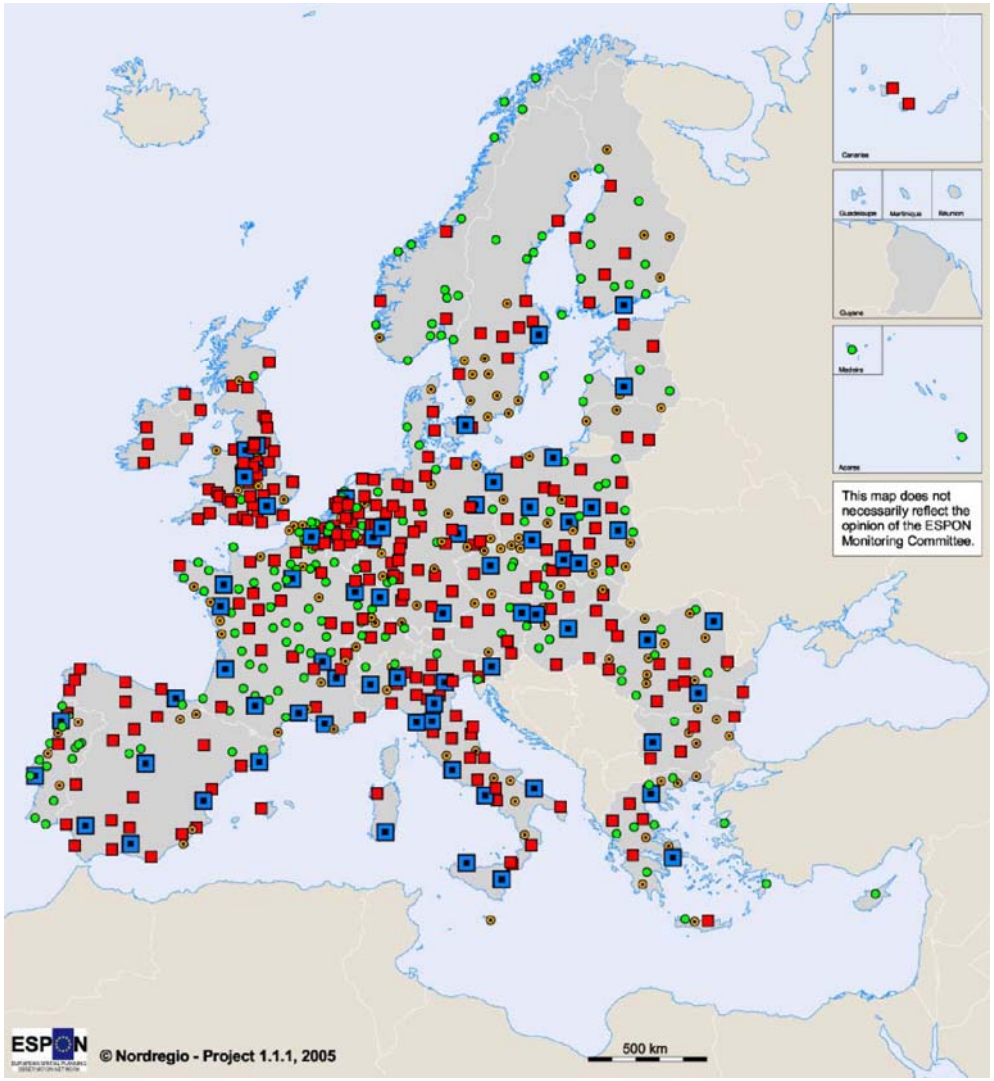


MAP 2: Cities' administrative functions



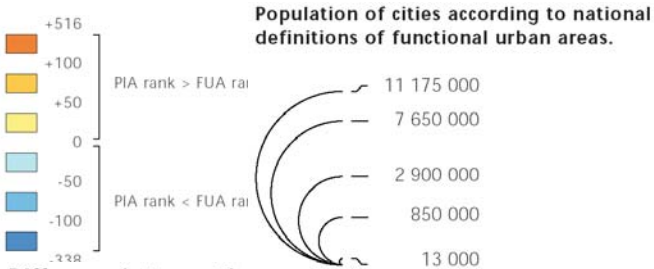
EU capital
National capital
Provincial / regional capital
Local administrative centre

MAP 3: Cities' knowledge function



- Knowledge node of European significance (50 000-500 000 students)
- Large higher education institute/s (10 000-50 000 students)
- Medium-sized higher education institute/s (5 000-10 000 students)
- Regional higher educatioin institute/s (less than 5 000 students)

MAP 4: Potential polycentric regions in Europe



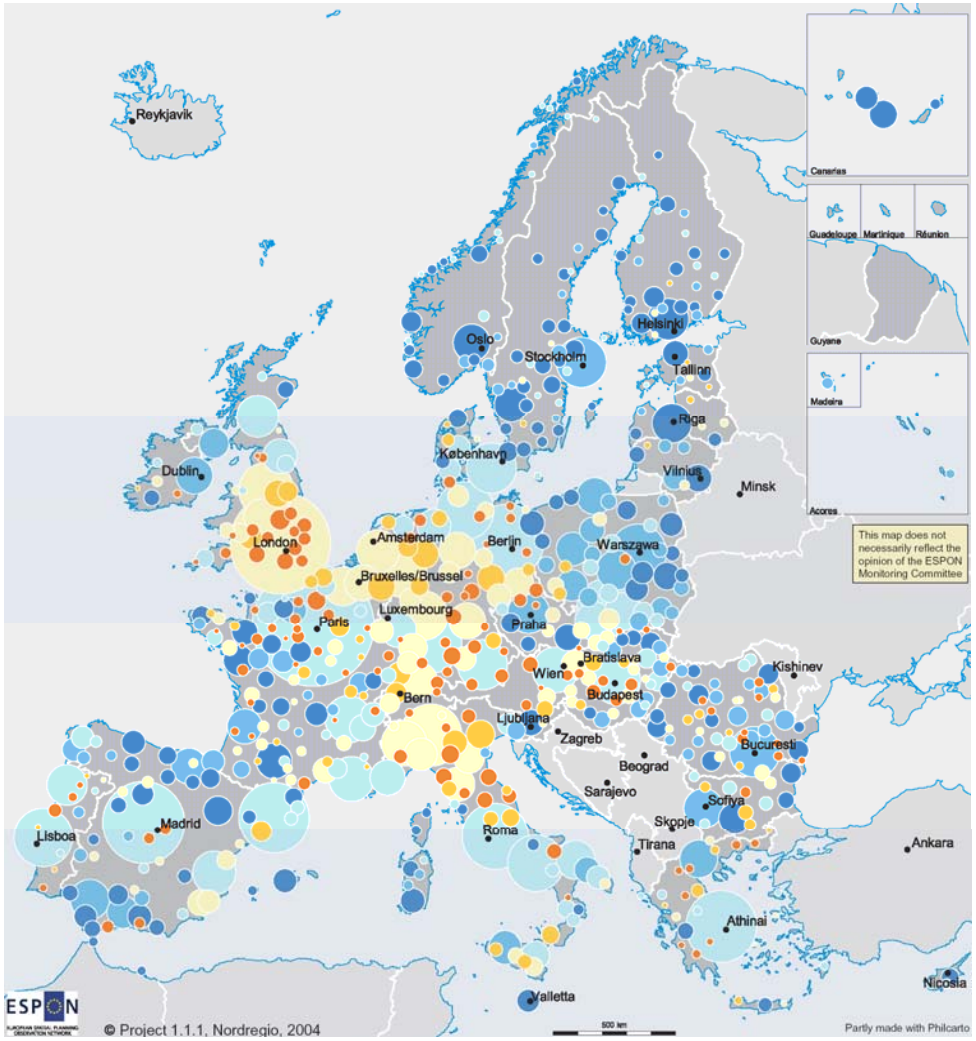
Difference between the European rank of individual cities and the European rank of the corresponding Potential Integration Area (PIA) considering the main city of each PIA only

The Potential Integration Area includes neighbouring cities with overlapping potential commuter areas, which could gain from co-operation and a common use of comparative functional advantages

Origin of data: Eurostat, National Statistical Offices, national experts, Nordregio

UTH delimination: RRG
PIA identification: Nordregio

Source: ESPON Database



MAP 5: Major urban areas, their accessibility and significant profiles

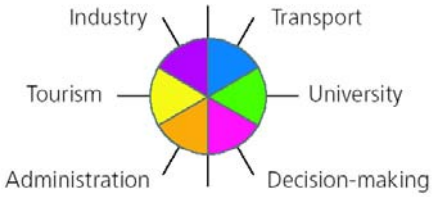
Accessibility to the nearest MEGA by truck - travel time to reach the nearest MEGA in minutes

- up to 120
- 120 to below 180
- 180 to below 240
- 240 to below 300
- 300 and more
- No data available

Decision-making functions outside MEGA's by significance

- Global significance
- European significance
- National/transnational significance
- Regional significance
- Local significance

Metropolitan European Growth Areas (MEGA) by functional importance of global, European and transnational significance



Size according to average value of related significance of functions

© EuroGeographics Association for administrative boundaries
Regional level: NUTS 2
Origin of data: ESPON 1.1.1 Nordregio ESPON 1.2.1 INRETS
Cyprus: Data for government controlled areas only.
Source: ESPON database