

# Annexes

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## **Annex 1. Major past trends and probable future demographic trends**

Demographic trends in the European cities are in accordance with the general trends at European level and at the national and regional level in which they are embedded. This is why we will first describe the demographic trends at the European level (section 1) before we get into the national and regional specificities of these trends (section 2). Demographic specificities of the cities will be tackled in the third section, including the internal demographic differentiation.

### **1.1 Major trends at the European level**

#### *Past trends*

At the most general level, demographic trends of the whole Europe are of course affecting the cities. Demographic trends are well documented in the institutional literature: the state of the cities and cohesion reports give a relatively clear idea of demographic trends in the European cities and regions. In this literature, the accent is put on global trends affecting nearly all European cities: the ageing process, immigration processes, evolutions of the household compositions and declining fertility are the most common themes. These trends are the result of long term structural trends on which policies seem to have little impact:

- the decline of fertility rate is related to social and cultural evolutions such as the increasing women's activity rate;
- the increase of life expectancy;
- the ageing process as a long term consequence of these two first processes;
- the household's decomposition with the growing share of single-adult household is also to be understood in this structural evolution of the society (woman's work, individualism...);
- immigration. From the nineties on, Europe became an immigration continent, which was not the case before (Vandermotten et al., 2004). The trends in immigration are much more subject to short and middle term evolutions and immigration is often seen as the possible adjustment variable in demography and economy. However, migratory policies have a moderate impact on migratory flows which concentrate in the major cities.

#### *Future evolutions*

Because of the inertia of the age structure, demographic trends are reasonably well predictable. First, it seems that in the last years, fertility rate has reached a bottom level and does not change much. Second, life expectancy continues to increase regularly in Europe. By applying these trends on the age structure, there is little doubt that Europe as a whole and all parts of Europe will have to face population decrease, ageing process and a growing dependency ratio.

Immigration seems to be the only process which could soften this ageing process. However, the economic crisis will probably affect immigration policies. Past experience in the seventies in North-western countries suggest that the crisis and closing borders finally reduce the immigration process and change its nature (from working immigration to familiar one). How much the new crisis will affect immigration in a more open, unequal and globalized world is of course subject to uncertainty?

## 1.2 Geographical differences in these major trends

### *Past trends*

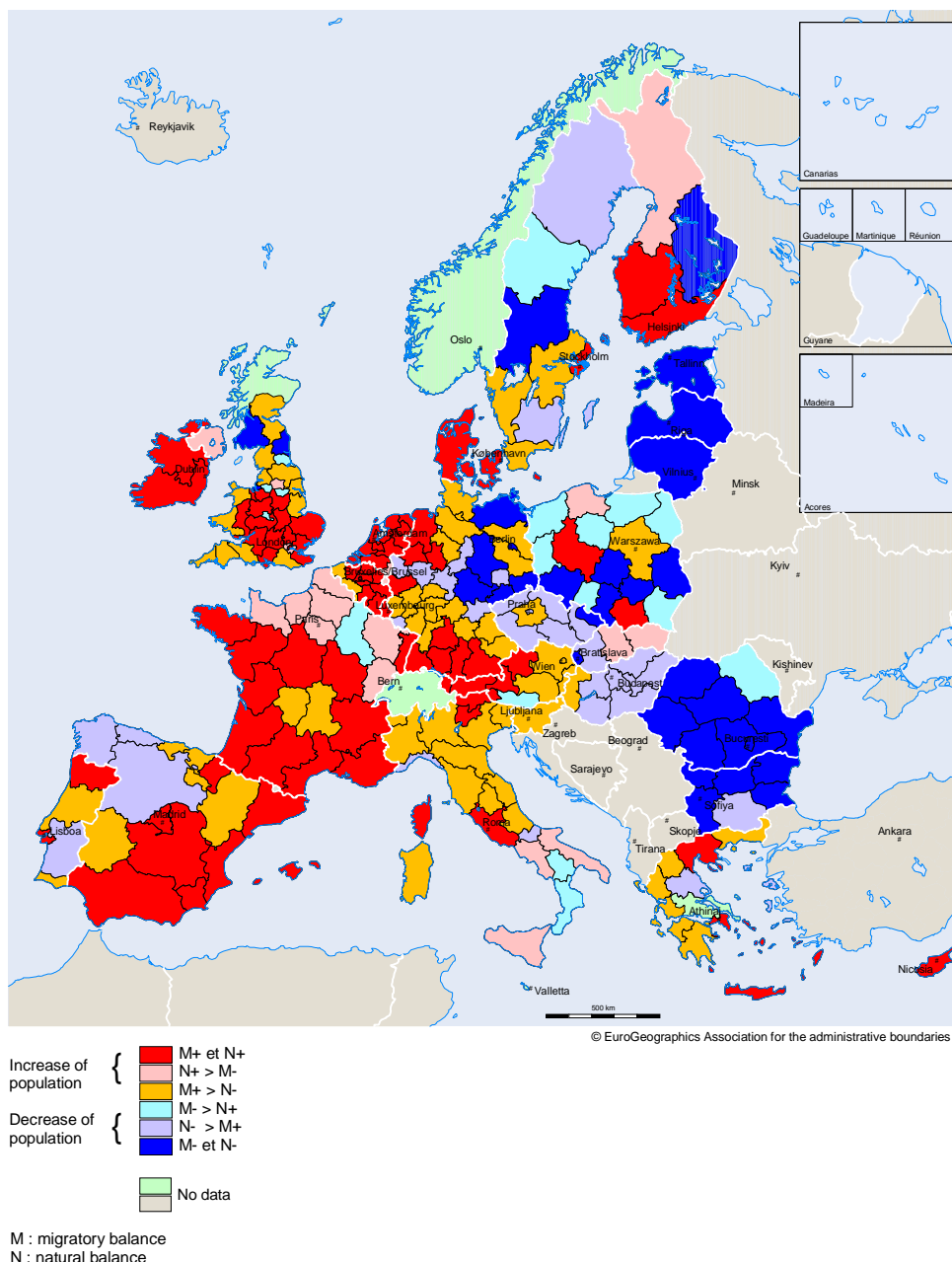
At the second level, the European trends have diversified pattern at regional level and cities themselves have similar evolutions than the regional and national environment in which they are embedded (State of the European cities, 2007). These national and regional demographic patterns are well known and also, to a certain extent, well predictable because of the inertia of the age structures (Espo 1.1.4, 2004; Shrinking regions, 2008; Fourth report on social and economic cohesion, 2007). The most unknown aspect concern of course migratory flows, especially those coming from outside Europe.

The major geographical cleavage is between Eastern and Western Europe (Map 1). The most dramatic demographic evolutions have been observed in central and Eastern European countries. First, it is due to the dramatic fall of fertility in the 90's. Second, in the same time, life expectancy is lower and has stagnated in some countries in the nineties. Finally, central and Eastern Europe has not been attractive for immigration: on the contrary, migratory balances have been negative for nearly all regions between 1995 and 2005 except Czech and Hungarian regions as well as some capital cities. However, because of originally younger population in the eighties, the population is not older in the NMS than it is in Western Europe but the ageing process is much faster because of these trends.

In Western Europe, the fall of fertility has been more regular and never reaches the level observed in some parts of Eastern Europe, except in some parts of Germany, Northern Italy and northern Spain. One of the main long term evolutions inside Western Europe is that we do not anymore observe difference between peripheral Western Europe (Mediterranean and Ireland) and the north-western countries. In the sixties, natural growth was higher in the peripheral Europe and migratory flows could be synthesized as periphery to centres movements at the European and national scales (Vandermotten et al., 2004).

The geographical pattern of demographic trends inside Western has become much more complex (map 1):

- the difference in fertility rate has disappeared and some southern parts of Europe have the lowest rates of all Europe (Northern Spain for example);
- life expectancy is often higher in some Mediterranean regions (Greece for example). Once reached a certain level of GDP per capita, the economic wealth has a marginal impact on life expectancy which depend much more on social and cultural features, such as the food or the health system (OECD, Social indicators, 2006);
- Mediterranean countries and Ireland became massive immigration countries at least from the end of the nineties.



**Figure 1 Components of population increase at NUTS2 level, 1995-2004**

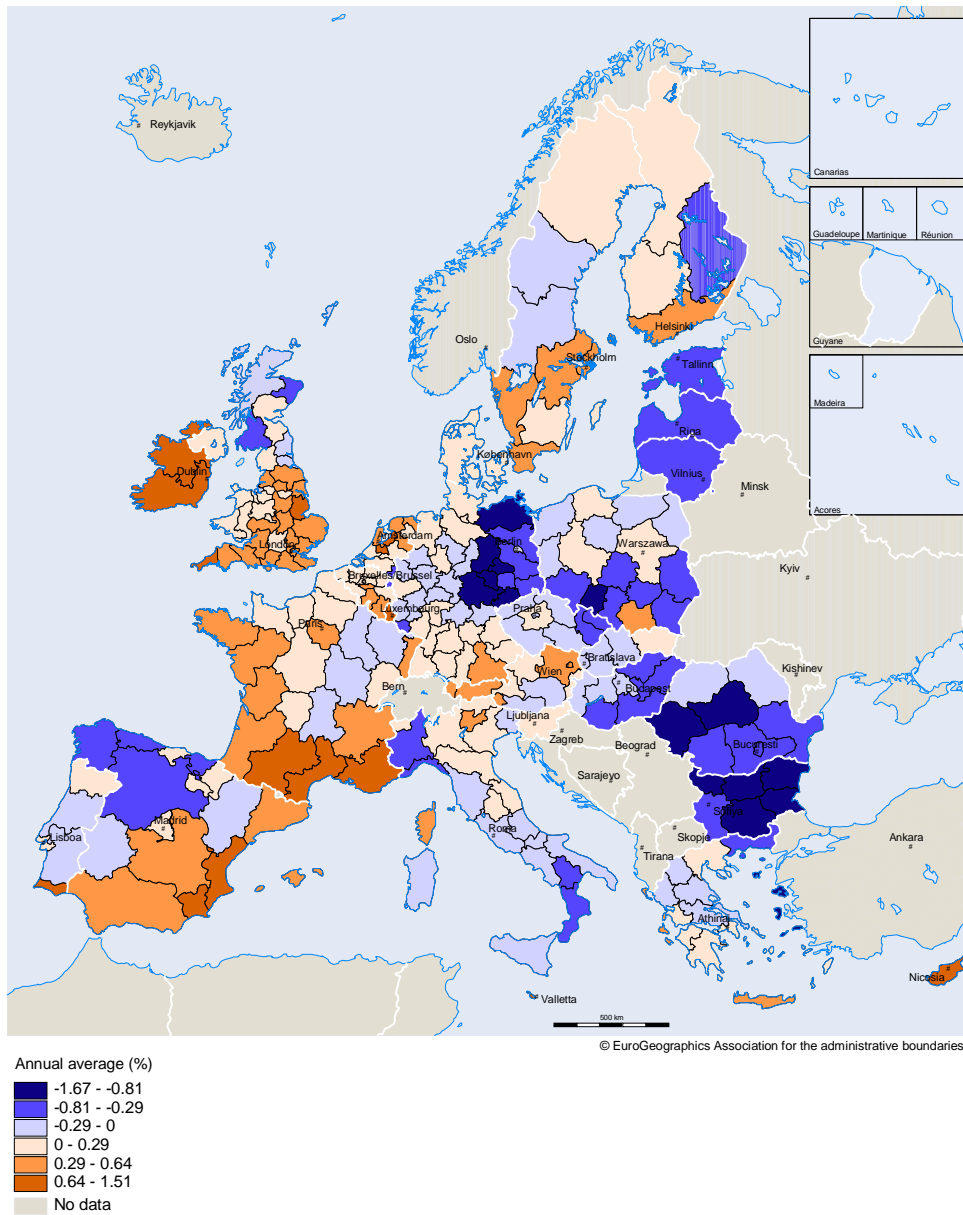
Source: Eurostat

*Future evolutions*

Most of the shrinking regions for the next 25 years are indeed located in central and Eastern Europe, including Eastern Germany (see map 2) (Shrinking regions; ESPON 1.1.4). However, the capacity of Western European regions to maintain its population is in most of the regions, except France and Ireland, related to the capacity to continue to attract new migrants. And as already discussed in section 1, because of economic and political reasons, there is no certainty about that.

However, because of the inertia of age structure and lower life expectancy, dependency ratio of the older population on the active age population will still be lower in the NMS than

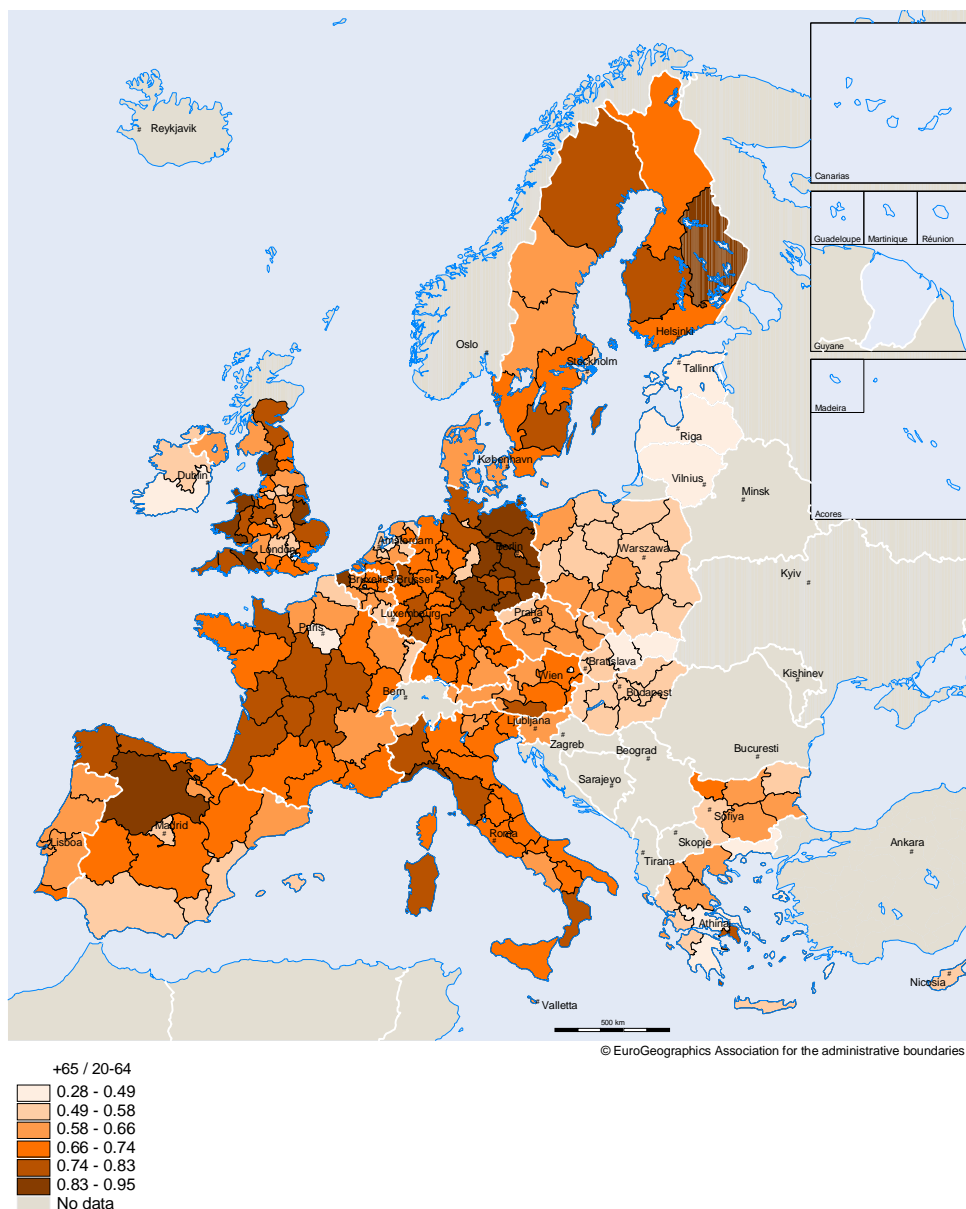
it will be in Western Europe in 2030 (Map 3). Major cities are also characterized by lower dependency on the old population but the main reason here is their capacity to attract young active population.



**Figure 2 Population increase 2005-2030. NUTS2.**

Source: Eurostat, National Statistical institute for France and UK, UMS-RIATE for calculations\*.

\*Data have been gathered in a project financed by the European parliament



**Figure 3 Dependency of old versus active age population in 2030. NUTS2**

Source: Eurostat, National Statistical institute for France and UK, UMS-RIATE for calculations\*.

\*Data have been gathered in a project financed by the European parliament

### 1.3 Specificities of the cities

As already stated, cities demographic dynamics – especially when not considering the biggest ones – are very much in accordance with the regional and national trends in which they are embedded.

However, cities in general – at least from beyond a certain level of the urban hierarchy – have a specific place in the migratory process. They attract young populations (students,



young active and foreigner immigrants) and expulse older active (active adult's households with children, old active people, and young pensioners).

Depending on the level of the cities in the urban hierarchy and contextual factors, this process occurs at the different scales: major cities such as London or Paris and many other capital cities play this role at the national and growingly at the international level (migration of wealthy pensioners to Spain for example); at a lower level, cities could play this role at the regional level; for the small cities, this process could be reduced to the suburbanization process which is of course also taking place in the bigger cities.

As a result of these processes, metropolitan areas are younger than average and have a higher natural growth rate.

The official literature treats in a more marginal way major trends of the internal evolutions of the cities. On this aspect of intra-urban dynamics, the huge scientific literature is structured around two major paradigms, strongly related to the social and territorial cohesion: suburbanisation (Harvey, 1990; Donzelot, 2004) and gentrification (e.g. Smith, 2000; Lees et al., 2007; Van Criekingen, 2008). The demographic results of the intra-urban migratory movements can be synthesized as follows:

- A younger population in centre of the cities, especially in the most central areas where a gentrification process has taken place;
- A higher share of active households with children in the suburban areas. These middle class populations are the most concerned by the urban sprawl process through suburbanization;
- Poor immigrants – new comers as well as the second or third generation of ancient immigration – are concentrated in some specific areas of the cities. Two types of geographical structures can be observed regarding the location of immigrant in the cities: concentrations near to the centres (case in Belgium, Germany, UK...) or in specific parts of the suburbs (France, Mediterranean countries).

#### **1.4 Demography as an important driving force**

On the one hand, the demographic trends are the result of long term structural trends on which policies seem to have little impact. On the other hand, these trends are generally well described in the literature on cities and regions. This is why the demographic trends will mainly be tackled as driving forces for the main themes of the project: competitiveness, social cohesion and environmental aspects.

From the literature, we can draw that demographic trends have an impact on the different fields of urban evolutions we are dealing with. Several hypotheses can be explored concerning these impacts:

1. The competitiveness is for a part dependent on dependency ratio and activity rates (see Cohesion report or State of the cities);
2. social cohesion depends among others on three interrelated major demographic evolutions: the concentration of poor immigrants in the big cities where they generally occupy the low qualified segments of production (Sassen, 2001; van Kempen, 1994; Cox and Watt, 2002), the evolution of the household composition (state of the cities, 2006; Van Criekingen, 2008) and the gentrification process (e.g. Smith, 2000; Lees et al., 2007);
3. as far as sustainable development is concerned, demographic trends are of major importance: the population growth, the household (de)composition and the suburbanization process are factors producing urban sprawl.

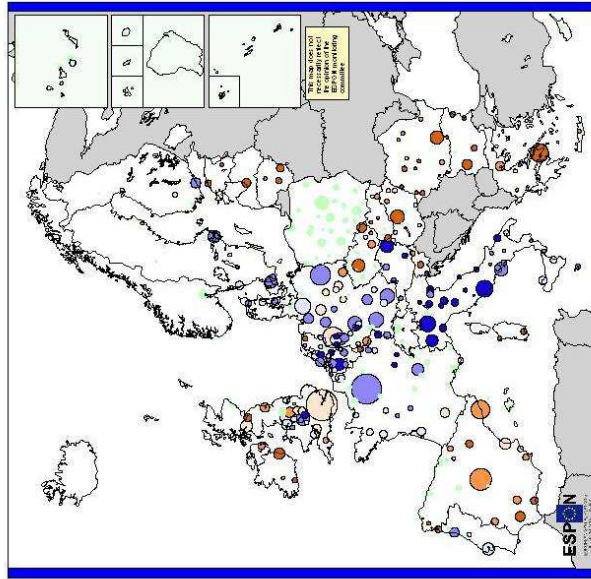
## **Annex 2a. Evaluation of “basic” competitiveness indicators of cities**

Gilles Van Hamme, Moritz Lennert

Because of the bad state of the UA data, which only clearly became apparent with the delivery of a more or less final version of the data during the month of February, we have decided to use NUTS approximations of economic indicators, representing different parts of the competitiveness pyramid, both in terms of revealed competitiveness and in terms of driving forces.

We present both basic indicators such as GDP and unemployment rate, but also sectoral structure of value added, size of airports and insertion into the global economy. Before providing a real analysis and comment of these maps they will have to be completed.

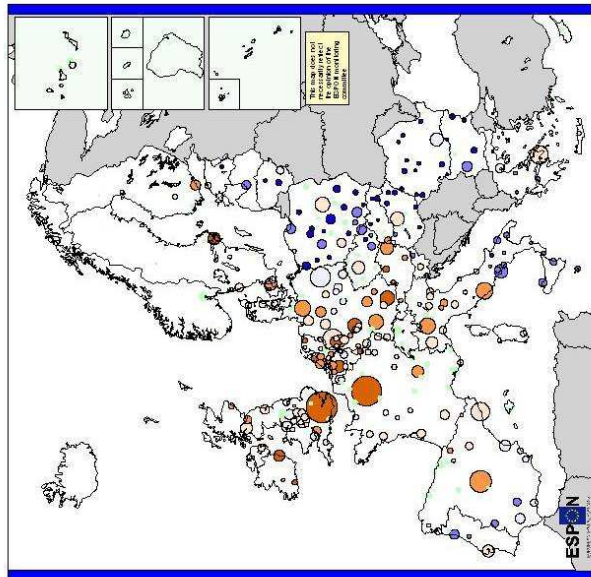
Evolution of GDP/inhab. according to European average, 2000-2006



GDP/inhab. 2006 (EUR = 100) -  
GDP/inhab. 2000 (EUR = 100)

- 25 - -10
- 10 - -5
- 5 - 0
- 0 - 5
- 5 - 10
- 10 - 40
- No Data

Gross Domestic Product per inhabitant



GDP/inhab.  
EU27 average = 100

- 22.02 - 60
- 60 - 80
- 80 - 100
- 100 - 130
- 130 - 160
- 160 - 272
- No Data

Cities approximated to NUTS3  
Size of the circle is related to the LUZ population



Author: IGEAT  
Source: Eurostat

Figure 4 GDP per inhabitant, static and dynamic

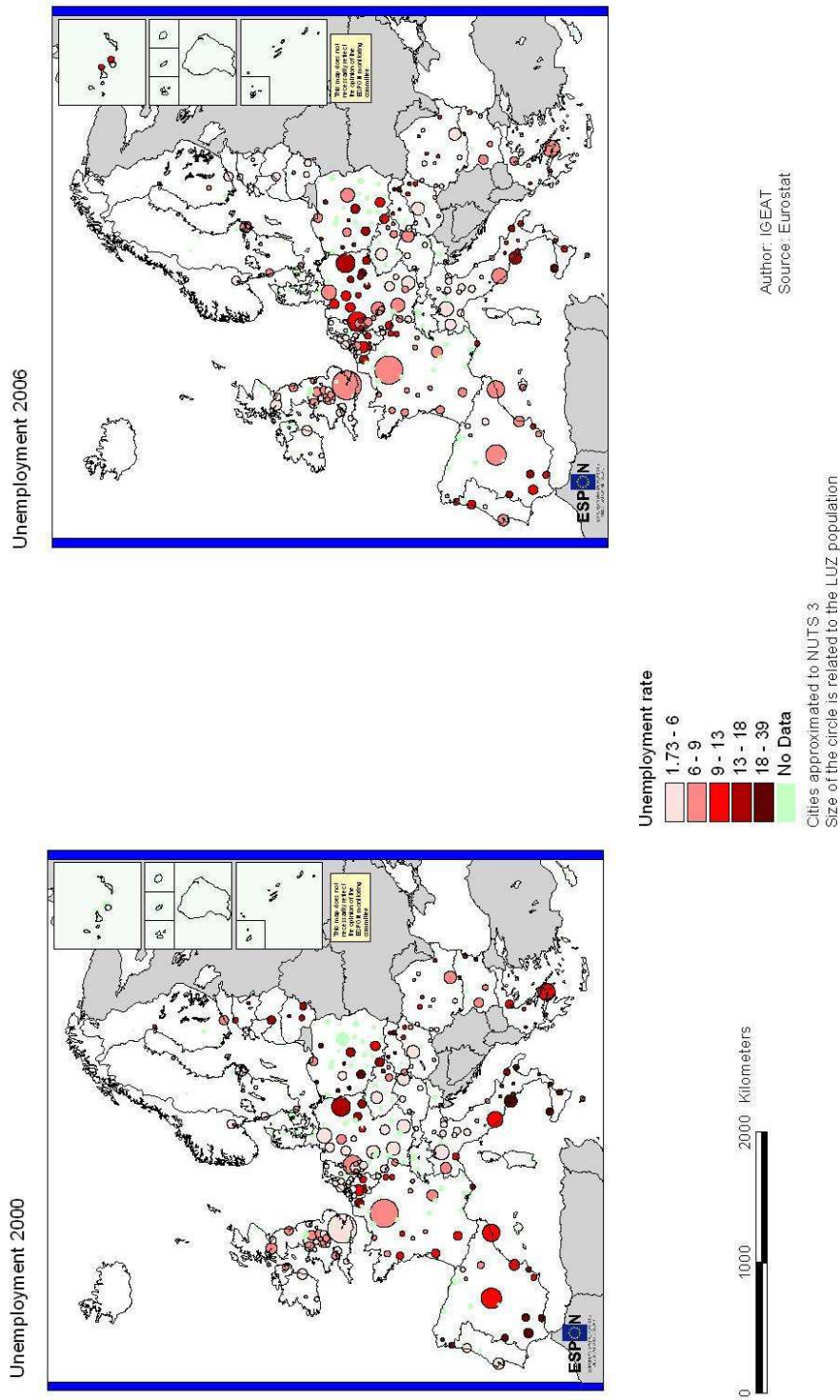


Figure 5 Unemployment rate 2000 and 2006

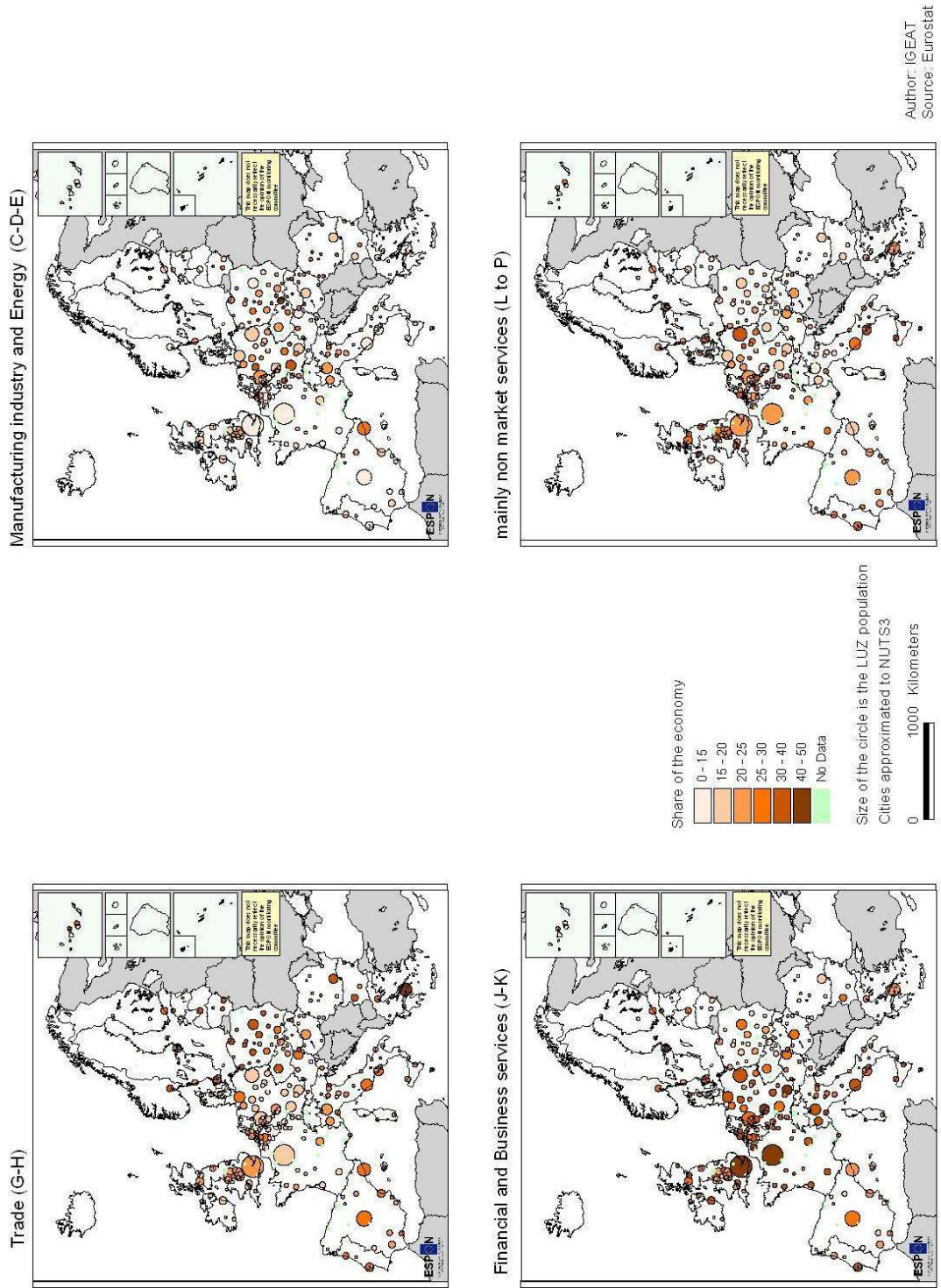
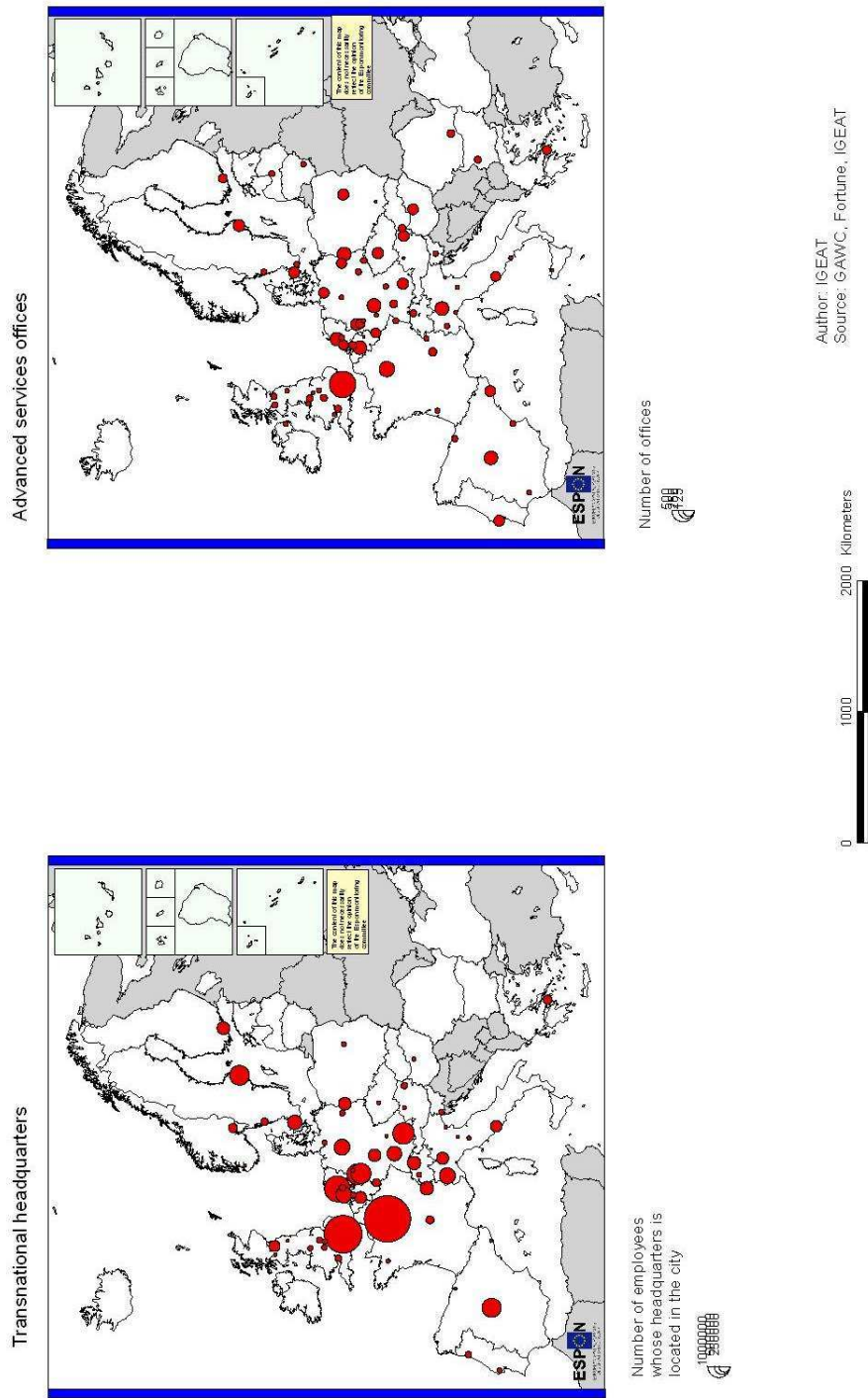


Figure 6 Sectoral structure of value added





**Figure 7 Position of cities in global economic command structure: number of headquarters of multinational firms and of advanced producer services offices**



## **Annex 2b. Processes shaping the economic future of cities**

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(IGUL, Lausanne, Géographie-cités, Paris)

Cities are embedded into systems of cities, which constrain a large part of their becoming. Their own resources interact with the whole system in several ways:

- through competition and complementarities allowing the development of self-organization processes (1);
- through the strategic behavior of major private actors like multinational firms (2);
- through emergence and diffusion of innovation (3);

These three types of processes can be oriented by specific public policies, what we discuss in the last section (4).

### **2.1 Dynamics of Urban systems**

The European urban system is integrating through a variety of processes that enhance the financial, economic, technological, political and cultural linkages between them. Integrated systems of cities have developed within the limits of national states, but since a very long time many linkages were also built at European level. They lead to the building of an integrated network of cities that is now operating at least for the largest metropolis, above a given threshold (Brunet, 1989; Cattán et al., 1994; Pumain, Saint-Julien, 1996; Rozenblat, Cicille, 2003). The polycentricity of the structure has been recently questioned (Cattán, 2007). The integration ensures that the connected cities participate in the general economic development, but the effects generated by the networks are not always evenly distributed among all parts of the system. Two main general trends of urban development affect the European urban system since the 1990's and will continue during the next two decades at least: globalization and development of knowledge economy have already selected first locations for their investment. According to observations and in conformity with an evolutionary theory of urban systems, they are priority boosting the two European global cities, London and Paris, then most of national capitals and some specialized cities. Scaling effects support an historical trend to the reinforcement of urban hierarchies. They also contribute to more concentration in the "urban pentagon" or European megalopolis. There is indeed a competition between European cities that is driven by their capacity to attract firms and to develop innovation (Hall, Hay, 1980; Cheshire, Carbonaro 1996). There is also a less often studied competition between European cities and cities in other parts of the world, mainly through investments in innovative sectors and delocalization of mature activities. A careful assessment of actual positions and trends is necessary before risking prospective analysis. That is why we think important to develop two main approaches of urban competitiveness in Europe: an improvement of existing cross-national comparisons of urban functions through typologies of their economic profiles; a direct observation of networks that are developing among cities and a thorough full analysis of their structuring and dynamics.

### **2.2 Organization networks of multinational firms**

In the context of urban system, Saskia Sassen (1991), as Manuel Castells (1996) made the assumption that the flows become dominant for structuring the space of places: "*These*



*flows are not simply an element of the organization: they express the processes that dominate our economic, political, symbolic. That is why the dominant physical processes in our societies are made up of all elements that underpin these flows and are also made up of those making materially possible their articulation. There is a new spatial characteristic form of social practices that dominate and shape the network society: the space of flows*" (Castells, 1996, p.511). In addition, cities are more selected in the competitive process. *"All the indicators show a strengthening of the hierarchical structure of functions of command and control, and exchange information which follows [...]. The spatial concentration of information resulting from high levels of uncertainty, self-generated by technological change, the demassification market, regulation and globalization of trade."* (Michelson and Wheeler, 1994, pp.102-103).

At the level of urban systems, it produces strongest hierarchies, inside the "Scale free networks" that follow some processes of "preferential attachment" recently pointed by Barabási and Albert (1999). Such an explanation of the Zipf's law was earlier proposed by Gibrat (1931) and Simon (1955), referring to the "Yule process" (Yule, 1925). Indeed, there are evidences in urban systems that innovations spread preferentially from the largest cities, already concentrating multiple networks, to the smallest ones (Batty, 2005; Pumain, 2006). At a micro level of individual behavior, these processes are in a large part due to the search of security rather than maximization, in a context of partial information (for instance in game theory see Luce, Raiffa, 1957). The "bounded rationality" mainly developed by Simon (1957, 1972, 1999) explains why, in a context of random probability of meeting opportunities, individuals choose the first satisfactory opportunity, rather than the best one. These trends lead to a strengthening of major cities, where opportunities are more likely to be diversified and where interactions are maximized, decreasing transaction costs (Coase, 1937).

These processes allow some specific properties of centralities, equivalence or structural equivalence positions for cities or for groups of cities according to positions in networks of located individuals or organizations. The networks take different forms (Williamson, 1985, Powell, 1990; Grossetti, 2003), and establish both structures and processes for the emergence of new networks. Different geographical scales are emerging from these networks (Continental, National, trans-boundaries etc. ) offering new opportunities to develop new networks, or at the opposite locking cities into some specialized networks. The specializations also occur in terms of economic activity. While Sassen underlined the financial networks developed into a restricted group of "Global Cities", the whole productive economy must be taken into account in the globalization processes (Friedmann, 1986, 1995; Rozenblat, Pumain, 2007; Wall, van der Knaap, 2009). Then, the diversity of urban networks, both in term of economic specialization and geographical influence, is the *sine qua non* condition for cities "resilience" in the global economy (Houdet, 2008; Pumain, Rozenblat, 1999). The future scenarii we will develop rely on two main hypothesis: first, the European cities closure or openness to the other continents. In second hypothesis, the cities specializations will have to be tested. Finally, bridge roles between closed cities groups will have to be simulated.

### **2.3 Emergence and diffusion of innovation into cities and beyond cities**

Knowledge and information, reflexivity and the capacity to learn and invent are driving the urban development. The crucial role that cities have played in the generation of innovations – intellectual and material, cultural and political, institutional and organizational – is well documented (e.g. Bairoch 1988; Braudel 1992; Hall 1998; Landes 1999). The role of cities as centres for the integration of human capital and as incubators of invention was rediscovered by the "new" economic growth theory, which posits that knowledge spillovers among individuals and firms are the necessary underpinnings of

growth (Lucas 1988, Romer 1986). As Glaeser (1994) points out, the idea that growth hinges on the flow and exchange of ideas naturally leads to recognition of the social and economic role of urban centres in furthering intellectual cross-fertilization. Moreover the creation and reposition of knowledge in cities increases their attractive pull for educated, highly skilled, entrepreneurial and creative individuals who, by locating in urban centres, contribute in turn to the generation of further knowledge spillovers (Feldman and Florida 1994, Florida 2002, 2004, Glaeser 1999, Glaeser and Saiz 2003). The process, whereby knowledge produces growth and growth attracts knowledge, is the engine by which urban centres sustain their development through unfolding innovation. The essential role of knowledge generation, recombination and circulation within and across urban areas must be at the core of the explanation of their competitiveness.

The change in economic activity proceeds over time, not through any continuous flow of novelty but according to more or less intense periods of creativity: these major innovation cycles which were called "revolutions" in economic and historical literature. At least for the last three centuries five of these major cycles were narrowly connected to urbanisation and diversification of urban activities: the development of planetary maritime trade and the banking sector in 17<sup>th</sup> and 18<sup>th</sup> century, the first industrial revolution of steam machines and railways at the beginning of 19<sup>th</sup> century, the electricity and automobile at the turn of 20<sup>th</sup> century, the electronic revolution in the middle of 20<sup>th</sup>, and the now engaged revolution in converging technologies (NBIC, nano, bio, information and cognition) for the 21<sup>th</sup> century. Empirical studies established that urban growth is linked to innovation cycles (Berry 1991) and are following a hierarchical diffusion process over time (Robson, 1973, Pred, 1977). Conversely, the major urban specialisations can be linked to the main innovation cycles (Pumain, Rozenblat, 1996, Paulus, 2004, Pumain et al., 2006).

Contrary to a frequent assumption that innovation may merge anywhere on a territory, empirical studies have demonstrated that large cities remained the major nodes for the accumulation, production and diffusion of the scientific and technological knowledge that support innovations (Bouinot 2002, Castells 1996; Lever 1999; Pumain 1997; Simmie 2001). Actually, innovation is both cause and consequence of urban development. It is a driving force in the process of their dynamics, within cities as well as in the system of cities. Within a city, innovation is a multi-scalar process which combines at a variable extent according to the city size, internal and external interactions of medium and large spatial range. Moreover, since the 1990's, with the emergence of knowledge based economy, there is an increasing circulation of information that increases the speed of diffusion and technological change in every economic sector. Two main processes explain that transformation in production processes and services: an increasing share of intangible capital (R&D, education, human capital ...) and the diffusion of new technologies of information and communication. The interacting model of Kline and Rozenberg (1986) has been substituted to the classical concept of innovation that implied a strict linear causality between fundamental research and innovation.

It is thus essential to focus a prospective analysis of European cities on their situation within the next innovation cycle. This is known as the cycle of "converging technologies" (nano and bio technologies, as well as technologies of information and cognition). As this new economic cycle is still at the stage of R&D, it will be studied according to the research networks that are developing it since twenty years (Comin, 2009).

## **2.4 Role of policies for orienting urban development**

Policies oriented towards economic development for territories have been developed mostly in Europe around the concept of *Cluster* until 2000 (Porter, 1986, 2004). This concept of Cluster refers to three models at once (Gordon, Mac Cann, 2000; Karlsson et al. 2005):

- I. the classical model of pure agglomeration, referring to job-matching opportunities and service economies of scale and scope: local market and local spillovers.
- II. The industrial-complex model, referring to explicit links of sales and purchases between firms: trading and other interaction links that bring about reduced transaction cost.
- III. The network or club model, also referred to as the social-network model, which focuses on social ties and trust.

Then, policies were developed recently at national, regional or urban levels in three ways (Sölvell et al., 2003):

- IV. focused on actors embedded ness (at regional level with the implicit model of Silicon Valley and Italian Districts); ;
- V. National networking of innovative activities;
- VI. Local networking of innovative activities.

The “best” practice seems to be in the articulation of the three ways as it was undertaken in Germany since 1998 through national innovative specialized networks (*Kompetenzenetze*) relayed at local levels by regional and urban policies reinforcing the first and the third orientations. In other cases like for Catalogne and Basque region, the policies since 1991 were mainly local without any national vision (sometimes, European ones). In France, the supports of *Local Productive Systems* in 1997 and *Poles of competitiveness* in 2004, were mostly oriented also towards local networking that is much more powerful while accompanying decentralization than during the former the national research policies (which failed until now).

Meanwhile, the articulation of industry, research and training is the core of today main economic policy in Europe. The question is thus how supports are concentrated in a restricted number of cities and how it creates polycentrism at regional, national and European scales. Measuring the evolution of inter-urban networks, we shall assess the main trends at different scales, growing cohesion or/and competitiveness following the main ESDP 1999 recommendations. Then we will be able to produce different recommendations according to a variety of spatial situations.

## **Indicators and methods**

One method is based on the profiles of the urban areas, the other one measure the relative position of cities in economic and research networks.

### **2.5 Urban profiles and specialization in the competitiveness perspective**

From previous studies on the dynamics of European cities, we retain that the probability of urban development (measured by a higher differential growth) is linked to three main urban synthetic indicators:

- 1- The position of the city in the urban hierarchy
- 2- The degree of specialization in former innovation cycles
- 3- The capacity to develop and attract activities of the next innovation wave

The correlation of urban growth is positive with the first and third indicator; it may be zero or even sometimes negative with the second one.

Several typologies of the largest European functional areas are already available from published materials. Five main references (Cattan et al., 1999; Taylor et al., 2004; SDEC,

1999, Rozenblat, Cicille, 2003, Boyle et al. 1996) will be used and compared in a systematic way for producing a new typology of urban functional areas according to the criteria of economic competitiveness. The existing classifications are rarely complete in terms of number of cities that are included, and they may slightly differ according to the indicators that were selected for establishing them. At the moment, we have collected the information including about 400 different European Larger Urban Zones as well as the metadata defining the significance of classes for each of them and the sources of data that were used for establishing them. These typologies are numerous, they were made for very different purposes and they rely on more or less accurate and detailed information: a critical comparison of these typologies is in preparation. In a further step, we shall harmonize the information about the type of cities, according to a cross classification of their hierarchical level in Europe, also in the state where they are located, and a degree of specialization in the activities of the last three main innovation cycles. This harmonization will be made with the help of a sample of relevant indicators extracted from the urban audit, including the application of a correction if these are not given for the functional urban area but for another definition of the urban zone. The method is cross checking the inclusion in a class and the mean level of the relevant indicators describing the profile of each class.

Code	Indicators
EC1001I	Activity rate
EC3039I	Median disposable annual household income
EC2001I	GDP per head of resident population
EC2015I	GDP per employed person
EC2004I	New businesses registered as a proportion of existing companies
EC2003I	N° of companies with HQs in city quoted on stock market
EC2033I	Proportion of net office space that is vacant
EC2011I	Prop. of employment in financial and business services
EC2012I	Prop. of employment public admin., health and education
IT3006I	Percentage of labour force producing ICT content
TE2022-24I	Proportion of population qualified at level 5-6 ISCED
TE1026I	Students in higher education per 1 000 resident population
CR2004I	Number of air passengers using nearest airport

Source: Manninen A. et al. (2004)

### **Table 1 Principal structural indicators qualifying cities economic competitiveness**

We know that these indicators are not available in an exhaustive way for all European FUAs, but they will enter as a complement within the combined classification of previous typologies. Moreover, when possible, urban indicators will be approximated by available information at NUTS3 level (in collaboration with the ULB team). Especially, the economic and social profiles will be used for determining which previous major innovation cycles have been captured by the specialized cities.

### **2.6 Selected networks for measuring urban competitiveness**

In order to complete the static cross-sectional typology of cities established according to indicators of capacity regarding economic resilience and innovation adoption, we shall analyze two types of networks that are especially representative of the linkages enhancing these capacities: (A) financial links in multinational firms networks, and (B) specialized research networks for the next wave of innovative activities (convergent technologies,

NBIC). In both cases, we use the same approach to integrate locations into Morphological Urban Areas, and Functional Urban Areas (C).

A- Multinational corporations invest in many cities, reinforcing urban economic capital through the integration of located plants in the strategic competitiveness of the whole company group (Rozenblat, Pumain, 1993; Castells, 1996; Taylor et al., 2004; Rozenblat, 2004). They also increase interdependencies between cities by the way of financial links, global value chains and strong relationships leading to the diffusion of various technologies, production modes, enterprises cultures (Gereffi, 1996; Gereffi et al., 2005). Especially with financial links, through different kinds of controls and powers of headquarters on their subsidiaries where they are located, cities are put in dominant or dominated positions regarding the directly connected cities, as well as the whole urban network when indirect paths of subsidiaries to many other cities are considered.

In order to measure these positions of cities within such corporation networks, we built a database including all the direct and indirect subsidiaries of the first 4.000 worldwide companies groups classified by their turnover (Orbis, BVD, 2007). Each group is seen as a (quasi) tree, owning subsidiaries which themselves own other subsidiaries and so on. It results a sample of 450.000 subsidiaries located all over the world, linked by 700.000 financial links, which are directly or indirectly owned (at least at 10% threshold) by the main first 4.000 groups. The data base includes for each of these subsidiaries attributes of location, activity sector (NACE) and names of owners and subsidiaries.

B- Technological innovation has acquired in Europe, as in the rest of the world, an increasing strategic importance in economic competition. It also plays a crucial role in the structuring and dynamics of the settlement systems: in the emerging “knowledge economy” the main dynamical feature that characterizes the evolution of systems of cities seems to be competition for collecting knowledge and innovations. Contrary to the largely widespread idea according to which innovation may locate indifferently, various empirical studies stress the importance of cities as nodes of accumulation, production and diffusion of scientific and technological knowledge. Thus, from the analysis of scientific collaborative networks we can derive some critical insights regarding the wider geography of European cities’ interactions.

In order to study the most innovative scientific sectors, we focus on NBIC technologies (nanotechnology, biotechnology, information technology and cognitive science) commonly named “converging technologies”. Such technologies are believed to drive the future innovation wave expected to emerge by 2020 (Nordmann, 2004). There are three principal types of indicators for studying technological flows between cities: (i) patents documents include references to previous patents (citation). According to A. B. Jaffe et al. (1993) patent citing earlier patents reveal knowledge flows between localized inventors. (ii) The co-authorships networks related to joint publication activities indicate intense working relations and then potential knowledge flows between localized authors. The main difficulty with these two indicators is to collect data related to the cities where innovative actors are located. (iii) In our analysis, we consider scientific and technological collaborative linkages between the organizations engaged in innovation processes (namely research organizations: public research centers, universities and firms’ research centers) within European funded research and technology development projects (RTDs) dedicated to converging technologies.

Data come from the EC database CORDIS RTD-PROJECTS (Community Research and Development Information Service) drawn from the 2<sup>nd</sup> to 6<sup>th</sup> European Framework Programs for Research and Technological development (or FPs) (the 1<sup>st</sup> FP is much too incomplete to be used): the CORDIS data base provides information about the evolution of European research supports from 1986 to 2006. CORDIS data give information about the real location of the organizations that are involved (it is not the location of organizations’ headquarters).

Indeed, institutions can have several research centers located in different cities. That is why we choose to identify the precise location of each of the research centers (laboratories) that are really involved in projects dedicated to NBIC. We can thus create urban networks, by aggregating CORDIS data at the city level for measuring the links which are created between cities by these networks (see J. Hoekman et al 2008 -for UE 27 regional study-; Rozenblat and Cicille 2003 ; Besussi, 2006; Rota, 2008; and Comin, 2009 -for scientific urban networks)

C- Urban aggregation method: in both cases, we have defined cities as functional urban areas. Each institution appearing in the networks have been geographically localized and then aggregated to the urban area they belong to. More specifically, in Europe, there is no universal definition of FUAs. Generally, FUA is defined as a core municipality and its adjacent commuting areas (ESPON 2007). At the moment, we did not select *a priori* a list of cities, but we have collected all names of the localities that were mentioned in the source data bases about financial or research networks. Then, we observe that even small towns and/or extra-European cities can have subsidiaries or research centers involved in the European networks. Consequently, we have developed two different methods to aggregate research centers to FUAs they belong to: (i) First, we consider only FUAs defined by ESPON Project (1.1.1. and 1.4.3.) in order to build a data base that is comparable with other studies. It is a good method, but it supposes to exclude a large part of small cities and/or extra-European cities involved in urban networks. (ii) Second, we have defined our own homogenous definition of FUAs in order to deal with all cities involved in research networks (even small and/or extra-European cities). To define our FUAs, we consider morphological urban areas (MUA) as the cores of FUAs (Géopolis database (Moriconi-Ebrard, 1994) completed and updated by the laboratory Géographie-cités, Paris, France) and then we aggregate the mentioned localities surrounding these cores. The aggregation of the fringe is made through thresholds of distance to MUAs centers because we don't have data allowing us measuring the travel-to-work areas for all European cities involved in the research networks. We can assert that the distance thresholds fixed here (table 2) are deliberately very restrictive in order not to integrate localities that would be totally independent from the MUAs with which they could be connected, what constitutes the major risk of our aggregation method. The resulting FUAs database is named NBIC-Euro database for research networks and SPANGEO database for multinational firms.

Number of inhabitants in MUA	Thresholds of distance to MUA
Between 10.000 and 50.000 inhabitants	30 km
Between 50.000 and 100.000 inhabitants	50 km
More than 100.000 inhabitants	70 km

**Table 2 Distance to MUA centers thresholds to define FUA**

As a whole, the NBIC-Euro database includes FUAs with 10 000 inhabitants and more, only five of them (Suomussalmi, Argostoli, Horta, Kardla and Lerwick) have less than 10 000 inhabitants. The NBIL-Euro database contains 9299 research centers localized in 799 functional urban areas distributed in 117 countries. Among all functional urban areas, 512 of them are located in UE 27.

However, the distribution of functional urban areas in the European Union is highly contrasted. Indeed, they concentrate especially in the European megalopolis. Furthermore, the capital cities of European countries and more generally the large European metropolises are all involved in the research networks under study.

In the case of multinational firms' networks, many indications about location were missing in the original source. Thus, we are completing this information about addresses in localities in order to build a clean database. We shall then measure in a similar way their distance to MUA centers to include the subsidiaries into relevant European FUA. The data base also deals with all other cities of the world. For USA, we used the official definition of Micropolitan Areas and Metropolitan areas (US Census, 2002). For other countries, we shall use national definitions of Functional Urban Areas (especially in the case of Australia, India, China and South Korea). Then we will be able to measure in a rather comparable way the many networking indices that are built upon these aggregated graphs.

## 2.7 Measuring the relative importance of cities within networks

A graph is a symbolic representation of a network and of its connectivity. A graph G is a set of nodes n connected by edges e. The construction of a graph depends on data and analyses. Then a graph can be weighted or not, directed or undirected (Berge C. 1958). Several indices and measures can be used for measuring the relative importance of nodes within a graph. Each of them describes different aspects of the positions of a node within a graph. Here we propose a short presentation of the principal indices we will use:

- It is possible to measure the attraction of some cities within a weighted directed graph by extracting all the strongest links for each pair of cities (Nystuen, Dacey, 1961). The more one or more cities attract the "**largest flows**" of each pair of cities, the more they **polarize** the graph.

- Two indices of centrality developed by L. C. Freeman (1977, 1979) can be used for describing the relative importance of cities within undirected graphs. (i) **Degree centrality** is defined as the number of links incident upon a node. It measures the relational activity of a city. (ii) **Betweenness centrality** measures the potential intermediary role of cities within a network: the more a node occurs on many shortest paths between other nodes within the graph, the higher is its betweenness centrality. As the degree centrality is a measure of local centrality to their direct neighbors in the graph, Betweenness Centrality evaluates global centralities according to the entire network. Both of them can take into account different weights of links.

- Measures for weighted directed graphs enable to analyze the hierarchical relationships between networked cities. (i) The number of edges directed into a given node (or **indegree**) can be interpreted for networked cities as the extent to which a city is commanded by other cities (ii) Conversely **outdegree** (the number of edges directed out of a node) describes the degree of commandment activities on a given number of cities within networked cities. These two indices measure local centralities because they only take into account direct connections of each city. (iii) At this local scale, cities dependency is the balance between indegree and outdegree and shall reveal its specific relational role within networks.

- The variety or specialization cities can be seen at least in two ways: (i) the variety of geographical orientations of cities connections (within or outside their country or Europe could evaluate the range and radiation at different scales); the variety of types of networks (firms activities or research thematic). In general, the variety will mean a positive structure of links leading to highest likelihood of innovation emergence and adaptive socio-economic structure. But also, cities will be compared regarding to their radiation at each scale, which would be measured by the average distance between the city and its direct linked cities.

Type of graphs	Measures	Description
Undirected weighted graphs	Degree	the number of links incident upon a node

	Betweenness centrality	Sum of the occurrences of a node on shortest paths between other nodes in the graph
	polarization	Major flow
Directed weighted graphs	indegree or outdegree.	The number of edges directed into a node or the number of edges directed out of a node
	Dependency to another city	Highest indegree
	relational role	The difference between in and out degree of a given city, divided by the sum of in and out degree of this city
Directed and Undirected weighted graphs	variety/specialization	Specialized orientations of cities connections
	Scale specialization	Geographical scale orientations of cities connections (National, European, Worldwide).
	Interaction range and Radiation	Average distance between a city and its connected cities for different scales or different specializations

**Table 3 Principal relational indices qualifying cities situations within networks**

These indicators allow us to examine the positioning of cities within the two types of economic networks studied (financial links in multinational firms' networks, and specialized research networks for the next wave of innovative activities).

TOTAL Continent Owner	Continent where subsidiary is located						Total
	Pacific Oceania	Eastern Asia	Europe	South America	North America	Western Asia	
Pacific - Oceania	2 803	319	1361	111	143	40	5 546
Eastern Asia	141	30 401	5856	1367	3 110	45	44 128



Europe	4 271	21 305	322 445	11 351	25 499	580	468 581
South America	203	1 716	3202	3 491	1 745	22	13 561
North America	1 244	10 971	30 029	8 626	108 275	190	178 107
Western Asia	31	16	92	29	9	519	752
Total	8 737	64 943	367 799	25060	138 869	1402	606 810

Source: Orbis, 2007.

\* About 100 000 more links are still under verification for completing the data base.

**Table 4 First (provisional\*) result from multinational firms' networks: Number of firms and subsidiaries in the data base according to the continent where the owner and the subsidiary are located**

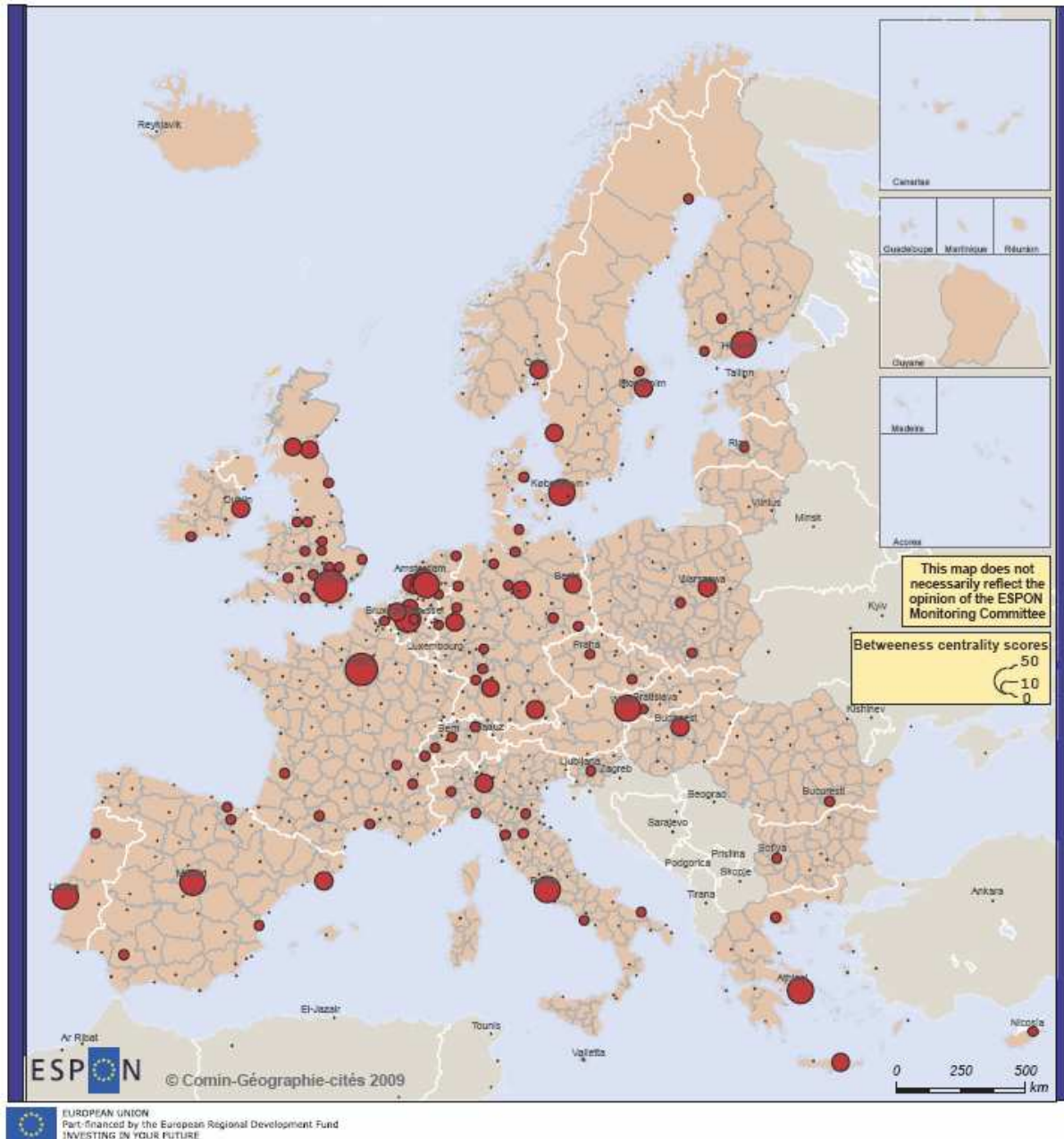
According to Table 4, more than half (53%) of the links between firms are internal to European Union. We can explain it by the historical legal obligation to create a new corporation each time a company invests in a new country. This legal obligation no longer exists, as the European society status appeared in 2004. But corporations created before are still there, and also many companies continue to create national corporations in order to benefit from law taxes or other national advantages.

The cities' position in the converging technologies research networks highlights the geographical structure of the European production of new knowledge facilitating economic competitiveness of cities in the actual "knowledge economy". For example, European cities' betweenness centrality indicator (figure 9) show that Paris and London, and more generally European national capital cities have strategic positions within scientific networks dedicated to NBIC which can be interpreted as their potential capacity to control the circulation of knowledge spillovers that flow within European cities, whereas the relational activity of cities as measured by the degree centrality is less hierarchical (figure 10).

More over to foresee cities possible rate of new knowledge creation we propose to achieve a dynamic analysis of urban relations for converging technologies research.

Dynamic analyses are possible in two ways:

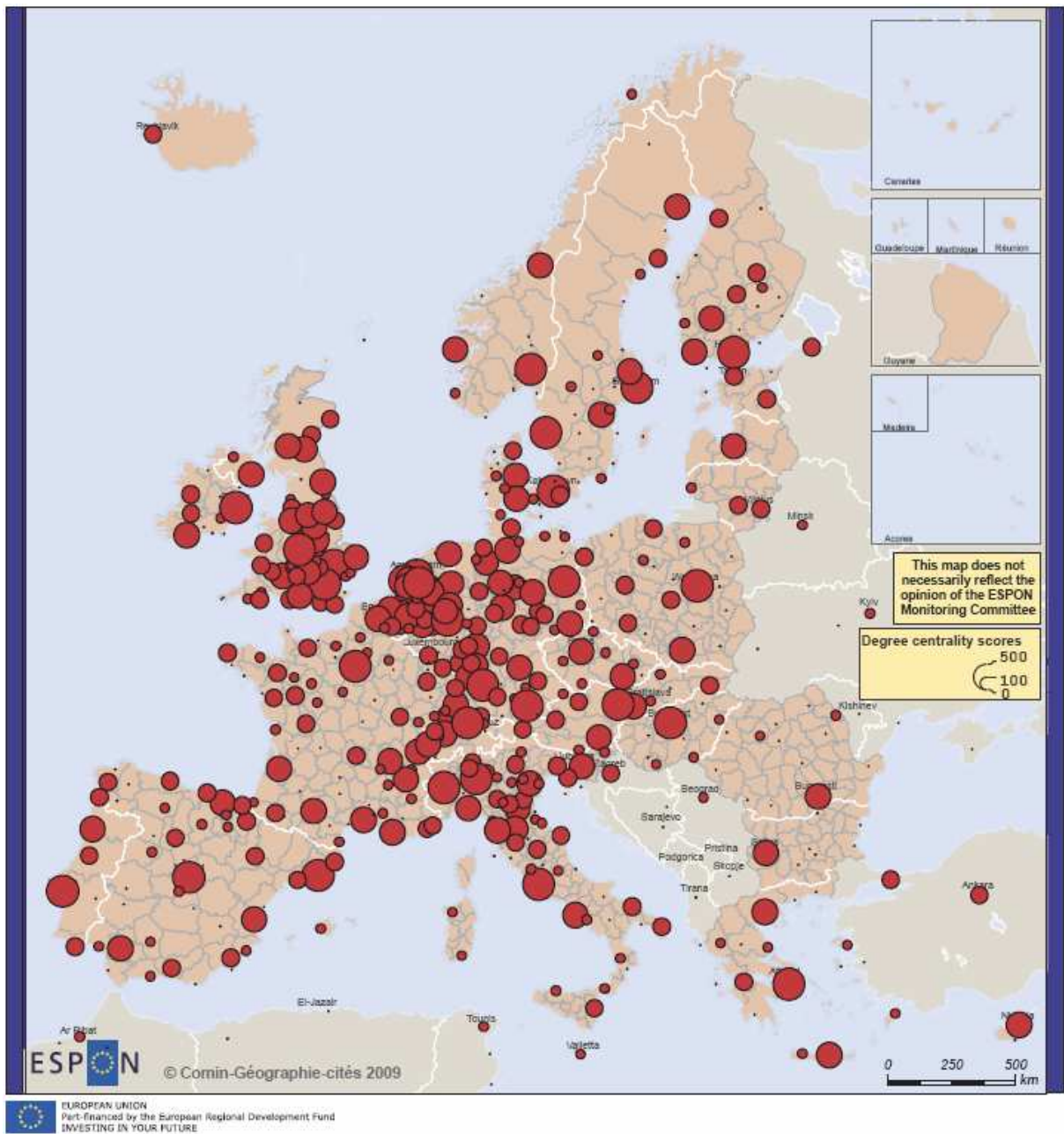
- First, longitudinal data allow us to describe the evolution of a network as a sequence of static networks evolving through time. Then it is possible to compare different local or global parameters (e.g. table 2) at each sequence: 1986 to 2006 for research networks and 2007 to 2010 for firms' networks.
- Second, there exist models of evolving networks allowing us to study the evolution of the entire network, e.g. since 1986. These statistic parameters are used to test assumptions about evolution of networks at global scale. (Guillaume J. L. et al 2008, Newman M. et al. 2006). Dynamic analyses of urban relations for converging technologies research are useful to understand the trend of European urban interactions for innovative activities: do trend show the reinforcement of metropolitan patterns in the European urban system through the integration of cities at European scale for developing innovation activities? Or conversely, do trend show the reinforcement of polycentric patterns in the European urban system?



**Figure 9 European cities’ centrality within scientific and technological networks dedicated to NBIC**

*Notes: betweenness centrality measures the potential intermediary role of cities within a network: the more a node occurs on many shortest paths between other nodes within the graph, the higher is its betweenness centrality. Here, betweenness centrality (X 1000) is calculated with Pajek software. Network construction: scientific and technological collaborative links between FUAs. NBIC technologies projects. Data come from the EC database CORDIS RTD-PROJECTS drawn from all Framework Programmes for Research and Technological development, from 1986 until 2006. Undirected and unweighted graph.*

*Source: NBIC-Euro database.*



**Figure 10 Participation of European cities to the research networks about NBIC (degree centrality)**

*Notes: calculated with Pajek software. Network construction: scientific and technological collaborative links between FUAs. NBIC technologies projects. Data come from the EC database CORDIS RTD-PROJECTS drawn from all Framework Programmes for Research and Technological development, from 1986 until 2006. Undirected and unweighted graph. Source: NBIC-Euro database*

## Conclusion : dynamics of city networks

According to our analyses of the two large databases we have on European cities networks, with the help of these position indices, we expect to derive a dynamic typology of the situation of cities within the European urban system. Since the network dynamics is reinforcing the urban hierarchy while at the same time extending the scope of the network, we shall identify which cities can benefit from a future improved situation in the emerging European polycentric urban hierarchy.

During a period of economic crisis as we are living now, as the uncertainty is increasing for private enterprises as well as for public investments, the movements of concentration in strongest central metropolis are likely to reinforce again. In fact, the usual bounded rationality (Simon, 1962) lead firms and decision-makers to adopt the first satisfying option regarding to investment security. Meanwhile, a few decision makers who are more audacious and fearless will search rare niches, which could be more profitable on a long term period.

According to the participation of cities in the expanding networks of multinational firms, as well as their capacity to participate in the next innovation wave that is measured by their position in the NBIC research network, we shall add a dynamic aspect to the typology of European urban areas that encapsulate some relevant information about their possible future evolution.

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## **Annex 3. Transport and territorial cohesion in Europe: analysing the transport and accessibility trends for scenario building**

### **3.1 Literature Review**

Among the range of policies having an impact on spatial development, transport plays a major role regarding territorial cohesion. Transport infrastructures are the support for flows between regions and cities, for linking places and hence reinforcing cohesion between places. For territorial analysis, transport is most often assessed through the measure of flows and through the measure of accessibility.

Accessibility, or the possibility to reach places, is widely recognised as a key issue in urban development. Accessibility and the development of transport systems is seen as a factor favouring or supporting or even causing urban development that it be locally in the neighbourhood of entry points and globally concerning the entire urban entity.

In this paper we will discuss the trends in transport and in accessibility concerning the ESPON space. We base our development on the analysis provided in the ESPON report 3.2 for the building of territorial scenarios for Europe. We then review the recent literature to confirm or amend the identified trends.

#### **3.1.1 Transport trends**

##### **3.1.1.1 *Transport trends identified in 2006***

An ESPON report has proposed in 2006 a series of spatial scenarios for Europe (ESPO report 3.2 "Scenarios"). This project was focussing mainly on regions and territories and not specifically on cities. Nevertheless the major tendencies identified for regions can to a large extent be considered as valid concerning cities present in these spaces. We will give a special attention to the fact that our concern here is the future of *cities*, which is not completely equal to the future of regions in Europe.

Among the major sectoral domains playing a role in territorial cohesion, transport trends were studied specifically. Six major trends were identified.

The first trend (T1) considers the uneven nature of accessibility across Europe.

The second trend (T2) concerns the imbalances among transport modes. Railways, mainly with regard the freight transport, maritime and inland waterway transport are less performing than road and air which are favoured by the observed trends. A special mention is made of low cost airlines credited of a "revival of air transport".

The third trend (T3) recalls the predominance of national characteristics in the organisation of networks with organisational shapes very specific to organisational and geographic realities in each country.

The fourth trend (T4) focuses on the importance of East-West flows in relation with the problematic of enlargement.

The fifth trend (T5) expresses the changing transport paradigm among new members states, or the "regions of the cohesion" in the new territorial jargon, that saw a sharp decline in freight transport and that favours road on rail.

The final identified trend (T6) assumes the growing congestion of major networks.

The overall picture proposed in the report 32 of the ESPON is still valid 3 years after it was emitted.

Nevertheless many evolutions in the world of transport have occurred or have been developing since then. We will consider these recent evolutions that may temper or in the contrary reinforce the trends identified in 2006. We propose to analyse the recent literature and consider if amendments have to be formulated regarding the six trends identified.

### **3.1.2 Analysing the trends in accessibility**

#### **3.1.2.1 Accessibility of European cities, the "global city" and the rest**

##### **Rozenblat, C. et Cicille, P. (2003). Les Villes européennes : Analyse comparative. Paris, DATAR**

This work renews an older contribution by Roger Brunet in 1989 that highlighted the "blue banana" organisation of the European territory.

In this approach cities are analysed with a series of 15 indicators, among them 2 concern transport: traffic by air and sea transport and accessibility to others cities by plane or train.

The main results of this work highlight the existence of peripheral cities with high accessibility levels and central location cities with low accessibility levels. The analysis opposes a series of large European metropolises very well linked to each other and a network of smaller cities not so well connected to the major armature. The trend observed by the author favours the reinforcement of a European "global city" associating a limited number of cities and threatening the medium and smaller cities.

The trend towards differentiation of space (T1) is here identified with a dichotomy of larger cities against the rest of urban settlements.

#### **3.1.2.2 Update of accessibility indicators in 2007**

In a study made public in 2007 Klaus Spiekermann and Michael Wegener (ESPON report "Update of Selected Potential Accessibility Indicators", 2007) have updated the major indicator considered in the analysis of accessibility at the date of 2006. They propose a series of conclusions regarding the evolution of the very same indicator previously computed in 2001.

The first observation is that of the continued existence of large disparities of accessibility for road and rail across the ESPON space. Regional deficits remain. This first observation is in line with the first trend identified in the spatial scenarios (T1).

The measure of the differential in accessibility shows that "transport infrastructure projects can have substantial impacts on potential accessibility of individual regions". In particular high-speed rail is reshaping the geography of the continent. This observation expressed at the level of regions is even more accurate concerning cities, which are the nodes of the HST networks. The update of the regional accessibility indicator shows that "high accessibility by rail is much more concentrated than road accessibility, around nodes and along corridors of high-speed rail lines". These observations are susceptible to amend the major trend proposed in the scenarios study (T2). High-speed rail in itself can have a strong local impact on accessibility, and the tendency to the development of this fast transport mode leading to the emergence of a proper European network including cross border links plays currently and will more and more in the future play a role of re-equilibrating of the imbalance of modes in favour of rail, and in favour of the nodes served by this network, namely the major cities connected.

A third observation is proposed in the fact that EU enlargement had its impact on accessibility, in particular with the improvement of road transport by means of reduced border costs and waiting times, and the infrastructure development. This observation is in line with the two trends (T4 and T5) highlighting the East-West flows and the modal shift in enlargement countries.

Furthermore the development of accessibility measure expresses the prioritising road infrastructure development among new members, a trend already identified in the Scenarios study (T5).

### **3.1.3 Long-distance transport and metropolitanization**

Accessibility is seen by some authors as simply the possibility to reach places, referring in the broad sense to the potential for interaction and more recently as supporting a key character of the metropolis, the faculty to communicate with other equivalent urban entities at the global scale (Rozenblat, 2003).

### **3.1.3.1 World air flows multilevel approach**

**Amiel, Mélançon, Rozenblat, 2005, Réseaux multi-niveaux : l'exemple des échanges aériens mondiaux de passagers, Mappemonde, 79.**

The method allows for identification of three major integration zones, USA, Europe and Oriental Asia. The approach shows also the lack of integration of air transport network in Europe compared to the USA, an argument in line with that of an unevenness of accessibility over Europe (T1). The importance of hub-and-spokes network organisation confirms this trend with nationally organised sub networks (T3).

### **3.1.3.2 World geography seen from the air networks perspective**

**Cattan N., 2004, Le monde au prisme des réseaux aériens, Flux, 58, 32-43**

If polarisation continues in the air transport network through the development of the hub-and-spoke approach favouring world cities, a simultaneous evolution occurs with a decrease of the part of most structuring flows in the overall flows. This constitutes an argument in favour of more dispersion of flows and accessibility.

### **3.1.3.3 Concentration or dispersion in global air travel?**

**O'Connor K., 2003, Global air travel : toward concentration or dispersal ?, Journal of Transport Geography, 11, 83-92**

In the early nineties some commentators (Rimmer 1991) predicted the apparition of very large airports. This evolution has not occurred. In the contrary a greater dispersion of traffic has been observed during the nineties, an argument contrary to that of the differentiation of larger platforms as opposed to the rest of the cities, tempering the unevenness argument (T1).

### **3.1.3.4 Territorial impacts of the liberalisation of air transport**

**Dobruszkes, F. (2008). "Libéralisation et desserte des territoires : le cas du transport aérien européen". Bruxelles, P.I.E Peter Lang, Coll. Action Publique. 287p.**

In this book on the territorial impacts of the liberalisation of air transport in Europe, a picture of the recent evolution of the air mode is developed.

The "lowcost" airline development, which is credited of most of the growth of air transport in the last decade, has spectacularly favoured a series of small airports all over Europe. Nevertheless, the analysis of flows and their evolution leads to the idea that major patterns of flows and polarities remain unchanged by this phenomenon. Despite the attention raised by the development of some small airports, some of them located in the remote periphery of major cities (the example of Charleroi), general spread of the development of air transport is not observed. This conclusion leads to not changing the unevenness tendency in accessibility (T1) as the general case.

Past evolution of air accessibility reveals that dramatic decrease in accessibility have been observed in cities suffering from the collapse and/or deep reorganisation of airline companies, like Bruxelles with the disappearing of Sabena, or Genève with Swiss. The dynamism but also the fragility of the air transport system, highly subject to the energy crisis and at the first stage of the consequences of the current global crisis, suggests that cities access to air transport could dramatically evolve in the near future, especially for airports too dependant of one single operator. This case of fragility is more critical in second

and third level airports, than in the first class where concurrency between several airlines can prevent local strong negative evolutions.

### **3.1.3.5 A metropolis without a hub?**

#### **Roth P., 2003, Quelle desserte aérienne intercontinentale et régulière pour les aéroports non-hubs européens ?, *Transport*, 417, 10-20**

The author of this study proposes, as a solution to concentration and congestion of the air system, a series of recommendation in the sense of developing the intercontinental relations of non-hub airports and cities. Tools for correcting territorial imbalances are proposed by the author, but feasibility remains a question since in the current economic landscape air transport companies are the key players and are not necessarily willing to support very long distance transport when transport demand is not present.

### **3.1.3.6 Metropolises without international airport?**

#### **Bozzani-Franc, S. (2006). "Grandes Vitesses, Métropolisation et Organisation des Territoires : L'apport de l'intermodalité aéro-ferroviaire à grande vitesse au rayonnement métropolitain". Thèse de doctorat en Géographie et en Aménagement. Lille, Laboratoires TVES (USTL Lille 1) et LVMT (INRETS), 609p.**

For cities whose size is smaller than that of the highest level urban hierarchy, the possession of an international airport is often considered as the only solution? The analysis of the Lille case shows that a valorisation of intermodality between high-speed rail and air transport systems can build an accessibility level equivalent to that produced by an international airport located near a slightly bigger but comparable city (Lyon). This analysis is

The foreseen development of the HST network and the introduction of more air-HST interconnexion nodes such as Roissy-Charles de Gaulle

## **3.2 Indicators and methodology**

Transport, being an indispensable support for economic and social interaction, has a major role to play in the structuring of urban regions all over Europe. Accessibility is one of the basic factors of competitiveness, but also of access to services, while at the same time it is one of the major sources of pollution and of energy consumption.

Accessibility is one of the major factors of city development. Accessibility constitutes a necessary condition for the economic and spatial development, and accessibility is one of the key sectors where public action plays a major role in infrastructure as well as in service provision in interaction with the transport operators. Developing tools that are able to assess the quality of the accessibility is then a major stake for decision help dedicated to urban stakeholders.

In addition accessibility represents a necessary condition for the development of exchanges between cities and between cities and their hinterlands. Measuring accessibility constitutes a step in the study and the identification the potential for development of cities; it also allows for identifying those links that already permit the development of cooperation between cities and those links that lack the minimum service provision to support polycentric development.

The analysis of transport services across Europe will give much importance to the air mode as the privileged long distance mean to link cities. If we consider that the intensity of the links decreases with distance, we observe that proximity OD pairs are of major importance to city development, and to polycentric organisation. On these shorter distance high-speed rail, and to a lesser extent conventional rail, can play a prominent role.

Most of the recent and dramatic development of the air mode in Europe has to be credited to the rise of the low-cost airline model. Recent literature shows that the low cost airline model seems to benefit to medium or small size airports serving intermediate cities. This hypothesis will be investigated through the analysis of the contribution of the low-cost airlines to the present accessibility.

### **3.2.1 Metropolises and communication: the role of high speeds**

Globalisation, considered together with metropolitanization as its urban counterpart, is being made possible by the development of efficient, long-haul and short-haul transport systems. If metropolises can be defined as urban entities that communicate on a global scale, the air mode constitutes the major passenger transport system associated with globalisation (Sassen 1991; Haggett 2001). Indeed, the equipment of metropolises with airport infrastructure, the number of flights and destinations available or the air distances are often used as indicators of the position of cities in the global competition (Rozenblat and Cicille 2003; Taylor 2004; Grubestic and Zook 2007). Nevertheless, the development of the air mode during the 20<sup>th</sup> century and beyond has not lead to the replacement of other slower transport systems. Each transport mode has developed inside its own space of predominance, with fierce competition in the margins. On the scale of metropolitan spaces, the road system can be considered as the major mode, even if regional specificities can be stressed (Kenworthy and Laube 1999). The overall picture of mobility involves two distinct levels with the agglomeration or local level dominated by car and the longer distance dominated by air. This typology has to be put in correspondence with the functioning of urban systems having intra-metropolitan and inter-metropolitan components associated with privileged transport modes. In order to complete the analysis, this picture has to be enriched marginally with the development of other transport systems, urban public transport and regional and high-speed rail, each of them operating as a complement to, rather than in substitution for cars and planes.

For a long time now sociology researchers have highlighted the importance of weak ties, i.e. relations with acquaintances as opposed to relations with friends and relatives, in the processes of evolution of individuals (Granovetter 1983). Recently, after theoretical developments made in the domain of networks analysis, these approaches have been diffusing in the field of geography<sup>1</sup>. This direction of researches indicates that in order to understand the territorial dynamics, the study of major flows highlighting the hierarchical relations, should not prevent from considering the minor relations, sometimes on longer distances, since they can constitute the support for thematic cooperation between distant cities. *Small world* analysis of air networks<sup>2</sup> suggests the existence of less hierarchical longer distance sets of relations able to promote networks of cities where kilometre proximity is not the only horizon.

### **3.2.2 Analysing air and rail networks in Europe**

Accessibility through fast transport systems, a key feature of the metropolitan fact, is all but independent of the sustainability issues. A particular focus can be put on sustainability by studying the roles of road, train, high-speed train and planes in their respective contribution to metropolitan accessibility. Recent researches have shown the key role that can be played by the high-speed rail and air association to develop city accessibility. To which extent the rail mode can substitute to less sustainable modes road and air remains an open question that we propose to investigate in the light of European urban development.

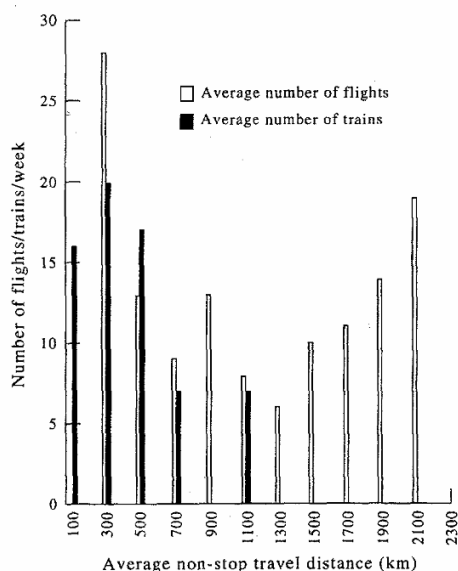
Janic studied the quality of service in the European railway network, highlighting the speed of relations, the frequencies and the delays according to the hierarchical level in the network (Janic 1996). This analysis focussed on the quality of the transport service.

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<sup>1</sup> Ref to Rozenblatt (en others) works

<sup>2</sup> SpanGéo book on preparation

Janic studied the two networks air and rail in Europe, comparing the distances of relevance of each mode (Janic 1997). In this paper he considered trains between locations and flights. Since most long distance trains and flight link major cities, this dataset can be considered as relevant in the analysis of the accessibility of (major) cities at the European scale. The number of existing trains on origin-destination (OD) pairs is maximum for distances of 300 km, which is also the case for air. For shorter distances one can find more trains than flights, while beyond 500 km, air becomes the dominant mode.



Cattan<sup>3</sup> has shown that the analysis of flows in the air and rail networks in Europe reveal privileged relations between cities potential support for territorial cooperation, and also helps identifying the barriers that a voluntarist transport policy could aim at overcoming.

### 3.2.3 Time geography and the concept of contactability

The time-geography framework refers to the works conducted around the geographer Hägerstrand (Hägerstrand 1970). The question raised in this domain of research is the necessity of considering time when one wants to analyse space (Chardonnel 2001). This framework is relevant when one wants to analyse “the interrelationships between activities in space and time, and the role of transportation and communication technologies in facilitating and constraining these relationships” (Miller 2004).

Contactability is defined by Haggett (Haggett 2001) as the possibility to contact people in a distant city. The contractibility is considered, in a regional scale by Swedish geographers Hägerstrand and Tornqvist when it is possible to meet for 4 hours during a normal weekday. This indicator refers to an idea of spatial cohesion inside a territory.

Contactability analysis in a regional space was studied with specific indicators allowing for daily journey-to-work between majors cities (L'Hostis, Menerault et al. 2004).

In the ESPON project on transport and territorial cohesion contactability indexes were developed under the aspect of daily accessibility. These indicators have been reused in several contexts including the definition of global integration zones as proposed in the ESPON atlas<sup>4</sup>. This illustrates the potential of such indicators to help propose a spatial support for territorial cohesion concepts.

<sup>3</sup> Cite: N. Cattan, Barrier Effects: the case of air and Rail flows, International Political Science, vol 6, n°3, p 237-248, 1995

<sup>4</sup> Ref to ESPON atlas BBR 2006 [http://www.bbr.bund.de/cIn\\_007/nn\\_149732/BBSR/EN/Publications/SpecialPublication/2006\\_\\_2001/DL\\_espon-atlas,templateId=raw,property=publicationFile.pdf/DL\\_espon-atlas.pdf](http://www.bbr.bund.de/cIn_007/nn_149732/BBSR/EN/Publications/SpecialPublication/2006__2001/DL_espon-atlas,templateId=raw,property=publicationFile.pdf/DL_espon-atlas.pdf)

We will now propose a series of three indicators to assess the relations between cities, with contactability, attractiveness for business and attractiveness for leisure short-stays.

### 3.2.4 Indicator of daily accessibility from a city: contactability

According to the time-geography theoretical framework initiated by Hagerstrand, and the concept of contactability, the quality of the link between two poles can be assessed through the possibility to go from the pole A to the pole B, to have enough time for an activity related to work, education or other purposes, and to come back to pole A in a single day. Consequently, and following the approach adopted in earlier works (Mathis, Bock et al. 2004), we propose to evaluate the possibility of single day business trip with 6 hours available at destination and within the time window 6h-22h, in a door to door approach and detailed as follows.

#### Structure of the return trips:



This criterion can be used to define a minimum service provision for the functioning of city networks and applies on the links in the network.

This family indicators deals with intermodality by allowing to compare modal accessibilities (rail, air, road), and intermodal accessibility (air-rail), but also by taking into account the initial and terminal parts of the trips.

Concerning the collective transport systems –rail and air– the main data considered is the timetable information. The assumption is made that short travel times and high frequencies are necessary but not sufficient to guarantee the daily accessibility level, and that an adequacy of timetables to mobility rhythms must be tested.

The data sources on the collective transport systems services resides in the information available on the major transport internet sites in Europe: Deutsche Bahn, Expedia, Amadeus air transport database, and also websites integrating these data with low-cost air carriers timetables such as BravoFly. The data collection is made through automatised interrogation of the websites. Extra data is used to connect transport nodes –station and airports– to cities, in order to attain a door-to-door approach.

### 3.3 Indicator of daily accessibility to a city: attractiveness for business purpose

Reciprocally, one can assess the possibility for a city to foster an event gathering people from remote metropolises. The same criteria are used but inversely, to allow for people from city A to get to city B, and to held a meeting there. The indicator expresses the attractiveness of city B to organize a conference, an event with several persons.

This indicator will be necessary to develop a congress activity of a city.

This direction of the relation is also useful for universities, research centres, firms headquarters that need to gather persons from several remote cities, for seminars, colloquium and board of administration (translation of "conseil d'administration").

#### 3.3.1 Indicator of short-stays: attractiveness for leisure purpose

This indicator measures the possibility to do short stays in distant cities for tourist purposes. It measuring the possibility to do the one way trip, focusing on

- Friday air supply,
- direct flights only

- assuming that the return will be possible a few days later (hypothesis to be tested on a sample of OD pairs).

As for the business oriented indicator, we can measure the possibility for a city to *emit* short-stay trips (measure at origin city) and the possibility for a city to *foster* short-stay (measure at destination city)

This indicator will also allow a better understanding of the role of low-cost airlines which are more relevant on this type of air mode use, as opposed to heritage airlines more especially dedicated to business trips.

### **3.3.2 Data gathering**

The data necessary to compute these indicators are timetables for the air and rail transports systems.

Concerning air transport the list of airports is currently under constitution. It will include all commercial European airports. The attention is currently focused at adapting the automatic collecting tool to a website including both classical and low cost airlines<sup>5</sup>.

Concerning the rail system an automatic query of the major cities and major rail nodes has been executed on the Deutsche Bahn website<sup>6</sup>. It covers all direct trains between cities in Europe for a typical weekday of the winter 2009. The base of the urban grid is constituted by the Urban Audit list of cities. Currently further investigations are conducted to assess the possibility to complete the database to include smaller cities (e.g. all ESPON FUA). The territorial base includes all countries of the ESPON space up to Moscow. Some parts of the network missing in the Bahn database are currently being completed through national timetable servers: Ireland, Greece, Portugal and Northern Spain.

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<sup>5</sup> The website is Idealo: <http://flights.ideal.com/>

<sup>6</sup> The website : <http://www.bahn.de/>



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## Annex 4. Social cohesion

### 4.1 Introduction

In general, European studies on this question are using a static and normative view of social cohesion through several simple indicators (« State of European Cities »; Reports on social and territorial cohesion). Also, it seems to confuse two very different aspects in the way to evaluate the social cohesion inside the European space: social cohesion to sustain competitiveness; social cohesion as alternative non economic evaluations of well-being.

As a consequence, the only report which deals systematically with the question of social cohesion in European cities provide only very general and normative indicators of social cohesion, mainly related to the sustaining of competitiveness in the cities. The Lisbon benchmarking proposed in the report is very significant of this type of approach and includes only unemployment as indicator of social cohesion (« State of European Cities », page 42).

In this project, we intend to clearly separate these two main aspects and only focus on the second one in this chapter, the first being integrated in the chapter on competitiveness. This approach is also the one adopted by OECD in its report on social indicators (Society at a Glance: OECD Social Indicators - 2006 Edition): "Promoting social cohesion is a central goal for social policy in many OECD countries. However, because of the lack of a commonly-accepted definition of the term, identifying suitable indicators is especially difficult. The approach taken in this volume is to assess social cohesion through indicators that describe both the extent to which citizens participate in societal life and derive satisfaction from their daily activities; and those informing about various pathologies and conditions that put affected individuals at risk of exclusion from mainstream society, or that reveal the extent of social strife in a country."

OECD provides then a more operational conception of social cohesion related to 4 major objectives of social policy:

A) Enhancing **self-sufficiency** is an underlying objective of social policy, featuring prominently in, for example, the communiqués of OECD Social and Health Policy Ministers ([www.oecd.org/socmin2005](http://www.oecd.org/socmin2005)). Self-sufficiency of individuals is promoted by ensuring active participation in the economy and society, and autonomy in activities of daily living.

B) **Equity** in this context refers to social or labour market disadvantage, and equality of opportunity. Equitable outcomes are measured mainly in terms of the access by households to resources.

C) While improving the **health status** of populations is the fundamental objective of health care systems, attaining it implies a focus that is broader than disease and its cure, and which extends to other social factors that affect mortality and morbidity.

D) **Social cohesion** is often identified as an over-arching objective of the social policies of countries. While little agreement exists on what precisely it means, a range of pathologies are informative about *lack* of social cohesion. This is true, for example of crime, imprisonment, suicides, industrial strife, and family instability. Falling under this heading are also measures of the extent to which individuals' participate in the community where they live." (Society at a Glance: OECD Social Indicators - 2006 Edition)

For each of these objectives, several relevant indicators are proposed.

Of course, OECD is dealing with national territories while we are dealing with cities in the European context. This is why it seems very useful to address the question of scale to assess social cohesion in the city. We distinguish three scales of analysis related to different approaches of social cohesion:

- Non economic measures of social well-being at the city scale, for example related to health status ;
- Social polarization and social exclusion at the individual scale for the whole city, including “a range of pathologies are informative about *lack* of social cohesion”: income inequalities; poverty rates; unemployment; criminality...;
- The socio-spatial polarization at the neighbourhood scale.

The first aspect is to a certain extent related to economic well-being, even if it becomes less true beyond a certain level of development (Society at a Glance: OECD Social Indicators - 2006 Edition).

We will thus concentrate the literature review on the second and third aspects because social inequalities and social exclusion are very intense in the cities. On the one hand, the literature provides major evidences of a social polarization process occurring in the developed countries, which is particularly marked in the cities (Atkinson, 2003). On the other hand, in the cities, there are evidences of a growing socio-spatial polarization (Badcock, 1997...). The main driving forces behind these two major trends are described in the rest of the text.

#### **4.2 Past evolutions and main driving forces behind the process of social polarization in cities**

The literature provides some evidence of general trends about the evolution of social inequalities, social-spatial inequalities and social exclusion in the cities.

First, it seems clear that in the last decennials, social polarization has increased in nearly all rich countries, including the new member states of EU after the collapse of communism. However, the intensity and the timing of this trend are very different from one country to another. For example, while it has mainly occurred in the eighties in the UK, it has begun only from the nineties in the Nordic countries. Also, the final point is very different according to the country (Croissance et inégalités : Distribution des revenus et pauvreté dans les pays de l'OCDE, OCDE, 2008). However, we also find some evidences, at least for the European countries, that – mainly for the recent years – the inequalities have increased more at the top of the income distribution than at the bottom (Smeeding, 2002).

There is no systematic empirical testing trying to test these trends at the city level in Europe. However, many authors argue that this trend has been particularly dramatic in the global cities, whatever the driving forces behind this process (Sassen, 1990; Hamnett, 1996). To put it very simply, the level of social polarization of a city seems to depend first of the national context and second to its level of insertion in the global economy and the new forms of economic growth related to the knowledge-based economy.

Second, social-spatial polarization in the cities seems also to have increased in the last decades with growing gaps in well-being between the districts of the cities. This can be explained by global economic changes and cut backs on welfare (Badcock, 1997). However, it is clear that the spatial configuration of this process is very different according to the socio-residential heritages of the cities (Musterd, Murie, 1996 ; Kesteloot, 1994). This socio-

spatial configuration is not unimportant since some authors argue that the place of residence has an impact on the social exclusion processes (Musterd, Kesteloot, 2003).

Third, there is less evidence of a general increase of a social exclusion process since it might take very different forms and be measured through very different indicators: employment; incomes; social life.... In the city, major evolutions could have contradictory impacts on social exclusion: on the one hand, the specificities of the cities labour market reinforce social polarization and, on the other hand, informal networks inside the cities might soften such exclusion process.

**Given the lack of empirical evidences on these different aspects at the city level, our project needs to produce more systematic empirical evidences on these past trends in Europe with some basic indicators concerning social polarization at the whole city level, socio-spatial polarization, social exclusion processes.**

From the scientific literature, we identify several major driving forces on the social polarization in the city (but this is not an exhaustive list) : **the relation between economic growth and social cohesion** (Sassen ; Hamnett; Wilson; numerous monographic studies); the consequences of **socio-demographic evolutions** (composition of the household for example) on social cohesion; **the impact of the real estate market** which is strongly related to the precedent factor through the paradigm of gentrification (Madanipour et al., 1998; Mingione, 1999); **public policies** at the state and at the city-level (Esping-Anderson, 1990; Harvey, 1989). We will detail these driving forces in the rest of this paper.

#### **4.3 Economic and labour market driving forces of social polarization in the city**

The basic question is about the relationships between the economic evolutions – the new types of growth – on the one hand, and the evolution of social polarization, on the other hand.

Interpretative frameworks have long remained dominated by considerations of the social and socio-spatial consequences of the decline of the fordist / industrial model. The decline of industrial manufacturing industry has been observed in all developed countries. Already during the fordist period, we observed a decline of industrial manufacturing activity in the city: the lack of the workforce during the golden sixties (full-employment period) for Taylorized production and the growing space demand of new industrial architecture are the major causes of this divorce between industry and the city in the sixties. The seventies crisis has accelerated the deindustrialization process of the cities leading to a social crisis. However, to a certain extent, deindustrialization is not the major process of social polarization in the last years because most of the manufacturing industry has already gone in most of the cities. In many European cities, even industrial suburbs are nowadays underindustrialized. This is however less true for some German cities for example. Also, it clearly appears that central and Eastern capitals have been able to attract both medium-high level services and manufacturing industries.

In the last decades, the literature has emphasized more on the major restructuring of economic process occurring in many cities through the concept of metropolization. There is a large body of works in economic geography or spatial economy tackling with issues of economic growth of metropolitan areas in the contemporary post-industrial – or post-fordist – period (e.g. Fujita et al. 1999; Veltz, 1996; Storper, 1997; Taylor, 1998). These works notably highlight the new emphasis put on short-term profitability in knowledge-based sectors and the growing competition between firms for new, innovative products or services

in advanced capitalist economies. These characteristics strongly emphasize high-skilled segments within the production process (such as R&D, marketing, consultancy, financial analysis, etc.), while low-skilled routine functions are subjected to a wide range of cost-minimisation strategies. This **professionalization process** in a more intensively **knowledge-based economy** is also to be understood in the **globalization process**. The literature emphasizes the growing importance of interconnections between cities especially in the most advanced services. In this perspective the interconnectivity of the cities (space of flows) is becoming more important than the connection in the local environment with the Hinterland (Taylor, 1998). In this context, we could observe the emergence of a very mobile world elite with very high salaries, strongly disconnected from their local (temporary) environment (Castells, 1996).

Locations in large metropolitan environments are clearly favoured under such new conditions of economic production, notably given the possibility for firms to tap into a vast reservoir of highly-skilled professionals or specialist sub-contractors (e.g. Sassen, 1998) and the interconnectivity of these cities (Taylor, 1995).

The processes that lead to a dualization in the cities of the labour market are still a matter of debate. Parallel to the growing demand for highly skilled labour, some authors highlight that there is also a growing demand for low qualified personal services in low unionized, female, precarious and partial jobs (Sassen, 1998). Others authors insist more on a general professionalization with lower and insufficient demand of low qualified labour (Hamnett, 1998), with the emergence of a spatially concentrated urban underclass (Wilson, 1987).

In the Marxian and regulationist literature, the focus is on the new forms of regulation of the so-called flexible capitalism in regard to the fordist regime (Husson, 2008; Levy, Duménil, 2001). As compared to the analysis described above, the focus is less on the technical aspects related to the knowledge-based economy or informational technologies, but more on the reorganization of the work after the blockages faced by the fordist economy (Harvey, 2006). Labour force shortage, high salaries and the high level of organization of the workforce explain at least for a part the decline of the profit rates at the end of the fordist period and the necessity to restore the profit rates through new forms of regulation. Flexible capitalism is this new form of regulation to a more flexible reorganization of the work (outsourcing process at different scales) which have been allowed and accelerated rather than initiated by technical innovations. In this perspective, the social polarization is not the result of new offer/demand equilibrium for qualified and unqualified workforce but a new political form of economic regulation to restore the profit rate which has been possible because of new power relations between capital and work in a period of structural underemployment. The fragmentation and segmentation of the production process has weakened and flexibilized the workers and produced worst situations for them than in the previous period.

From the literature, we can argue that the new forms of economic growth lead to growing social polarization through different mechanisms. From this literature, we can raise the hypothesis *that the more global and the more engaged in the knowledge-based economy a city, the more socially polarized it will be* – all other things being equal –.

**However, literature provides no systematic analysis on a large number of cities, and one of our objectives will be to test this hypothesis for the European cities.**

#### **B. Socio-demographic driving forces and real estate**

In the process of social exclusion and social polarization, household composition plays a major role (OECD, 2008; State of European cities, 2008). It means that within stable economic and labour market conditions, social polarization and poverty increases only because of some socio-demographic trends, which are particularly marked in the cities. First, there is a general tendency of household size to reduce and the share of single-adults

household to increase. This is due to long term social, economic and cultural trends in the European societies. Second, the risk of poverty is much higher for this type of household, especially mother-single household, even when they are working. Moreover, this process of household decomposition is particularly advanced in urban areas, where the share of single mother is much higher than average.

A second important process is the international immigration. Very roughly, we can distinguish two types of international immigration: from rich countries and from poor countries. The first one is globally balanced in the European countries, even if cities are particularly attractive for qualified workforce (ESPON 1.1.4; OECD, 2002). Immigration from poor countries had complex evolutions since the golden sixties (Vandermotten, van Hamme, 2002 ; Van Hamme et al., 2004). From the nineties on (and not before), Europe became an immigration continent. The intensity and the geography of this international immigration completely changed from the traditional patterns of European migrations. Outmigration countries of Mediterranean Europe (Greece, Portugal, Spain, Italy) and Ireland became massive immigration country during this period. In all countries, immigration concentrates in the cities and particularly the biggest ones (ESPON 1.1.4). There are several reasons for this, notably the networks of the migrants and the economic demand in personal service sectors, for example related to the population ageing. Related to this new economic demand, it is interesting noting that female immigration for work has an increasing share of the total international immigration (OECD, 2007).

As a consequence, big cities concentrate immigrants from low and high-level of qualification reinforcing the dualization process. At the same time, the poor immigrants concentrate in certain specific areas of the big cities reinforcing the pattern of socio-spatial polarization. However, to a certain extent, this concentration helps making work the solidarity networks inside some communities. It might also reinforce the emergence of specific economic activities sometimes called ethnic entrepreneurship (Musterd, Ostendorf, 1998).

Whether these processes very visible for the big cities are also true for middle or smaller cities is rarely tackled in the literature. Will the economic crisis reduce the immigration flows is another interesting question? The previous major crisis in the seventies did not stop immediately immigration flows; it occurs only during the eighties. Of course, we already see some countries – where the economic growth also relied on a cheap and massive import of workforce – changing their policies when economic conditions are getting worse. However, due to new conditions of mobility, it is not sure whether European countries will be able to control the immigration flows.

A third important process are intra-urban migrations. These movements play a major role in the socio-spatial polarization process and its geographical shaping. Suburbanization and gentrification are the major paradigms to describe these intraurban migratory patterns. *Suburbanization* dates back to the fordist period, when the space consumption was one of the major aspects to sustain the consumption as a whole (Harvey, 1989): the suburbanization process does not only sustain the construction activity but also many other forms of consumption, especially the car industry. This process has certainly not lessened in the postfordist period: middle class households with children continue to leave central cities to acquire unifamiliar house. As a consequence, central cities often concentrate both social extremes, while in different neighbourhood: the poorest, including old and new immigrants, and the richest part of the urban population. The intensity of the suburban process has been much related to financial conditions – interest rates in particular – but showed no tendency to slow down on middle term perspective. It means that the financial crisis could reduce this process to some extent but economic, social and cultural factors which favoured this process need strong political involvement to be reversed.

*Gentrification* paradigm describes the social and demographic transformations in the central cities – especially the historical centre – through renovation processes. It is often not

contradictory to the suburbanization process because young middle classes without children are the most concerned. One of the consequences is the growing concentration of the most fragile populations in the most deprived and not (yet) gentrified neighbourhoods (Smith, 2002; Lees and al., 2007).

These evolutions cannot be understood without taking into account housing market prices. First, the rise of the housing market prices has a clear impact on the living standards and the level of poverty of the households, especially the most deprived. Second, suburbanization is constrained by the high prices of the ground for middle classes which are willing to become owner of their homes. Third, renovation process – often initiated by public powers – makes housing prices grow and lead to the “natural” expulsion of the most fragile populations. Finally, housing market explains the reproduction of the spatial configurations of the social inequalities in the cities (Marcuse, Van Kempen, 2000).

#### **4.4 Political driving forces**

One of the major determinants of social inequalities and social exclusion in the cities is related to public policies at two different scales: the state and the city levels.

*The state level* is the main scale through which welfare state functions operate. The type and the level of welfare state is determining the level of social redistribution within a society and, as a consequence, explain a part of the level of social inequalities and social exclusion. While in many countries welfare state functions have been cut off and reoriented from the eighties on, we still observe major differences from one country to another (OECD, 2008). Esping-Andersen defines three different types of welfare state in the rich countries: the liberal, the social-democrat and the corporatist. The first is minimal and based on individual responsibility while the second is built on a Universalist and egalitarian conception of social protection. Corporatist regimes concern continental Europe (Belgium, Germany, Netherland...) and are characterized by the importance of intermediate institutions between the states and the individuals in the redistributive system. It seems clear that social and even socio-spatial polarization within cities is lower in the social-democrat than in the liberal welfare states (Musterd, Kesteloot, 2003). However, in all these systems, the ideology of individual responsibility has developed and justifies welfare cuts off which have favoured increased social inequalities.

*The public policies at the city level* are decisive on three different perspectives in the social inequalities trends and its spatial shaping. *First*, urban municipalities are a part of the welfare state notably through the social housing system. Property regulations and the level of social housing play a major role in the socio-spatial polarization of the city: while Scandinavian or Dutch cities are less spatially polarized because of their high level of social housing, it is not the case for Belgian or French cities, where housing market is nearly entirely privatized (Badcock, 1997). *Second*, cities played a growing role in accompanying the economic development. Some works have particularly emphasised the changing attitudes of urban governments vis-à-vis the regulation of economic growth, in particular the shift from a ‘managerial / redistributive’ framework to an ‘entrepreneurial / neo-liberal’ heavily focused on city-marketing strategies and large-scale flagship projects (Harvey, 1989; Van Crielingen, Decroly, 1998; Moelaert et al., 2003; OECD, Competitive cities, 2007). In this perspective, entrepreneurial policies ruled by the cities reinforce “natural tendencies” of the labour market notably by focusing on the attraction of advanced services or major events. *Third*, and in accordance with the new entrepreneurial cities, the last decades have seen the development of social policies seem oriented toward place-based policies rather than households- and individuals-oriented policies: urban renovation in the deprived neighborhoods; social mix policies; attraction of prived investments through tax



exemptions; flagship projects located in the deprived districts... However, some authors are very skeptical about the ability of these policies to solve social problems, that is to say to really have an impact on the deprived populations of the deprived neighborhoods which are targeted (Murie and Musterd, 2004). Social mix policies seem also to have pernicious effect by the housing markets and exclusion of the deprived populations in contradiction with the official goal of improving their situation through neighbourhood effect (Murie and Musterd, 2004).

#### **4.5 A synthesis of the main determinants of social exclusion in the city**

Inspired by the Esping-Andersen model based on the three pillars of social protection (the market, the reciprocity notably through the family and the redistributive functions of public bodies), Musterd and Kesteloot (2003) proposed to analyze the trends and the specific role of the pillars inside urban areas. From this analysis, they conclude that:

1°) labour market trends seem to have favoured social exclusion in the cities through professionalization (Hamnett thesis) rather than polarization (Sassen thesis) in most of the European cities;

2°) Welfare state of course softens social exclusion through redistributive policies. However, local bodies have increasingly become growth sustaining bodies rather than social ones. They focus more and more on the will to adapt local conditions to global economic demand;

3°) household structure and social networks play a major role in the concrete process of social exclusion. Some evolutions have contradictory results in political terms. For example, the concentration of immigrants – sometimes also on a cultural basis – could at the same time favour social networks and soften exclusion process from both labour markets and welfare state redistributive policies and worsens the situation by the concentration of social problems and cultural specificities in some parts of the city.

#### **4.6 Conclusions : Main political questions**

**1. What is the level of social and socio-spatial inequalities in the European cities?**

**How can we explain the geographical differences?**

**2. How social and socio-spatial polarization has evolved in the European cities and why?**

**3. What can we say about the impact of the economic growth on the social polarization of the cities?**

**4. What can we say about the impact of the immigration on the socio-spatial polarization in the cities**

## 4.7 Data and Methodology

In order to answer the main questions related to social cohesion, we will define a strategy in terms of data.

The main objectives of the analysis of the social indicators are the following ones:

- VII. to produce a general picture of social cohesion in the European cities;
- VIII. to cross relevant social cohesion indicators with economic data to test the hypothesis of that with the new forms of growth in the globalized and knowledge-based economy, social cohesion is more and more decoupled from economic performances.

### 4.7.1 Data and indicators

Social cohesion is a complex matter and can be apprehended through many different indicators. Following the OECD line, our approach will try "to assess social cohesion through indicators that describe both the extent to which citizens participate in societal life and derive satisfaction from their daily activities; and those informing about various pathologies and conditions that put affected individuals at risk of exclusion from mainstream society, or that reveal the extent of social strife in a country" (OECD, 2006).

In this approach, we could define 4 types of indicators related to the major dimensions of social cohesion: self-sufficiency, equity, health, participation to social life and social pathologies.

For each dimension, many indicators can be used: table 5 gives some potential indicators (used by OECD), the urban audit indicators which could be used as proxies for these indicators and their effective availability in the urban audit database. The table underlines the very incomplete coverage of urban audit cities. The problem is not only the global completeness of the different indicators but rather the unequal coverage in the different countries (see maps of the second section).

To these urban audit indicators, it is very important to add the result of enquiries about the life satisfaction in many fields for 30 major European cities: it does not allow to cover all urban audit cities but well to give some indicators of social cohesion and to cross these subjective perception of the cities by their inhabitants with more objective ones.

Type	OECD indicator	Urban audit indicator (proxy)	Availability urban audit (2003-2006)
Self sufficiency indicators	Unemployment	Unemployment rate, young unemployment rate, old active unemployment rate	40%
	Employment rate	activity rates for 20-64, 15-24 and 55-64	50%
	Mothers in paid employment	-	

	Childcare costs	Share of children 0-2 years old in childcare	40%
	Earnings inequality	the share of households receiving less than half of the national average household income, Proportion of households reliant upon social security, income distribution in quintiles.	25%
	Gender wage gaps		
	Intergenerational mobility	-	
	Poverty persistence	long term unemployment rate	40%
	out-of-work benefits	-	
	Public social spending	-	
	Total social spending	-	
<b>Equity indicators</b>	Material deprivation	Average occupancy per occupied dwelling, Proportion of households living in social housing, Average area of living accommodation (m2 per person), number of homeless people as a proportion of total resident population, Proportion of dwellings lacking basic amenities,	30%
	Earnings inequality	the share of households receiving less than half of the national average household income, Proportion of households reliant upon social security, income distribution in quintiles.	25%
	Gender wage gaps		
	Intergenerational mobility	-	
	Poverty persistence	long term unemployment rate	40%
	Housing costs	Average price of dwelling; average price of house; average renting	33%
<b>Health indicators</b>	Life expectancy		
	low birth weight	Infant mortality	80%
	sick related absence from work		
	health inequalities		
	Intergenerational mobility		
	Suicides		
	Work accidents		
	Health care spending		
Long term care spending			
<b>Participation to social life and social patholo</b>	Voting	Electoral participation	75% (core areas only)
	Suicides		
	Work accidents		
	Strikes		

<b>gies</b>	trust in political institutions		
	life satisfaction		
	Prisoners		
		number of murders and violent deaths for 1000 residents, Number of car thefts for 1000 residents	60%

**Table 5 Social indicators and their availability in the urban audit**

#### 4.7.2 The scale question

The question of social cohesion – and of the data related to it – is not specifically related to the cities.

To tackle the social cohesion in the cities, the scale question is a major issue. Cities have very different types of spatial structure. In social terms, it has huge consequences when comparing social cities between cities. While in some cities, the most deprived districts are located in the peripheral parts of the city, in other cities, poor districts are located near the centre. As a result, the LUZ allows a more homogeneous comparison between cities than the core areas.

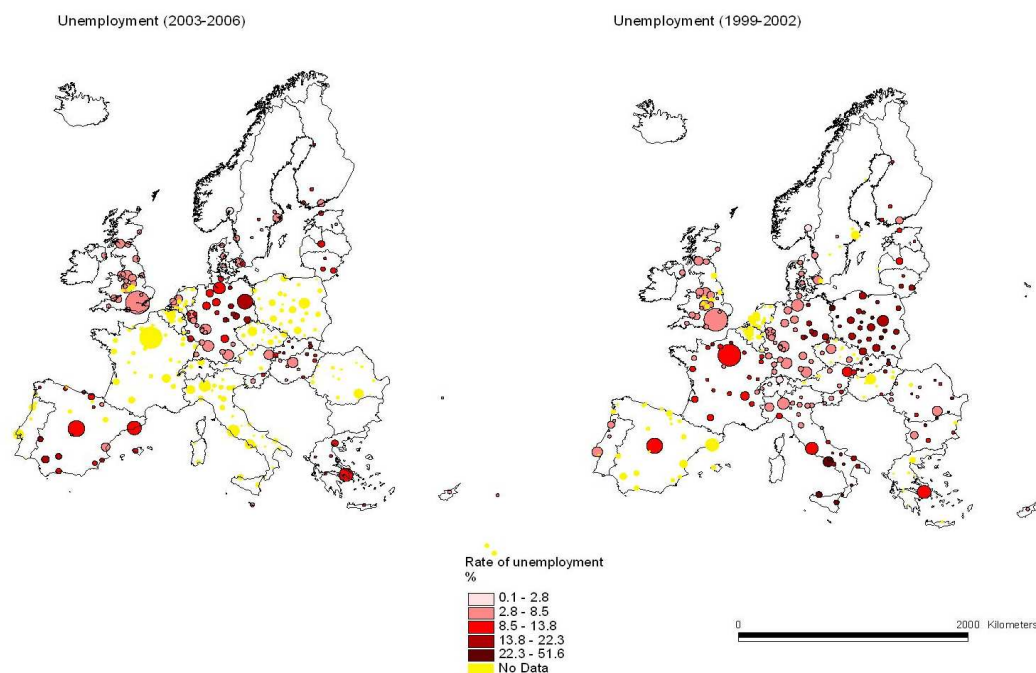
Inside the LUZ area, social cohesion can be tackled through different forms of aggregation of the data: average of the social indicators for the whole LUZ (average infant mortality, unemployment...); districts inequalities (level of the social indicators in the different districts of the cities); social inequalities at the individual level (income inequalities, inequalities in the access to the services...). The first types of indicators give an average quality of social life in the cities, the second gives an idea of how much social difficulties are concentrated in different areas while the third allows evaluating inequalities at the individual level.

However, data are very poor concerning districts and moreover individual data. It means that the data allow having a good idea of average social well-being in the cities but not of the inequalities which are absolutely central in terms of social cohesion: a good average income can hide very unequal distribution, a low infant mortality can hide unequal access to health services....

#### 4.8 First descriptive analysis

As we can see from the maps, the analysis of social indicators is nearly impossible for Urban Audit cities because too many cities are missing. Many data also appear to be not coherent when compared to national means or to other periods.

This means that urban audit data in its actual state will not allow achieving the main objectives of the project in terms of social analysis. We will thus propose alternative strategies to obtain data and produce relevant and original analysis.



## 4.9 Alternative to deal with the data and analysis

### 4.9.1 The NUTS3 proxies of the city

Most of the cities of the urban audit can be approximated by NUTS3 delimitations (see annex 11).

On this base, we will produce a complete database at the NUTS3 level and use the correspondence to make it a LUZ database. NUTS3 data of social indicators are relatively poor on an annual base but a bit more consistent for 2001 – the census year – for which data on dwellings, activity, household composition or graduation are available.

These data will allow giving a more complete picture of social indicators (first objective). It will also enable us to cross social indicators with economic performances in order to give a first approach to our second objective.

Unfortunately, these data only give average figures for the whole city which is quite insufficient to tackle the social cohesion which also requires data at the individual level (unequal access to incomes, services...) and district level.

#### **4.9.2 Deepened analysis for selected cities**

Perception survey results give interesting data about the perception of the inhabitants about several decisive aspects of social cohesion in the cities (services, security....) and cover completely 75 middle and big cities.

This selection of cities is good point of departure to produce a more complete and sophisticated database on selected cities. Since many of these cities are very big, they could be approximated at NUTS2 level which gives access to a much wider set of data including from the Labour Force survey. See annex 11 for details about the NUTS2 approximation of cities.

This database on selected cities will allow producing the following analysis:

- synthesize the perception of the cities by its inhabitant;
- to confront the subjective perception to some – when available – objective indicators, including urban audit indicators of course and data using NUTS3 or NUTS2 proxies;
- to confront the subjective and objective social indicators with economic welfare.

The following graphs give some examples of this comparison between subjective and objective data in different fields. The comparison is not always easy to do because objective measures are often incomplete and objective indicators are unsatisfactory. This could explain the absence of correlation between the number of hospital beds and the subjective satisfaction with hospitals since quantity is surely not the most important aspect when citizens evaluate their hospitals. Many other examples – but incomplete in terms of data – show this absence of correlation (housing price and its perception, incomes and financial difficulties...) On the other hand, the perception of easiness to find a job is very well correlated with unemployment rate as well as the share of foreigners in the city seem to degrade the perception of the quality of their integration in the city.

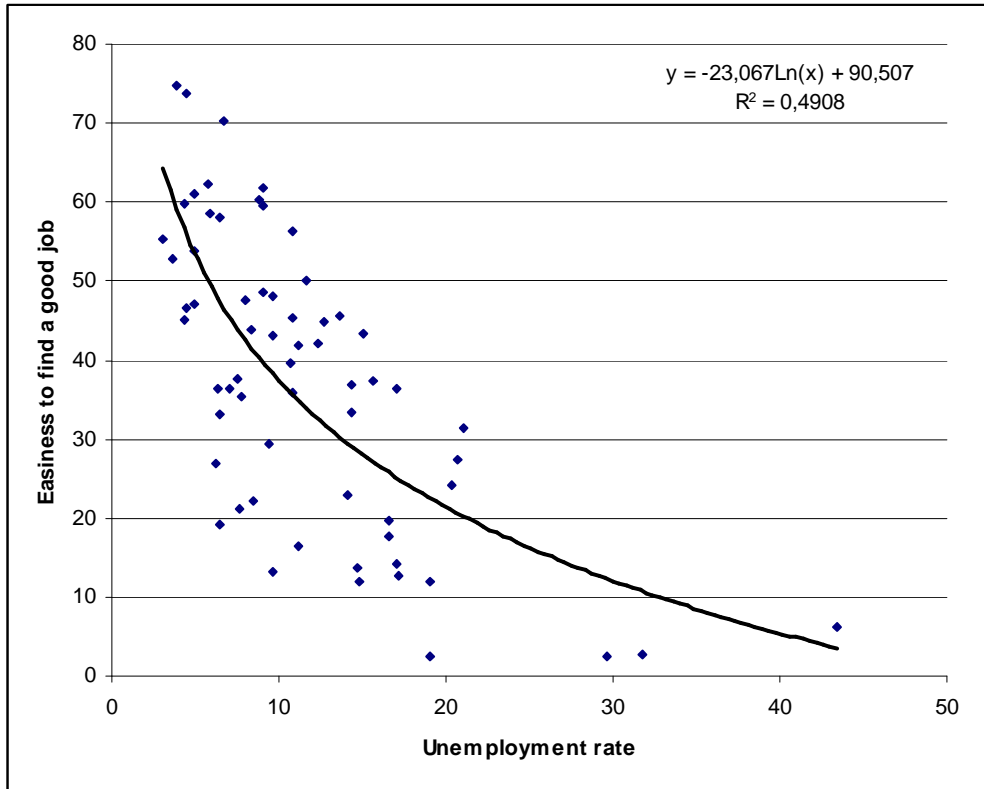


Figure 11 Objective and subjective evaluations of the labour market in the city

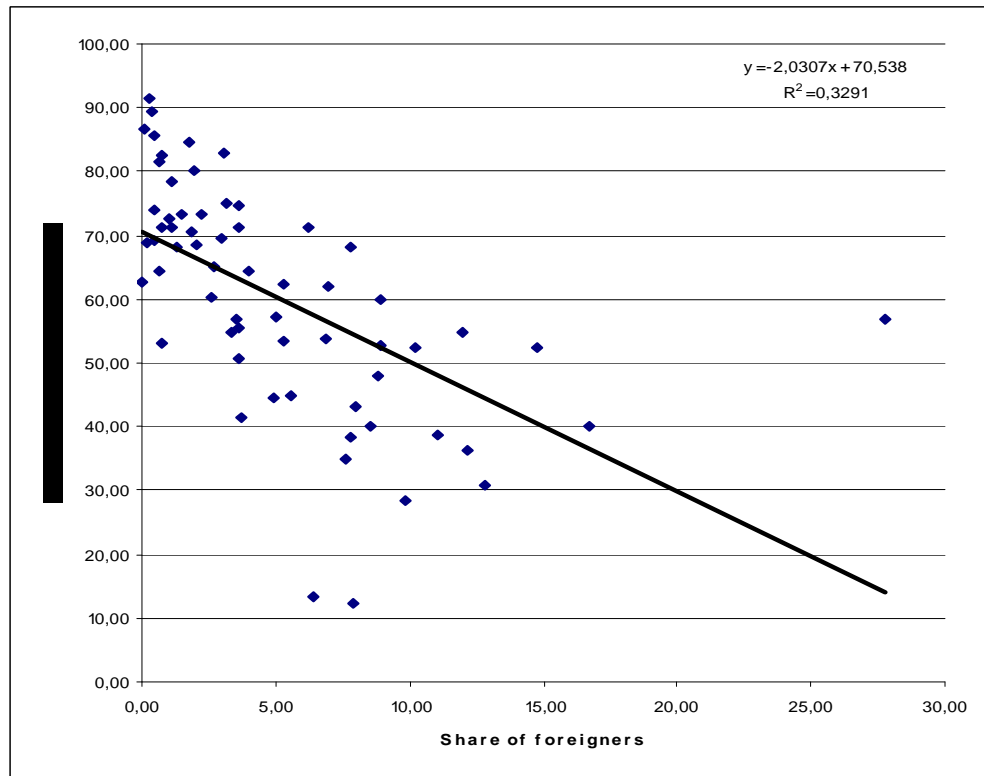


Figure 12 Objective and subjective measures of the foreigners in the city

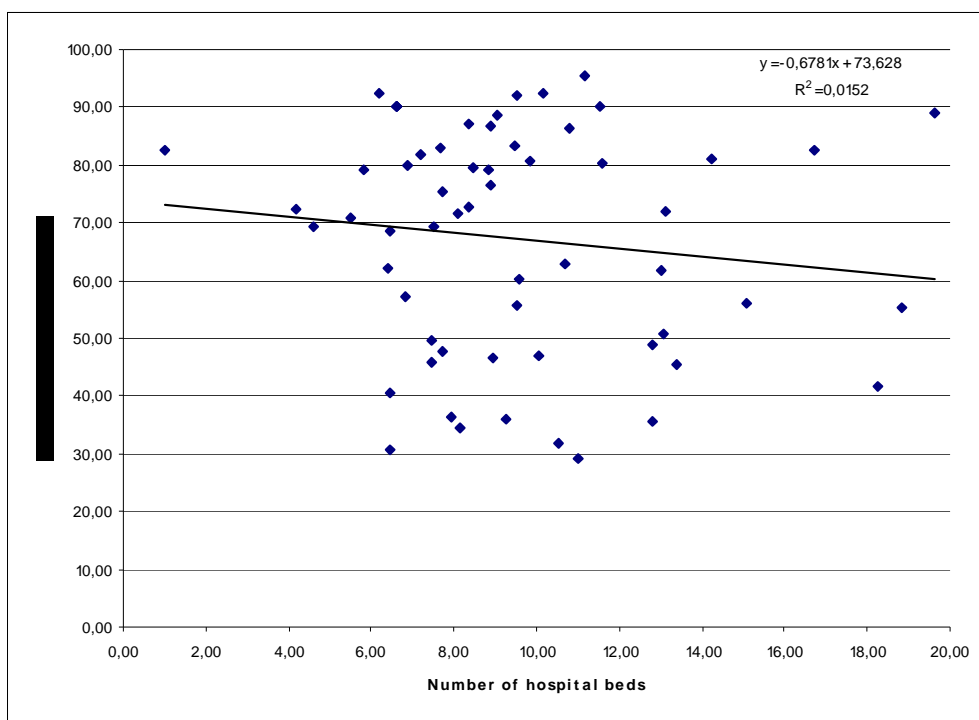


Figure 13 Objective and subjective measures of hospital services



In order to answer the decisive questions of the relationship between economic welfare and social indicators, especially social and socio-spatial inequalities, we will have to select some case studies to gather original and complete set of data at individual and district level.

Case studies will be selected through two different criteria: the city's position in the world networks (world cities, European cities...), and the national context in which these cities are embedded using the Esping-Anderson typology. From the literature, it appears that both aspects have an important impact on social inequalities inside the city: the first one, because world and highly ranked cities are creating more qualified jobs and the second because most of the welfare system still depends upon the national scale.

The following indicators will be gathered:

- indicators of economic welfare (incomes and GDP/inhab.);
- indicators of economic structure (sectoral and professional structures);
- social inequalities at individual level : distribution of incomes, access to employment according to the graduation level;
- social inequalities at the district level: graduation level, income level and unemployment rate.

The following case studies could be included as case studies (provisional list nearly all included in the perception survey):

- World cities : London and Paris;
- European cities: Brussels, Berlin, Stockholm, Zurich, Hamburg, Madrid;
- other cities: Warsaw, Bucarest, Oslo, Lisboa, Malmö, Antwerp, Athens.

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## Annex 5. WP 2.3 Environment (“sustainability”)

### 5.1 Literature review

#### Introduction

##### 5.1.1 Urban sprawl, a key issue

Urban systems emerge as distinct entities from the complex interactions among social, economic and cultural attributes, and information, energy and material stocks and flows that operate on different temporal and spatial scales. Such complexity poses a challenge to identify the causes of urban environmental problems and how to address them without causing greater deterioration.

Urban sprawl, as opposed to compact city, has been recognised as one of the main problems of cities at the turning of the century for several reasons:

- Unsustainable loss of natural resources (Jenks et al., 1996; Williams et al., 2000; Jenks and Dempsey, 2005).
- Many social and ecological problems are side effects of urban sprawl (Burton, 2000; Jenks and Burgess, 2000).

Urban sprawl first appeared as an American phenomenon, but recent works well described the specificities of this problem in Europe (EEA, 2006; Couch et al. 2007). It can also be recognised that European institutions have been progressively including the urban environment in their agenda although the competence of urban issues lies at Member State level<sup>7</sup>.

##### 5.1.2 Working definition

A variety of urban forms have been covered by the term “urban sprawl” ranging from contiguous suburban growth, linear patterns of strip development, leapfrog and scattered development. In terms of urban form, sprawl is positioned against the ideal of the compact city, with high density, centralised development and a spatial mixture of functions, but what is considered to be sprawl ranges along a continuum of more compact to completely dispersed development. In any way it is important to recognise that urban sprawl is not merely an attribute, or **pattern**, of a city. Moreover, it should be considered as a **process of urban change** (Couch et al. 2005). Finally, urban sprawl can not be defined by a single parameter (Kasanko et al. 2006). Galster et al (2001) defines sprawl as a pattern of land

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<sup>7</sup> By the early 1990s DG Environment had placed the issue of the urban environment on the EU policy agenda and later communications from the European Commission in the second half of the 1990s sought to create an ‘urban agenda’ which moved urban problems and sustainable urban development up the EU policy agenda. An indication of this change has been that since 1998 most EU Presidencies have held Urban Forums of one sort or another. Indeed by the beginning of the Twenty First Century ‘urban issues’ had been incorporated into the Structural Funds (Objective 1 and 2) and the URBAN programme was well established along with a number of other urban related initiatives particularly associated with economic competitiveness and social exclusion. Later on urban issues have been mainstreamed and DG Environment has developed a ‘Thematic Strategy on the Urban Environment’ (2006) as part of the Community’s 6th Environmental Action Framework.

use in an urbanised area that exhibits low levels of some **combination of eight distinct dimensions**: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity. These eight attributes also combine two dimensions of the compactness/sprawl characterisation: physical and functional. The physical compactness refers to the spatial configuration of land use development within the city, the functional compactness to the density and the mix of daily activity

For the purpose of this work this eight dimensions will be considered whenever the information is available.

### **5.1.3 Approach**

This literature review focus in two aspects:

- **Urban sprawl** as one of the key issues in current urban environment: past trends, drivers and future projections.
- Exploration of the concept of **sustainability** and link to urban sprawl. This literature review will be useful for the further development of WP 2.3.

However, there is a big gap in knowledge to understand to what extent there is a differential impact on the environment from certain policy options (policentricity, competitiveness, overall performance) which will be partly addressed in this work package during the project.

## **5.2 Urban sprawl in the past 50 years**

### **5.2.1 Long term trends in Europe**

One of the problems to understand urban sprawl in Europe is the lack of long time series of data. Availability of satellite images and computing capacities were big constrains until the end of 1980s. Consequently, most of the existing information for the period 1950 – 1990 relies on population data. In that sense the work developed under the MOLAND project is the best land cover data for the period 1950 – 2000 since it covers 28 cities.

The following tables summarise the main trends in Europe for the 1950-2000 period compiled from existing literature (Antrop 2004, Kasanko et al. 2006, Turok and Mykhnenko 2007, and Couch et al. 2007).

Time-lag	Average annual city population growth rate <sup>1</sup>	Average annual growth of built-up areas (%) <sup>2</sup>	Trends in Western Europe
1950 - 1960		3.3 (1.1 – 8.4)	At the beginning of this period the number of growing
1960 - 1970	2.87		
		2.3 (0.5 – 6.1)	
1970 -1980	2.32		
1980 -1990	0.97	1.4 (0.4 – 2.5)	Period of stabilisation. Although the average rates decreased, the number of declining cities remained the same as in the late 1970s.
1990 - 2000	-0.13	0.5 <i>(estimate from CLC for whole Europe)</i>	The differential between growing and declining cities narrowed steadily until the late-1990s, when cities fell below national trends and were actually declining on average. For the first time the number of declining cities was greater than the growing ones. The late 1990s was the worst period for European cities as a whole, with decline most widespread.
2000 - 2005	0.15		Resurgence (in general). There was a slight improvement in the first few years of the new millennium, although there were still more cities in relative decline than growing.

1 After Antrop 2004; 2 after Kasanko et al. 2006.

**Table 6 Major trends in population and built-up areas in Western Europe (1950-2005)**

Time-lag	North West Europe (+ Denmark)	Western Europe	Mediterranean	New Member States
1950 - 1960	Urban population: 75% Start process of suburbanisation	<i>High variability between cities and countries. No common pattern.</i>	Urban population: 45% Compact and densely populated cities.	Urban population: 40% Compact cities by centralised planning and reliance on public transport
1960 - 1970		Start process of suburbanisation in many cities.		
1970 -1980	Revitalisation. Recovering the city centre in terms of both population and urbanisation.	Revitalisation. Recovering the city centre in terms of both population and urbanisation.		
1980 -1990		Revitalisation. Recovering the city centre in terms of both population and urbanisation.	Increasing the process of sprawl.	Towards the end of 1980s start of political changes.
1990 - 2000	High rates of sprawl in Ireland. Denmark showed the lowest rates of sprawl.	Average rates of sprawl. Steadily growth of German cities.	Rapid increase of urban sprawl.	Post socialist period. Most cities are declining and sprawling. Romania and Poland show the highest shares of declining cities.
2000 - 2005	Continuous long-term decline in UK (Merseyside, Tyne and Greater Glasgow)	Growth of German cities at lower rates. Few German cities show continuous decline (Leipzig being a prototype of decline and sprawl).	Most of the Spanish and French cities show a continuous growth. Sprawl is still important in Spain.	Decline in most Polish cities.

**Table 7 Major trends of urban dynamics in regions of Europe for the period 1950-2005. After Couch et al. (2007) and Turok and Mykhnenko (2007)**

From the long term data it can be concluded:

- The largest urban land expansion in Europe started in the 1950s.
- The past **history** was reflected in **high diversity** of city attributes at the beginning of this period.
- Rapid changes during the last 50 years resulted from combined effects of increasing affluence, mass motorisation for the transport of persons and goods, the introduction of air transportation and the shift from manufacturing to services in urban economies caused a much more **dispersed, fragmented** and **low density** urban development. This development did affect existing functions and structures of many cities, in particular less attractive neighbourhoods and obsolete industrial and port areas suffered. Many cities experienced population loss.
- The process did not take place at the same time in all regions. Process in **Mediterranean cities** started later than Northern and Western Central Europe. Also Mediterranean cities were more compact and kept some of this attribute during the 1990s.
- By the end of the 1960s and 1970s a process of **revitalisation** started with new town and urban renewal efforts. Gradually, more investments were made in housing, businesses, infrastructure and public services. The revival is related to the emergence of a society and economy based on knowledge, information and

creativity and an accompanied growing interest in urban life styles. But physical and socio-economic polarisation also increased and became a large scale urban problem.

- Central planning, dominance of public transport and no land market determined a specific form of **compact** city in **former socialist countries**. Changes since the 1990s are explored in next section.
- Urban change is incremental: most of the physical fabric of cities survives for many decades if not for centuries. The social fabric is much more prone to change, but nevertheless, in general, changes only by a few percentages of change per year.
- There has been a process of **convergence** in most of the cities accelerated by the end of 1990s.

### 5.2.2 Recent trends (1990s and 2000s)

Improved statistical data (e.g. Urban Audit) and the availability of Corine Land Cover for the reference years 1990 and 2000 (2005 to come) explains why this section focus in the 1990s and early 2000s. The appearance of urban issues into the European agenda in the 1990s has facilitated the development of new initiatives for urban data collection at European level (see for example the GMES<sup>8</sup> programme and related Downstream Services). However, most of this information is not yet available.

During this period the growth of urban areas and associated urban infrastructure consumed more than 8 000 km<sup>2</sup>, about the size of Luxembourg. This increase has been at higher speed than population change.

Combining land cover and population changes (1990-2000) with population density and percentage of urban land (2000) the following patterns emerged (Figure 14)<sup>9</sup>

- Regions with a **high level of urbanism** and relatively **slow to moderate (physical) growth** are mainly dominant in the Pentagon area (the area limited by London, Paris, Milan, Munich and Hamburg). The fastest urbanisation in north-west Europe is found here. This means that already highly urbanised regions in the European heartland have continued to grow relatively fast. Densification and dedensification are found side by side in this part of Europe.
- In most of southern Europe and in parts of north-western Europe, mainly in regions in Ireland, a **low to moderate level of urbanism** is present. A relatively **rapid physical growth with low densities** is dominant here. The most rapid urbanisation has occurred in regions in Spain, Portugal and Ireland. These are countries which experienced relatively strong economic growth and major infrastructure investments supported by the EU. Also some regions in the Netherlands, Italy and Greece have shown rapid urbanisation.
- In nearly all of Eastern Europe, but also in parts of central and north-western Europe - mainly in France and Great Britain and in some southern European regions in Spain, Italy and Greece - a **low level of urbanism** is linked to **limited physical growth**, mostly with low densities. Because this combination is primarily found in peripheral locations in Europe, the gap between peripheral, rural regions and more rapidly urbanising, urban regions is widened. At the same time, the divergence between most of Eastern Europe, and the more rapidly urbanising southern European regions and the Pentagon is increasing. However, a number of large cities in Eastern Europe belong to the first group, where there has been relative fast urban growth.

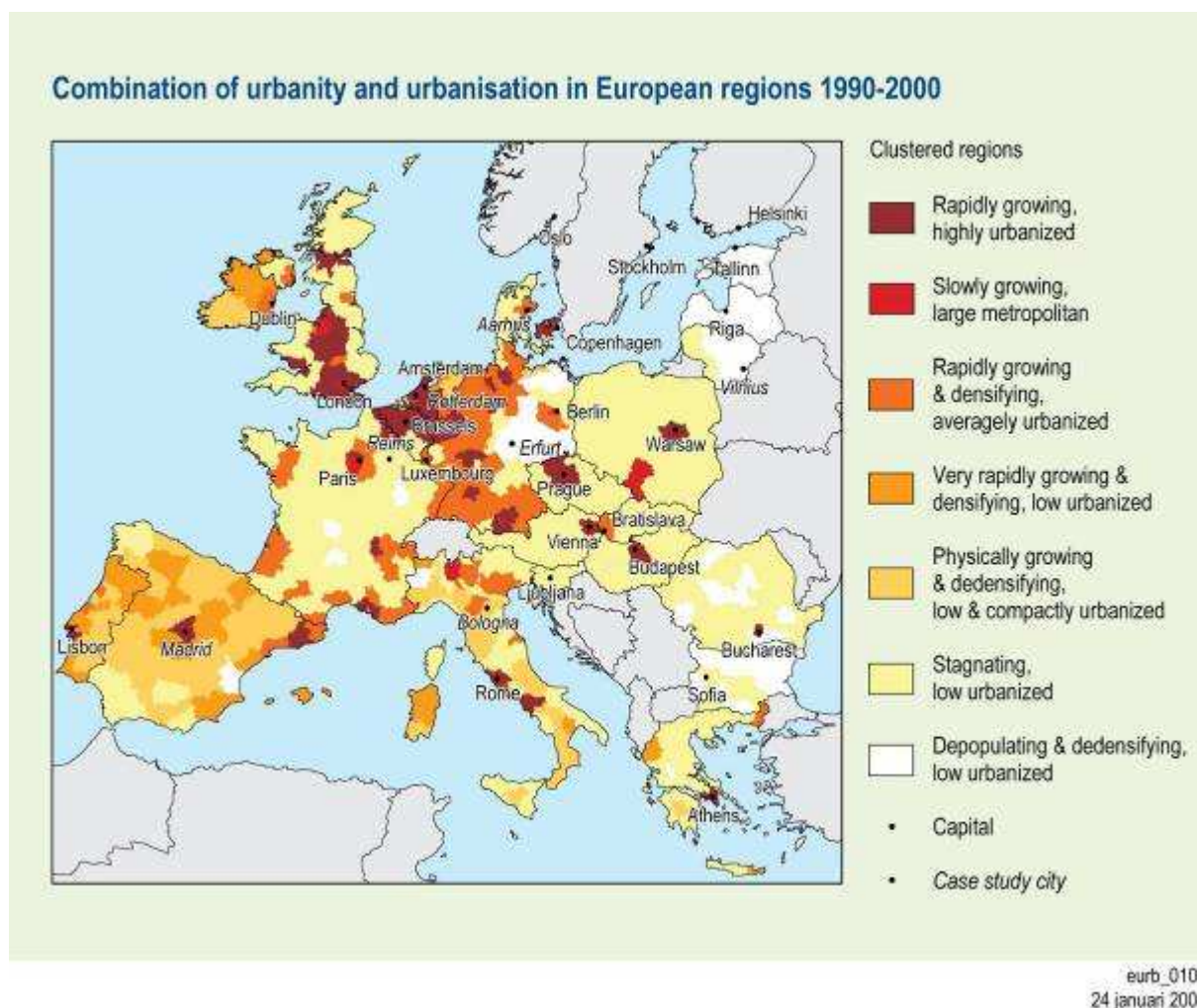
In conclusion, in Europe urbanisation generally leads to less dense urban areas, because dedensification is the most dominant form of urbanisation. Urbanisation in regions with a low level of urbanism is relatively limited, in contrast with urbanisation in regions with

<sup>8</sup> GMES: Global Monitoring for Environment and Security (<http://www.esa.int/esaLP/LPgmes.html>)

<sup>9</sup> A similar approach was taken in ESPON Project 2.4.1 (2006) with similar results (Final Report, page 103).



higher levels of urbanism. As a result, the differences in urbanism in the European Union are increasing.



**Figure 14 Urbanism and recent urbanisation trends in European regions, based on the proportion of artificial land cover, population size and population density in residential areas in 2000 and changes in these indicators between 1990 and 2000, combined in a new typology (PBL, 2008)**

### 5.2.3 Changes in Central and Eastern countries

Political changes occurred at the end of the 1980s and 1990s in the former socialist countries represent a special case because the factors that shaped cities in the previous period were very different from the rest of Europe. The centralised planning and the non-existence of land markets resulted in more compact cities compared to the western counterpart. By 2000 most of the cities were still below 100 000 inhabitants (25% between 100 000 and half a million, 6 between half a million and one million; and only 3 with more than one million -Budapest, Warsaw, Prague).

Although regional differences exist and the process has taken different pace depending on the cities, some commonalities have been found:

- General **decline in population** in the last decade except in Poland, Slovakia and Slovenia.
- **Privatisation** of the housing stock. After the transformation, a large number of the dwellings were sold to the inhabitants at low prices. As a consequence the new member states show the highest number of owner-occupied dwellings in

Europe (96.7% in Lithuania in 2001). The exception is the Czech Republic (47% in 2001) that has never introduced such privatisation plans (vanKempen et al., 2005).

- Gradual **deterioration** of housing blocs as consequence of low income of many new owners, unable to repair and maintain the dwellings (Murie et al., 2005).
- Progressive deterioration of city centres. Increase of **pollution** because inadequate transport policies.
- Changes in the economic basis in the cities, increasing the opportunities in the **service sector**. However, the workers required for the service sector are not always those who have lost their job in another sector.
- **Commercial development** constitutes an important force that has substantially contributed to a massive reorganisation of land use patterns. Such development has been recognised as a tool of local economic regeneration and growth, often supported by government policies.
- Revitalisation of city centre has **raised the prices** in the inner city, becoming too expensive (e.g. Lithuania).
- Disparity in prices between capitals, more expensive and regional cities.

All these elements have led to the current situation:

- Increased **suburbanisation and sprawl**, although most of the cities are still more compact than in the Western Europe. The acceleration of city sprawl is evident in Hungary, as well as in Poland and the Czech Republic.
- The situation is more dramatic in cities where sprawl has been combined with **decline** implying a strong environmental impact (e.g. Budapest).
- Social, and sometimes ethnic, **polarisation**.

The major constraints to further improve the situation in these countries are:

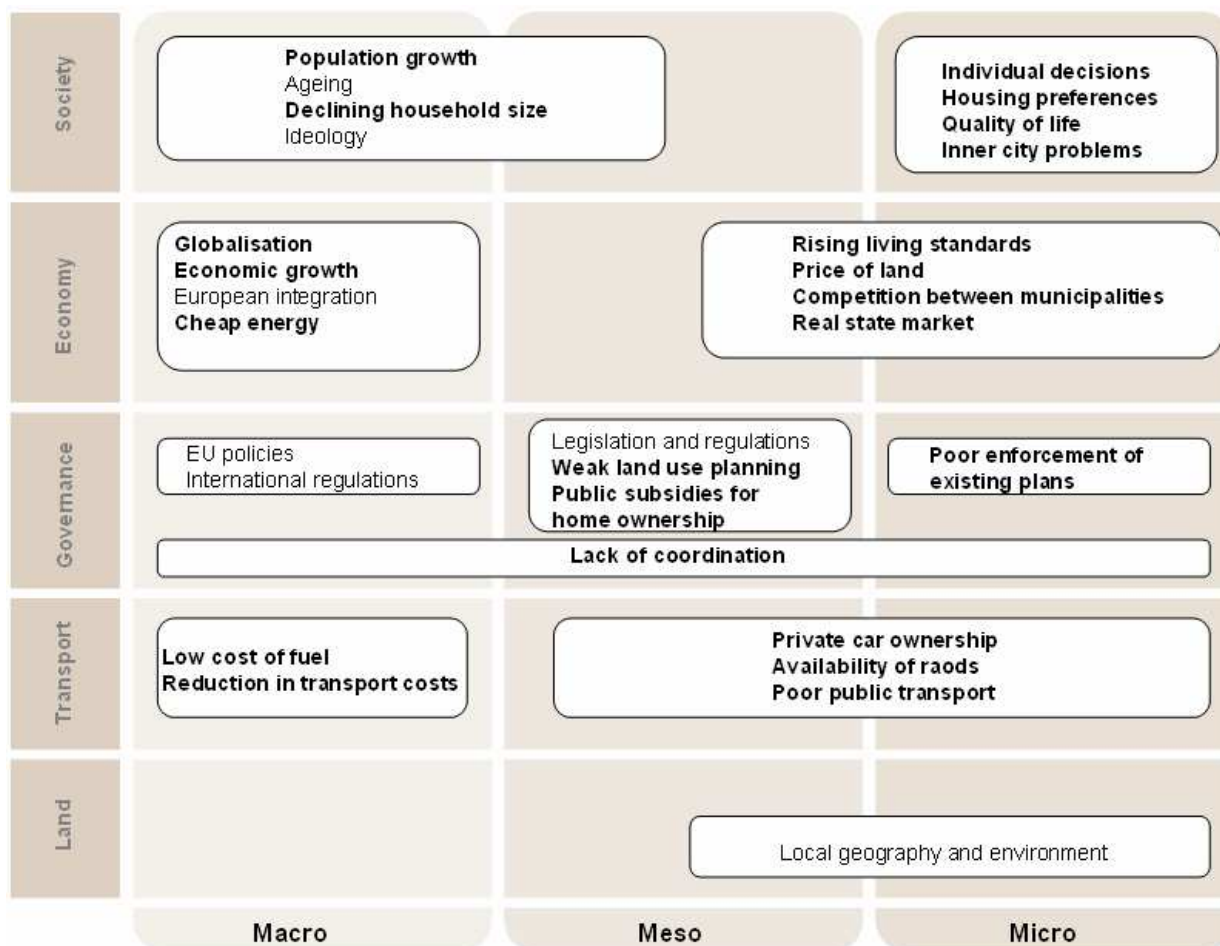
- **Brownfields**. Former industrial sites that have been abandoned and in most cases have serious problems of contamination. The cost of remediation of these sites is very high. It has been estimated that 40% of the Budapest area can be characterised as brownfield land (Baross 2007). The EC's Thematic Strategy on the Urban Environment<sup>1</sup> recognises brownfield regeneration as a major means to achieve a sustainable urban environment
- Existing "**frozen land**" (Bertaud 2004): It consists either a) areas with "fuzzy" tenure, or b) areas owned by government but not occupied by a legitimate government function. This prevents their timely renovation or recycling.
- Residential estates of **high density panel housing** located in the suburbs.
- Weak and poorly maintained **infrastructure** which is inadequate to support the high residential densities found in the centre.

### 5.3 Drivers of urban sprawl

In order to systematise the existing literature on drivers of urban sprawl the following dimensions have been considered (Figure 15):

- **Scale**.
  - Macro level. Political and economic paradigms that shape the nature of the urban societies.
  - Meso level is where much of the discourse about the causes of urban sprawl can be found.
  - Micro level captures the decisions of individual actors in the urban system.
- **Demand and supply**. Very often the drivers focus on the demand side. However, recent studies in Germany showed that the supply side may be more important than demand alone (Dosch, 2008).

- **Domain:** society, economy, governance, transport and land. This categorisation is largely in line with the ESPON projects on polycentricity and economic change (ESPON, 2005), where the characteristics of urban development are related to changes in the main functions of urban regions: population, transport, tourism, manufacturing, and knowledge and decision-making in the private and public sector. It also relates to the basic determinant blocks of regional competitive performance presented in the current project.



**Figure 15 Main drivers of current urban sprawl in Europe. Drivers have been organised in two dimensions: domain (horizontal) and spatial scale (vertical). Demand/supply has not been differentiated. In bold: factors that drive urban sprawl; the remaining factors may become drivers of urban sprawl under certain conditions. Adapted from EEA (2006), Couch et al. (2008) and , Urban sprawl book and PBL (2008).**

### 5.3.1 Society

As has been seen in the previous sections population growth no longer determines the outward expansion of built-up areas. There are other elements related to cultural aspects and **individual decisions** modulated by the supply side and other external conditions (price, transport, and cost).

The **feedback** between drivers and urban process can be seen in the case of population dynamics:

- Population change is an important consequence of urban conditions, especially the availability of economic opportunities (Green and Owen, 1995; Champion and Fisher, 2004; Storper and Manville, 2006). Migration is a response to differences in employment or the quality of life between places, even if the process of adjustment is inefficient. The bigger the differences, the more worthwhile it may be to move, subject to barriers such as distance, legal restrictions, housing constraints and information on the opportunities available. The propensity of people to move is affected by their age, qualifications, financial resources and sense of attachment.
- Population change is also an important influence on urban economic conditions (Glaeser et al., 2001; Glaeser, 2005; Florida, 2004; Krugman, 2005). There is evidence that sheer population size and deep labour pools increase agglomeration economies and productivity (Rosenthal and Strange, 2004; Rice et al., 2006). Loss of population has certainly caused wider economic and environmental problems for cities (Cheshire and Hay, 1989; Begg et al., 1986). Shifts in the level of population affect local jobs through demand for consumer goods and services, housing, schools, etc. Changes in working age residents also affect the supply of skills, which may influence mobile investment decisions. The composition of the new population is bound to have an important bearing on the scale and nature of the economic impact.

### 5.3.2 Economy

**Globalisation** is recognised as one of the main drivers of urban sprawl interrelated with the development of information and communication technologies together with the increased accessibility to almost any place in the world (JRC). The traditional geographic range (space of influence) is overcome, and place is disconnected of economy (Castells, 2001). This has direct consequences for governance creating a conflict between local/regional policies and global market.

**EU integration** may have an undesired side effect through the investments on major transport infrastructures and opening the doors of sprawl to new areas. Since transport is one driver of urban sprawl special attention should be paid in these cases implementing additional policies of containment (EEA, 2006).

**Real state market** is an important player from the supply side. According to Bertaud land price profile follows approximately the population density profile in market economies. This promotes the urbanisation of the less dense areas within a certain time distance of the main centre.

The **differential price** between agricultural land and already urbanised land discourages the revitalisation or recycling of built space generating derelict land. It also has a strong impact in fertile flat areas where accessibility generates a conflict of uses leading to a **marginalisation** of agriculture.

### 5.3.3 Governance

One of the main failures to effectively control urban sprawl is the **lack of horizontal (space) and vertical (institutional) integration of policies** (EEA, 2006). City boundaries are becoming diffuse increasing the complexity of levels of governance (e.g. intermediate metropolitan administrations).

Nearly all environmental management is carried out at a **local level**, and measures adopted at this level influence the impacts at broader scales (Bellot et al. 2007). Municipalities have limited number of tools to influence the urban spatial structure although some typical municipal objectives have a spatial implication:

- Protecting the natural environment requires more compact cities;
- Maintaining a high ratio of public transport trip requires high densities;
- Low housing prices requires an increase in land supply at densities set by demand generating a large suburban expansion.

**Fragmented decision-making.** Typical situation for actor groups involved in the development of land (UBA, 2008):

- **Municipalities** maintain the hope that new inhabitants will lead to a tax surplus, when in fact studies have shown that this is only seldom the case. Therefore they generally favour the development of land. Costs are transferred as far as possible to the investor and as the municipality bears “no” costs the project is regarded as “good”.
- For **landowners** a plot represents an economic asset in whose increasing value they hope to profit. Thus, owners of agricultural land which is facing development become highly active.
- For **project developers** high unit costs to connect new dwellings or commercial premises to supply networks are often more than offset by the much cheaper land prices in peripheral areas at the edge of existing settlements. The extra transport costs are countered by other sales arguments (e.g. property prices, “living in the countryside”).
- **Utility companies** have little motivation to influence the location and density of use of newly constructed or newly connected areas, as the associated costs are reimbursed by users in the form of construction subsidies or by a general rising of charges for all users.
- **Householders** seeking a new location are often ignorant of the high costs for technical infrastructures associated with low density peripheral areas. The low price of suburban land hides the rising infrastructure costs per housing unit which low settlement density causes.
- As a result fragmented decision taking supports therefore unsustainable land use developments: The single decisions are comprehensible; but whether actors ignore the high follow up cost for transport, infrastructure, loss of land, biodiversity and ecosystem services or transfer these costs to others, finally every resident.

The complex interrelations and possible **side effects** are often missed –or difficult to assess at the time of issuing the policies. For example rising prices as consequence of policy for urban concentration (Cheshire, 2006; Richardson and Bae, 2004).

In market economies **actors** play an important role. It seems that that the preferences of people are lower densities and car ownership in many parts of Europe (see France for example Richardson and Bae, 2004 pàgina 93 posar referència). It has also been reflected in the rise of second homes that has been facilitated by the supply side (construction and related economies have been one of the most successful sectors in Spain in the last 10 years).

#### 5.3.4 Transport

Land use and transport are inter-dependent in complex ways as development influences mobility patterns. New suburban development without adequate public transport typically increases the demand for private car use. In contrast the construction of new light rail systems has a tendency to increase housing densities around access points (Handy, 2005). Households make choices between residential areas taking into account the price of housing and the price of commuting between the work and home. When travel costs fall below a certain threshold and income reaches a certain level the rate of sprawl quickens, and sprawl is more common in regions where incomes are high and commuting costs are low (Wu, 2006).

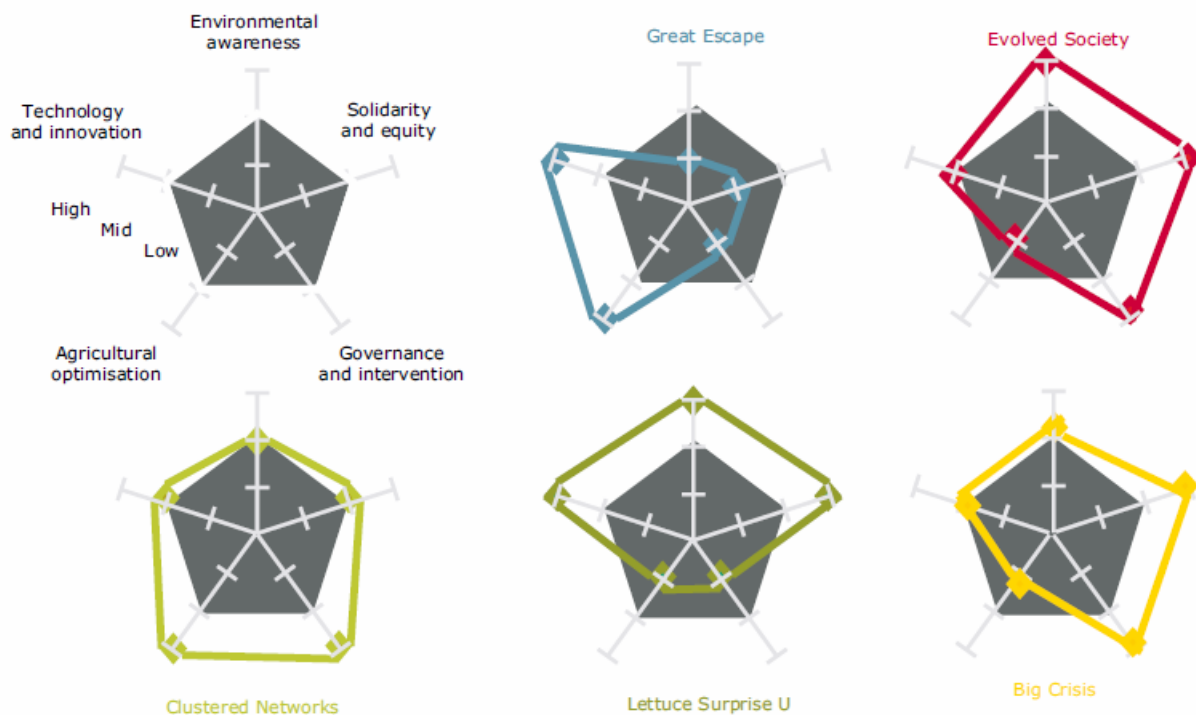
#### 5.3.5 Land

Past history and geographical surroundings of the cities are underlying factors that modulate the morphology and trajectories of the cities. Coastal or mountainous location creates very different development options than location on a plain or along a river (Kasanko et al. 2006).

## 5.4 What can we expect? Scenarios

### 5.4.1 European scenarios: PRELUDE

PRELUDE (PRospective Environmental analysis of Land Use Development in Europe) was developed by the European Environment Agency and explores what European landscapes may look like in 2030. Instead of making predictions, it tackles the uncertainties of the distant future by analysing a range of plausible developments. As a result, five contrasting futures are depicted in a set of coherent scenarios. They have been developed by a story – and-simulation approach in a large stakeholder group. The scenarios cover a wide spectrum of possible developments of drivers of change in society, economy, governance, environment and technological invention. Figure 16 shows simplified spider diagrams (developed on the basis of the 20 driving forces that were initially developed) that illustrate the key characteristics of each scenario.



**Figure 16 Simplified spider diagrams of key drivers**

The scenarios are described below.

### 5.4.2 Great Escape

This scenario is driven by globalisation, decreasing solidarity and passive government. Societal tension builds up as relatively poor immigrants move to urban city centres. Climate change affects the growing conditions for agriculture. The agricultural market is liberalised

and only large-scale farms with intensive management survive the pressure from the world market.

Between 2005 and 2015, people who can afford to start leaving the major cities (> 500 000 inhabitants) inside the so-called Pentagon to live in safer, more rural areas. The wealthiest settle in so-called 'Gated communities' that spring up in the countryside far from cities and in non-flooding areas. Poor people from rural areas who move to these cities balance this migration. This changes, however, during 2015 to 2035, when more and more disadvantaged members of society move to rural areas (1.0 % per year) leaving the cities inside the Pentagon (1.0 % per year). People move because there is a strong need for workers to provide basic services, private health, education, leisure and security in the 'Gated communities'. They are housed in sprawling prefabricated bungalow patterns outside, but still close to, the 'Gated communities'.

As a result, there is a relatively high growth of settlement area of 3 % between 2005 and 2035. Due to limited spatial planning and government interference, the urbanisation pattern is rather diffuse. In this scenario the largest increase in urbanisation is in areas where in 2005 less than 5 % is urban land use. The urban population decline in large cities will cause some abandonment of existing urban areas. Despite low environmental awareness only a very small fraction (0.01 %) of further urbanisation takes place inside designated or protected areas.

### **5.4.3 Evolved Society**

Main ingredients in this scenario are an energy crisis, growing environmental awareness and active rural development. Serious flooding occurs and people leave the most vulnerable areas. They rediscover the countryside where small-scale organic farming, supported by strong policy measures, increases.

A high overall increase of 3 % in settlement areas in Europe between 2005 and 2035 is the result. In certain areas, especially in the Baltic States with small and medium-sized cities, these increases are much higher. The migration to rural areas leads to an increase of urban land use in the new EU Member States, which is rather diffuse. More than 60 % of urban area increase takes place in regions with less than 5 % of urbanised area in 2005 in this scenario. The downside of this diffuse pattern of new urban settlements in rural areas is an increased demand for infrastructure (such as roads, administration buildings, etc.) with likely negative impacts on regional landscape quality. However, this is partly offset by new forms of living and working without much travelling. Because of the west-to-east migration, there is also a decrease in urbanised areas in some metropolitan parts of the Pentagon.

### **5.4.4 Clustered Networks**

This scenario is all about optimization of land use and strong spatial planning in response to an ageing of society and a declining agricultural sector. Climate change is a less prominent driver in this scenario.

Urban areas increase by about 3 %. Urbanisation is concentrated; new settlements are located in the periurban areas of large and medium-sized cities. There are 14 new cities distributed across Europe, which locally will produce major urban increases of up to 60 %. These new cities generate major local changes in infrastructure, new employment opportunities, and activities in peripheral European regions. On the other hand, the migration of 3.5 million people out of the Pentagon<sup>10</sup> is likely to produce a decline of activities and income in the centre of Europe. Overall, population trends continue at current levels (0.12 % per year) throughout the scenario period.

### **5.4.5 Lettuce Surprise U**

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<sup>10</sup> The area limited by London, Paris, Milan, Munich and Hamburg.

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The essential drivers here are growing environmental awareness, technological innovation and decentralisation. Agriculture revolutionises, facilitated by open source mentality and propagation of knowledge. Production becomes small scale and less intensive.

The growth in settlement area is 1.2 % until 2035 and represents the lowest of all five scenarios. This growth is due to the sustained growth in urban population across Europe. It is lowest in the scenario because there is no major migration and thus no need for new settlements apart from those required to cover population growth. From 2005 to 2015 urban growth occurs around medium and small-sized cities, and after 2015 it occurs in periurban areas.

#### **5.4.6 Big Crisis**

In this scenario climate change related disasters and increasing solidarity are all-important. Floods and droughts affect many people and trigger strong European policy interventions, aimed at a balanced regional development.

There is an increase in urban land use in the periphery and an increase in population of 2.0 % per year in cities outside the Pentagon. By contrast, urban population decreases by 2.0 % per year inside the Pentagon. There is an overall 0.5 % per year increase in the urban population. Overall, population trends continue at current levels (0.12 % per year) throughout the scenario period.

The increase in settlement area until 2035 is 1.2 % and, therefore, low compared to the other scenarios. This growth is due to sustained urban population growth across Europe. Map 3.13 depicts the changes in urban area between 2015 and 2035. Whereas, from 2005 until 2015 counter-urbanisation causes urban growth around medium- and small-sized cities, after 2015, new urban settlements are spread in periurban areas.

The growth in urban areas is slightly higher than in the 'Lettuce Surprise U'-scenario, as people migrate away from major flooding areas and incentive policies strengthen the periphery of Europe. Government intervention and subsidiarity are high. The implementation of these new policies in several of the new European core areas along the periphery focuses on the way people and goods are being moved across Europe. In addition, the transportation infrastructure is subsidised in these regions. A special network of high-speed trains is established, making the cities in the periphery more attractive for living and working.

#### **5.5 Existing scenarios for cities**

Based on the MOLAND project several scenarios have been compiled for three European cities (Table 8).



City/region	Time horizon	Scenario	Drivers	Actors	Impact at local scale	Regional scale
Dublin	2000 - 2025	Business as usual (baseline) Planning regime with few constrains	Population growth Economic development High house prices in centre of Dublin Small size of apartments	Families with children needing more/cheaper space Irish housing ideal	110% increase of residential areas in Greater Berlin. Increase of commercial areas. Growth along transport axes and accessible topography.	Development of polycentric relationship with neighbouring cities. Dublin – Belfast corridor reinforced.
Madrid	2000 - 2020	Business as usual (baseline) Competitiveness	Low mortgages rates Demand for first and second homes Improved transport networks (motorways & rail)	Supplier side (construction and related sectors). Governance: mismatch between regulatory capacities of the municipality and drivers	Increase of built-up areas (426 km <sup>2</sup> ) Loss of agricultural and natural land High rise of prices	Appearance of new urban hubs
		Scattered development Competitiveness Market led	Low mortgages rates Demand for first and second homes Improved transport networks (motorways & rail) Increased demand for urban land.	Supplier side (construction and related sectors). Governance: mismatch between regulatory capacities of the municipality and drivers	Increase of built-up areas (475 km <sup>2</sup> ) Loss of agricultural and natural land High rise of prices	Appearance of new urban hubs
		Compact development Competitiveness internalising environmental impacts Involvement of stakeholders		Stakeholders involved in land planning Governance: This scenario is considered unrealistic by the authors.	Contained growth (230 km <sup>2</sup> ) Limited loss of agricultural and natural land.	

City/region	Time horizon	Scenario	Drivers	Actors	Impact at local scale	Regional scale
Dresden – Prague corridor	2000 - 2020	Business as usual Access to EU funds Decrease of population Extrapolation of current trends	Doubling number of households		Moderate sprawl	
		Motorway impact Access to EU funds Decrease of population	Development of the A17/D8 part of TEN Corridor IV		Increase by 3 times urban sprawl	

**Table 8 Scenarios for Dublin, Madrid and Prague-Dresden corridor (EEA, 2006).**

## 5.6 Some guidelines for scenario development and policy recommendations:

1. Factors that will be active in coming years and that will have a certain impact (high certainty).
  - Cities have certain **inertia** and policy takes a long time to have any significant effect in terms of change of urban patterns (Cheshire, 2006). For this reason tackling the problems at an early stage, with a progressive implementation, is to be preferred to late and aggressive action. These results challenge current assessment methods of climate change stabilization strategies and show that it is essential to take into account urban dynamics and inequalities in the design of climate policy (Gusdorf, Hallegatte, and Lahellec).
  - **Implementation of stronger policies** to control urban sprawl (e.g. Germany, National Sustainability Strategy of the Federal Government, 2006) and stronger enforcement of law at mesoscale (see for example the resolution of the European Parliament on the Fact-finding mission to the regions of Andalusia, Valencia and Madrid, 21 June 2007).
2. Emerging issues that may have a potential impact (uncertain, but high potential – management at meso/micro level).
  - Management of current built-up areas, and in particular the sprawled ones, remains an area for big improvements. The focus so far has been too much in avoiding or controlling urban sprawl and large dispersed areas has been forgotten.
  - Innovative housing design (intermediate between collective and individual housing) in order to meet simultaneously the individual household aspirations and the collective density criteria (SCATTER project).
  - Location of community services, like schools.
3. High uncertainties
  - Changes in actors
    - Next to the implementation of traditional "top-down" growth control instruments, urban land use policies should employ awareness campaigns and foster capacity building for more effective inter-municipal planning cultures in regional and sub-regional scales. Furthermore, this study found (qualitative) evidence that the intensity of the political debate on urban sprawl and more sustainable forms of urban development at the federal and state level influences the consciousness of local stakeholders.
    - Actor's structure: age, economic sectors, social classes.
  - Private investments going to Eastern Europe to find new opportunities (recent trends and still to be in coming years)
  - Integration of different levels of governance.
4. There is not a unique model of urban evolution given the history and geographic constrains. Consequently the objective should be to reach similar objectives (increased diversity, mixed use of spaces, improved urban environment), but not necessarily with the same means. Best practices should be promoted taking these aspects into consideration.

## 5.7 Sustainability

### 5.7.1 Framing the concept

Sustainability has become a mainstream word extensively used, as if only mentioning it would solve the environmental problems. In particular the concept sustainable cities appear everywhere, but in many cases the conceptual or empirical basis is missed. Consequently it is very difficult to set targets and to get the right information to assess the evolution and trends. Moreover, very often the concept is used as an absolute attribute (sustainable/unsustainable) whereas it would be more pertinent to analyse sustainable/unsustainable process/trends.

The policy report *European Sustainable Cities (1994,1996)* called for an integrated ecosystems-based view of the city and emphasised, for example, demand-side management, equity and efficiency in the use of resources and effective engagement with local communities and other stakeholders. Practical application of these ideas and further development of local sustainability approaches has been carried out through the *European Sustainable Cities and Towns Campaign*.

Although the integration of different disciplines (thermodynamics, ecology and information theory) is still in a research phase, several factors have been identified as key components of sustainable systems:

- Rates of consumption of natural resources below certain thresholds;
- Maximisation of energy efficiency;
- Maintenance of ecosystem services;
- Maximisation of networks, diversity and information flow.

Taking some of these principles, three different approaches have been identified:

- **Ecological footprint.** The ecological footprint is a measure of the resources necessary to produce the goods that an individual or population consumes. Some authors criticise this approach because, among others, it does not take into account land degradation obscuring the effects of a larger sustainability problem. However, it has been a useful tool for communication as has been proven in London.
- **Urban metabolism.** The socio-economic metabolism approach conceptualizes the relationship between societies and their natural environment as a physical input–output process: materials and energy are extracted from the environment, processed within society, partly accumulated as socioeconomic stocks (e.g., buildings, infrastructure, durable consumer goods, etc.), and, finally, released into the environment, either as waste and emissions, or as deliberate discharges such as fertilizers or pesticides (Ayres and Simonis, 1994; Fischer-Kowalski, 1997; Matthews et al., 2000)
- **Environmental vectors or domains.** In this approach different compartments of the urban system are analysed considering their trends over time.

The problem of the first two approaches is the high data requirements reflected in that most of the studies focus in few, if not only one, cities or areas.

The environmental vectors also allows to emphasize the land dimension, beyond the city skirts, which is a central component of the hypothesis presented in the project:

- Environmental issues in the city
  - Air quality
  - Energy consumption
  - Land consumption
  - Quantity and quality of green areas
- Environment beyond the city border

- Land consumption
- Geographic extension of the impact of the city growth
- Pressure on natural areas
- Fragmentation

### 5.7.2 Land resources

Land, and soil, can be considered limited resources at human scale. The Soil Thematic Strategy identifies soil sealing by impervious surface as one of the main threats to soil conservation in Europe.

Loss of farmland and natural areas in the surrounding countryside, whilst the creation of greenspace within urban areas did not match the speed of urban growth (EEA, 2002). Moreover, there is an impact that extends far beyond of the city limits by the destruction of biotopes and fragmentation of eco-systems. It also increase the pressure on protected areas by increased air pollution.

These changes are characterized by a generalized **homogenization** of the existing traditional landscape diversity and the creation of largely chaotic patterns. Such a chaotic development is typical for complex systems and is also referred to as autonomous development (Antrop, 1998). New forms of land use are **not ecologically related** any more with the land and the place.

All these environmental issues are clearly related to the type and form of city growth. Moreover, once urban areas have sprawled it is very difficult to counteract its impact given the amount of energy needed to restore urban sealed areas.

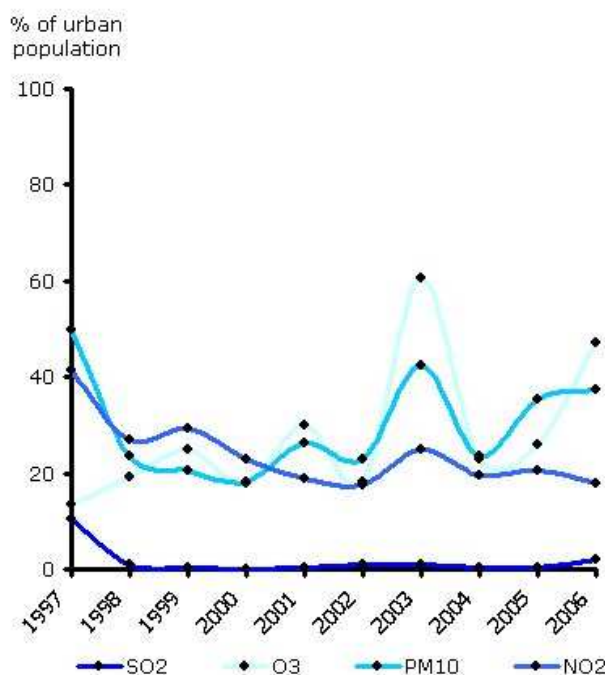
### 5.7.3 Pollution

Despite the **progress** made in controlling local air pollution, urban areas show increasing signs of environmental stress and air quality is one of the major concerns (EEA, 2009). In the period 1997-2005, between 16 and 45 % of the urban population was potentially exposed to ambient air concentrations of PM10 higher than the EU limit value set for the protection of human health. There was no discernible trend over this period and differences between years were related to weatehr conditions (EEA 2007). Many European urban areas experience daily average PM10 concentrations higher than 50µg/m<sup>3</sup> on more than the permitted 35 days per year. The highest urban concentrations were observed in cities in northern Italy (Po valley), Spain, Portugal, the Czech Republic, Poland, Hungary, Romania, Bulgaria, the Benelux countries, Greece, and the cities of the West Balkan countries.

For ozone (O<sub>3</sub>) there was considerable variation over the years. During most years, 20-25% of the urban population was exposed to concentrations above the target value. In 2003, a year with extremely high ozone concentrations due to specific meteorological conditions, the exposure to high concentrations increased to about 60%.

About a quarter of the urban population in north-western Europe, Romania and Bulgaria remain potentially exposed to concentrations above the NO<sub>2</sub> limit value. The percentage of the urban population exposed to SO<sub>2</sub> concentrations above the short-term limit values decreased to less than 1% and the EU limit value is thus close to being met (EEA, 2007).

As a result, the exceedance of air quality standards seriously increased respiratory and cardiovascular diseases, in particular with young children or elderly people. There seems to be a strong relation between the amount of heavy traffic and the health effects; epidemiological studies, for instance in the Netherlands show that more negative health effects such as lung diseases, coughing and heart diseases occur to people living in the vicinity of major roads (Hoek, 2002). In the European Union, the number of premature deaths that can be attributed to anthropogenic PM<sub>2.5</sub> due to emissions from traffic and other sources is estimated to be about 350 000 for the year 2000 (CAFÉ 2005). These health effects are linked to high economic losses in form of higher costs for medical treatments and losses for employers for sick workers.



**Figure 17 Percentages of the urban population in EEA member countries (except Turkey) exposed to air pollution above the limit and target values (AirBase)**

While it is clear the linkage between air pollution and emission sources (road traffic, heating systems,...), the relationship between city form and air pollution is more complicated since it strongly depends on the selected area of study (districts, city center, metropolitan area,...) and type of contaminants. Moreover, local geographic and climate conditions can obscure other factors.

In a simulation study, Borrego et al. (2006) found that the highest emission rates were attribute to the so-called corridor city, i.e. cities characterized by growth in linear corridors with origin in the city centre, supported by high quality transport infrastructure (highways). The disperse city demonstrated the lowest emissions per area and the compact city was characterized by lower emission rates per inhabitant. It was concluded that, at regional level, compact cities with mixed land use provide better air quality compared to disperse cities with lower densities and segregated land use or network cities equipped with intensive transport structures.

Waste

#### 5.7.4 Noise

European cities have become increasingly "noisy"; the noisy places became not necessarily louder, but there are less quiet places left. Today not only traffic noise, but also leisure and neighbourhood noise affects people since noise surrounds them nearly 24 hours a day. Detailed noise data across Europe is, however, hard to obtain. Different sources give the following picture:

- **Road traffic** is the dominant source of exposure in major urban areas. In 2006, the EU Thematic Strategy on the Urban Environment reported that exposure to continuous road traffic noise affected:
  - 160 million people in the EU-15 (40% of the population) at an "averaged" level above 55 dB(A)- associated with significant annoyance;
  - 80 million people (20% of the population) were exposed to continuous road traffic noise above 65 dB(A) - associated with cardiovascular effects;
- In 2002 the European Commission introduced the Environmental Noise relating to the assessment and management of environmental noise. From the currently

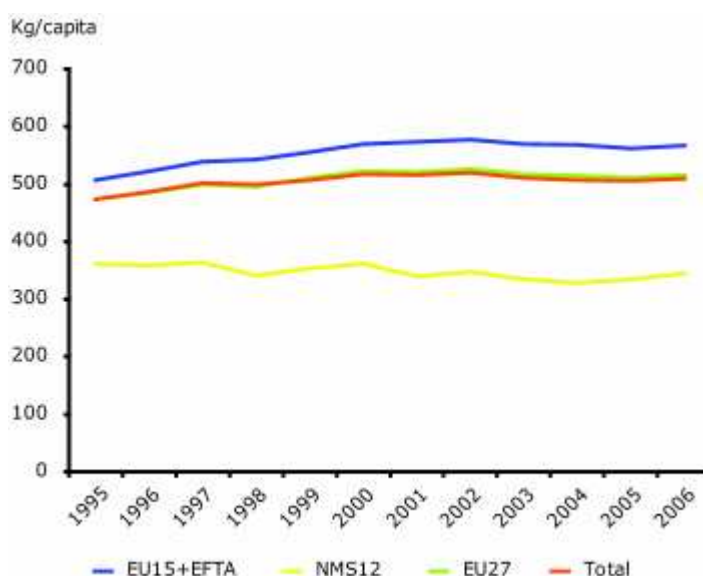
available exposure data which only cover parts of the Member states, it can be seen

- 56 % of the population living in cities is exposed at an “averaged” level above 55 dB(A)- associated with significant annoyance;
- 35 % of the population living in cities is exposed is exposed to continuous road traffic noise above 65 dB(A) - associated with cardiovascular effects;

Persistent high levels of noise are associated to reading disabilities, memory and concentration loss, as well as to irreversible health effects such as heart attacks and strokes (Stansfeld et al. 2005, Babisch 2006 and Jarup et al., 2008), for instance in the Netherlands, yearly 20-150 people suffer from heart attacks caused by traffic noise (Houthuijs, 2008). It has also an economic impact as stated by Gjestland (2007): in Norway, the “cost” of one extremely annoyed person has been estimated to be approximately 1600 € per year -due to the linearity, the “cost” of a moderately annoyed person thus equals 800 € per year. Moreover, it has been observed that house prices decrease between 1.2 and 1.6% per dB in Denmark, and in Germany the price goes down by a 50% at 70 dB (European Commission, 2007)

### 5.7.5 Waste

One of the targets set in the 5th Environment Action Programme (EAP) was to reduce the generation of municipal waste per capita per year to the average 1985 EU level of 300kg by the year 2000 and then stabilise it at that level. **Erreur ! Source du renvoi introuvable.** shows that the target was far from ever being reached. The average amount of municipal waste generated per capita per year in many western European countries still exceeds 550kg.



**Figure 18 Municipal waste generation in Western Europe (EU-15 + EFTA), New Member States (NMS12), EU countries (EU-27) and total in Europe (total). Source: EEA, 2008.**

The target was not repeated in the 6th EAP. The Waste Framework Directive (2008/98/EC) rather includes a general target to break the link between economic growth and the environmental impacts associated with the generation of waste. Since generation of municipal waste per capita has stabilised in the EU since 2000 while GDP has increased by 13%, the generation of waste at least has been decoupled from economic growth across the EU. As a result, it is likely, though it does not necessarily follow, that the environmental impacts associated with municipal waste generation have also been decoupled from GDP.

Municipal waste generation rates in new Member States are lower than in western European countries and generation appears to have decreasing somewhat since the mid-nineties. This decrease occurred over a period with strong economic growth as well as growth of consumption expenditure. The causes of the decoupling and overall decreases in municipal waste generation per capita in EU-12 are not clear. Several countries of the region have reported that the reductions are only apparent caused by changes in measurement methods. Weighing of waste deliveries at landfills has been gradually introduced in EU-12 countries over the past decade. Previously the amounts were estimated according to volume. Since amounts of lightweight waste (e.g. packaging) are growing and amounts of heavy fractions (e.g. ash and slag) are decreasing, individual landfills may have overestimated weight of municipal waste in the years immediately prior to introduction of weighing, if based on even older waste composition data. This would lead to a sharp reduction in recorded weight following the introduction of direct weighing of waste. Since weighing has been introduced gradually these numerous sharp reductions would be smoothed out and appear as a gradual decrease in waste generation over a country or region.

Other trends, such as those in consumption patterns and waste collection methods (e.g. limited collection of bulky waste), may also have played a role. Reporting systems may also need further development, especially regarding the definition of municipal/non-municipal waste in some streams e.g. waste from small enterprises and services, bulky waste and packaging waste.



## 5.8 First results

### 5.8.1 Introduction

This paper provides first results on the analysis of type of growth of European cities which should help to better understand the process of urban sprawl. This preliminary analysis may be incomplete since data collection finalised in March 2009. However, the assessment will be extended to the full geographic coverage in the coming weeks.

The second step of the work, to be developed, will relate these typologies with different environmental issues like transport, air pollution and emissions in the European cities.

### 5.8.2 First results

Distribution of urban areas by countries is strongly related to country size: UK, Germany, France, Spain and Italy are the countries with higher number of urban areas. Finland and Sweden, for climatic and geographic reasons, have much less urban areas than expected according to its size (also Norway although it is not included in the study –CLC not available). The larger urban areas follow a NW – SE axis, with a greater density around Brussels and Dortmund. On the other side, southern Europe can be characterised by smaller urban areas, with the exception of Italy. However, this picture slightly changes when looking at the population: big cities appear in southern and Eastern Europe (Figure 19). These differences relate to different population densities, which in turn reflect different city structure.

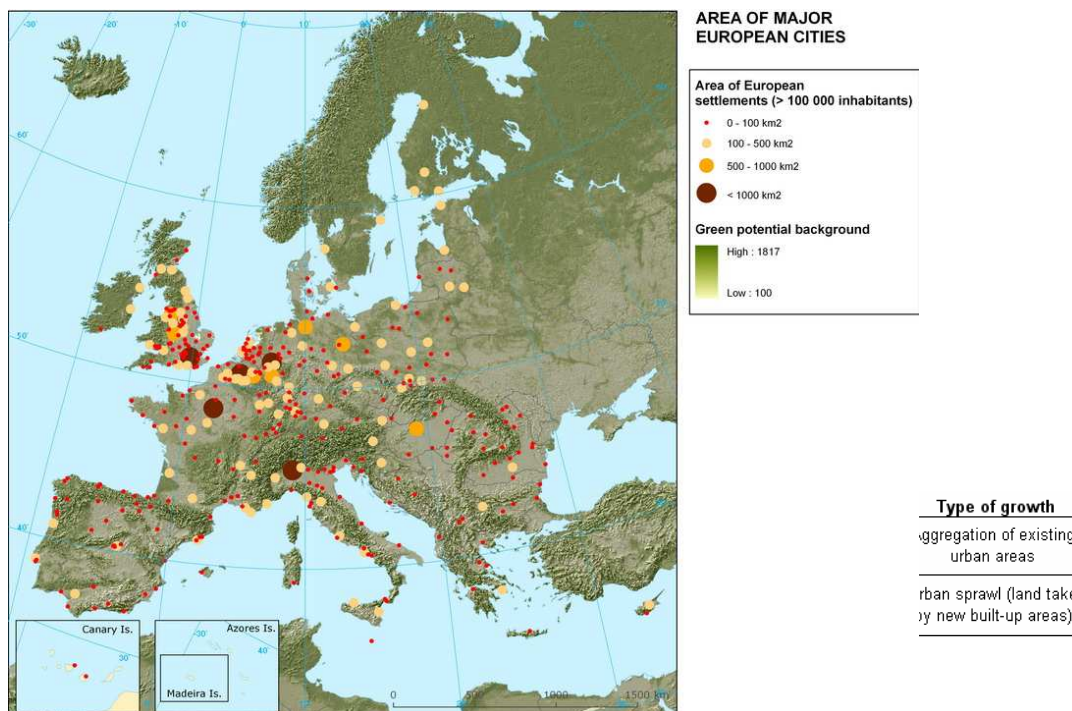
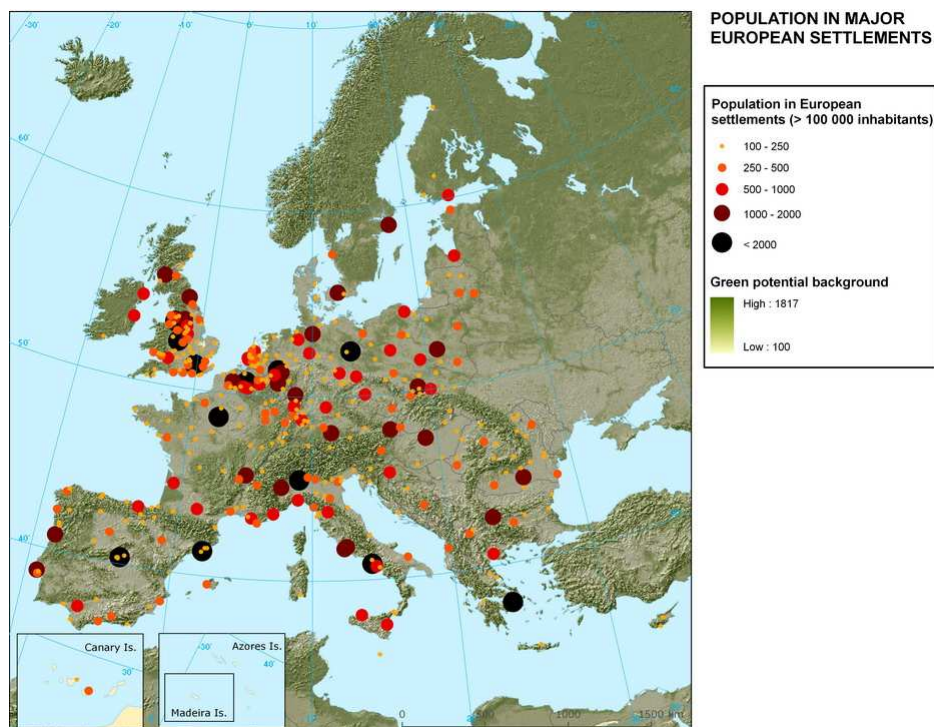
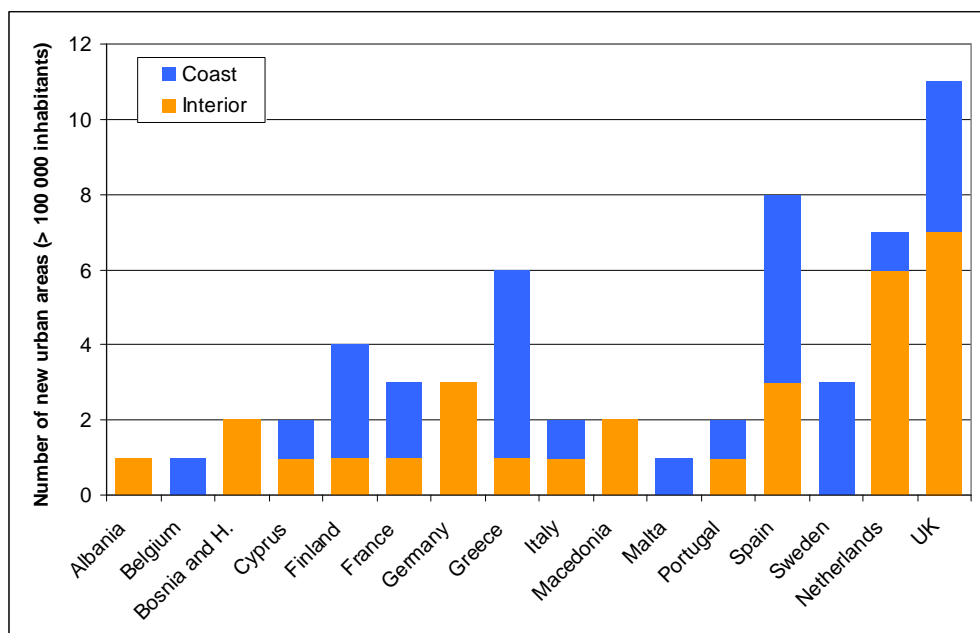


Figure 19 Area of cities in Europe.



**Figure 20 Population cities in Europe**

A first glimpse on the growth of urban areas is provided by the new cities that in 10 years have reached, and passed, the threshold of 100.000 inhabitants. Most of these urban agglomerations are located in UK, followed by Spain, Netherlands and Greece. Almost half of the new urban areas have been growing on the coast.



**Figure 21 Number of urban areas that have surpassed 100 000 inhabitants in 1990-2000.**

In fact, there are two components that should be taken into account considering the growth of these urban agglomerations:

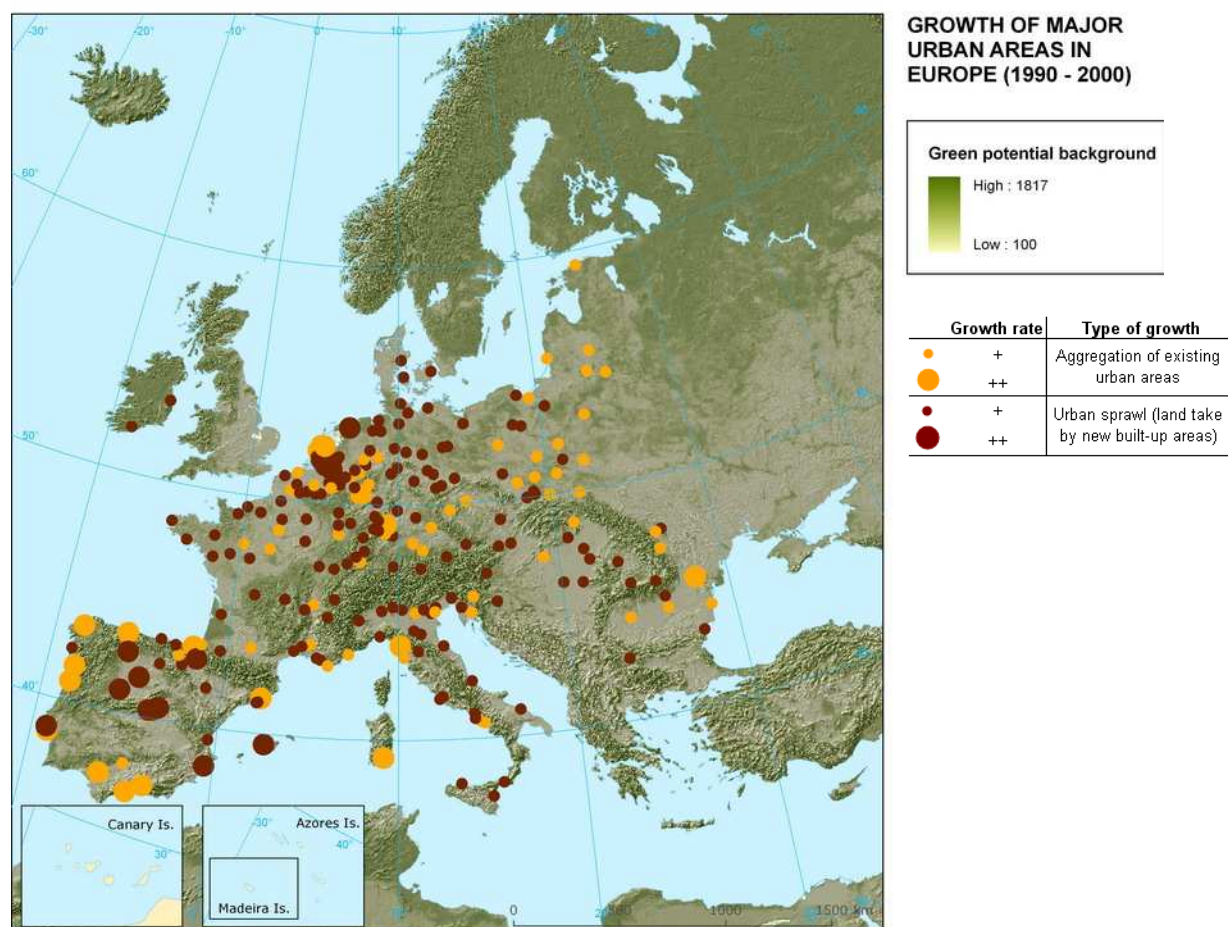
- Increase of total area, which includes non built-up area that remains between houses and other infrastructures: green urban areas, abandoned agricultural land... This growth is reflecting how far is going the city border.
- Increase of built-up area inside the urban area. The existing built-up area, together with its increase is relevant to know which type of urban growth is taking place: diffuse or compact.

The growth of urban areas in Europe has been taking place at different rates in the last decade (1990-2000): from 0.7% up to 70%. Rapid growth of many European urban areas is explained by two different processes:

- New built-up areas have been connecting existing scattered settlements. As a result, former small urban areas become part of the same conurbation.
- The growth is mainly due by new built-up areas. This would be an example of urban sprawl.

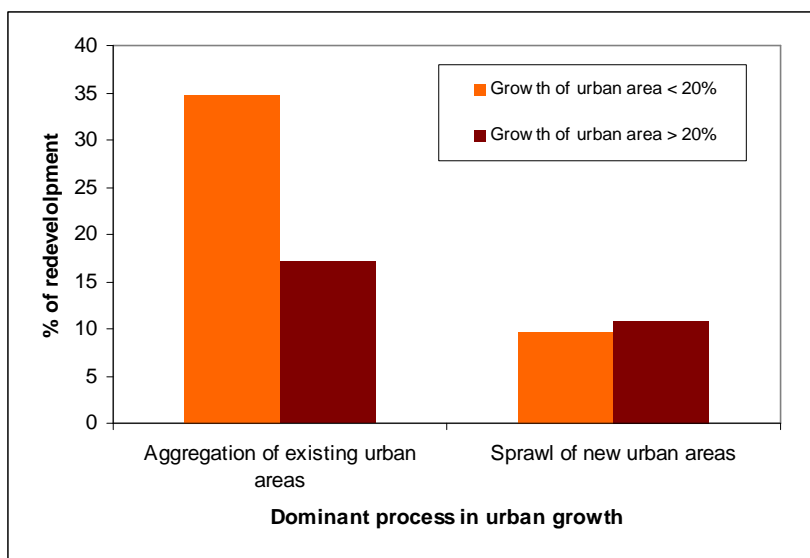
Combining the rate of growth with its typology, four groups of cities can be identified (Map 22):

- Urban areas with small to mid rate of growth (< 20%) due to aggregation of existing settlements. They are mainly located in central and eastern Europe.
- Urban areas with high rate of growth (>20%) dominated by the aggregation of existing settlements. Most of these cities are located in Spain, mainly on the coast, and Portugal, followed by Netherlands.
- Urban areas with small mid rate of growth (< 20%) caused by increase of new built-up areas. These cities are scattered all over Europe, although they are less frequent in Spain and Portugal.
- Urban areas with high rate of growth (< 20%) caused by increase of new built-up areas. These conurbations are located in Spain, followed by Portugal and Netherlands.



(UK is missing because land cover changes were not available at the time of processing the information).

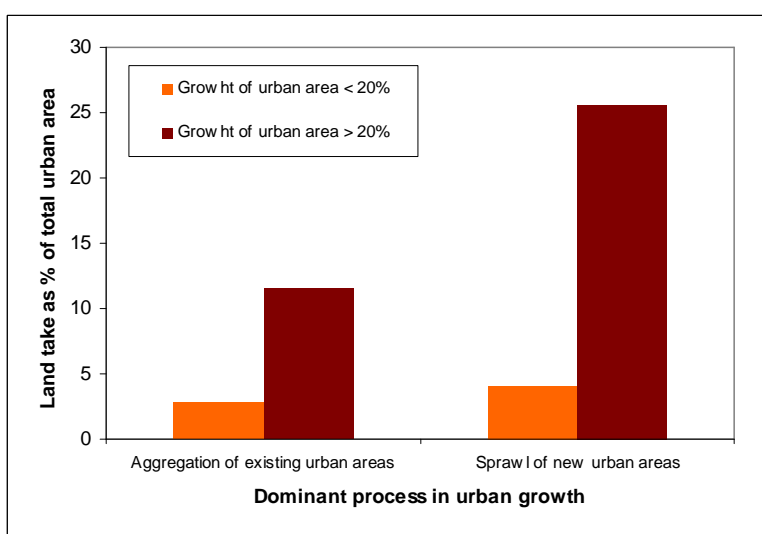
**Figure 22 Type of growth of urban areas in Europe (1990-2000)**



**Figure 23 Redevelopment of existing built-up areas as percent of total increase of built-up area (1990-2000).**

As can be seen in Figure 23 different process of urbanisation are related to different efficiency in the use of the land: urban areas resulting of aggregation of existing settlements show a higher degree of redevelopment over existing built-up areas. On the other side, urban sprawl is less efficient recycling existing urban fabric. This pattern is modulated by the rate of growth of urban areas: at higher rates the percentage of redevelopment is reduced.

The effect of rapid growth is also observed on the land taken by built-up areas inside the cities (Figure 24): up to 25%, as an average, is taken in the case of sprawl of new urban areas.



**Figure 24 Land take by built-up areas as % of total urban area (1990-2000).**

The new built up area is mainly used for residential purpose and, in all cases, dominated by the growth of diffuse urban fabric. Industry is relevant in the following cases:

- Larger cities
- Smaller growth rate
- Northern and eastern cities.

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## **Annex 6. Literature review on other drivers related to the potential development of urban systems**

**(J. Robert)**

**(Part 1)**

### **6.1 “La ville dans le futur: réflexion prospective sur le phénomène urbain.» Rencontres internationales de prospective du Sénat (France ; Février 2004)**

#### **6.1.1 Towards the digital city**

The technological revolution is moving towards the development of very fast Internet (“fast TCP”) with transmission speeds of several gigabits per second. Huge amounts of information will be transferred in a few seconds. In addition, thanks to the IPv6 Protocol, the number of Internet addresses will be practically unlimited, so that numerous objects (dwellings, buildings, cars etc) will be permanently connected to the web. This is likely to have major economic and social impacts in terms of development of e-services and activities (remote observation, tele-medicine, home-working, e-teaching etc) as well as control/regulation activities (intelligent homes and cars, traffic, security).

Some lessons can be learned from recent experiments with such new Telecom technologies:

- the fast web of Milan has confirmed that digital infrastructure is one of the main factors of territorial competitiveness. Collective learning at local/regional scale is necessary to draw benefits from the available knowledge, the emergence of innovation requires a strict management and promotion of territorial identity. Information as such is not sufficient. This conclusion is also confirmed by observations made elsewhere (Bilbao, Newcastle).
- Experiments in the Netherlands with broadband networks in specific neighbourhoods have led to the development of various clubs, associations etc., through which people have become more interactive and conviviality has increased. This new conviviality is potentially highly productive.

The potentialities of such technologies in terms of added value requires significant adaptation efforts in the political, social, economic and cultural fields.

In the information society which is just starting, cities are the main locations of sources, production and exploitation of knowledge. The new digital economy strengthens the roles of the cities as reference units for economic production, organisation of society and production of knowledge. Concretely, the digital city will be characterised by the superposition of public and private electronic services to the real city. In addition, a “virtual city” city will be produced through simulation by technologies of image and virtual reality.

The model of “machine-city” of the industrial era promoted by Le Corbusier is being replaced by the electronic, intangible and fluid city of the knowledge society, which generates new social, economic and pedagogic relationships reshaping the physical territory. The digital dimension of future cities will be essential and will significantly boost the possibilities of creation and innovation while also changing the ways of living. It may

also have important impacts on the restructuring of cities and on the morphology of new urban developments. It is however uncertain which impacts it will have on mobility, since people who use large quantities of information are precisely those who are highly mobile.

### **6.1.2 Evolution of building and housing technologies**

In addition to the development of intelligent buildings and houses thanks to the new, powerful Telecom technologies, other technologies are on the move, especially in relation to materials and energy issues.

Presently, energy consumption peaks in buildings take place in various countries in summer time because of air conditioning. Energy consumption in wintertime is also significant and there is potential for substantial energy savings in buildings through technological innovations and also through changes in the ways of living.

Future buildings will integrate more systematically bio-climatic considerations. In summer time, comfort will be ensured through as few air conditioning as possible. Local renewable energy sources will be more and more used. In order to benefit sufficiently from solar energy, the morphology of neighbourhoods has to be organised so as to have sufficient surfaces exposed to sunshine. This raises questions in relation to the move towards densification and more compact cities. Compromise solutions will be necessary. New buildings are being experimentally developed, characterized by "positive energy balance" (they produce more energy than they consume). They will therefore have no negative impacts in terms of greenhouse gas emissions. In this respect, new glass products for windows are being developed which protect the interior of buildings from heat in summer time and which limit energy losses in wintertime. They make substantial energy savings for heating and air conditioning possible. Such products are already quite widespread in northern European countries, but are much less used in other parts of Europe.

More advanced technologies lead to the production of glass for windows, the opacity of which can be electronically regulated in order to draw optimal benefits from solar heat and light. Other systems are being conceived which will make possible to transfer sunlight towards the darkest parts of buildings, in order to save electricity.

Changes are also expected in building materials and systems which will provide the inhabitants of houses and buildings with more flexibility in shaping their apartment or house. There will not be any more a fixed housing infrastructure, but instead, services composed of modules which will compose the various rooms and in-house spaces. It will be possible to modify them periodically.

### **6.1.3 Urban transport services on the move**

Urban transport issues are a huge political, technological and social challenge. In a number of countries, the number of car trips is increasing more strongly than the number of vehicles and the amount of kilometres driven even more strongly than the number of trips. During the past three decades, transport has become the largest energy consumer and it consumes mainly fossil energy. Urban traffic corresponds roughly to 40% of CO<sub>2</sub> emissions generated by transport.

As far as traffic is concerned, major technological evolutions are underway such as fuel cell engines, electric cars, hybrid cars. A number of problems still have to be solved, such as

the mass production of hydrogen in the case of fuel cells or the creation of high-capacity batteries for electric cars, enabling long-distance trips.

A significant evolution of public policies related to the use of cars in cities is the progressive introduction of road pricing/tolls in inner-city areas. The first emblematic case has been that of London, where car traffic entering the central area of 13 km<sup>2</sup> has decreased by 20% during the first year following the introduction of the pricing system. In the same time, the number of people travelling by bus has increased by 10%. Delays caused to buses by traffic congestion were reduced by 20%. It is likely that in future car users will be substituted to taxpayers when it comes to finance appropriate road infrastructures in cities.

Mobility in cities has become an important economic and social issue in relation to the accessibility to jobs, leisure, education etc. The main problems related to urban mobility are the total costs generated (including the environmental ones) and the existing social disparity: while middle and upper class urbanites are not facing particular difficulties in moving throughout the city and between cities, lower income groups living and working in peripheral housing estates or in modest inner-city areas generally cannot afford high mobility and have therefore restricted visions and perspectives with regard to opportunities existing in cities.

A positive correlation seems to exist between the functioning of the city in terms of mobility and the creation of jobs and wealth. Despite the development of telecommunications, the issue of urban mobility remains therefore fundamental.

Further investments in public transport systems will be highly necessary in the coming decades. It is however necessary to reconsider a number of issues. While up to now, the logic of public transport has been to provide services for journeys to work in relatively dense areas, other types of transport demands are rapidly emerging. These are related to other types of urban trips, for instance for leisure, shopping or educational purposes. Demand is not limited to dense urban areas and to peak hours. It is widespread in time and in space. New solutions are therefore necessary with more diversified types of vehicles and services. Public transport on demand, development of intermodal solutions, better integration of transport and information/telecommunication services are possible solutions. The concept of mass public transport for journeys to work should be progressively replaced by the wider concept of provision of services to mobility, combining various transport modes, information and transport, conviviality, facilitation and simplification of accessibility etc.

Various investigations have shown that existing public transport systems are producing insecurity in the context of growing violence in society, because of ill-conceived services and technological solutions. The increase of security in public transport systems calls for new solutions which are not only of technical nature. Advanced public transport systems responding to these requirements are being developed in various European cities and can be observed for instance in Zurich (Switzerland) and Freiburg (Germany).

An interesting example of good integration between urban development and public transportation can be found in the city of Curitiba (Brazil). Urban growth as being concentrated along public transport lines. The result is that on normal working days, more than 70% of people moving in the city use public transport. Gasoline consumption per inhabitant is 25% lower than in the eight other similar Brazilian cities. Air pollution is also significantly lower.

#### **6.1.4 Growing social issues in European cities**

Globalisation brings with it stronger diversity and growing disparities in European cities. The ways, places and times of live of various social groups are more and more fragmented and sometimes in opposition. Social groups in cities are more and more in competition with regard to education facilities, housing etc. Integration policies are being counteracted by the global economic framework which generates disparities. It is likely that gated communities will develop in Europe as it is already the case in the United States and elsewhere. In Southern USA, 40% of new housing is being built in gated communities.

The number of socially problematic neighbourhoods is increasing in European cities. The general characteristic of such neighbourhoods is their strong social immobility. Residential trajectories (changes of residence related to social progress) are blocked. Socio-economic disparities with other parts of the city are growing (unemployment rates, failures at school etc).

The regeneration of problematic neighbourhoods will be an important task for the decades to come. The objective should be to improve the living environment (development of services and facilities; improvement of the physical environment), but also to generate dynamics likely to reduce the social immobility of such areas. Pilot projects of urban regeneration in problematic neighbourhoods are underway in a number of European cities.

As long as the global paradigm produces growing social disparities, urban regeneration and integration policies at local level will face difficulties in creating a more balanced social environment in cities. This raises the question of redistribution policies at national level.

#### **6.1.5 Issues of urban governance**

The governance of urban entities is developing and changing in various respects.

Large metropolitan areas require more and more an efficient governance level at the scale of the metropolitan entity. The re-establishment of the Greater London authority in the year 2000 is an example of such evolutions. Fragmented governance of metropolitan areas appears counter-productive in the context of growing competition between them. Excess of proximity ideology at the scale of the neighbourhood may be negative, in terms of governance, for developing efficient solutions to urban challenges, because these often require a wider scale. It can also be observed that, among European cities, those which carry out significant investments are often those which have new, powerful institutions.

Another dimension of the evolution is the “complexification” of decision-making processes. More and more, decisions have to be collective and negotiated. They require a higher degree of democratisation. In the digital cities of the future, the strengthening of citizens’ participation and of urban democracy will be unavoidable, because such cities will have the possibility to permanently re-organise themselves socially and institutionally.

#### **6.1.6 Trends and potentialities for the evolution of cities and urban systems**

The process of metropolisation is strongly connected to that of internationalisation/globalisation. A new paradigm of connectivity is being added to the gravity principle which has traditionally characterised urban systems. The new economy, characterised by growing inter-sectoral exchanges and by the integration of functions, is becoming an “economy of circulation”. According to this new paradigm, the rank and the

role of cities depends less from their respective “catchment area” than from their integration into global networks. The world cities are the cells of the new world economy.

The metropolitan networks are enlarging at European scale. While the “Blue Banana” represented 20 years ago the privileged zone of competitive metropolitan areas, a significant number of metropolitan areas located outside have in between strongly increased their international competitiveness, such as Berlin, Vienna, Madrid, Bilbao, Barcelona, Munich, Marseille etc.

The concept of polycentric metropolitan area is gaining in importance through the intensification of intra-regional co-operations between cities. In France, this is the case for the city networks of the region Rhône-Alpes (Grenoble-Chambéry-Annecy; Lyon-Saint Etienne), for Nancy-Metz in the Lorraine region or for Rennes-Nantes in western France. The morphology of metropolitan systems may vary significantly from case to case. It is not necessarily incompatible with desurbanisation trends.

Metropolitan areas concentrate jobs in upper level functions. Such jobs generally represent less than 10% of the total employment by country. Indirectly, however, upper level functions may generate roughly one third of new job creations. They are therefore of primary importance.

A number of inner urban issues are particularly significant for the future in relation to the re-modeling of cities:

The greening of cities corresponds to widespread expectations of urban dwellers. This concept may somewhat counteract that of compact cities. It is however not necessarily incompatible with high local densities. Innovative solutions will have to be conceived to improve the quality of life in cities through green modernity without hampering development. This objective opens a wide field of activity for urban planning in the decades to come. An example of such an approach can be found in the Lille area “Le Bois à habiter”.

The remodeling of cities calls for better integration of infrastructures and large assets in order to avoid functional segregation and the development of large urban assets only in the outskirts. Near Amsterdam, a new urban entity is being built on two levels. The lower level is dedicated to infrastructure and large shops while the upper level is allocated to housing, small shops and other services.

The concept of democratisation in the accessibility of services should be revisited. Urban rhythms are changing in the sense of growing de-synchronisation. This results from the fact that the working function is by far no more the only “driver” of time organisation in cities. While it is necessary to better coordinate the time dimension related to services (schools, childcare, shops, other services), the organisation of mobility is also an important dimension, especially for those who are facing specific constraints in organising their daily life (long distances to reach service areas, missing public transport facilities, lack of flexibility in working time etc). Stronger democratisation in mobility and accessibility will become an important issue. A specific aspect of this issue is the need to avoid over-concentration of services in central urban areas at the expense of more distant ones. Pro-active decentralization of services towards less-favoured areas will contribute to increasing their accessibility by less privileged social groups.

## 6.2 Globalisation and its territorial impacts revisited

Compiled by from:

- Michel Husson: "Les enjeux de la crise". La Brèche N°4. 2008
- Jacques Gouverneur : « Alternative economic policies against crisis and unemployment ». Oct 2006.
- Jacques Sapir: "Les racines sociales de la crise financière. Implications pour l'Europe". 2009
- Various articles from periodicals (The Economist, AFP etc.)

The strongest evidence for the existence of powerful globalisation mechanisms is without any doubt the financial/economic crisis itself. The crisis is not only the result of the globalisation process. Its roots are themselves deeply interwoven with the globalization process. The territorial impacts in Europe of globalisation have been an important subject of investigation and debate during the past decade. Now, the potential territorial impacts of the financial/economic crisis are on the forefront. Looking at the issue from a more structural point of view, the real question is which kind of globalisation will follow the financial/economic crisis? Alternative possibilities departing from past trends can be envisaged, taking into account possible new attitudes of stakeholders, including international institutions and national governments. The future of European cities will certainly very much depend upon the post-crisis globalization mechanisms. It seems however essential to revisit the genesis process of globalisation in order to better identify the factors which have led to the crisis.

### 6.2.1 The move from Keynesian to neo-liberal policies

The move from the "fordist" to the "post-fordist" economies which has taken place in the mid 1970s has been accompanied by a deep change in public policies. During the period 1945-1975, the economic "miracle" of the post-war period largely resulted from the fact that Keynesian policies were systematically applied which raised global demand through wage earners' consumption and public expenditures. In the context of growing productivity, enterprises enjoyed both high profits and enlarged markets and reinvested their profits in larger production activities. The scarcity of manpower led numerous manufacturing industries to create branch plants in rural regions, taking advantage of abundant and cheap labour force and from the incentives that national governments made available in the context of their respective regional policies. Domestic and international competition between enterprises used to take place in the context of generalised increases in wages and employment.

The oil shocks of the 1970s had deep impacts on enterprises and on regional development. The fall in profits resulted in a fall in investments and in the closing down of numerous plants using low qualified manpower, mainly in rural regions. The post-fordist economy which emerged from the oil crisis showed a clear preference for cities. Urban economies became progressively an essential location factor throughout (Western) Europe.

Rising unemployment was one of the factors leading governments to change their policies and to move towards neo-liberal approaches and practices. Arguing from competitiveness and profitability constraints, they put pressure on wages, on social allowances and on public expenditures. Such policies were inaugurated by the tandem Reagan/Thatcher, soon followed by other European government leaders, irrespectively from their political obedience.



Then began a general vicious circle, since restrictive policies adopted by one country call for similar policies in other countries. Though being rational on a micro- and meso-level (each country seeks to improve the competitiveness of its enterprises so as to ensure their survival or growth), neo-liberal policies lead to completely different macro-economic results: the spreading of wage and employment reduction measures entails a restriction of global demand and hence the slowing down of production, employment and consumption in all countries. The neo-liberal policies applied since the 1980s produce contradictory results. On the one hand, they increase the enterprises' total profit and thus their financial potential for investment. On the other hand, as they put pressure on the wage earners' purchasing power and on public expenditure, they contract the enterprises' markets and thus their opportunities for profitable investments. For lack of sufficient market outlets, enterprises can reinvest only a small part of their profits in production activities. Profit is then massively invested in transfers of ownership, which have taken considerable importance since the 1980s (takeovers of private firms or corporations generating a worldwide concentration of production in all sectors; purchase of privatised public enterprises; speculation on currencies and securities leading to a financial bubble etc). In this context, growth remained weak and unemployment could not be eliminated.

While the rate of profit of enterprises and the rate of accumulation/savings of households had similar evolution until the beginning of the 1980s, the gap between both curves has been permanently growing since then. Neo-liberal policies, characterised by the limitation of public expenditures, had so far significant impact on cities, especially in failing to respond substantially to growing social needs (exclusion, poverty, immigration) through the provision of appropriate infrastructures and services.

### **6.2.2 Genesis of the financial crisis**

The financial crisis is the combined result of push and pull effects. The pull effect has its roots in the significant changes in income distribution which have taken place since the early 1980s, with the part of wages in GDP being permanently reduced. The push effect has been the permanent creation of free capital looking for maximum profitability.

The origin of the financial crisis is to be found in the United States where the evolution of consumers' revenues during the 1980s and 1990s was significantly lagging behind the increase of production. The worsening of the financial situation of households has resulted in a dramatic increase of their debt level, facilitated by appropriate, innovative financing procedures. American households have been more and more using mortgage credits guaranteed by their home property for maintaining their consumption level or simply for surviving ("Home Equity Extraction"). This became necessary because of the income decline of a significant part of households with the exception of the wealthiest ones (this can be easily shown by the Gini coefficient of income distribution) and was facilitated by numerous new procedures of financial engineering as well as by the availability of free capital.

A further factor which has significantly contributed to the occurrence of the financial crisis has been the introduction of a number of new financial instruments and procedures in the USA which has generated a considerable opacity in the real nature and value of financial operations along the chain from mortgage loans towards highly speculative and profitable investments. Procedures such as the "Credit Default Swap CDS" (loan insurance), "Collateralised Debt Obligations" (CDO), or "Collateralised Loan Obligations (CLO) reduce considerably the perception of risks. While such financial products derived from mortgage loans practically did not exist at the end of the 1990s, they amounted to 46 000 billions USD in 2007. CDOs were introduced with mortgage support for stock exchange operations. In this way, high risk credits (loans attributed to low income households) were transformed into financial products apparently without risk and with high return rate. Among the most

risky mortgage loans, the so-called “sub-prime loans” are those attributed to people with a debt/income ratio above 55% or with a loan/mortgage ratio above 85%. In March 2007, the total amount of the sub-prime loans in the USA was estimated to 1300 billion USD. Most of related loan contracts were based on variable interest rates which worsened the situation as interest rates in the USA have been increasing from 2000 until 2008. By October 2007, 16% of such sub-prime contracts were subject to significant delays in reimbursement or even to households’ bankruptcy. The worsening of the situation has been exponential during the year 2008. The real estate markets in the USA plunged literally.

### **6.2.3 Globalisation of the financial crisis**

Various factors contributed to the globalisation of the financial crisis:

*The liberalization and deregulation of financial markets* which contributed significantly to the financial crisis had also their origin in the USA. These have put pressure on the IMF to replace the “current account convertibility” by a “capital account convertibility” (which increases the role of speculation in international financial markets). The EU has followed with the adoption of directives on the liberalization of financial services. The globalisation of financial markets was implemented while control mechanisms on the “quality” of financial flows were abolished.

*The general development of wage deflation, including in Europe.* Wage deflation has been generalizing in the context of the progress of free trade under the auspices of the WTO. Wage deflation has been strongest in sectors exposed to growing international competition, especially from emerging economies. While the relocation of activities towards low-wage countries and countries with modest social and environmental regulations has been emblematic for this process, pressure to curb down wages in the developed countries had a stronger impact than the relocation of activities. Wage deflation has also been aggravated by the introduction within enterprises of “leveraged buyout” (LBO) procedures which impose a strict financial logic and therefore high profitability standards (above 10% per year). High pressure has therefore been put on wage levels and on the working conditions of employees.

Wage deflation was accelerated, in the context of globalisation, by the attitude of emerging economies. A number of them, especially South Korea, Brazil, Russia had been severely affected in the years 1997-99 by the worldwide liberalisation of financial markets. The IMF proved unable to efficiently solve this crisis and numerous countries, especially those of the Far East, started building excessive foreign currency reserves in order to protect themselves against this type of problem. In order to cover the significant internal costs generated by this practice, the countries concerned had to boost their exports, to devalue strongly their own currencies and to constrain domestic consumption. Such policies have contributed to strengthen the process of wage deflation in developed countries. In the case of Europe, wage deflation has in addition been exacerbated by the EU enlargement process. The new member countries do not only compete through lower wage levels, but also through weaker currencies in relation to the Euro.

It resulted from this that the level of households’ debts increased also in Europe, but in a context of heterogeneity. Great Britain, Ireland and Spain have followed the American evolution with very high growth of households’ debts over the past decade, to reach a high level compared with national GDP (107% in Great Britain; 84% in Spain in 2006). The financial mechanisms were very similar to those used in the USA, especially with the borrowing level following the market value of real estate property in a context of strong speculation. In case of declining value, those benefiting from a mortgage loan were obliged to make a bank deposit corresponding to the value reduction. This explains the high level of private insolvency and bankruptcies once speculation waves were over.

In France and Italy, on the opposite, the level of indebtedness of households, although increasing from the end of the 1990s onwards, has remained much more limited, especially because the rules governing loan attribution are different from the ones prevailing in the United States. Households' cumulated debts amounted in 2006 to 45% of the national GDP in the case of France and to 39% in the case of Italy. Germany had an intermediate position between the two groups of countries with households' debts amounting to 68% of GDP in 2006. The German model combines elements of the American and Asian models. The neo-mercantilist policy adopted has been characterised by a massive relocation of subcontracting activities, mainly towards countries of Central and Eastern Europe, with the maintain in Germany of final assembling activities ("made in Germany" was virtually replaced by "made by Germany"). At the same time, the government has transferred to households a part of the burden of enterprises, mainly by increasing the VAT rate. Despite strong foreign trade surplus until 2008, GDP growth remained modest because of depressed domestic demand. Growth would have been even weaker without the increase of households' debts in recent years.

The opacity of financial mechanisms in place in the USA, to which those set up in a number of European countries were added, favoured by uncontrolled speculation on the real estate properties, abundant free capital circulating in search of high profits, generated a financial bubble based on bad quality debts. Through the globalisation of financial markets, American bad quality debts were disseminated throughout the whole international financial system. Because of the situation of "Eurodivergence" with regard to the situation of banks and households' debts, a coherent European policy to accelerate to recovery seems difficult to conceive.

The explosion of the financial bubble in 2008 has nevertheless significant impacts for cities throughout Europe. The most visible and immediate one has been the depression in the housing and real estate markets as well as in building activities. The speculation movement of the past decade has been suddenly stopped. As the economy crisis is following the financial one, unemployment is increasing significantly, especially in manufacturing activities. Cities are likely to be more affected by the crisis than rural areas.

***Potential impacts of the financial/economic crisis on the globalization process***

Numerous are those to assert that the world economy has entered into a process of deglobalisation which means a weakening of economic interactions between countries and continents. The evolution of a number of indicators since summer 2008 confirms this evolution:

- *World trade has plunged.* Countries most open up to world trade are particulate affected. Over the last three months of 2008 the economies of a number of strongly exporting countries shrank at impressive annualised rates (13% in the case of Singapore, 11% in the case of Taiwan, 8% in the case of Germany, 13% in the case of Japan). In February 2009, China's exports lost 25.7% compared with February 2008. In the case of imports, it was 24.1%. Industrial production fell by 6.8% in Germany, 21.7% in Taiwan and 12% in Japan. Intercontinental flows of goods are particularly affected. In December 2008, intercontinental air cargo traffic, responsible for over one third of the value of world traded goods, was down 23% on December 2007. Intercontinental container transport has become very cheap, compared with the situation in 2007, with numerous freighters being half empty.
- *FDIs inflows shrank by 21% in 2008.* The fall of FDIs has been strongest in rich countries: 1/3 on average and half or more in Great Britain, Italy and Germany. Finland and Ireland have seen net outflows. FDIs flows to developing countries are strongly being reduced. In the countries of Central and Eastern Europe, the growth of metropolitan areas, especially of capital cities, has largely been based over the past decade on FDIs. The strong reduction of such investment flows would be a particular constraint not only for the large cities, but for the economies of the whole countries which is more and more driven by them.

- *Financial deglobalisation* is seriously affecting Eastern Europe and Russia, because local banks borrowed on international markets while foreign banks came into domestic markets and moved out again. In Eastern European countries, external debts have risen and current account deficits have grown considerably in the past decade. The reversal of globalisation has exacerbated problems that were building up anyway. More generally, the financial crisis has generated the transfer of savings from large international banks towards more regional and cooperative banks which are far less active on international markets and less suspect in investing in unsecure financial products. Such banks generally invest in local or regional projects and are particularly useful in supporting endogenous development strategies. This dimension of financial deglobalisation may prove particularly efficient to facilitate the economic recovery, provided a sufficient number of endogenous projects are generated.
- *Decline in the international tourist sector.* International tourist arrivals fell by 1% at world scale in the second half of 2008, compared with annual growth rates of 5% for the previous four years. In the Caribbean, visitors may fall by 1/3 in the 2009 season. In some islands, hotels are half empty, flights are being cancelled and national budgets, reliant on tourism, are being strained. This is a particular problem for countries highly dependent upon tourism (Spain, Portugal, Greece, Malta, Cyprus etc).
- *Migrants returning back home.* Because of growing unemployment, a significant number of migrants are going back home. In Europe, this is the case for instance for Poles working in Ireland, in North America, numerous Latinos are going back to South America and in the Gulf states, a large number of Asians are moving back to their South-Asian home countries. This has a significant impact on the flows of remittances from wealthier to poorer countries and increases unemployment in the poorer ones.
- *New temptations of protectionism.* The temptation to reintroduce protectionist measures is not a negligible when it comes to boost domestic demand through public measures. Public support by governments to their strategic manufacturing companies (steel production, automotive sector etc) often wakes up the need to better protect national markets by higher tariffs. The plan for economic recovery adopted by the American Parliament in January 2009 contains an article which forbids the purchase of foreign steel for infrastructure projects financed by the plan. India has already raised some steel tariffs. Russia has raised import duties on vehicles. The development of non-tariff protections may also develop in some sectors.

Although deglobalisation trends are underway, it should not be hastily concluded that the crisis means the end of the development of international economic and financial interactions. A number of clear signals show that various factors are at work to refurbish, possibly in a more selective way, this type of interactions.

- A quite significant number of countries are adopting measures to boost domestic demand and activities through fiscal incentives, financial support to threatened manufacturing activities, public expenditures for the development of infrastructures etc. In a context of largely open borders and despite the resurgence of protectionist temptations, such measures should have significant impacts on the revival of

international trade. Expanding domestic demand should favour imports, while supports to manufacturing activities are hardly compatible with non-growing exports. It is too early to judge if the new policies are Neo-Keynesian ones and if they are going to be long lasting, but it is quite likely that they will favour the expansion of markets and therefore of trade flows.

- A number of significant international partnerships are being concluded in the energy and manufacturing sectors. The revival of nuclear energy driven by oil depletion forecasts and by the requirements on the limitation of greenhouse gas emissions is one of the main pulling factors in this respect. A cooperation programme on nuclear energy was signed by France and Italy in February 2009 for the construction in Italy of at least three nuclear power plants of new generation EPR, with the Italian energy company ENEL taking financial participations in the construction of 2 ETR in France. French and German energy companies (Areva and Siemens) are associated for the construction of the EPR Olkiluoto in Finland. The two German energy companies EON and RWE are cooperating for entering into the market of nuclear power plants in Great Britain. The German company Siemens has concluded an agreement with the Russian Atomic Energy Agency Rosatom to develop and construct jointly new nuclear power plants. The reactivation of nuclear energy is also on the agenda in Sweden and will call for transnational corporation, as it is already the case in Finland where the construction of five new nuclear power plants has been decided and a sixth is envisaged. Trends are similar at world scale. In the gas sector, transnational cooperation is being organised in relation to the construction of a major gas pipeline called Nabucco connecting the Caspian Sea (Azerbaijan) to Austria through Turkey, Bulgaria, Romania and Hungary. The total length will be 3300 km and capacity 31 billion m<sup>3</sup> per year. Total investment costs are to amount to € 8 billion.
- In a number of emerging economies and of oil/gas producing countries huge amounts of capital reserves have been constituted in the form of sovereign funds or simply of private capital reserves by states and corporations. Such funds and reserves are looking for profitable investment possibilities as well as for the appropriation of new technologies. As an example of such trends, high-level Chinese delegations visited Europe in early March 2009 to investigate the possibilities of taking over European enterprises and/or of taking participations in the equity of European companies in need of fresh capital.
- Technological innovations will continue to progress and to be disseminated throughout the world, ignoring national and continental boundaries. The evolution in a number of sectors such as biotechnologies, nanotechnologies, robotisation, telecommunications etc is extremely promising. It is therefore likely that technology will continue to be a powerful vector of globalisation.

Summing up, the globalisation process is presently being shaken into different, sometimes opposite directions. At the present stage, it is rather premature to elaborate predictions about the potential territorial impacts of its evolution. It should be remembered that the regional impacts of the 1973 oil shock distinctly appeared only by the end of the 1970s. Not only "natural evolutions" are of importance in this respect, but also the nature, intensity and coherence of public policies applied. In this respect, the continuation of the macroeconomic policies applied since the 1980s has to be questioned. The genesis of the crisis clearly shows that the size of domestic markets and the level of purchase power of large parts of the

population play an important part in a balanced growth process and in a socially cohesive society. The scenarios could investigate more deeply how contrasted macroeconomic policies could impact the regional and urban systems and how regional/local policies could interfere with the macroeconomic policies.

### **6.3 Economic and social impacts of demographic change in the coming decades**

#### **a) (Growing regions; growing Europe; Fourth report on economic and social cohesion; 2007)**

Demographic change will gradually limit the scope for future employment growth. Although the population of working age (aged 15–64) is already expected to decline from around 2011 onwards, total employment in the EU-25 is expected to continue growing up to around 2017 due to rising labour force participation.

Thanks to higher education levels and greater labour force participation of younger cohorts of women, female employment rates are projected to rise from just over 55% in 2004 to almost 65% by 2025, assuming, of course, a counterpart growth in jobs. The employment rates of older workers are also projected to increase, from 40% in 2004 for the EU-25 to 47% by 2010 and 59% in 2025. From around 2017 onwards, however, in the absence of an increase in net inward migration, the shrinking working-age population could lead to the number in employment remaining unchanged and, subsequently, to it declining. Productivity growth will then become the only source of economic growth.

Overall, three phases can be distinguished:

- Between 2004 and 2011, there is scope for significant employment and economic growth as both the population of working age and participation rates are expected to increase.
- Between 2012 and 2017, rising participation rates can offset the decline in working-age population resulting from the baby-boom generation entering retirement and being replaced by much smaller numbers of young people becoming of working age. The overall number of people in the work force in the EU could continue to increase, though at a slower rate and this period could be characterised by tightening labour market conditions.
- After 2018, the ageing effect will dominate. By then, the cohort trend towards higher female participation rates will more or less have come to an end putting even greater pressure on measures to increase participation of women as well as on measures to increase the participation of older workers to raise the effective retirement age. Consequently, the declining number of people of working age can then be expected to result in a decline in total employment and lower prospects for economic growth, though not necessarily of growth in GDP per head.

#### **b) “Changing regions – structural changes in the EU regions” final report**

Study carried out for dg regional policy by APPLICA and WIIW (2007)

**Observation:** The economic projections presented hereafter were made before the economic crisis. They have to be considered with caution. The results of the study may however show interesting territorial directions of development

The approach adopted is to relate the projections of labour demand to those of working-age population to give projections of employment rates by education level across regions. These show, in other words, the proportion of working-age population with different education levels who are projected to be employed in future years, given the demand for their broad skills and given also an absence of constraints on them being able to take up the jobs on offer (such as, in particular, the need to balance caring for children with working in the case of women). Comparison of the employment rates so projected with the present rates indicates the extent to which demand is either increasing ahead of supply or falling short of it. Prospective labour shortages are indicated where the employment rate projected exceeds its maximum plausible level, which is around 90% or so, given that there will always be a certain number of people unable to work, moving between jobs or having a spell away from employment in education or training or meeting other responsibilities.

It should be emphasised that such an exercise gives only a broad indication of labour imbalances given that it takes no account of the particular skills or areas of expertise of the people concerned, so that one university graduate is treated the same as any other, irrespective of whether they have, for example, a degree in engineering or in sociology. In practice, this is likely to be equally as relevant, if not more so, for any particular job vacancy than the possession of a degree as such.

Nevertheless, a shortage of engineers with degrees is still likely to show up in the projections if the fact of having a university qualification seems to be a requirement of particular jobs which are expanding in terms of numbers. What will not show up, in other words, is mismatches between the pattern of job growth and the specific disciplines which people coming on to the labour market have been educated or trained in.

Equally, the exercise takes no account of any difference in the qualification obtained by those completing tertiary or upper secondary education in different countries, or indeed regions, of the fact, for example, that those completing tertiary education in, say, Germany or Italy are on average significantly older – in their mid-to-late 20s – than those completing tertiary education in Spain or the UK, or that equivalent differences exist between those completing programmes of uppersecondary education, whether general or vocational in nature. It is, therefore, assumed that a university degree obtained after three years in one of the latter countries equips someone to do a given job that requires such a qualification just as well as in one of the former countries, or that the same is the case for those completing three years of vocational training at upper secondary level as compared with six years.

Moreover, no account is taken of the standard of education or training received, irrespective of the time that it takes. Private universities in Poland which have developed rapidly in recent years to cater for the demand for degrees are, therefore, assumed implicitly to offer the same standard of education as an old established university, which may or may not be the case in practice, though it is likely that the standard of education they provide is more variable than that obtained in publicly funded universities.

### ***Projections of overall employment rates***

Examining the implications for overall employment rates of those aged 15-64, first, and leaving to one side potential mismatches in the levels of education demanded and supplied, the projections indicate a rise in rates for most of the regional groups in countries with differing income levels, given the growth of GDP which has been assumed. In the high income countries – i.e. in the 12 EU15 Member States, excluding the three Cohesion countries, Greece, Spain and Portugal – where an annual growth of 2.5% a year has been assumed in each case, the overall employment rate is projected to rise to around 70% or

above by 2015 in all the regional clusters, grouped by area of specialisation, except in agricultural regions. This implies a rise of between 2 percentage points in the core regions, where the employment rate is already high and where the growth of working-age population is projected to be higher than elsewhere, as seen above, and almost 6 percentage points in the basic industry regions, where population is projected to remain virtually unchanged but where the demand for labour is projected to increase by around 0.8% a year. In agricultural regions, where the employment rate in 2005 was under 60%, the number in work is projected to increase by more than in the other regions (by over 1% a year), and the employment rate in 2015 to rise to just over 65%.

In the medium income countries – the three EU15 cohesion countries plus the Czech Republic, Slovenia and Cyprus (Malta is not included in the projection because of lack of sufficient data) – where GDP is assumed to grow by 3% a year, the employment rate is projected to a rise to well over 70% in the core regions, where it is already close to this as well as in the engineering region. The rate is also projected to increase significantly in the agricultural regions, many of which are in Spain, but to remain below 70%, while in the basic industry and basic services regions, the employment rates is projected to rise only a little, partly because of the projected increase in working-age population. This increase is particularly marked in the tourist regions, as noted above, and here it outstrips the projected demand for labour and the employment rate is projected to decline significantly.

In the low income countries – all the new Member States apart from the four listed above – where GDP growth is assumed to be maintained over the 10 years up to 2015 at 5.5% a year, which only the three Baltic States have managed to achieve over the past 10 years, the employment rate is projected to increase significantly in the core regions though even more in the engineering, basic services and tourist regions. (It should be noted that a relatively growth rate has been assumed partly because a high rate is required in order to expand employment significantly given the substantial scope for productivity gains as well as to close the gap in GDP per head with the rest of the EU markedly, and partly in order to highlight the potential constraint on attaining such a high rate of growth that labour market factors might impose.) In each case, however, it rises only to around 65% at most despite the high growth assumed. In the two other regional groups, agricultural and basic industry, the number employed is projected to fall and the employment rate to decline from its present relatively low level. In both cases, therefore, a rate of under 60% is projected in 2015 and in the basic industry regions, only around 53%, the rate declining particularly in the Romanian regions included in the group.

### ***Projections of employment rates by education level***

In terms of education levels, the projections indicate a systematic tendency for employment rates of those with tertiary education to increase, in most regions markedly, as the growth of demand for labour with this level of educational qualification outstrips the increase in supply. This is the case for the regional clusters at all income levels. In many cases, this results in the employment rate for such people exceeding 90-95%, which, as noted above, is probably close to the maximum to which the rate can plausibly rise and therefore denotes the prospect of shortages of labour with the broad skills concerned.

In the high income countries, therefore, the employment rate for those with tertiary education is projected to rise in the core regions and, more markedly in the agricultural regions, but in each case to remain below 90%, though only just, suggesting the possibility of some shortages of labour with this level of education. In the basic industry and basic services regions, the employment rates is projected to increase to around 95%, which almost certainly is not attainable, implying therefore that skill shortages might slow down structural change and, accordingly, economic growth. In the engineering industry regions, the projected increase in the rate is well over 95% and in the tourist regions, well over



100%. Consequently, in these cases, shortages of labour with this broad level of skills is likely to be acute unless there is a corresponding increase in supply, which as noted above is very difficult to achieve in a short space of time, given that the relative number of young people completing their education and joining the work force is inevitably a relatively small proportion of the total of working age. A potential solution is to expand life-long learning and, effectively to educate those who have already left the education system some years before to tertiary level – or at least, to give them sufficient tuition that they are able to perform jobs which are undertaken to a large extent by people with university degrees or the equivalent.

In practice, what is likely to happen in these circumstances, not just in regions in high income countries but generally, is a combination of a shift to new activities being slowed down and the upward trend in education levels moderating. The latter means in practice that more people with upper secondary education will take on jobs for which people with tertiary education cannot be found. In cases where job requirements do not strictly entail having a university level of education but where employers prefer to recruit university graduates, this may have few consequences, except to provide jobs for those with upper secondary education, which in the tourist regions in particular are projected to decline. In cases where having a high level of education may not be necessary given the tasks which need to be performed but where university graduates perform better, productivity may increase by less or new opportunities may remain unexploited. In yet other cases, the jobs concerned will not be done at all and both the pace structural change and economic growth will tend to be slowed down.

In all the regional clusters in the high income countries, the employment rate of those with upper secondary education is projected to increase only modestly or to fall, whereas the rate for those with only basic schooling is projected to rise in all of the cases, except the tourist regions. In all the regional groups, however, it will remain below 60% in 2015, in most cases, substantially below, and in agricultural regions, below 45%. This increase in the employment rate for those with this low education level is a result of the numbers concerned declining significantly in all of the clusters as increasing numbers of people have upper secondary or tertiary qualifications rather than of any growth in jobs which can be done by those with no qualifications. Indeed, the number of jobs concerned is projected to decline in all cases. In addition, the fact that the employment rate for such people is projected to rise does not necessarily mean that it is likely to increase in practice. Instead, it might be the case that some of the jobs concerned will be taken up by people with upper secondary education, especially in regions where, such as in the core group or the engineering cluster, the demand for people with this level of qualification is projected to decline relative to their growing numbers.

Examining the projections in more detail indicates that the constraints on structural change and, accordingly, economic development imposed by a prospective shortage of people with tertiary education could well be a particular problem in Italy and Austria, where the proportion of the work force with this level of education is much smaller than in other parts of the EU. In most regional groups in Austria, therefore, the employment rate for university graduates or the equivalent is projected to rise to well above 100%, while in Italy, this is the case in the basic industry and engineering regions in the north of the country – ie in the traditionally strong industrial area where GDP per head is relatively high, but where as noted above, the relative number not only with tertiary education but also upper secondary schooling is significantly smaller than the EU average.

Shortages of labour with tertiary education also appear to be a prospective problem in Denmark, all regional clusters in the UK and in basic industry regions in Germany (such as Koblenz and Kassel). In the medium income countries, the employment rate for those with tertiary qualifications is projected to increase above 95% only in the core and engineering

regions, while in basic service and tourist regions, the employment rate for people with this level of education is projected to decline. Indeed here, the main increase in the employment rate is for those with upper secondary education, which is projected to rise to around 75% or more by 2015, which is line with the rate in the other regional clusters (whereas at present, it is well below this rate). Analogously to the case of those with upper secondary education competing for relatively low level jobs with those only basic schooling, however, people with upper secondary education in these two regional cluster are likely to experience increased competition for jobs from those with tertiary education, since the demand for these relative to supply is projected to fall. In practice, therefore, so long as those with tertiary qualification are willing to accept the going rate for the job, their employment rate can be expected to hold up at the expense of those with upper secondary education.

By contrast to the relative growth in demand in most of the clusters in medium income countries for those with upper secondary and tertiary education, the employment rate for those with only basic schooling is projected to decline in all of the groups, as the number of jobs which can be done by those with low skills falls by more than the reduction in the number of people concerned. The employment rate for such people is therefore projected to fall to below 50% in all the cluster apart from the core regions. This emphasises the prospective problems faced in regions in Spain and Portugal in particular where the relative number of people of working age with no educational qualifications remains substantial and where the structure of economic activity is shifting towards people with higher education levels. These problems arise for everyone concerned – for individuals who cannot find jobs for the skills which they have to offer; for companies who cannot find people to recruit to fill the new jobs they are creating, or would like to create if they had the people to fill them; for public authorities, who have to cope with a rising number of people out of work and have to find policies for reducing this number, in a context where the main solution of raising education levels is difficult, if not impossible, to accomplish within a short period of time.

A more detailed examination of the projections indicates that shortages of labour with tertiary education is likely to affect most of the Czech regions in particular, including the capital city regions, despite the growth in people with this level of education, as well as those in Portugal, including the basic industry region of Norte, where textile and clothing production is concentrated as well as Lisboa. (Norte is one the regions examined in more detail the next chapter.) It is also likely to affect a number of engineering regions in Spain, including Pais Vasco, Aragon and Cataluña. as well as the basic service region of Ipeiros in Greece.

In the low income countries – i.e. the new Member States apart from the four listed above – employment rates for those with tertiary education are projected to rise in all regional clusters, with the exception of agricultural and tourist regions, though only in the engineering and basic service regions is the rate projected to exceed 95% in 2015. In all regional clusters, as in the high income countries, the employment rate for those with only basic schooling is projected to rise.

Despite the increases, however, the proportion of such people is projected still to be under 45% in all regions in 2015, though in agricultural regions, only marginally, under a third in Core and engineering regions and under 30% in basic industry regions. As in high income countries, however, the small increases which are projected are the result not of an increase in demand for such workers but of the projected reduction in supply exceeding the fall in demand.

By contrast, in the entire regional cluster, apart from the tourist one, the employment rate for those with upper secondary education is projected either to remain much the same (as in the core, engineering and basic service regions) or to decline. Whether this occurs in

practice or not depends on whether they are capable of doing jobs for which there are insufficient numbers of people with tertiary education to do in the regions where this is a problem. It also depends on their willingness to do lower level jobs which do not seem strictly to require the skills and competences they have to offer. In other words, as also in the case of high income countries, the rise in employment rates projected for those with low education levels does not necessarily mean that labour market problems are set to ease for such people in the new Member States, even slightly. Since the jobs they do can equally well be performed by those with upper secondary education, it is likely to mean, in practice, that more of the jobs will be taken by such people, so long as they are willing to accept the level of pay which goes with them.

Examining the projections in more details indicates that the prospective shortages of people with tertiary education to do the jobs which seems to require their skills and know-how are widespread across the new Member States, except in the three Baltic States. They are projected to be a problem in all of the regions in Hungary, even the capital city region, except the agricultural region of Dél-Dunántúl. In Poland, despite the growth in the number of university graduates, they affect in particular the engineering regions of Dolnoslaskie and Opolskie and the basic industry regions of Lodz and Kujawsko-Pomorskie., though not the capital city region of Mazowieckie or Slaskie, where the increase in graduates has been especially high. (Slaskie is one of the regions considered in more detail in the next chapter.) In Slovakia, they are projected to affect the engineering region of Západne Slovensko but not Bratislavsky.

In the two newest Member States, the growth in the number of people with tertiary education in recent years means that employment rates are projected to remain below a critical level in both the Sofia region and Bucuresti. On the other hand, demand for labour with these qualifications is projected in Bulgaria to exceed the growth of supply in the basic service regions of Severozapaden and Yugoiztochen and in Romania, in the engineering region of Sud.

In sum, therefore, the projections highlight the implications for the demand for highly educated workers which trend shifts in the structure of economic activity entail and draw attention to the potential shortages of people with university degrees or the equivalent which seem set to arise unless there is a marked increase in the numbers completing tertiary education. These prospective shortages are evident in regions at all income levels, or stages of economic development. As such, they are liable to constrain the growth of more advanced, higher value-added activities and limit the shift which occurs from declining sectors into these. While it might be possible for those with upper secondary education to substitute for those with tertiary education and do many of the jobs concerned, so relieving the potential bottleneck, there are a likely to be limits to how far this can happen and even tighter limits on how far it can happen without damaging efficiency and competitiveness.

The limits may well be especially binding in regions in the new Member States, where a large number of those with upper secondary qualifications have had a relatively narrow education focused on training for a particular vocation, which accordingly has ill-prepared them to diversify their skills to take up jobs in other areas.

## **Annex 7. WP3: Cities and their hinterland - from economic landscapes to super-clusters**

### **Introduction**

This paper offers an analysis of relationships existing between the city and its regional surroundings. In its first part, the report provides a review of classical and contemporary urban and regional development theories, placing a special emphasis on the implications for the city-region linkages. As the next step, a typology of such relationships is discussed, including their current situation and recent changes. In the subsequent parts of the chapter, the impact zones of a large city are defined, and a model for the changing relationships between the metropolis and the region is proposed. On this basis, some research questions and hypotheses are proposed, to be later verified in the course of empirical studies conducted for ESPON countries, and also on the occasion of selected regional case studies. The subsequent parts provide results of analysis at ESPON level aimed at selection of metropolitan macroregions suitable for further investigation based on administrative criteria. The paper present preliminary result of city-regions analysis for such a sample based on basic indicators: GDP per capita and GDP growth rate in years 1995-2004. This enabled us to make a proposal of case studies for detailed analysis of city-region relationships.

### **7.1 City-region relationships in light of selected theoretical approaches**

In many classical and contemporary theories and concepts dealing with urban and regional development, we will find some aspects explicitly or implicitly discussing the relationships between the city and the surrounding region (Tab. 9). In the classical references, this issue is frequently limited to analysing mutual ties between cities and rural areas, or those within a hierarchical city system. In reality, processes accompanying the development of information economy can lead to obliterating the dichotomy between urban and rural areas, also because of the now made more facile popularisation of city lifestyles and increasing role of network linkages between cities from different hierarchical levels, which in turn calls for a new look at this phenomenon, particularly in highly developed countries. New concepts which have emerged from the theory of polarised growth and the network theory can be viewed as expressions of such a novel perspective.

Among classical models of spatial interactions, we have Ullman's triad (1957) and a group of gravity potential models. The former is used to analyse the following three components: complementarity, intervening opportunity and transferability, all of which determine the ties existing between regions. Complementarity means that individual regions have access to different resources. Their surplus or deficit leads, respectively, to the creation of supply and demand, which in turn triggers exchange of goods between regions. An intervening opportunity means both being able to use supplies from various regions and to sell goods to them. This component is strongly associated with transferability, which refers to the impact of distance on the strength of linkages. On the other hand, gravity potential models mainly focus their analysis on distance and its reductional impact on the intensity of relationships. Interactions between two centres and two regions are in direct proportion to their potential and in inverse proportion to the distance between them. The decreasing role of distance as a factor that determines linkages between cities and regions, which can be observed today, leads to a greater role of complementarity and intervening opportunity in the spatial interactions model, while in the gravity potential model the role of distance depends on a given spatial scale. Spatial interaction theories, being general in nature, fail to highlight in detail the linkages between the city and the region. This means

that exchange of goods between the metropolis and the region is dependent on the differences in their economic structure, their mutual attractiveness as sales and supply markets, and the role of distance in such an exchange.

<b>Theory / theories</b>	<b>Types of relations between city and region</b>	<b>The role of region in city development</b>	<b>The role of city in regional development</b>
Spatial interaction theories	Complementarity Intervening opportunities Transferability	Provides resources and serves as a market for goods and services	Provides resources and serves as a market for goods and services
Urbanisation theories	Evolution of regional settlement systems as result of agglomeration or deconcentration processes	Area of origin or destination for migrations depending on current tendencies	Area of origin or destination for migrations depending on current tendencies
Economic base theory	Basic and non-basic local activities of city	There is no distinction between regional hinterland and other export markets	Not applicable. Region is one of possible markets for goods and services.
Central place theory	Good and services provided by city for the region	The importance of city depends not only on local, but also regional demand. The city is central place for its hinterland.	Region depends on city.
Growth pole theories	Positive spread effects and negative backwashing effects	Region provides simple resources and labour	Capital investments, diffusion of innovations, but backwashing of human resources
Network theories	Network linkages a-hierarchical and not depending on distance between nodes.	Region does not play important role in city development unless there are nodes of regional network.	City as a centre of nodal region.

Source: prepared by the author.

**Table 9 City-region relations derived from selected theories**

In the light of urbanisation theory, individual stages of urbanisation processes and the attendant changes in the distribution of population in cities and their surrounding areas represent important phenomena for the city-region relationships. The starting point here is the definition of urbanisation, which is considered to be a cultural and civilisational process that is epitomised in the development of cities, their increasing number and surface area, growing concentration of population in cities and their direct vicinity, popularisation of sources of sustenance other than agriculture, acceptance for, and absorption of 'city culture': city standards, customs, etc., which leads to an increase in city population (Castells 1982). As part of this theory, the question of distinguishing individual stages of the urbanisation process is frequently tackled. For this, such measures as changes in the population of the city and its adjoining areas (treated collectively as a city region) are most frequently used (Tab. 10). The main thrust of these theories is that a process of the city's

spatial development involves subsequent stages of concentration and deconcentration of the population, which, however, as a rule are taking place on a constantly increasing spatial scale. As a consequence of such cycles, and depending on whether concentration or deconcentration processes prevail, the city and its region either represent, vis-à-vis each other, a source or a target area for the migration of the population, which in turn affects both the spatial extent of the city and the forms of possible uses of the city space. In this context, Jałowiecki's definition of metropolisation (1999 p. 29) should be evoked: *"metropolisation is the final stage of urbanisation, consisting in the transformation of urban space and change of the relations between the central city and its direct environment, and in a non-discrete way of using urban space. It is manifested by a weakening or severing of the city's economic ties with its regional hinterland and replacing them with contacts with other continental or global metropolises."*

Stage of urbanisation process	Type of process	Population changes		
		Core	Periphery	City-region
1. Urbanisation	1.1. Absolute centralisation	++	-	+
	1.2. Relative centralisation	++	+	+++
2. Suburbanisation	2.1. Relative decentralisation	+	++	+++
	2.2. Absolute decentralisation	-	++	+
3. Desurbanisation	3.1. Absolute decentralisation	--	+	-
	3.2. Relative decentralisation	--	-	---
4. Reurbanisation	4.1. Relative decentralisation	-	--	---
	4.2. Absolute centralisation	+	--	-

++ large increase; + small increase; - small decrease; -- large decrease; the last column is a sum

Source: R. Drewett et al. (1992).

### Table 10 Stages of functional development of an urban region

The economic base theory has not evolved into a uniform theoretical system. According to this theory, urban development depends on two factors: basic and non-basic activities. While the former refer to functions provided for the local economy, the latter, also referred to as city-forming functions, are provided for the external world. The latter type of functions can include exchange between the city and the region or its further external environment. In such a perspective, the region surrounding the city is only one of many potential markets for supplies or sales of goods and services.

On the other hand, the central place theory (Christaller 1933), which in some aspects could be regarded as a specific example of the economic base theory (cf. Preston, Mitchell 1990, p. 90) is the first of the theories discussed here which directly deals with the mutual relationships between the city and the region. According to this theory, the city is a centre that offers central goods to its regional hinterland. Such goods can include administrative, cultural, healthcare, trade and financial functions, as well as the labour market, transportation or telecommunication services. It should also be pointed out that the range of individual goods can vary. This concept also implies that the role of the city, that is its regional nodality, results from the degree of centrality for the regional hinterland. On the other hand, however, the region is not self-sufficient and is dependent on the city as its functional centre. At the same time, in the light of the economic landscape theory which is an elaboration of the central place theory as developed by A. Lösh (1961), we can expect a differentiation in the density of the population distribution and business activity, characterised by an alternate occurrence of sectors with many and few urban centres.

At the same time, when the city is treated as the centre and its environment – as the periphery (especially on a macroregional scale), the relationships between them can be

highlighted using a group of theories widely referred to as polarised growth theories. The theories of growth poles, initiated by F. Perroux (1950), underline the role of motor units, from which specific centrifugal forces emanate and towards which specific centripetal forces are directed. For instance, A.O. Hirschman (1958) distinguished positive *trickling-down effects* and negative *polarisation effects*. Beneficial trickling-down effects result from the complementarity of activities undertaken between two poles (the developed one and the underdeveloped one), from purchases and investments coming in from the developed pole to the underdeveloped one, and from the absorption of hidden unemployment in the underdeveloped pole. Polarisation effects are generated by the existence of a competitive advantage in the developed pole and the draining of qualified personnel from the underdeveloped region. On the other hand, G. Myrdal (1957) distinguishes centrifugal progressive *spread effects* and centripetal regressive *backwash effects*. The growth pole theory has found applications in different areas, and distinguishes various types of polarisation: technological, income-related, psychological and geographical.

When we analyse the impact of such effects on the hierarchical settlement system, we can expect that they will result in a transformation of the traditional structure of central place. This process is anticipated to involve such elements as the taking over of functions typical of lower-order centres by the central agglomeration and the formation of the so-called 'shadow of the metropolis'. At the same time, as S. Sassen (2000) observed, contemporary development trends are leading to the emergence of new forms of centrality, which are expressed in the expansion of the centre beyond the traditional business centre, to include other nodes situated within the metropolitan area of a large city.

To sum up, this concept can be directly transposed to the interdependency between the metropolis (centre, growth pole) and the region (periphery), in which positive centrifugal spread effects following the development of the growth pole can be observed (mainly in the form of capital and innovations) as well as negative centripetal backwash effects whereby the periphery (region) is stripped of simple resources and labour, particularly highly-skilled personnel.

Similarly to the theory of polarised growth, there is no comprehensive network theory (e.g. Glucker 2007). The main tenet underpinning this group of theoretical approaches to the settlement system is that hierarchical relations between cities as shown in the central place theory give way to a new generation of systems – city networks. Such networks develop when two or more cities that have been independent before but have complementary functions are trying to cooperate, and on the whole manage to merge their economies, a process which is enhanced by fast and reliable transport corridors and telecommunication infrastructure (Batten 1995). American researchers (Fisman 1990) tend to depart from the terminology related to the central city and suburbanisation processes and introduce 'new cities' instead – urban regions which are characterised by the absence of a distinct centre/central node and boundaries, and which are developing along the transport corridors connecting urban centres. As a result of accelerating such linkages, the relationships between cities lose their hierarchical character and become horizontal network ties.

<b>Territorial organisation</b>	<b>Network organisation</b>
Centre, periphery	Nodes, tendency to decentralise mutual linkages
Size-dependent	No dependency on size
Boundaries	Connections
Coherence, continuity	Dispersion, separation
One- directional flows	Two-directional flows

Closedness, outward impermeability	Territorial openness
Constancy, inelasticity	Short-livedness, flexibility
Proximity, location ties – transport costs	Insensitivity to distance, omnipresence – costs of information
Territorial hierarchy, vertical links, dominance of size	Horizontal links, cooperation and competition

Source: based on: B. Jałowiecki (1999).

**Table 11 Selected differences between territorial and network organisation of space**

The key differences between territorial and network organisation can be summarised as follows (Camagni 1994, Batten 1995, Minar 1997, Jałowiecki 1999). Firstly, there is an observable departure from the distinct spatial delineation of the centre and the periphery, and the dependence of linkages on the size of the city centre and its economic significance; instead, we have decentralised linkages concentrated in network nodes, which occur between urban centres of varying sizes. Open, continuous areas which are separated from one another by distinctly marked boundaries, between which one-directional flows used to take place, are losing in significance whereas the significance of horizontal ties between dispersed locations is growing. The constancy and inelasticity of mutual relationships in internally closed regions (which are strongly dependent on distance) is superseded by short-lived, flexible relationships between open systems lying far from one another. In consequence, the hierarchy, vertical linkages and the dominance of size are replaced by the network, horizontal linkages, cooperation and competition.

As P. Korcelli observed (2000), increased significance of non-hierarchical interaction networks within a system of cities leads to the fragmentation of traditional urban systems. As a result, the ties between the city and the region become dependent on the existence of the network's nodes in the proximity of the city. Nevertheless, due to the building of strong ties with other large nodes of the network, the role of the region in urban development is waning. On the other hand, the city is the main node of the network which consolidates the surrounding region. In this particular approach, small and medium-sized cities are of special significance as potential nodes of such a network (cf. ESPON 2006; INTERREG 2005).

Spatially dependent transaction costs	Uniformly low	Heterogeneous	Uniformly high
Externalities			
Low	1. Spatial entropy	2. Random dispersal combined with emerging Loscherian-Weberian landscapes	3. Loscherian-Weberian landscapes
High	4. Small interconnected clusters	5. Super-clusters	6. Small disconnected clusters

Source: Scott (1998 p. 87).

**Table 12 Distribution of business activity depending on: a) spatially dependent transactions, cost-related, and b) externalities**



The rise of new theories drawing on the network approach does not mean that they can absolutely explain the spatial relationships in any regional or settlement system. There is little doubt that we can still find many examples of territorially organised settlement systems, as well as systems where territorial and network organisations are intermingled. For example, A. Scott (1998) offered an interesting typology of the spatial location of business activity in contemporary economy based on such dual spatial organisation. This typology takes into account both distance-dependent transaction costs and externalities, which can result from the adopted way of information exchange and information flow, as well as factors of a socio-cultural nature. On this basis, six model situations can be distinguished, including, on the one hand, low and high externalities and on the other hand - uniformly low, heterogeneous and uniformly high spatially dependent transaction costs (see p. 87). According to Scott, the model of heterogeneous transaction costs and high externalities is currently the most popular one; it involves a differentiation of transaction costs (which, for example, are barely visible in the case of foreign currency exchange, and are relatively high if there is a need for direct, personal contacts) and high external effects related to the post-Fordist system of the organisation of production. With a sufficiently high vertical disintegration of enterprises, clusters will emerge in order to reduce transactions costs. On the other hand, low costs of some transactions enable enterprises to have access to the resources and sale markets on the global scale. In consequence, this may foster a speedy development of the local systems in which those enterprises operate. And that, in turn, leads to the emergence of a large number of such local-global super-clusters, otherwise known as metropolises. These observations are supported also by selected empirical studies (i.e. Gordon, McCann 2005).

## **7.2 Types of relationships between the city and the region**

The basic assumption underlying our line of argumentation is that the relationships between the city and its surroundings are expressed by two categories of flows: periodic-variable flows (e.g. commuting to work), and constant-permanent flows (e.g. internal migrations). Permanent flows are constituents of transformations in a given spatial system, while another constituent of transformations includes internal changes in a given system, such as population increases or changes in the number of enterprises.

It should be emphasised that developing a consistent typology of mutual relationships between the metropolis and its region involves many challenges owing to the multitude of dimensions in which such linkages can be analysed. Among those dimensions, two major ones can be distinguished:

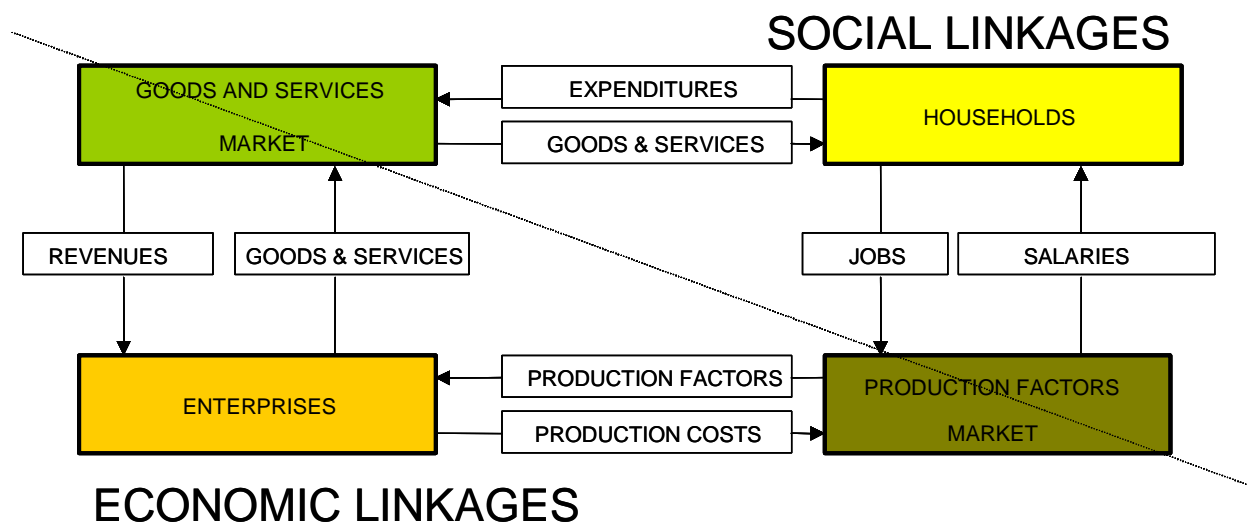
- Sectoral dimension (which inter alia includes the enterprise sector, the household sector and the public sector);
- Material dimension (which includes flows of goods, information, population as well as financial flows).

To the above, another two universal dimensions should be added: time one (which takes into account changes of flows in time, as well as their durability) and spatial one (which takes into account different spatial ranges of the linkages, and on the other - linkages between different regions).

Social and economic components which make up the metropolis-region system can be divided into the following: the enterprise sector, the household sector and the public sector, plus capital flows and trade exchange with the external environment. In traditional input-output analysis, intersectoral flows within one region including (Hoover 1980, pp. 224-227). material flows of goods and services between individual sectors are associated with cash flows going in the opposite direction (Fig. 25). The main object of analysis is the enterprise sector where inter-branch exchange is taking place. Sales outside the enterprise sector represent the final demand, which comprises consumer goods purchases made by

households, demand in the public sector, investments and sales outside the region, which we have termed exports for the purposes of this paper. On the other hand, purchases outside the enterprise sector represent basic supply which includes workforce, capital resources and purchases outside the region, which we here have called imports.

As regards the placement of individual systemic components vis-à-vis the region-the external environment model, in this approach only the enterprise sector is confined to the region; the public sector and capital flows go beyond the region's boundaries. In addition, this can also apply to the household sector, depending on how the boundaries of a given region are delimited (dotted line in the diagram).



Source: prepared by the author.

**Figure 25 Social and economic linkages between enterprise sector and household sector**

The above model can be made even more specific for two sectors which are of greatest interest to us, viz. the enterprise sector and the household sector. The linkages that we refer to as economic ones will take place between the enterprise sector and the production factors market (with purchases of production factors corresponding to the production costs of a given enterprise), and between the enterprise sector and the market for goods and services (with sales of goods and services corresponding to the revenues of a given enterprise). On the other hand, the linkages that we refer to as social ones will occur between the household sector and the factors of production market (remuneration for work), and between the household sector and the market for goods and services (purchases of goods and services). This directly implies that a given phenomenon (such as for example commuting to work) may simultaneously be a manifestation of economic linkages or of social linkages, depending on whether we look at it from the perspective of the enterprise sector, or that of the household sector.

### 7.3 City-region relationships in a spatial dimension

Inclusion of the spatial dimension into the classification described above produces a result shown in Tab. 12 and Fig. 26. Individual, hypothetical relationships taking into account various types of flows (in the definition of which classifications of ties between urban and rural areas discussed in SPESP (2000, pp. 38-41) and ESPON 1.1.2. (2004, pp.

86-90) have been used), have been ascribed to a spatial-sectoral matrix (city, region and enterprises, households, public sector, respectively).

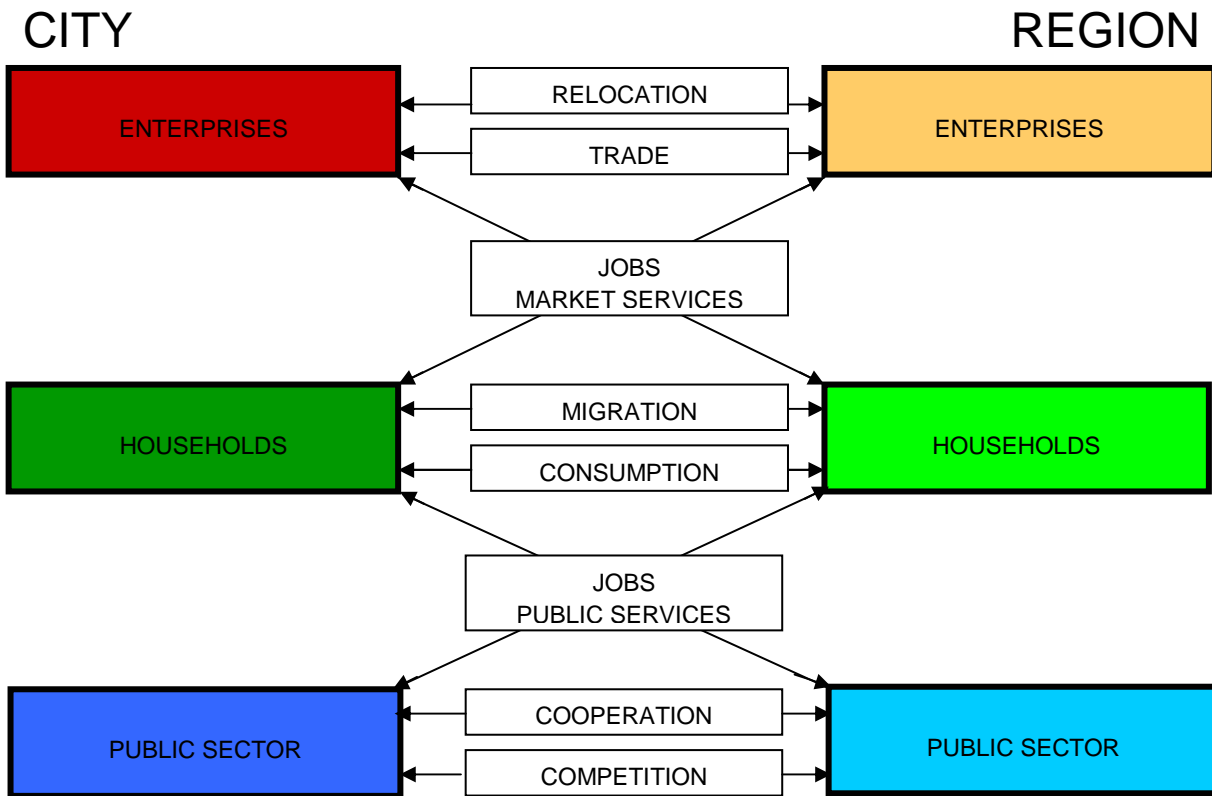
City	Region	Enterprises	Households	Public sector
Enterprises		Relocation Exchange	Work Consumption	Purchases Services
Households		Work Consumption	Permanent migration Consumption	Work Services
Public sector		Purchases Services	Work Services	Cooperation Competition

Source: prepared by the author.

**Table 13** Types of intersectoral relationships in the city-region system.

### 7.3.1 Enterprise-enterprise relationships

**Relocation:** In recent years, there has been an observable tendency for a regional deconcentration of business activity (particularly industry-related). Studies conducted in the United Kingdom by D. Keeble and P. Tyler (1995) showed that employment in production enterprises located in rural areas grew faster than in cities. Among the reasons for deconcentration in industry, the authors named such factors as: attractive living and working conditions, new sales markets and lower operating costs in rural areas. In metropolitan areas of large cities (e.g. Copenhagen - Winther, Hansen 2006), this is mainly related to soft location criteria associated with quality environment and living conditions, whereas business operations in these areas mainly aim to provide services to the local residents and local enterprises. Shifts between urban and rural areas are taking place mainly due to changes which occur *in situ*, and only to a lesser extent are they connected with relocation of business activity and establishment of new enterprises (Healey, Ilbery 1985). It should also be emphasised that relocation connected with the influx of inward capital, given all types of attendant multiplier effects, can have a significant impact on the development of local systems, which in many cases can be greater than stimulation of - frequently limited - local resources (Smętkowski 2000).



Source: prepared by the author.

**Figure 26 Key types of intersectoral linkages in the city-region system**

Exchange: Exchange of goods and services is undoubtedly among the major types of relationships existing between metropolitan and regional enterprises. Owing to differences in the economic structure and in the accessibility of various resources in the city-region system, there can occur mutual complementarities arising from differences in the supply and demand. As a rule, metropolitan enterprises produce goods with a higher added value component, which can then be sold to regional enterprises (e.g. Gorzelak, Smętkowski 2008). In many cases, metropolitan enterprises also act as intermediaries in the trade exchange between the metropolitan region and the external environment. In addition to that, certain types of services offered by enterprises operating from a metropolis, such as banking, insurance, consulting, advertising, public relations, etc., can be offered to regional enterprises. On the other hand, as distance from the city centre grows and real property prices fall (reduced land rent), the role of traditional labour-intensive sectors of business activity, which produce goods with lower added value, increases. Here, agriculture is an interesting example as one of the key activities pursued in rural areas situated in metropolitan regions, especially when we consider the area occupied for farming purposes. Modern, market-oriented farming can have multifaceted links with city centres. Firstly, rural areas can perform a feeding function vis-à-vis the metropolis by providing foodstuffs for its residents. Nonetheless, as huge shopping centres operating as part of global retail networks appeared, the role of local farming was significantly curbed. The traditional model of land use proposed by J. H. Thünen has been replaced by a more sophisticated model of mutual dependencies. Although rural areas remain food suppliers, the interdependency expressed by the distance between the place of production and the place of sale has been largely constrained. Moreover, areas under intensive agriculture are losing their rural character and turn into zones of quasi-industrial farming production, with all the negative consequences of

the process, mainly environmental pollution (e.g. Tacowi 1998, p. 159). Another type of linkages is the supply of minerals (needed in power and construction sectors) to metropolitan enterprises, which may be mined in rural areas, also those situated in a metropolitan region.

### **7.3.2 Enterprise-household relationships**

Work: This type of linkages is considered to be the cardinal component of all relationships between the city and its surroundings, and can be quite varied in character. Firstly, city residents who have moved out of the city to a place within the boundaries of the metropolitan area or even beyond, still work in the city. This largely depends on the spatial and housing policy addressing rural areas around the city. Secondly, residents of the surrounding region account for a considerable part of the city's labour market. As regards movement in the opposite direction, such linkages are few and far between, as a rule being associated with the deconcentration of economic activity (which is usually contained within the boundaries of the metropolitan region) and commuting of highly qualified specialists to regional enterprises. Both the strength and the scale of such linkages depends on the spatial accessibility of areas surrounding the city: the higher the accessibility the stronger and wider the linkages. Such relationships largely determine the boundaries of the functional urban region (metropolitan area), although they can also reach beyond it. At the same time, the metropolitan area acquires an increasingly polycentric character, demonstrated in multi-directional flows between individual centres (Aguilera 2005; Hall, Pain 2008).

Consumption: Certain types of services undoubtedly have a natural tendency for concentration in places which are referred to as central – as claimed by the central place theory. Cities which supply the surrounding areas with services can be regarded as such central places. Such centrally-provided services can include finances (banks, insurance companies), education (higher education institutions and – to a lesser extent – secondary schools, training centres), R&D (research institutes, universities, laboratories), healthcare (hospitals, outpatient centres), retail trade (shopping centres) and culture (cinemas, theatres, libraries, culture centres), etc. Owing to a lesser value of the lower threshold (minimum supply), some of these services can be located in smaller city centres (lower-order central places), rural areas or – due to good accessibility of a given location and lower operating costs – outside the metropolitan centre. According to the central place theory, the system of central places tends to increase the level of hierarchisation. Many types of services require a heavy demand and a high turnover. For this reason, when certain areas (rural areas and smaller cities) become depopulated, they become less attractive for the providers of such services.

The development potential of small and medium-sized cities in the vicinity of big metropolises is a serious problem. Naturally, some of them use the proximity of a large city to their advantage, for example due to an inflow of both residents and capital. This is especially the case when such cities can offer easily accessible, cheap land for investments, a situation most frequently encountered in development corridors connecting metropolises. In consequence, some of these cities become incorporated by the polycentric metropolitan area. Conversely, further located small and medium sized cities have a lesser potential for growth. Instead, they can compete by offering better living conditions, and attracting the location of residential estates and certain types of business activity. For instance, surveys of medium-sized cities (with 20,000-100,000 population) lying in the vicinity of large urban centres in Germany (Adam 2006) indicated that they tend to preserve their functions and serve as commuting centres, although they depopulate at a faster rate than larger cities.

On the other hand, rural areas surrounding the city play an important role in satisfying those needs of the residents which are connected with recreation and leisure. Some of rural areas situated near big metropolises are being transformed into aggressively developed recreational areas (golf courses, amusement parks, etc.). In areas lying still further away,

collective and individual recreation amenities are being developed, such as hotels, pensions and so-called 'second homes'. This process can lead to the transformation of rural areas into areas of intensive consumption. On the other hand, spatial policies pursued by the authorities often aim to counteract negative aspects of suburbanisation and attempts to preserve open, undeveloped areas. In such territories, there are restrictions concerning permissible development and less intensive recreation and leisure functions are encouraged.

### **7.3.3 Household-household relationships**

Permanent migration: Relationships between households in the metropolis and those in the region are mainly associated with permanent migrations. Very frequently, the metropolis is viewed as an attractive place for working and living by the region's inhabitants. This results in an outflow of such people, mainly those who are best educated, to the regional centre (Gorzela, Smętkowski 2008). On the other hand, examples of some inverse processes could be found, such as an efflux of residents from the metropolitan centre, usually confined within the boundaries of the metropolitan area in the case of working age population, and also beyond it – in the case of post-working age residents who frequently use their 'second homes' for this purpose.

Consumption: The relationships between the metropolis and its region associated with consumption in the household sector are contemporarily of a minor significance. On the one hand, they can include travels of the region's inhabitants to the metropolis, for example with a view to selling their agricultural produce in marketplaces. On the other hand, this can be connected with agri-tourism stays of metropolitan residents in locations within the metropolitan region.

### **7.3.4 Public sector – enterprise relationships**

Consumption: When providing services and delivering investment projects, public authorities may opt to use the enterprise sector. Nonetheless, it is difficult to narrow down the extent of the flow of services offered by enterprises to public authorities by metropolitan and regional enterprises. Undoubtedly, in most cases orders in their majority are delivered by local companies which often act as subcontractors of the executed investment projects (cf. e.g. Smętkowski, 2004). For this reason, the attendant public expenditure is not regarded as a significant component of linkages between the metropolis and the region.

Services: public authorities can also provide various services to enterprises, mainly through an indirect development of business environment institutions. In most cases, such activity is aimed to support local enterprises and does not play any important part in the relationships between the metropolis and the region.

### **7.3.5 Public sector – households relationships**

Work: Relationships associated with commuting to work in the public sector are similar to those which occur in the enterprise sector. However, their role is smaller, also because of the diminishing role of public ownership in the economy.

Services: In this case, we can mention services for the residents of the metropolis and the region which are provided by the public sector in the same way as they are offered by the enterprise sector. Examples include public higher education, high culture or specialised health care institutions, which are normally located in the metropolis, offering such services for the inhabitants of the metropolitan region. As regards the opposite direction, we can indicate tourist information centres, museums, etc., which operate in the metropolitan region and service tourist traffic largely composed of metropolitan residents. The typical linkages are similar to those discussed on the occasion of the enterprises-households relationships in the category of *consumption*.

### **7.3.6 Public sector – public sector relationships**

Cooperation: Both the scope and extent of cooperation between local authorities can vary, starting from the development of transport infrastructure and public communication, through environmental protection to spatial development. Structurally speaking, various facilities belonging to transport, telecommunication and power infrastructure are located in areas surrounding the city, which connect the metropolis via a network with other metropolitan centres. This leads to the development of infrastructure corridors and in turn can trigger fragmentation of rural areas. As people need to commute to work, public authorities must ensure accessibility of public means of transport having a sufficient quality. Thirdly, dumping sites for various types of waste are located in rural areas, ranging from relatively non-noxious municipal waste to highly noxious industrial waste. In addition to that, air and water pollutants can migrate easily, which necessitates cooperation in the sphere of environmental protection between different administrative units. Moreover, aforementioned processes related to changes in the distribution of population and enterprises call for joint spatial policy actions. As the example of such projects as Randstad Holland show us, such actions can be highly effective (Geurs, van Wee 2006). We can also observe processes to consolidate power structures in areas surrounding the city, as a result of which various organisations are set up to manage and administer those areas (regions, metropolitan areas, metropolitan unions); they are able to launch effective activities aimed to embrace the opportunities and counteract threats posed by globalisation (e.g. Scott, Agnew, Soja, Storper 2000, Stephens, Wikstrom 2000).

Competition: In addition to collaboration, local systems are engaged in competition in basic two aspects. The first of them refers to competing for investments. Public authorities can use a whole array of direct and indirect instruments in order to persuade potential investors to locate their investment in their area. Secondly, they can compete for inflow of residents. To be effective, they need to ensure attractive living conditions, inter alia by improving the quality of public services on offer. Thanks to incoming investments and new residents, their revenues grow, which as a rule will generate many positive feedbacks.

#### **7.4 The regional hinterland – a tentative definition**

As a matter of course, a city, especially a large one, cannot be viewed as an isolated point in geographical space. With the help of spatial, morphological or functional analysis, we can distinguish different zones relating to how the city influences its surroundings. It should be emphasised that there exist many, sometimes strikingly dissimilar, concepts for delimiting the city region, which is largely due to different definitions of the concept in hand, and to the existence of different impact zones of the city. As a result, the criterion for assessing the correctness and objectivity of a given method for delineating metropolitan area is largely a consequence of the adopted theoretical approach. There can be little doubt, however, that the range of the city's impact depends on the size and function of the city in question. Depending on the adopted measures, we can come up with a number of city impact zones which will differ in both object and range. On the basis of a review of relevant terminology, we can distinguish two main zones of city impact: zone of direct impacts in which the relationships are both fixed and strong (*Umland* in German) and zone in which the relationships are less vigorous or exceptional (*Hinterland* in German) (Schöller 1953; Boudeville 1966).

The former includes the suburban zone, that is the area adjoining to the central city's build-up areas, which is normally identified using the morphological criterion. In addition to open areas, the zone is made up of villages, towns and hamlets; it is a territory with different types of development, unstable in physiognomic, functional and demographic terms, where both the forms and the substance typical of the city and rural areas tend to intermingle. This is a multifunctional space, with the number and nature of its functions being dependent on the development stage and functional structure of the city. The following can be regarded as suburban zone functions: agricultural, recreational, residential, municipal, communication, industrial, spa and academic. From the perspective of regional and national settlement systems, the suburban zone forms a part of the urban

agglomeration, which also comprises the city's central and external districts. This zone is most seriously exposed to urban sprawl, a phenomenon which is commonly observed across the world, Europe not excluded (Schneider, Woodcock, 2008). It can also be noticed in EU's new member states, until recently socialist countries (e.g. Jauhiainen 2006), as well as areas undergoing a demographic downturn (e.g. Couch et al. 2005). The reasons underlying this process are universal, and relate to a greater interest of potential investors in new investment areas, recultivation of brown fields, location of huge shopping malls outside city centres, and housing aspirations of inhabitants who wish to own a house in the suburbs.

It should also be observed that the suburban zone, with its close ties with the city, has a more narrow range than the city's impact zone, the boundaries of which are delimited by the spatial extent of various functions performed by the city. Based on the functional criterion, two zones of city impact can be distinguished: one where the ties are strong and durable, that is the entire metropolitan zone, and one which has much weaker ties with the city while remaining within its impacts - that is the metropolitan region.

A metropolitan area can be defined using the spatial distribution of mutually interdependent production, consumption, exchange-related and administrative activities (Castells 1982). Metropolitan functions are performed by the entire metropolitan region (and not only by its constituent city) and can be located in various places. As a result, the metropolitan area is not entirely homogeneous and consists of a mosaic of spaces, each with a different function, but at the same time is characterised by a robust internal integrity. According to J.B. Parr (2007) four dimensions of such metropolitan area might be distinguished: built city, consumption city, employment city and workforce city constituted by commuting to work. Its terminological equivalent is a functional urban region or functional urban area (ESPON 1.1.1 2004), that is an area having functional ties with the city. In the functional urban region, daily commuting which has replaced regular movements of the population represents the main category of linkages. In addition to that, other linkages associated with the flow of goods, capital and information can be observed in the region, whereas the diffusion model of social, economic and technological phenomena is not hierarchical in nature. The functional urban region defined in this way largely corresponds to the city-region in the economic base theory, the local system in the settlement system theory, and the urban fields in spatial-interaction theories.

On the other hand, the notion of the metropolitan region was introduced by R. McKenzie (1933), who combined the city and its hinterland in a functional whole delimited by the range of the dominant impact of the metropolis. The central city with its institutions and services that extended to the entire region and tied it with other regions, was the centre of functional linkages. Among such services, the major ones were: press, communications, finances, management, as well as specialised trade functions and professional services. Just as in the case of the urban functional region, in certain aspects its terminological counterpart is the functional macroregion, the extent of which can be identified using such tools as for example impact analysis of competitive cities. For instance, studies examining the range of such impacts which were conducted in France also looked at different types of impact (economic, cultural) and, consequently, their different ranges of extent (cf. Maik 1997).

Here, we would like to quote the definition of a polarised region, formulated by J-R. Boudeville (and cited after: Grzeszczak 1999, pp.18-20), whereby such a region is a *"hierarchical entity made up of the metropolis, its satellites and rural areas dominated by them. It is a heterogeneous space, the different parts of which are mutually complementary and maintain a more intensive exchange between them, and particularly with the dominant pole, than they do with the poles of the same order from the neighbouring regions. As such, it is a place for exchange of goods, services and information, whose internal intensity at any given point is higher than external intensity. A polarised region is an integrated entity, and its not an autarky – it is a system."* The author contrasts polarised regions with urban regions, "which represent a generally uniform space, marked by a high population density,



high employment in industry and services, varied forms of non-discrete urbanisation, interspersed with farming enclaves. Hierarchical structures are dystrophic, giving way to strongly integrated structures characterised by functional interdependencies.” Although J.R. Boudeville set his definitions in a historical context, they could also well be transposed to a spatial context. As regards the terms mentioned above, the first definition should be ascribed to the metropolitan region (nodal region), while the second – to the metropolitan area (region which is largely homogeneous).

To sum up, in light of the spatial extent of the city discussed above, the notion of the metropolis should be viewed as equivalent to a system composed of a centre and a metropolitan area. Among others, this is associated with the blurring of centrality as part of a metropolitan system. In many metropolises, the economic centre is no longer clear-cut, as a result of the process whereby satellite centres are created, interconnected by a network of strong functional ties with the main metropolitan centre (e.g. Sassen 2000, Hall, Pain 2007). In this way, a polycentric metropolitan area emerges, which comprises the metropolitan centre (central city) and the adjoining, densely populated areas, and has strong ties within the network. On the other hand, a metropolitan macroregion is Boudevillean ‘polarised region’ – a region influenced by the city, the boundaries of which are limited by the range of impact of other metropolises. In this approach, a metropolitan area constitutes the internal hinterland zone for the city, and the metropolitan macroregion – the external hinterland zone.

### **7.5 Model of changed relationships between the metropolis and the region in information economy - research hypotheses**

In contemporary economy, the role of knowledge and information is constantly growing. The competitiveness of enterprises and territorial systems depends on creation of new knowledge, access to information and information processing – in other words – on broadly understood innovation. The question of competitiveness should be viewed in the global context because openness to information and capital flows and internationalisation of labour markets, epitomised by transnational corporations and their operation, is becoming a characteristic feature of contemporary economy.

The development of global information economy is accompanied by a dynamic growth of huge cities with international functions – the metropolises. Metropolises are becoming the key nodes of global economy, bringing together both management and control functions (Sassen 1991, Lo, Yeing 1998, Castells 1998, Taylor 2007). A multi-nodal, global system of cities is in the making, marked by robust internal ties. It is made of cities which have been able to create a desirable environment for innovation - due to a combination of economic, technological, institutional and social factors – to foster the development of the information sector. It should be noted that the information sector not only comprises higher-order services (Taylor 2007), but also knowledge-intensive industries (Kratke 2007).

The concentration of functions related to the generation and processing of information, handling capital flows and ensuring attractive location criteria for the headquarters of huge transnational corporations in selected metropolitan centres, coupled with the emergence of global and continental systems of cities, can have serious consequences for regional and local systems. Metropolisation processes are leading to changes in the cities’ internal structure and to a transformation of the relationships between cities and their surrounding regions. The spreading of metropolises onto regional hinterland areas can lead to the development of a metropolitan area in which the ties with the metropolis are both strong and wide-ranging. At the same time, the economic ties between the city and its metropolitan area and the surrounding region are weakening (as linkages as part of the global or continental city network become stronger). This latter aspect of the metropolisation process is much less researched, unlike the concentration processes of central functions in cities and the consolidation process of the global network of cities,

discussed above. Many authors have put forward the hypothesis that the regional hinterland is no longer needed by metropolises as it does not offer the resources that are necessary for metropolitan development (cf. e.g. Castells 1998, Jałowiecki 2000, Kunzmann 2000, Sassen 1991), and is therefore undergoing a relative marginalisation, while the differences in the development level between the metropolis and its regional surroundings are increasing.

In light of the new development paradigm outlined above, and the recent hypotheses published in the world's literature of the subject, an evolutionary model of the metropolises' global and regional relationships could be proposed, which takes into account the type of resources and scale of linkages (Smętkowski 2005). To offer a general picture, the relationships between the city and the surrounding region in the industrial economy were relatively strong, with the region providing simple resources: unskilled labour in the form of daily shuttle migration; food products; raw materials for production and construction enterprises located in the agglomeration. In return, the agglomeration would provide its hinterland with earnings from work, processed products (shopping in the city) and higher-level services. In the industrial civilisation, the relationships between the city and the global economy were as a rule limited to an exchange of industrial goods. In the information economy, the links between the metropolis and the region have become relatively weaker. The role of the hinterland has been limited to the provision of unskilled and skilled workforce in the form of weekly shuttle or permanent migration, as well as environmental resources – potable water, recreational space, building plots, etc. the resources which were earlier supplied to the city from the region now come from different sources (e.g. food) or have lost their significance (e.g. raw materials). In the information economy, for the metropolis, now turned into a node concentrating global information and capital flows (including human capital), the concentration of such flows (frequently of a non-material nature) has become more important than the material exchange of goods or attracting workforce on a large scale (factors which played a key role in the development of the urban-industrial agglomeration).

The above hypothesis on changing relationships between metropolises and regions is well-grounded in the literature of the subject. According to K. Dziewoński (1971), urban agglomerations form a separate subsystem at an advanced development stage of the settlement system, where their inter-linkages are more vigorous than those in the regional subsystem; "huge urban complexes are not central places but represent specialised settlement urban units with individual locations." This issue is also tackled in the works of A. Pred (1973, 1975, 1976), a proponent of the thesis that contacts between large urban agglomerations increase as economic development and urbanisation processes continue. Among more recent works on linkages within the global network of cities the study by A. Esparza, A.J. Krmenc (1994), with Chicago as its case study, is particularly interesting. On its basis, a complex picture showing the ties of a huge city emerges, which could be summarised as follows: flows of services occur in a two-level structure. The first such level is made up of global cities, for which the factor of distance does not play any considerable role, while the second relates to the national system of cities and shows the existence of a hierarchical structure in which distance adversely affects mutual interactions. On the other hand, the spatial range of demand for services does not perceptibly differ from the supply of services. Most enterprises purchase their services from suppliers operating from the city's metropolitan region. This can be seen as a proof of the significance of central functions, thanks to which the region is largely self-sufficient.

The other studies conducted in a few European cases also reveal a difference between metropolises (cf: Simmie 2001 et al., 2002; 2003) based to some extent on their position in the network of large cities. This is especially important in the case of capital cities that are far more worldwide connected (i.e. London, Paris, Amsterdam) than other regional cities (i.e. Stuttgart, Milan). In general, the higher the position of the city, the smaller significance of ties with regional surroundings for development processes of the metropolis. From a study of the linkages of selected Polish metropolises (Gorzela, Smętkowski 2007), an

overall picture emerges, which we can sum up as follows. The regional surroundings do not play any important part in the metropolitan development processes, and do not constitute any significant supplies or sales markets. Furthermore, the regional surroundings have a greater significance in the provision of simple resources: low-processed goods, low-skilled workforce, services which do not require skilled staff or generally accessible information about information rather than processed resources. The development of the metropolis is largely based on local human resources, which are subject to local deconcentration occurring as part of the suburbanisation process. On the other hand, the non-local inflow results in the draining of human capital, mainly from its the regional surroundings. However, the survey findings also indicate that certain disparities exist in the economic relations connected with the flow of goods, people, capital and information between the researched metropolises and the regions surrounding them, depending on the regional context. Nevertheless, on the one hand, because of the socialist-era heritage and lower innovativeness potential, these processes seems still to be not as advanced in Poland and probably also other post-socialist countries as in many other Western European cities. On the other hand, the intraregional differences in economic potential between core cities and peripheries are much larger in Poland than in higher-developed countries, so the impact of the backwashing of processed resources to main cities is much more severe for regional surroundings.

The other research project (Hall, Pain 2007) was devoted to access interplay between globalization and polycentricity in eight mega-city regions situated in North-Western Europe based on advance producer service evidence. This study (Cf. Hoyler at al. 2008) revealed the concentration of highly advanced functions in prime cities that was supported by dispersion of associated functions in wider mega-city regions (Zürich – Northern Switzerland) similarly to inter-urban linkages in South-East England, but without sectoral specialization that took place for instance in case of Randstad Holland. However in some other cases (i.e. Dublin, Paris) advance producers services remains highly concentrated and interlocked within metropolitan areas. Also Frankfurt plays a role of primate city mainly in national, European and global scale.

To sum up, some differences between these cases might be observed depending on city size and its function as well as the economic potential of regional hinterland. One should also have in mind that city-region relations are very complex (see above) and strongly depend on the regional context. This calls for further comprehensive and dynamic research focused on different types of regions.

The planned research intends mainly to describe the current situation and changes in the linkages between the metropolis (the metropolitan area) and the outward regional surroundings (the metropolitan macroregion) vis-à-vis other types of relations. The analysis will be focused on different aspects of such relationships, ranging from economic cooperation through the impact of the developing city on its surroundings to various services and supplies provided to its regional hinterland by the city that might be derived from different theories (see above). At the first stage, research will focus on the European level including typology of metropolitan macroregions based on GDP level and growth that may allow verifying the hypothesis that the difference in the level of development between metropolis and its region has been increasing as a result of metropolisation process. At the next stage, the analysis will be enhanced by including other aspect of relations between the metropolis and its region. The list of possible indicators that will be the subject of analysis of variance for selected types of metropolitan macroregions is the following: settlement patterns, population, economic structure, labour market, enterprises sector, innovativeness (R&D expenditures and employment), human resources, technical infrastructure, tourist and business attractiveness. As a result, this should allow formulating more detailed hypotheses on how the city and the hinterland influence each other and which types of cities pull their regional surrounding forward. These will be examined in detail on the basis of selected case studies at the regional level.

## 7.6 Selection of metropolitan and urban regions sample for the purpose of city-region analysis

This part of the paper presents a methodology for the selection of metropolitan and urban macroregions for the purpose of city-region analysis. The final outcome, based on NUTS3 regions for the ESPON space, is a “technical typology” of regions enabling a selection of metropolitan areas and their regional hinterlands for further analysis. Using NUTS3 units allows to avoid data availability constraints at city and larger urban zone levels. Furthermore, this enables us to analyse the situation in regional hinterlands of large cities. The following types of spatial units have been adapted to city-region relationship analysis:

- metropolitan/urban area, in which ties between the city and its surroundings are strong and permanent, and which has been approximated by a Larger Urban Zone as defined by the Urban Audit,
- metropolitan/urban macroregion that covers territories under the prevailing influence of the city, limited by the impact of other cities at a similar hierarchical level.

Approximations based on NUTS3 units, especially those concerning the delineation of metropolitan macroregions, are obviously a large simplification. Among the weaknesses of this approach, the following might be indicated: significant differences between adjusted metropolitan macroregions depending on statistical divisions in individual countries, neglecting of functional ties between territories, necessity of raw estimations in case of densely populated areas with a polycentric settlement pattern. However, other possible solutions based on smaller units are affected by insufficient availability of socio-economic data. Furthermore, in order to obtain long-term data series, NUTS 3 delimitation from 2003 instead of the new NUTS 2006 has been used.

The following general assumptions, underlying the identification of metropolitan and urban regions, have been applied:

- The importance of the city grows to some extent with the city size in terms of population,
- The influence of the city is decreasing with the distance from the city centre,
- The administrative borders of upper-tier administrative units (NUTS0, NUTS2) to some extent affect delimitation of metropolitan macroregions.

These assumptions are based on gravity potential models that, at least to some extent, relatively well illustrate relationships between the city and its region. However, these assumptions will be under investigation in the second part of this analysis, based on selected case studies. On the other hand, application of upper-tier administrative units as one of the criteria to separate different hinterlands reflects an attempt to adjust this division to socio-economic reality. For instance, among the advantages of NUTS2 units one may indicate that these regions reflect (depending on the country): real ties between territories as a result of an analysis conducted for their delineation; historical provinces that still constitute different types of relationships; geographical barriers (like mountains, rivers, etc.) that affect these relationships. Furthermore, there are self-government authorities responsible for socio-economic development at this level in some countries. Regarding national borders, despite transborder integration processes, one should have in mind that these are still important elements not only of the legal and administrative context of regional development, but also of socio-economic ties between territories as well. This analysis would not combine city-regions relationships with transborder interactions, because this would require a different methodology.

Other established operational rules and criteria reflect to some extent the principles applied in previous studies, such as the following:

- Identifying European metropolitan and urban regions based on the Urban Audit's Larger Urban Zones (DG Regio, 2008),
- ESPON 1.4.3. Study on Urban Functions (2007),
- ESPON 3.4.3. The Modifiable Areas Unit Problem (2006).

Based on these assumptions and remarks, the first step of this research has been to define metropolitan and urban areas (**MA**) based on the comparison of Urban Audit Larger Urban

Zones (LUZ) and EUROSTAT population data for NUTS3 regions. The following basic rules have been applied:

**Rule 1) Size of LUZ**

- Only LUZs with over 250,000 inhabitants have been included in the city-region analysis (**MA**).
- Larger LUZs with over 1 million inhabitants have been considered as metropolitan areas (**MAM**) while smaller agglomerations - as urban areas (**MAU**).

**Rule 2) Correspondence between LUZ and NUTS3**

- Only LUZs exceeding 70% of the population threshold of NUTS3 have been included in the city-region analysis (**MA\_REG**)<sup>11</sup>.
- In case of LUZs consisting of more than one NUTS3, only regions with at least 50% of the population living within LUZ were considered as a part of the metropolitan area (**MA\_REG\_PART**).

**Rule 3) Combination of metropolitan areas**

Polynuclear metropolitan areas (**MA\_POLI**) have been defined in the following circumstances:

- 1) The distance between LUZ's core cities have been smaller than: 60 km in case of LUZs with over 500,000 inhabitants (at least one) or 30 km in case of smaller LUZs.
- 2) Rule 2 applies to the whole polynuclear metropolitan area.
- 3) Polynuclear metropolitan areas have been considered as a compact (**MA\_POLI\_COMP**) or scattered (**MA\_POLI\_SCAT**) ones depending on other NUTS3 regions that separating them apart.

The regional hinterlands (**RH**) for such metropolitan and urban areas (**MA**) have been delineated using surrounding NUTS 3 combination approximations. Another set of rules has been applied here:

**Rule 4) Neighbouring regions**

- The regional hinterland (**RH**) consists of all NUTS3 regions directly neighbouring on the metropolitan area in a respective country (**MA\_REG**).
- The regional hinterland consists of NUTS3 regions whose at least 75% of their total area is within the range constituted by the maximum distance between LUZ's core city and the farthest point of the neighbouring regions.

**Rule 5) Predominance of larger metropolitan area regions**

- The neighbouring metropolitan area regions (**MA\_REG**) or a metropolitan area situated in the regional hinterland of another metropolitan area constitute a part of the regional hinterland of a larger metropolitan area region if the ratio of their population size is more than 3.

**Rule 6) Separate hinterlands**

- The NUTS3 region that is a part of two different regional hinterlands constitutes a part of the regional hinterland: a) of a larger metropolitan area region if the ratio of their population size is more than 3 b) of the neighbouring metropolitan area's hinterland c) of metropolitan area region situated in the same NUTS2 region.

The typology of NUTS3 regions (Tab. 14) based on these rules allows for identifying two main groups of regions: NUTS3 regions included in city-region analysis and other NUTS.

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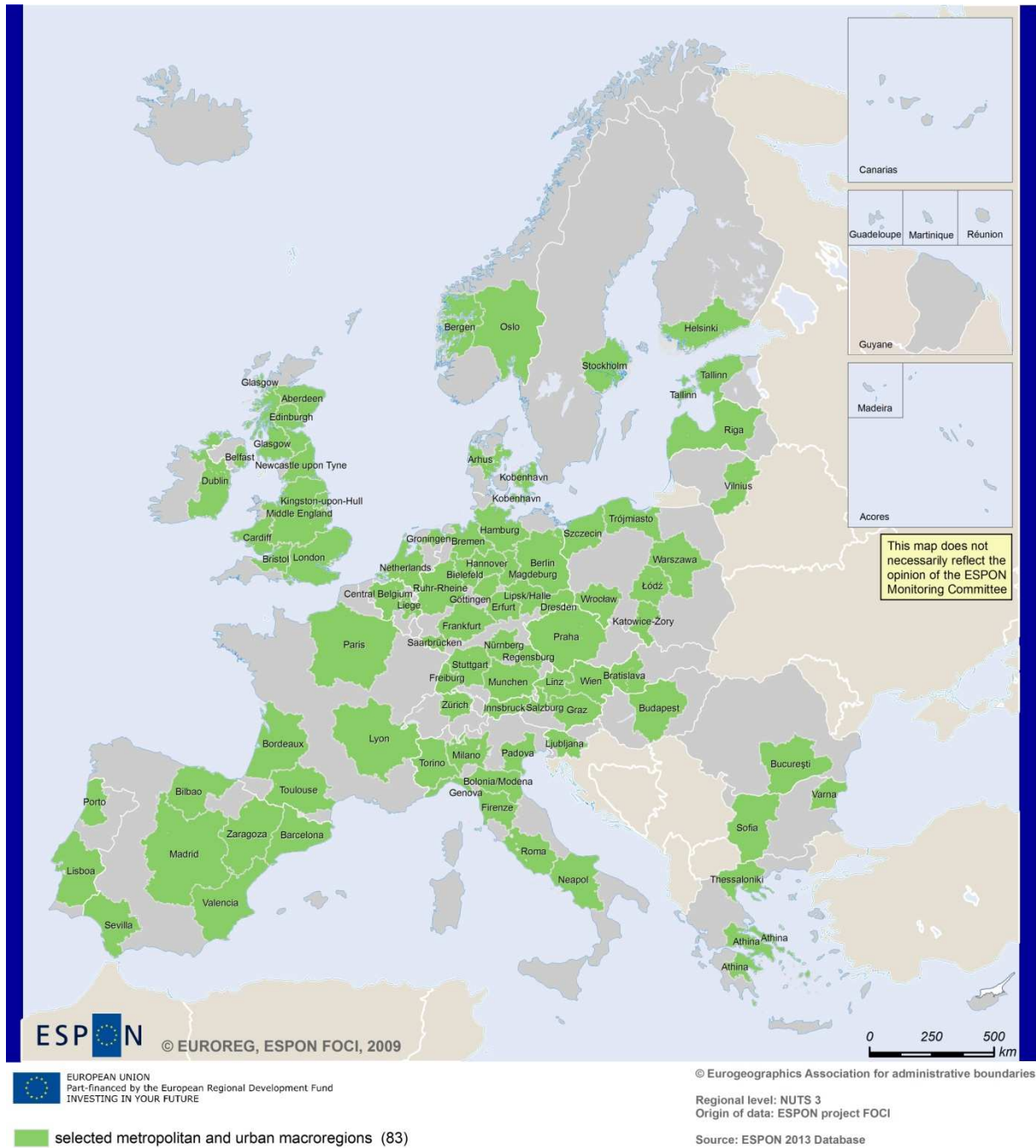
<sup>11</sup> The result has been checked against ESPON 1.4.3. project results and LUZ not classified as large cities (100,000 and more) has been rejected (i.e. Bajadoz (ES) and Maribor (SI)) as well as ESPON 1.1.1. project results to accept selected cities below the threshold (but over ca. 65%) classified as MEGA (i.e. Bordeaux in France, Gdańsk, Łódź and Szczecin in Poland, Sevilla and Valencia in Spain).

Abbreviation	Code	Name	Description
<b>NUTS3 selected for the city-region analysis</b>			
MA_REG	1,0	Metropolitan area region	Region with LUZ with over 250,000 population and LUZ population > 70% NUTS3 population
MA_REG_PART	1,1	Metropolitan area – part	Regions with LUZ that consists of more than one NUTS3
MA_POLI	1,2	Polynuclear metropolitan areas region	Region with more than one MA_REG and LUZ's core cities within certain distance
RH	2,0	Regional hinterland	NUTS3 neighbouring MA_REG or situated in NUTS2 within certain distance from MA_REG
RH_MA_REG	2,1	Metropolitan area – part of regional hinterland	Region with LUZ three times smaller than larger LUZ of neighbouring MA_REG
RH_MA_REG<70	2,2	Metropolitan area – part of regional hinterland	Region with LUZ three times smaller than larger LUZ of neighbouring MA_REG; LUZ population < 70% NUTS3 population
<b>Other NUTS3 regions</b>			
MA_REG<70	3,0	Metropolitan area – weak LUZ-NUTS3 correspondence	Region with LUZ with over 250,000 population and LUZ population < 70% NUTS3 population
MA_SMALL	4,0	Small urban area region	Region LUZ with less than 250 000 population
RH_MA_SMALL	4,2	Small urban area region – part of regional hinterland	Region LUZ with less than 250 000 population constitutes part of regional hinterland
NUTS3_IND	5,0	Other regions without LUZs	Regions situated outside influence of MA_REG or a part of two separate regional hinterlands

Source: own elaboration.

#### **Table 14 Types of NUTS3 regions**

Using these rules, we distinguished 83 metropolitan/urban macroregions (Map. 27). Owing to the specific characteristics of the respective administrative divisions, both the number and the surface area of these macroregions varied depending on a country.



Source: prepared by the author.

**Figure 27 Metropolitan and urban macroregions selected as a sample for city-region analysis**

Table 14 shows selected components from the profiles of the national settlement systems, highlighting in particular their specific nature related to LUZs as defined in the Urban Audit, as well as NUTS3 administrative divisions. In addition to that, the Table shows LUZs with a population over 250 000, which were excluded from the analysis of city-region relationships due to the following considerations:

- Non-fulfilment of the correspondence criterion (Rule 1),
- Being “dominated” by larger urban centres located in the vicinity (Rule 5),
- Impossibility to delimit the regional hinterland due to penetrating influence of the neighbouring urban centres or geographical barriers (Rule 6).

In effect, it should be noted that the analyses were carried out on a sample of macroregions whose selection was largely dependent on the specific natures of the national settlement systems, delimitation of LUZs in the Urban Audit, and the NUTS3 administrative division. It should be acknowledged, however, that despite leaving out some large urban centres, such a sample should be sufficient to show the diverse relationships between the metropolis and the surrounding region.

All the identified macroregions were accepted for further analyses. However, we should emphasise considerable differences between them, which can have a bearing on the results obtained (Tab.15). In particular, this applies to the relationship between metropolitan areas and their surroundings in the case of polynuclear metropolitan regions, which were singled out in the Netherlands, Belgium, central England and northern Spain. Secondly, it refers to LUZs with a large surface area as defined by the Urban Audit, which led to the setting of the extent of their impact quite broadly, on the basis of the adopted delimitation procedure (e.g. Berlin, Prague). On the other hand, such relationships may be distorted in the case of small LUZs (e.g. Bucuresti, Porto and Lisboa). We tried to take these considerations into account while interpreting the results. For the case studies selected for detailed analysis, we attempted to make the research polygons more unified.

Country	Number of selected macroregions	Characteristic features	LUZ with more than 250 000 inhabitants (rejected)		
			a) weak correspondence with NUTS3	b) dominated by larger Urban centers	c) difficulties in delimitation of regional hinterland
Austria	5	Relatively small LUZ of Wien in comparison to other urban centres in the country. Potential transborder relations of Wien.	-	-	-
Belgium	2	One dominant polynuclear metropolitan macroregion as a result of small distances between Brussels, Antwerp, Gent and Charleroi.	-	-	-
Bulgaria	2	The capital city macroregion	Plovdiv	-	-



		covers substantial part of the east part of the country.			
Cyprus	0	Geographical barriers as a result of location on the island (including division of the Cyprus).	Lefkosia		
Czech Republic	1	Large surface area of Prague LUZ and as a result very large regional hinterland that consists of number of smaller LUZs regions Penetrating influence of urban centres situated in Silesia and Moravia.	Brno	Plzeň	Ostrava
Denmark	2	Penetrating influence of urban centres situated in Jutland. Potential transborder relations of Copenhagen. The role of geographical barriers e.g. Odense.	-	-	Aalborg, Odensee
Estonia	1	The capital city macroregion covers substantial part of the whole country.	-	-	-
Finland	1	Helsinki macroregion covers substantial part of the country and the most densely populated	Tampere	Turku	-

		areas.			
France	4	Significant number of LUZ rejected mainly as a result of weak correspondence with NUTS3 regions. Large metropolitan macroregion of Paris consists of number of LUZ regions. Penetrating influence of urban centres situated in Alsace, Lorraine and Provence.	Lille, Nice-Grasse, Marsylia, Metz, Nancy, Strasbourg, Dijon, Caen, Renes, Nancy, Tours, Limoges	Amiens, Rouen, Orleans, Reims, Clermont-Ferand, Grenoble	-
Germany	18	Small size of NUTS3 regions lead to strong correspondence between LUZ and NUTS3 regions. This allows delineation of macroregions even for small urban centres (like Gottingen). Berlin LUZ has a very large surface area as a result of administrative division (LAU2). Penetrating influence of urban centres is observed very often. The macroregion of Hamburg consists of former East Germany territories.		Kiel, Schwerin, Karlsrue	Koblenz
Greece	2	Athens macroregion covers large	-	-	-

		number of islands.			
Hungary	1	The capital city macroregion covers substantial part of the whole country. Penetrating influence of urban centres situated in the east part of the country.	Miskolc, Debrecen	-	-
Ireland	1	Artificial boundaries of Dublin macroregion as result of NUTS3 division of the country.	-	-	-
Italy	8	The number of polynuclear metropolitan macroregions: Bologna-Modena, Venezia-Padova, Napoli-Caserta-Salerno. The macroregion of Genua has specific shape as result of geographical barriers. Penetrating influence of urban centres situated in the north and south part of the country.	Verona, Bari, Pescara	Brescia	Taranto
Latvia	1	The capital city macroregion covers substantial part of the whole country.	-	-	-
Lithuania	1	Penetrating influence of LUZs Vilnius and Kaunas that have also	Kaunas	-	-

		very large surface areas.			
Luxembourg	1	Potential transborder interactions.	-	-	Luxembourg
Malta	0	Geographical barriers as a result of location on the island.	-	-	-
Netherlands	2	One dominant polynuclear metropolitan macroregion as a result of small distances between Randstad Holland urban centres as well as Breda, Tilburg, Eindhoven, Arnhem and Nijmegen. Relative importance of Groningen situated in the north part of the country.	Twente	-	-
Norway	2	Large surface area of NUTS3 regions and as a result large macroregions of Oslo and Bergen.	Stavanger	-	-
Poland	6	Polycentric settlement system with large number of smaller cities (but usually weak correspondence between LUZ and NUTS3). Penetrating influence of urban centres. LUZs of Szczecin, Gdansk and Lodz have very	Kraków, Poznań, Olsztyn, Opole, Kielce, Bydgoszcz, Toruń.,	Częstochowa, Radom	-

		large surface areas.			
Portugal	2	Small LUZs of Lisboa and Porto.	-	-	-
Romania	1	Small LUZs and as a result weak correspondence between LUZ and NUTS3. LUZ of Bucuresti has small surface area.	Cluj-Napoca, Craiova, Timișoara	-	-
Slovakia	1	Potential transborder relations of Bratislava. Penetrating influence of smaller urban centres.	Košice	-	-
Slovenia	1	The capital city macroregion covers substantial part of the whole country.	Maribor	-	-
Spain	6	Macroregion of Madrid is very large. Penetrating influence of urban centres in case of Andalusia and in the macroregion of Valencia. LUZs of Saragossa and Seville have very large surface areas. Polynuclear metropolitan macroregion in Basque Country and Cantabria.	Badajoz, Oviedo, Gijon, Vigo, Cordoba, Malaga, Pamplona	Valladoid, Alicante, Murcia	-
Sweden	1	Large surface area of NUTS3 regions. Potential transborder	Goeteborg, Malmo		

		relations of Malmo.			
Switzerland	1	Potential transborder interactions.	Bern	-	Geneve, Lausanne.
United Kingdom	10	Very large polynuclear metropolitan macroregion of Central England. LUZs of Aberdeen, Kingston-upon-Hull, Newcastle upon Tyne have very large surface areas. Penetrating influence of urban centres in case of Glasgow-Edinburgh and Bristol-Cardiff.	Exeter	Cambridge, Portsmouth, Stoke-on-Trent, Worcester, Wrexham	

Source: prepared by the author.

**Table 15 Characteristics of the metropolitan macroregions sample in individual countries**

In conclusion (Tab. 16), of a total of 308 LUZs (including also Marseilles, Lille and Nice-Grasse) in the EU27, Norway and Switzerland, 126 (40%) were accepted for further analyses. These areas, however, were inhabited by nearly 80% of the overall LUZ population, while almost 40% of the population of the entire researched area were living in NUTS3 regions corresponding to these LUZs. Among them, 72 LUZs were predominantly monocentric in character, whereas 48 LUZs were parts of 11 polynuclear systems having at least a bipolar character (Tab. 17).

Type of LUZ/NUTS correspondence	No	% of total	Population LUZ	% of total	Population NUTS3	% of total	Population ratio LUZ / NUTS3
Metropolitan areas regions (fitted)	126	40.9	172 177 948	77.3	188 560 444	37.5	91.3
- <i>single NUTS</i>	36	11.7	50 352 896	22.6	57 538 575	11.4	87.5
- <i>combination of NUTS</i>	36	11.7	73 797 740	33.1	78 408 726	15.6	94.1
- <i>polynuclear areas</i>	48	15.6	48 027 312	21.6	52 613 143	10.5	91.3
Metropolitan areas (unfitted)	63	20.5	30 921 373	13.9	59 011 649	11.7	52.4
Metropolitan areas subordinated within metropolitan macroregions	21	6.8	8 499 365	3.8	14 383 432	2.9	59.1
Urban areas (LUZ < 250 000) subordinated within	33	10.7	5 089 015	2.3	15 216 131	3.0	33.4

metropolitan macroregions							
Urban areas (LUZ<250 000)	65	21.1	11 164 121	5.0	27 082 682	5.4	41.2
Other NUTS3 regions (848)	:	:	:	:	198 834 137	39.5	:
Total	308	100. 0	222 762 807	100. 0	503 088 475	100. 0	44.3

Source: prepared by the author.

**Table 16 Population in selected NUTS3 types**

At the same time, the barrier identified in the case of 63 LUZs (20% of their aggregate number) was their poor fit with NUTS3 regions. This meant that on average slightly over 50% of the NUTS3 population where a given LUZ was located inhabited an urban area. It should be noted that as a rule these were smaller cities' LUZs. This is proved by the fact that they had a lower than 15% share in the population of all the urban areas defined in the Urban Audit.

Polynuclear metropolitan areas region	Number of LUZ	Names	Population of metropolitan areas regions [mln]	Population of regional hinterland
Central England	10	Wolverhampton Leicester Sheffield Wrexham Manchester Liverpool Bradford-Leeds Birmingham Nottingham Coventry	12,0	8,8
Rheine-Ruhr	6	Bonn Köln Düsseldorf Mönchengladbach Wuppertal Ruhrgebiet	10,2	6,2
Netherlands	9	Utrecht Breda Eindhoven Tilburg Arnhem/ Nijmegen Rotterdam s' Gravenhage Amsterdam	7,1	5,0
Frankfurt am Main	4	Mainz Darmstadt Wiesbaden Frankfurt am Main	3,8	3,0
Central Belgium	4	Gent Charleroi Antwerpen Bruxelles / Brussel	3,5	3,8

Munchen	2	Munchen Augsburg	3,2	2,9
Napoli	3	Salerno Caserta Napoli	3,1	2,1
Bilbao- Santander	3	Santander Bilbao Vitoria/Gasteiz	1,5	1,2
Leipzig-Halle	2	Leipzig Halle an der Saale	1,4	1,7
Bologna- Modena	2	Modena Bologna	1,1	2,0
Padova-Venezia	2	Padova Venezia	1,2	2,2
Geneve- Lausanne	2	Lausanne Geneve	0,8	-

Source: prepared by the author.

**Table 17 Characteristics of polynuclear metropolitan regions**

Another important group was made up of LUZs (regardless of their population) which were incorporated in the regional hinterlands of much bigger urban centres. Although there were as many as 54 of such LUZs, they had a minor share in the aggregate population (6%). As insignificant in terms of the population were smaller urban areas with a population under 250 000, which were also poorly fitted with the NUTS3 administrative level (on average, only 40% population were living in a given urban area).

For the LUZs selected for analyses, altogether 83 macroregions were delimited on the basis of Rules 4-6. Their aggregated characteristics is presented below (Tab.18). The macroregions in question are inhabited by nearly 340 million population and altogether occupy an area in excess of 2 million km<sup>2</sup>, of which about 1/5 were metropolitan areas, and the rest formed their regional hinterlands. The demographic situation was different, with over a half of the population living in the core areas, and the dynamics of growth in the researched period (1995-2004) visibly led to a strengthening of this trend. At the same time, metropolitan areas generated over 60% of the macroregional GDP, and its rate of growth was much higher than in the case of the regional hinterland. It should be borne in mind, however, that the GDP in question is expressed in EUR, which means that the overall picture can be affected by the disparities in the development rates between individual countries, as will be discussed in detail below.

	Macro- regions	Metropolitan areas (MA)	%	Regional hinterlands (RH)	%
Area [sq km]	2 105 077	473 612	22.5	1 631 466	77.5
Population 1995	330 127	177 768	53.8	152 359	46.2
Population 2004	338 132	182 744	54.0	155 388	46.0
Population density (inh/sq2)	161	386	-	95	-
Population change 95-05 (1995=100)	102,4	102,8	-	102,0	-



GDP 95 [EUR]	5 531 133	3 330 141	60.2	2 200 992	39.8
GDP 04 (constant prices 1995) [EUR]	6 915 492	4351797	62.9	2 563 695	37.1
GDP change 95-04 (1995=100)	125.0	130.7	-	116.5	-

Source: prepared by the author.

**Table 18 Basic information about macroregions and their constituent parts**

As already indicated above, the analysed units are considerably varied (Tab. 19). An average macroregion occupies an area of 25 000 km<sup>2</sup> and is inhabited by 4 million population, which corresponds to the average population density of 182 inhabitants per km<sup>2</sup>. Nevertheless, whilst the number of the population in an average macroregion was stable over a 10-year period, its GDP expressed in EUR increased on average by over 30%. Significant differences could be observed between the analysed macroregions, expressed by the coefficient of variation (CV): the widest in the case of GDP (ranging from 573 billion to 1.5 billion EUR), but also considerable in the case of the population (oscillating from 21 million to 0.5 million inhabitants). The dynamics of economic development was also strongly diversified, with real GDP changes ranging from a 1.3% decrease (Bergen) and a 201.4% increase (Vilnius). The demographic development was more stable, with a 6.7% fall (Leipzig/Halle) or a 14.7% increase in the population (Valencia) in the extreme cases.

Indicator	Area [sq km]	Population density (inh/sq2)	Population 1995 ['000]	Population 2004 ['000]	Population change 95-04 (1995=100)	GDP 95 [mln EUR]	GDP 04 (constant prices 1995) [mln EUR]	GDP change 95-04 (1995=100)
<b>Metropolita/Urban macroregions</b>								
Average	25362	182	3977	4074	101,8	66640	83319	134,8
Max	105954	555	20315	21004	114,7	457761	573105	300,1
Min	3658	16	486	503	93,3	1044	1479	98,7
SD	18850	119	3929	4050	4,4	85290	107980	32,7
CV	74	65	99	99	4,3	128	130	24,2
<b>Metropolitan areas</b>								
Average	5706	443	2142	2202	102,3	40122	52431	143,9
Max	17612	1951	12182	12800	115,0	339308	413934	355,3
Min	797	29	270	274	92,7	580	999	95,2
SD	3941	356	2441	2511	4,7	57823	76005	43,1
CV	69	80	114	114	4,6	144	145	29,9
<b>Regional hinterlands</b>								
Average	19656	121	1836	1872	101,2	26518	30888	119,6
Max	97926	350	8443	8705	119,3	130142	159171	170,0
Min	1079	6	108	107	90,8	464	479	93,4
SD	17005	84	1659	1720	4,8	30642	35788	14,3
CV	87	69	90	92	4,7	116	116	12,0

Source: prepared by the author.

**Table 19 Differences between macroregions and their constituent parts**

The constituent parts of the macroregions were as strongly diversified, slightly more so in the core areas. An average core area occupied an area of 5 000 km<sup>2</sup> and was inhabited

by over 2 million people, with the population density of 440 inhabitants per km<sup>2</sup>. In the period in question, the population of such areas increased by 2.3%, and the GDP grew by 43.9% - a considerably better result than in their regional hinterlands, where the number of the population increased on average by 1.2%, and GDP was 19.6% higher (in constant prices). A typical regional hinterland occupied nearly 20 000 km<sup>2</sup> and had a population of 1.8 million, which meant a density of 121 inhabitants per km<sup>2</sup>, that is still more than the average population density in EUR27+CH+NO.

## Conclusions

The macroregions' sample selected for analysis was strongly varied in terms of area, population and GDP values. This was true for macroregions as a whole and for their constituent parts, i.e. metropolitan regions and regional hinterlands. It means that the results are strongly dependent on the regional context, which implies the need to carry out the analyses in the form of case studies which would complement the statistical surveys of the macroregions undertaken at the European level.

The demographic situation of the regions in hand was relatively stable when set against marked differences in the pace of economic growth. In effect, this generated wide differences between metropolitan regions and their hinterlands, but accompanied by visible differences between individual cases. Therefore, in the subsequent section of the report we will try to identify those macroregions which are developing most rapidly (including their constituent parts), and offer a typology of the macroregions under analysis in terms of the disparities in the level and pace of economic development.

### 7.7 Metropolitan macroregions at the European level: intraregional dynamics

In its part of the report, the empirical study of 83 metropolitan/urban macroregions situated in the EU27, Norway and Switzerland was aimed to:

- a) Discuss the developmental dynamics of the core areas in these macroregions in the context of the regions of the remaining LUZs regions,
- b) Compare the degree and dynamics of the internal disparities in the macroregions measured by GDP per capita,
- c) Compare the dynamics of economic growth in the macroregions' constituent parts, i.e. metropolitan regions and regional hinterlands.

#### 7.7.1 Dynamics of macroregions core areas vs. other LUZ regions

The first part of the study focused on the developmental dynamics of all NUTS3 regions corresponding to the LUZs as defined in the Urban Audit<sup>12</sup>, taking into account the degree of their fittedness, size of LUZs, and their location vis-à-vis one another. The analyses were conducted for the GDP dynamics in nominal terms, and for the GDP values relativised to the national average. The significance of differences between the surveyed groups of subregions was tested using the analysis of variance (ANOVA) and Tukey's test.

The development dynamics of NUTS3 regions corresponding to LUZs in 1995-2004 was quite similar (with real GDP growth of ca. 27-28%), regardless of the size and degree of fittedness of the NUTS3 region (Tab. 20). The exceptions were polynuclear metropolitan macroregions (15.6% increase) and regions situated in a close proximity to larger urban

<sup>12</sup> The study also included Marseilles, Nice-Grasse oraz Lille. Owing to the approximation of LUZ with a NUTS2 region for which GDP data was available, some LUZs were treated jointly, i.e. Białystok-Suwałki, Arnhem-Nijmegen, Rouen-Le Havre and Oviedo-Gijón.

centres (20.6% increase). Although statistically significant, those differences largely stemmed from the condition of the economies in the individual countries because the overall picture significantly changed once the data were relativised to the average pace of growth in a given country. Firstly, we could observe a significantly lower pace of growth (in comparison to the regions' national average) of those LUZs which were situated close to larger urban centres (lower by 2.3pp), and those with a population under 250 000 (lower by 0.3pp). On the other hand, the highest values could be observed in monocentric systems regardless of the LUZ - NUTS3 fittedness (increase by 2.5 - 3.0pp above the national average). The pace of development of polynuclear metropolitan macroregions was also higher than the national average (1.1pp).

The poorer results of urban centres situated in the vicinity of large metropolises support the hypothesis on the "shadow of the metropolis", which means the backwashing of functions and developmental resources from smaller urban centres into the core area. Characteristically, only some regions from this group recorded a pace of growth which was distinctly higher than the national average (Cambridge and Portsmouth in the metropolitan region of London, Brescia in the metropolitan region of Milano and Płock in the metropolitan region of Warszawa – higher than the national average; altogether, 22 regions were developing faster, while 31 regions -slower). On the other hand, the poorer results in smaller urban centres corroborate the thesis that small cities have lesser opportunities to participate in metropolisation processes. Given that, we should bear in mind that these results may arise from the unfittedness of LUZs to the NUTS3 administrative division, due to the inclusion of rural areas into these regions (for the purpose of analysis). At the same time, they provided more examples of speedy development (10pp higher than the national average), which was usually associated with the development of modern industries or tourism (Cork (IE), Győr (HU), Ancona, Sassari (IT), Coimbra, Funchal, Ponta Delgada, Faro (P), Irakleio, Ioannina (GR), Ajaccio (FR) and Oulu (F).

Code* /**	Name	N	GDP growth 1995-2004 [%]	SD	GDP growth 1995-2004 [each country=1 00]	SD
1; 1,1	Metropolitan areas' regions	78	127.0	24.3	102.7	8.8
3	Metropolitan areas' regions (weak correspondence between LUZ and NUTS3)	61	128.4	17.0	103.0	9.2
1,2	Polynuclear metropolitan areas	47	115.6	8.4	101.2	6.6
2,1; 2,2; 4,2	Metropolitan areas subordinated within metropolitan macroregions	50	120.6	15.4	97.7	8.5
4	Urban areas regions (LUZ<250 000)	49	128.5	20.2	99.4	12.2
	Total	285	124.5	19.1	101.1	9.4

\* markings as in Table 13

\*\* unavailable data was replaced by the following estimates assuming that regional GDP growth was the same across the country for Bulgaria (1995), Romania (1995-1997), Norway (2004), Switzerland (2004) and Athina (GR) (1995-2000).

Source: prepared by the author.

**Table 20 GDP dynamics in 1995-2004**

The weaker pace of growth in smaller urban centres is also confirmed in a different research dimension which only included LUZs with a population over 250 000, located outside the zone of impact of larger urban centres (Tab. 21). When this set is divided into three classes, i.e. LUZs with over 1 million; those between 0.5 and 1 million; and those under 0.5 million population, we will see that while the first two groups were developing at an average rate ca. 3.5pp higher than the national average, the smaller LUZs merely matched the national level (0.6pp *in plus*); however, the statistical significance of this difference was not high (0.15).

	N	GDP growth 1995-2004 [each country=100]	SD
<b>Population</b>			
> 1 mn	60	103.7	8.6
0.5 - 1 mn	55	103.4	8.4
< 0.5 mn	70	100.6	8.1
<b>Type of regions</b>			
Capital city-regions**	27	107.0	9.2
Other metropolitan areas regions	159	101.6	8.0

\* LUZs with less than 0.25 million population and LUZs situated within the metropolitan macroregions of a larger urban centre were excluded

\*\* capital cities of Cyprus and Malta were excluded

Source: prepared by the author.

**Table 21 GDP change in 1995-2004 [%] in metropolitan areas' regions 1995-2004\***

The differences can also be explained by the fact that different urban centres perform different functions. For example, this can be seen in capital city regions, which in the period 1995-2004 reached a pace of growth 7.0pp higher than the national average, while in the remaining cases the LUZs were, on average, developing at a modest rate which was only 1.6pp higher than that in other areas in a given country.

Based on the analyses made, we can propose the following, tentative conclusions:

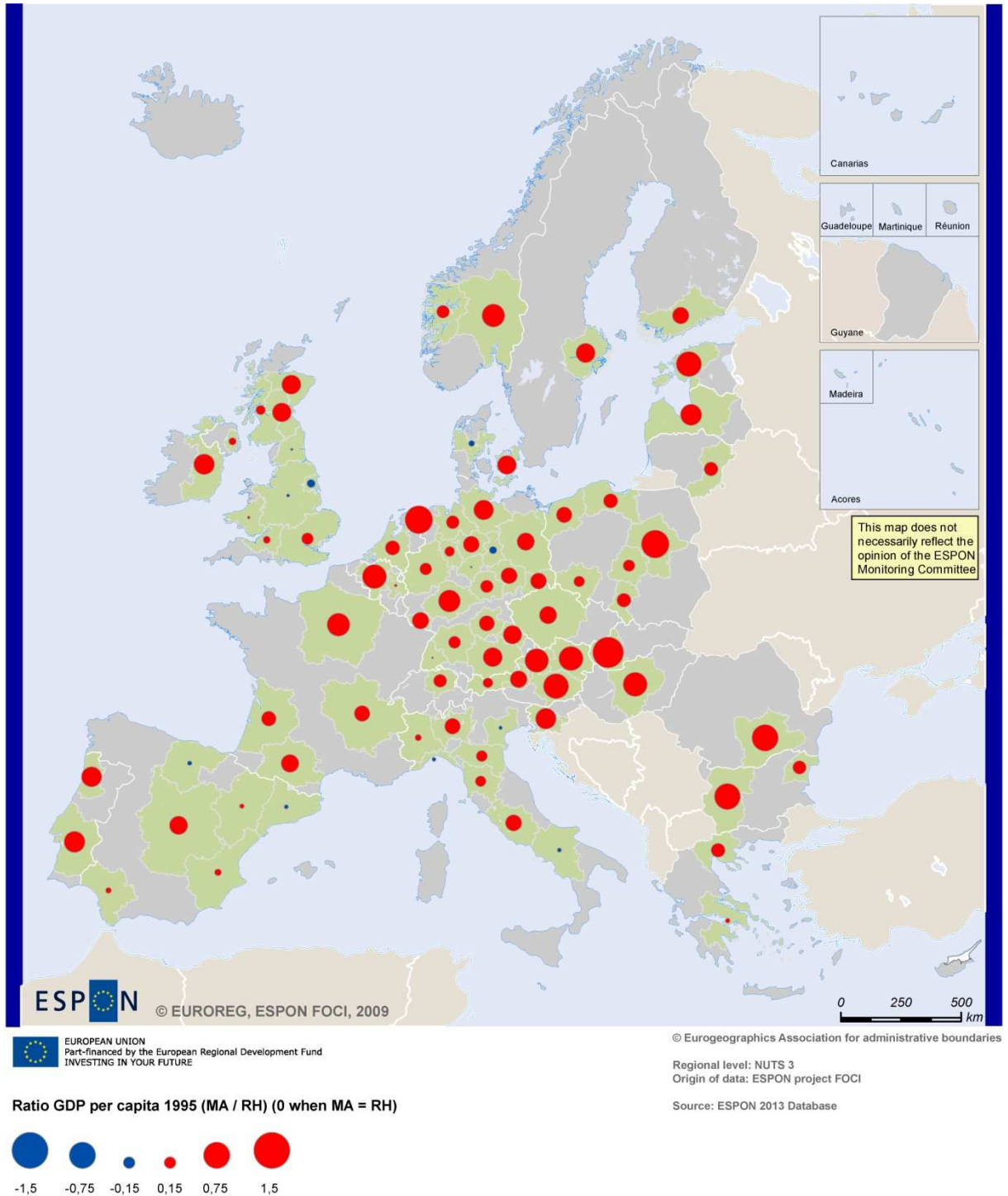
- the national context is of considerable importance in investigating the growth dynamics of LUZs regions,
- the pace of development in the regions of cities located within the macroregion of large metropolis is normally much lower than the average dynamics observable in a given country, although some exceptions to this rule could also be found;
- the regions of smaller urban centres (LUZ under 0.5 million) are as a rule developing more slowly; certain exceptions can occur when such cities perform specific functions (such as: national capital, tourist industry, modern industrial complex).

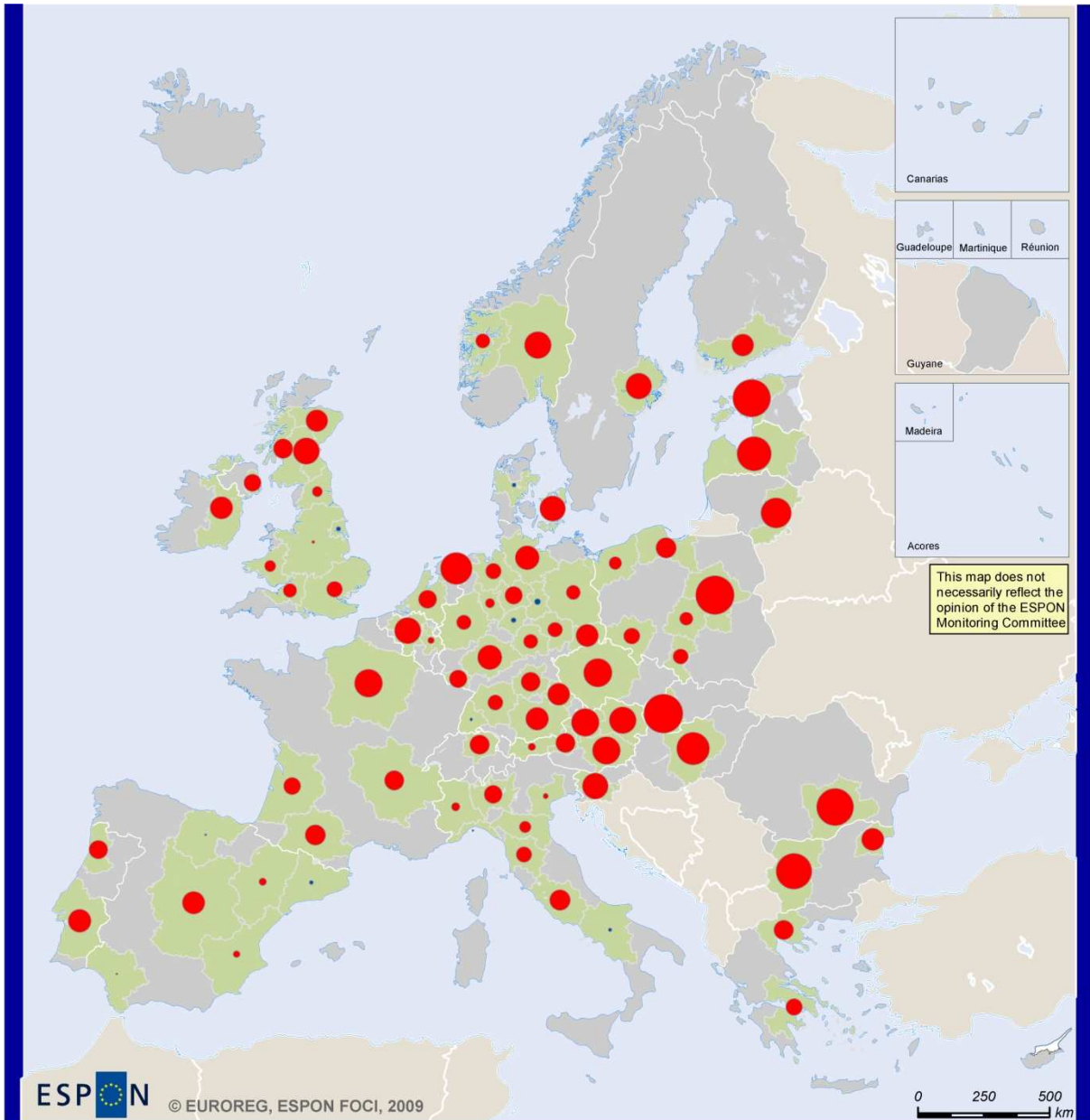
### 7.7.2 Internal differences in metropolitan macroregions

This part of the paper discusses the scale and dynamics of the internal disparities within macroregions. Its aim was to conduct a preliminary verification of the hypothesis that metropolitan processes tend to increase disparities in the development level between metropolitan areas and their regional hinterlands. The results obtained allowed us to

formulate further research questions concerning factors that can affect such disparities and processes underlying them.

The degree of internal disparities within the macroregions can be measured by comparing the development level of the core areas and their surroundings, expressed in the form of GDP per capita. To this end, the following measure was used:  $W_{ZR} = (\text{GDP per capita (MA)} / \text{GDP per capita (RH)}) - 1$ , where MA – metropolitan area, RH – regional hinterland. The indicator in question has positive values when the development level of the metropolitan area is higher than that of the regional surroundings, and negative – in the opposite situation.





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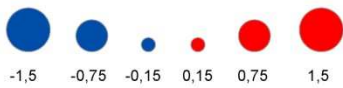
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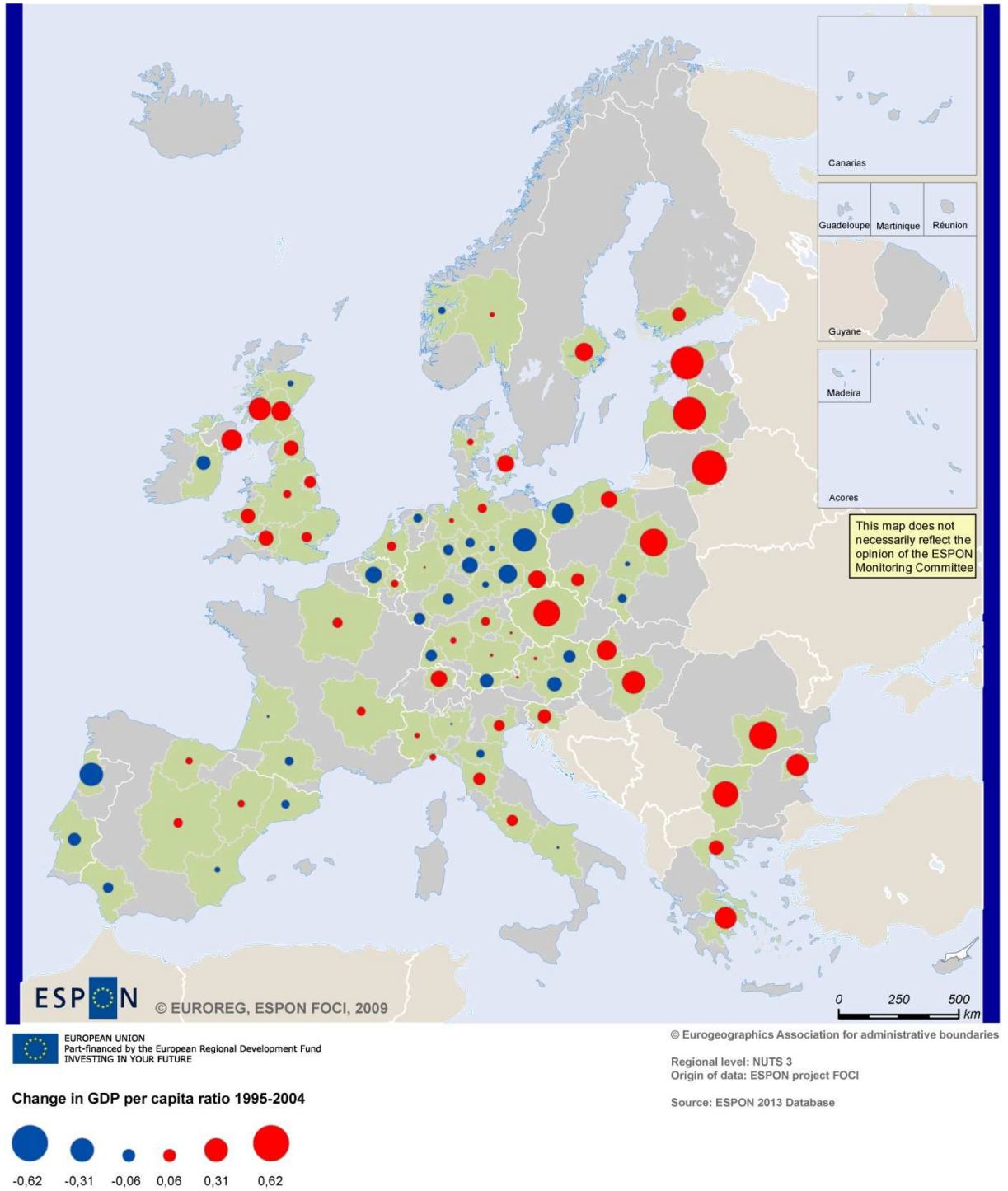
© Eurogeographics Association for administrative boundaries

Regional level: NUTS 3  
Origin of data: ESPON project FOCI

Source: ESPON 2013 Database

Ratio GDP per capita 2004 (MA / RH) (0 when MA = RH)





Source: prepared by the author.

**Figure 28 Disparities in the development level between the metropolis and its region in 1995-2004**

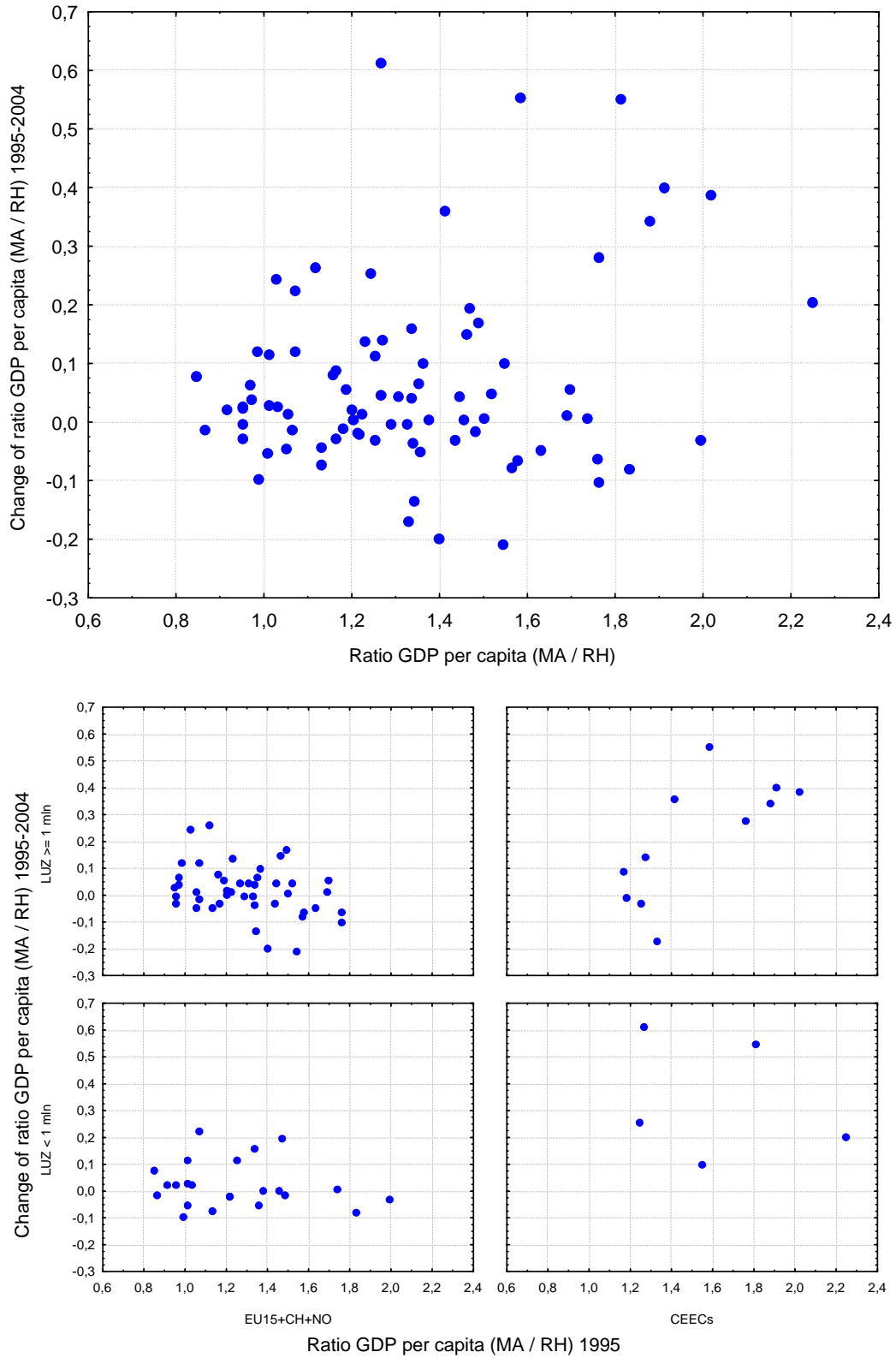


In the subsequent years, (1995-2004) this situation quite rapidly changed. In particular, the increasing intraregional differences in Central and Eastern European countries should be emphasised (with the exception of smaller urban centres which were not national capitals, which could be attributed to delayed industrial restructuring processes). Most remarkably, the increased disparities could be seen in the capital city regions of the Baltic states. Another distinct countries where the differences markedly increased were the United Kingdom (with a relatively weaker increase in the London region and the polynuclear Central England region), the Nordic countries (primarily the regions of Stockholm and Kobenhavn) and Greece. The existing disparities decreased in Austria and Germany – especially in the former GDR (except Dresden and the macroregions situated in the southern *Länder*). The intraregional differences also clearly diminished in Portugal (which could be caused by the small size of the Lisboa and Porto respective LUZs, which could lead in interpreting some of their functional urban areas as the regional hinterland). On the other hand, the situation in France and Spain was relatively stable. Altogether, 55 macroregions recorded a growth of the disparities in the development level, as compared to 28 where a decrease could be observed. When we exclude the 19 relatively stable regions (+/- 0.0025) from the picture, 42 recorded an increase (on average by 0.171), and 22 – a decrease (on average by 0.076).

Placing the scale of intraregional disparities in the context of their dynamics made it possible to develop a simplified regional typology, aimed to identify extreme cases in terms of both the conditions and the dynamics of such disparities (Fig. 29). Generally speaking, there was no clear correlation between the scale of internal disparities and its dynamics. However, it could be interesting to examine the situation of macroregions in two cross-sections: firstly, geographical along the east-west axis and secondly, related to the threshold of LUZs with 1 million population. As it turned out, the extreme situations in terms of the level and dynamics of the disparities could be observed in the capital city macroregions situated in Central and Eastern European countries regardless of the size of the LUZ. On the other hand, the macroregions of smaller LUZs did not differ considerably when compared to the remaining macroregions of Western Europe. At the same time, the macroregions in the EU15, Norway and Switzerland were more similar both in terms of internal disparities and the dynamics of change.

Interestingly, although the macroregions of smaller cities were more varied in terms of developmental differences, the changes in them were relatively insignificant but more prone to decrease. The situation in the macroregions of metropolitan areas with over 1 million population was different as they more frequently recorded higher disparities in the level of development. Interestingly enough, this increase was as a rule higher in those macroregions which were characterised by a smaller scale of internal disparities.

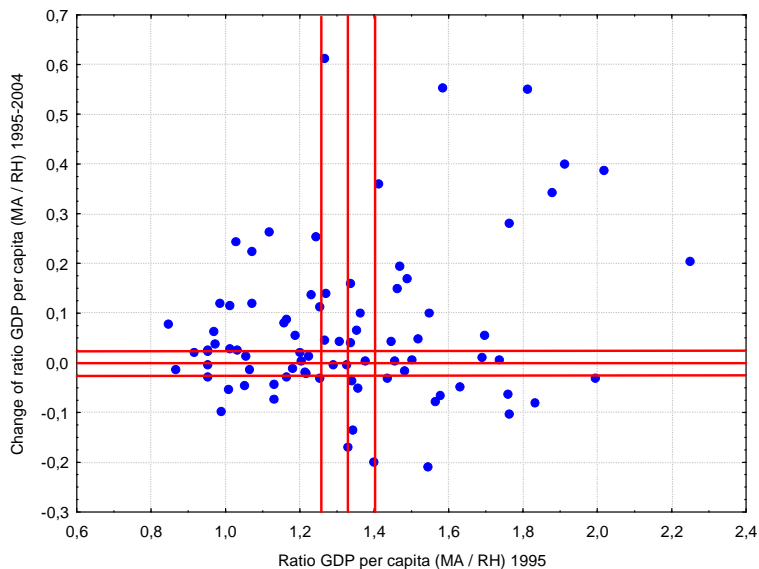




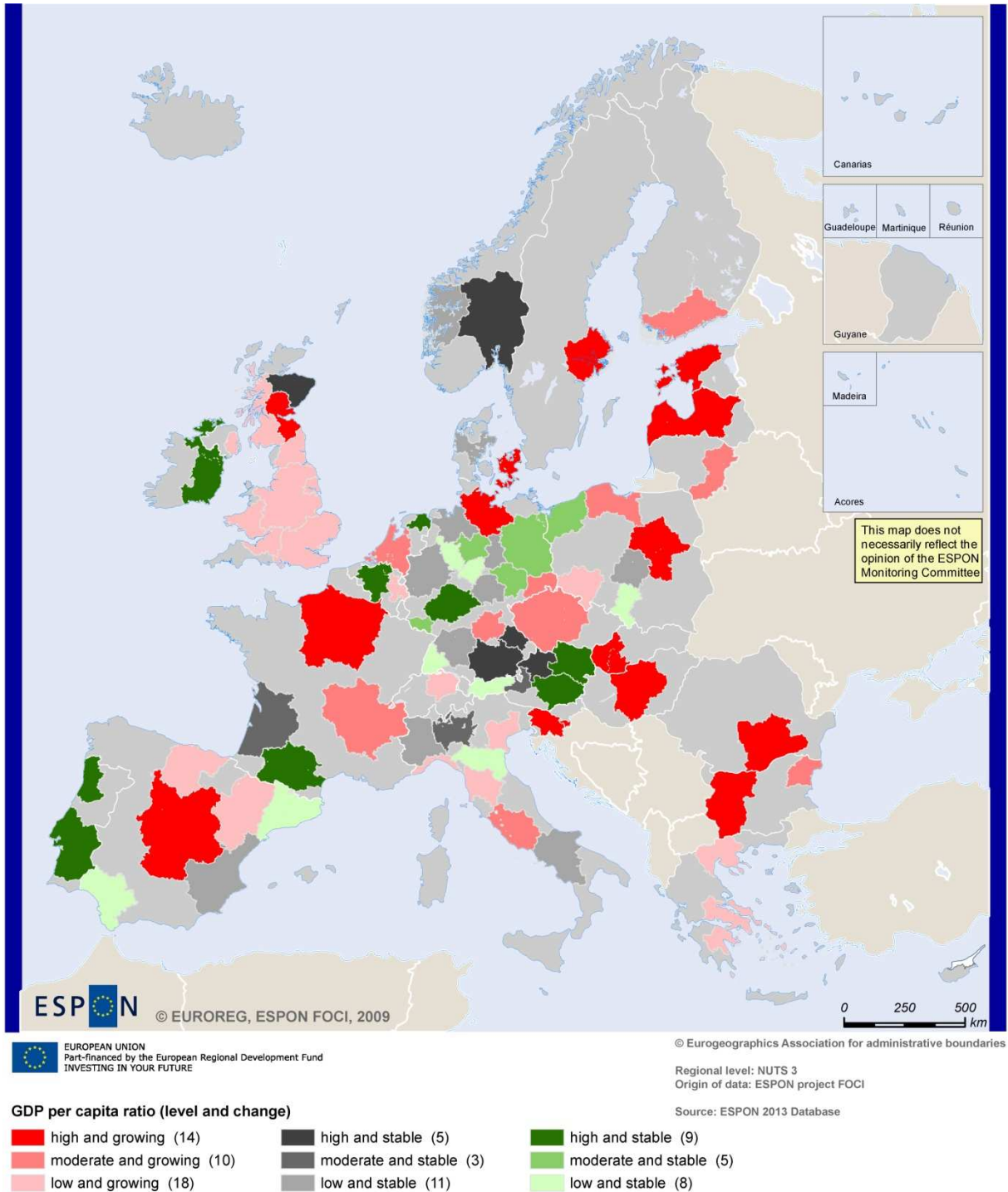
Source: prepared by the author.

**Figure 29 GDP per capita and its change in 1995-2004 (MA/RH ratio)**

The typologies of macroregions in terms of the level and dynamics of disparities in the GDP level were developed using the average value (1.33) for the level of disparities, after introducing an additional interval at a distance of ¼ of the standard deviation (+/- 0.07). At the same time, an additional, 'stability' interval was introduced for changes in the disparities, in the +/- 0.025 range for 0 (Fig. 30). The results were rendered on the map in which the regions with a speedy increase in the level of disparities were marked in red; regions with a rapid decrease – in green, and stable macroregions in grey (Fig.31). The intensity of the colour indicates the scale of divergences – the more intensive the saturation the wider the internal differences were in 1995. The macroregions with the highest level and pace of disparities in the development level included regions situated in Central and Eastern Europe, as well as Paris, Madrid, Edinburgh and Hamburg. On the other hand, in the macroregions in Portugal, Austria, Dublin, Toulouse, Frankfurt, Central Belgium and Groningen in the Netherlands, the scale of disparities was decreasing despite their being quite wide. At the other extreme, there were regions with a similar level of development in the core and in the periphery, where the disparities were increasing, e.g. the majority of British and Greek macroregions, as well as Zaragoza and Bilbao-Santander in Spain, Firenze and Padova-Venezia in Italy, Zurich in Switzerland, Liege in Belgium and Wrocław in Poland. On the other hand, particularly in smaller German macroregions such as: Gottingen, Bielefeld, Freiburg, and in Barcelona, Sevilla, Emilia-Romagna and Innsbruck, although they were insignificant, the disparities in the level of development were falling even further.



**Figure 30 Typology of macroregions**



Source: prepared by the author.

**Figure 31 Typology of macroregions based on GDP per capita ratio level and change**

### Conclusions

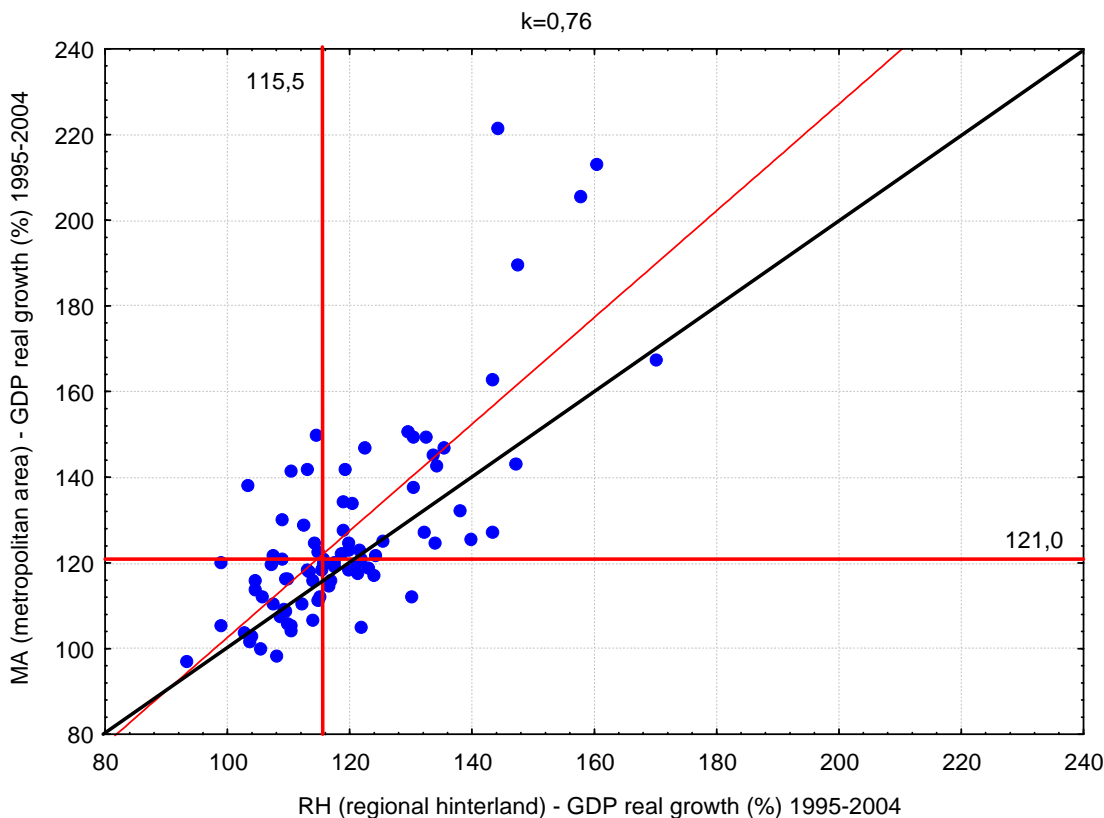
The macroregions covered by the study were characterised by a prevailing tendency for increasing the disparities in the development level between metropolitan areas and areas surrounding them. This was particularly well visible in the capital city regions (notably Nordic as well as Central and Eastern European countries), but such processes could also be

observed in some of other large cities. The declining scales of internal disparities were less frequent, with their greatest scale encountered in eastern and northern Germany (except Hamburg), Portugal, Austria and Ireland. It should be noted that as a rule this was the case in those regions where the scale of internal disparities had earlier been very high. On the other hand, in the period in question these countries – with the exception of Ireland – were characterised by a relatively low pace of economic development (see Fig. 33). These observations can mean that metropolisation processes spurred a faster development of large urban centres, which at the same time resulted in an increase in the development disparities in the metropolis-region system. The implications of this process for the regional hinterland in terms of the development dynamics are discussed in the chapter below, which offers a comparison of the development rate in the metropolis and in its hinterland. However, any fuller or more thorough analysis of these processes and corroboration of the interpretation of the results obtained will only be possible after an analysis of development factors at the European level, and on the basis of case studies' analysis.

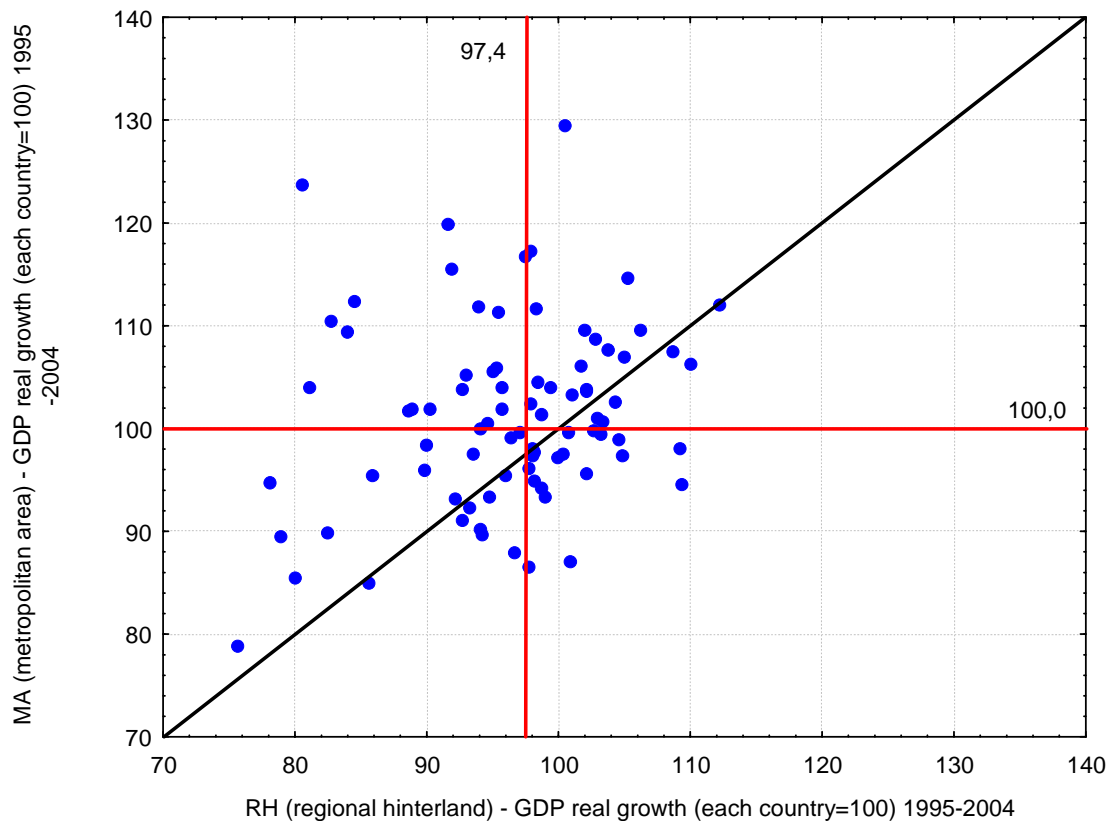
### 7.7.3 Dynamics of core areas vs. regional hinterlands

This part of the report strives to answer the question on the consequences of a rapid development of the metropolitan region for its regional hinterland. To this end, the correlations between the GDP for the metropolitan area and its surroundings were examined both for nominal values and when relativised to the national average. In addition to that, a typology was developed for the median values. On this basis, the core areas and the regional hinterlands which were developing faster or slower than the median values were separately defined (Fig. 32). As a result, we were able to distinguish four types of macroregions, viz.: a) rapidly developing metropolis and the regional hinterland, b) rapidly developing metropolis and slowly developing regional hinterland, c) slowly developing metropolis and rapidly developing the regional hinterland, and d) slowly developing metropolis and the regional hinterland.

a) real growth %



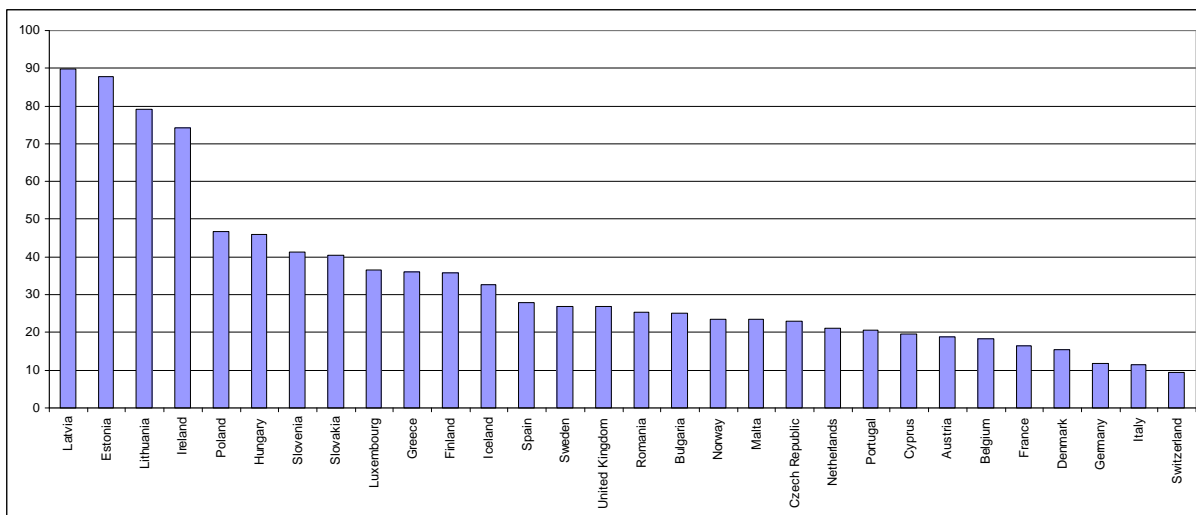
b) each country's growth = 100



Source: prepared by the author.

**Figure 32 GDP growth in macroregions 1995-2004**

When we compared the pace of growth in the macroregions' constituent parts, we found out that there was a strong positive correlation between the rate of growth in the central area and its surroundings, of  $k=0.76$  ( $k=0.60$  after excluding outliers) (Fig. 32a). Furthermore, the majority of cases showed a faster increase of the central area than that of its surroundings (54:29). An average GDP increase in the core areas was 28.4%, as compared to 19.6% in their hinterland. In general terms, no real GDP decrease could be observed in the researched period (save for one exception - Gottingen in Germany). The distribution of these types (Maps 34) illustrates the European-wide differences between the centrally located countries (Germany, Italy, Austria and Belgium), which recorded a low level of economic development in the period in question, and the external countries which were developing at a faster rate: Central and Eastern Europe, Nordic countries, United Kingdom, Ireland, Spain, Portugal and Greece. The above is also confirmed by the analysis of the real rate of growth of these countries (Fig. 33). As regards the central area, the exceptions to the above regularity were the metropolitan regions of München, Regensburg and Dresden (although in the latter case the metropolis' surrounding area was developing more slowly than the average), and in the peripheral areas – the British macroregions: Glasgow, Aberdeen and Kingston upon Hull.



Source: prepared by the author based on UNECE data.

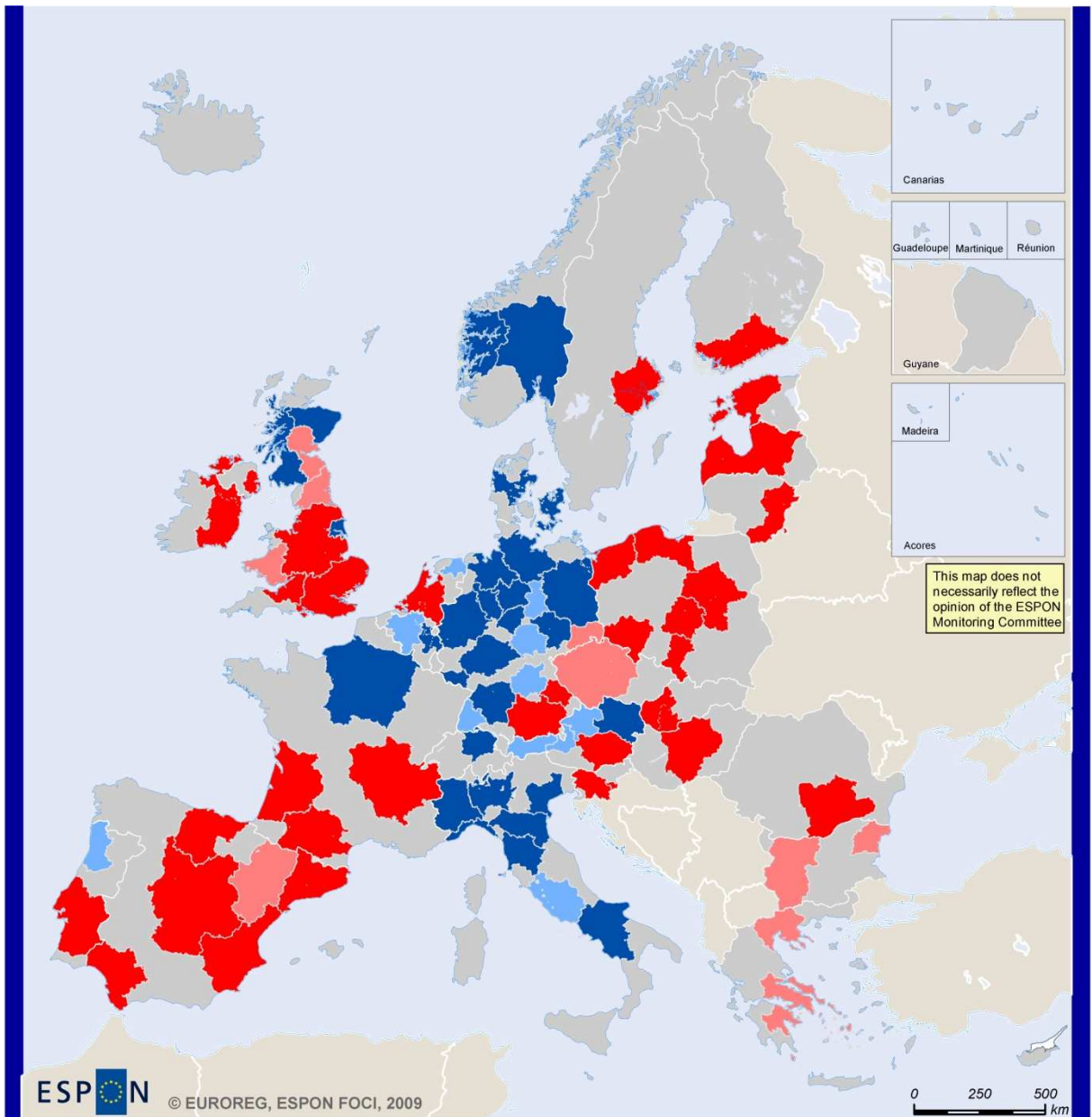
**Figure 33 GDP growth in constant prices (%) 1995-2004**

More interesting results can be obtained when the observations are made independently of the rate of economic growth in individual countries (Fig. 32b). In this case, no correlation between the growth rate of the metropolis and its regional surroundings could be observed.<sup>13</sup> As before, the number of macroregions whose core areas were developing faster than their hinterland was distinctly higher (51:32). In most cases, the rate of growth of the core areas was 1.6pp higher than the national average, whilst their surrounding area was developing 3.9pp more slowly. As compared to the respective national economies, the metropolitan area of Warszawa was growing the fastest (by 29.5pp), while the Bergen metropolitan area was at the other extreme (- 21.1pp). The growth rate 'leaders' other than the remaining Central and Eastern European metropolises included: Bristol, München, Stockholm, Helsinki and Toulouse. On the other hand, most acute problems were experienced by regions with a considerable share of industry in their economies, e.g.: in Poland (Katowice, Łódź and Szczecin), Portugal (Porto), United Kingdom (Aberdeen), Italy (Torino) and Germany (Saarbrücken). The regional hinterland developing at the fastest rate was that of München, and of the East German cities: Magdeburg and Erfurt, and – probably due to the development of the tourist functions – the hinterlands of Valencia (Spain) and Innsbruck (Austria). A faster development of the macroregions' two constituent parts was easily visible in the southern part of Germany (also in Magdeburg and Erfurt), southern England (London, Bristol), French macroregions (save for the Paris macroregion where the surrounding area was developing more slowly than the median value), certain capital city macroregions in Central and Eastern European countries (Warszawa, Budapest, Bucuresti), as well as in the region of Lisboa, some cities in central and northern Italy (Roma, Milano, Padova-Venezia, Firenze), Graz (Austria) and Aarhus (Denmark).

<sup>13</sup> A very weak correlation ( $k=0.31$ ) could be observed once the extreme situations were removed.



a) real growth %



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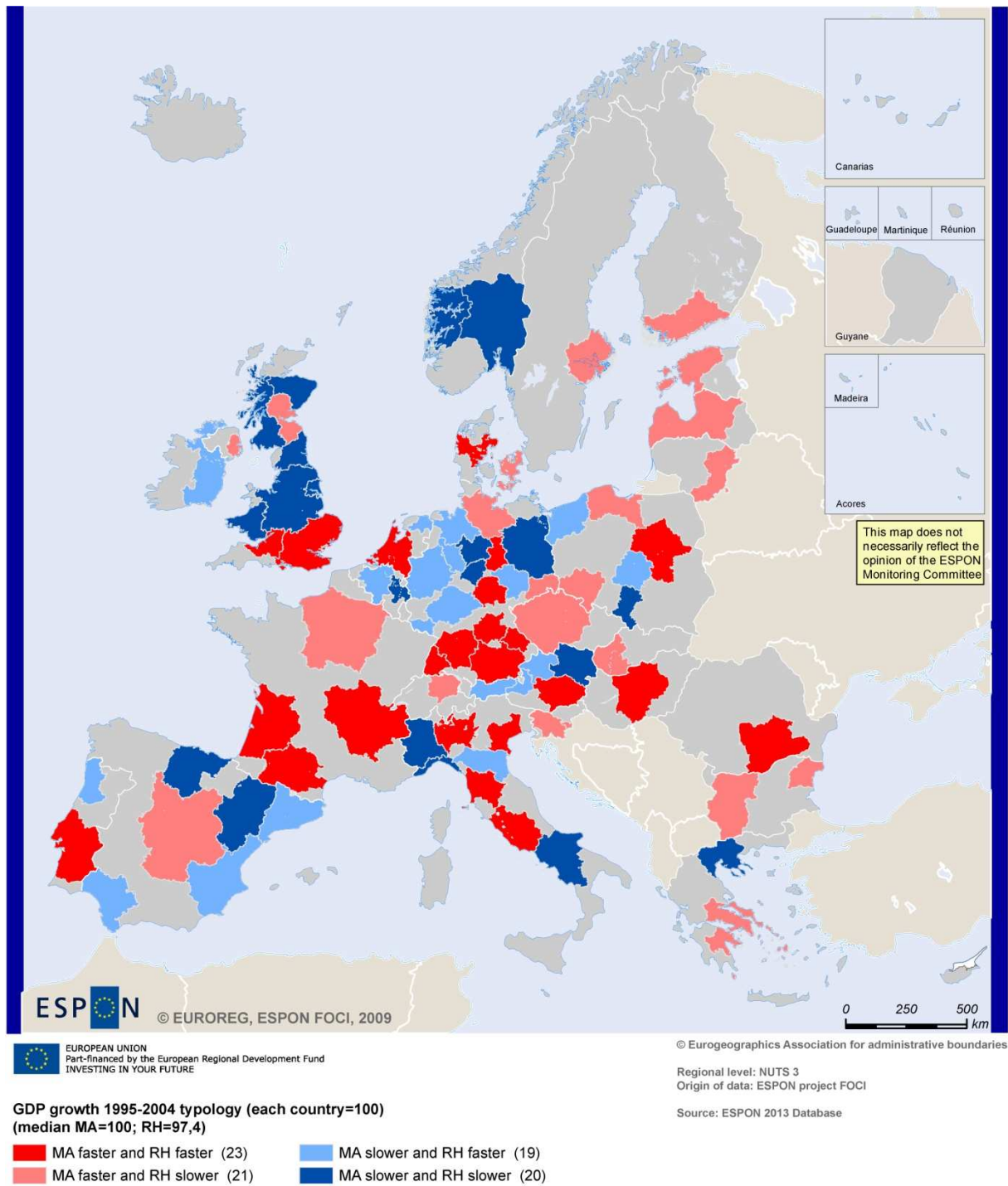
Regional level: NUTS 3  
Origin of data: ESPON project FOCI

Source: ESPON 2013 Database

**GDP real growth 1995-2004 typology**  
(median MA=121; RH=115,5)

- |  |   |
|--|---|
| <span style="color: red;">■</span> MA faster and RH faster (33)  | <span style="color: lightblue;">■</span> MA slower and RH faster (11) |
| <span style="color: pink;">■</span> MA faster and RH slower (10) | <span style="color: darkblue;">■</span> MA slower and RH slower (29)  |

b) each country's growth = 100



Source: prepared by the author.

**Figure 34 GDP growth 1995-2004 typology**



## Conclusions

The development dynamics in the macroregions was rather distinctly correlated with the nationwide rate of growth (in some countries, this was related to a significant share of one macroregion in the national economy). On the other hand, there were relatively few macroregions which deviated from this rule: they were the rapidly developing regions in countries with a lower growth rate, and the slowly developing regions in countries with a high rate of growth. Moreover, a faster or slower nationwide rate of growth as a rule affected both the metropolitan areas and their regional hinterlands. In this case, however, the number of exceptions was higher, which resulted in either a fast increase in the disparities related to developmental level, or in their visible decline. Putting the rate of growth in the context of the national average made it possible to clearly show the differences between the regions within a given country. In effect, we were not able to identify the interrelationships between the development rate of the metropolis and its regional surroundings, while the occurrence of the individual types of macroregions was similar. Consequently, we indicated macroregions where a fast development of the metropolitan area was accompanied by a speedy development of its surroundings. This could be viewed as a proof of the lack of barriers to the diffusion of developmental processes. On the other hand, an inverse situation could point to structural differences or low accessibility which hampered the diffusion processes or, alternately, to the backwashing of developmental resources from the periphery into the region. In a situation of a slower development of the centre, its surroundings as a rule coped slightly better than the mean value. This could either indicate relatively weak intraregional linkages or point to a competent use of endogenous resources by the regional hinterland (e.g. related to the development of tourism or modern industries). Nevertheless, there also existed macroregions where both the metropolis and the remaining part of the macroregion were developing tangibly more slowly than the national average; this could be seen as a proof either of their strong intraregional ties or of their structural affinities.

### 7.8 Further analysis to be conducted

This part of the report outlines the planned directions of research at two levels: a) European, and b) selected regional case studies.

#### 7.8.1 Differences in the system: metropolis-region – European level

The dynamics of the metropolis-region system in terms of the disparities in the level of economic development is one of the manifestations of mutual relationships between a city and its surroundings. In addition, changes in the disparities in the development level may be due to two basic factors, viz. the degree of similarity between the metropolis and its regional surroundings, and the intensity of mutual ties expressed in the flows of goods, people, capital and information. For this reason, in this part of the research it is planned to compare metropolitan areas and their regional hinterlands in terms of the following crucial aspects (research questions are shown in brackets):

- demographic situation (which regions and which their constituent parts show an increase in demographic terms, and which are becoming depopulated; what is the role of migration and that of natural increase in such processes; does it affect the settlement system (size of urban centres in the regional environment, degree of polycentricity of the metropolitan area)),
- economic structure (what is the degree of similarity of the economic structures of the metropolis and the region, particularly with regard to the role of the market services sector; are there any considerable differences in labour productivity in individual sectors),

- labour market situation (what is the situation on the macroregional labour market in terms of employment/unemployment rate; whether the dynamics of changes is similar across the macroregion),
- condition of the enterprise sector (what is the development level of the SME sector; is the scale of capital expenditures in enterprises in the metropolis and its environment similar),
- human capital and innovation (are there significant differences in the quality of human capital between the metropolis and its region; what is the scale of R&D expenditures in enterprises and institutions located outside the metropolitan region),
- role of the tourist sector (what is the development level of the tourist services sector and its use).

Based on the data collected, we will prepare a typology of: a) metropolitan areas, b) regions representing their regional hinterlands, and, resulting from them: c) typology of macroregions. Depending on the comparability and completeness of the compiled statistical data, in the research procedure we will either use multidimensional comparative analyses (factor analysis, cluster analysis) or will carry out a multivariate analysis of variance (MANOVA) for the types of macroregions which were distinguished in terms of the level and dynamics of economic development.

As regards the question on the intensity of linkages between the metropolis and the region, it will be discussed on the basis of analysing selected case studies, due to the lack of relevant indicators concerning flows at the European level.

### 7.8.2 Metropolisation processes on the regional scale – case studies

An evaluation of the strength and extent of linkages between the metropolis and the region is only possible at the level of regional case studies. Therefore, the planned case studies should help to provide answers to the following questions:

- What factors determine the strength of various linkages between the metropolis and the region and how does this affect the competitiveness of these territorial systems?
- What is the extent of the metropolitan spread effect and what affects it? What is the degree of the backwashing of development resources from the region into the metropolis and how does it affect the coherence of the city's macroregion?
- What measures (including form of governance) should be adopted to reinforce the positive effects and to counteract the negative effects of metropolisation processes, while taking into account the development of transport infrastructure, human resources, accessibility of public services and land use policy?

Based on the two typologies provided in chapters 7.2 and 7.3, we made a tentative selection of macroregions for the study, which the basic criterion was to show the complexity of the relationships in the metropolis-region system. The selection was made using two assumptions: a) macroregions should represent extreme types in terms of the scale of internal disparities in the economic level and their changes in the researched period, and b) macroregions should illustrate various situations with regard to the regional GDP dynamics for the metropolis-region relationship as compared to the national average (Tab. 21). In consequence, taking into account also operational aspects, we selected the following macroregions for further research:

- a) Among the regions with a high degree of intraregional disparities and their considerable increase: **Warszawa** (rapid increase in both the metropolis and the regional hinterland as compared to the national average) and **Stockholm** (weaker development of the regional surroundings) macroregions. It should be emphasised that such a selection for case studies also allows for making comparisons between the 'old' and 'new' Member States,

- b) Among the regions with a high degree of intraregional disparities but with an observable falling tendency in such disparities, the **Toulouse** macroregion was chosen, as it showed a high dynamics of growth whilst the country at large was developing slowly,
- c) Among the regions with a low degree of intraregional disparities, which however were rapidly growing, the **Glasgow** macroregion was selected as one characterised by the greatest increase in the scale of disparities in the particular group of regions, while showing a low pace of growth as compared to the national average,
- d) Among the regions with a low level of differences and their continuing falling tendency, the macroregion of **Barcelona** was chosen, as it was characterised by the most significant fall in the disparities, coupled by a relatively low rate of economic growth in the metropolitan region (as compared with the rest of the country), which in 2004 led to a rather uncommon situation whereby the development level of the regional hinterland was higher than that of its core.

It should be observed that the above set cannot – for obvious reasons – be regarded as a representative sample. For this reason, the conclusions drawn on its basis do not cover all possible situations which may be observed on the extremely diverse ESPON area. Nevertheless, it can be reasonably expected that the sample in question will allow for a better understanding of the relationship between the metropolis and the region which occur in rather extreme situations. In effect, this should help us to formulate a broad set of recommendations based not only on the analyses of individual cases but also on the comparisons between them.

At the regional level, the planned research will include, on the one hand, questionnaire surveys of representative samples of enterprises focusing on organisational structure, supply and sales markets, location factors and level of innovativeness. On the other hand, in-depth interviews with representatives of public authorities at the regional and local levels, business organisations and other relevant institutions focused on impact of transport accessibility, spatial behaviours of inhabitants, changes in land use patterns will be carried out. Such case studies should also allow for collecting additional detailed data at the NUTS5 level on the location of economic activity, commuting, transport networks and changes in land use patterns.

Typology of macroregions			GDP per capita MA/RH ratio – change (1995-2004)					
			Growing		Stable		Declining	
			RH good performance	RH weak performance	RH good performance	RH weak performance	RH good performance	RH weak performance
GDP per capita MA/RH ratio – level (1995)	High	MA good performance	Budapest <b><u>Warszawa</u></b> București	Tallinn Madrid Riga <b><u>Stockholm</u></b> Ljubljana Bratislava Sofia Edinburgh Hamburg Kobenhavn Paris	Regensburg Munchen		Graz <b><u>Toulouse</u></b> Lisboa	
		MA weak performance			Linz	Oslo Aberdeen	Dublin Groningen Porto Central Belgium Frankfurt	Wien
	Moderate	MA good performance	Lyon Netherlands Nürnberg Roma	Helsinki Vilnius Gdańsk Praha Dresden	Bordeaux Milano			
		MA weak performance			Salzburg		Szczecin Saarbrücken Lipsk/Halle	Berlin Hannover
	Low	MA good performance	London Bristol Firenze Padova/Venzia	Wrocław Belfast Varna Athina Zürich	Magdeburg Erfurt Stuttgart Arhus		Freiburg	
		MA weak performance		Central England Bilbao/Santander	Valencia Łódź Bremen	Torino Bergen Neapol	<b><u>Barcelona</u></b> Sevilla Innsbruck	Katowice- Żory Göttingen

				Zaragoza Thessaloniki Cardiff Newcastle upon Tyne Liege Genova <u>Glasgow</u> Kingston-upon- Hull	Ruhr-Rheine		Bielefeld Bolonia/Modena	
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**Table 22 Typology of macroregions based on GDP per capita MA/RH ratio (level and change) and GDP growth relativised to national average**

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## **Annex 8. WP 4 - Opportunities through “polycentric” cooperation**

### **Literature review working paper**

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#### **8.1 Introduction: content and scope of the working paper, questions / challenges and hypotheses**

**Aim** of the literature review is to support the work of FOCI WP 4 – Opportunities through Polycentric Cooperation. It attempts to provide input to the political process emphasising polycentricity as an important policy goal. It thus focuses on existing active or inactive polycentric structures, in order to assess their efficiency and potential for improvement or revival.

More specifically, it focuses on the following **questions**:

- *Analysis of the hypotheses on polycentricity for different polycentric regions in the polycentricity discourse, theoretic definition of typologies and indicators needed for analysing polycentric structures.*
- *Current policy concerning polycentric cooperation and prospective analysis of future of inter-city cooperation and new governance forms.*

Our purpose is not to proceed to an analysis per se but to formulate a planning concepts’ driven approach, aiming to tackle the “polycentric cooperation” space based policies implementation insufficiencies ascertained in the actual period of development in the frame of globalisation and deepening of the EU integration<sup>15</sup>.

From this scope, it is very helpful to use, apart from the relevant researches and theoretical publications, several recent EU, national etc territorial policy documents which discuss polycentric territorial development challenges as well as orientations for appropriate interventions in the European space<sup>16</sup>.

##### **8.1.1 Framework hypotheses / questions**

Although polycentricity has been agreed upon as a major policy goal within European territorial policies, we still lack sufficient evidence about the actual “reality” of polycentricity. Polycentricity-oriented policies and policy discourses thus often appear more as “wishful

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<sup>14</sup> Author of the working paper. G. Karka has contributed in some parts of the paper while K. Santimpantakis V. Filippa and C. Kapsopoulou have contributed in documentation.

<sup>15</sup> In this sense, for example, we will not approach the creation of new poles of innovation only as a mean of polycentric development but we will attempt to combine the creation of these poles with other interventions into precise zones which make the most of their assets in tourism – culture or in the rural sector, taking at the same time into account the treatment of the environment degradation in urban areas as well as the intensification of inequalities in several districts of city – centres or in specific parts of wider regions.

<sup>16</sup> As, for example, the recent “Green Paper on Territorial Cohesion” (EC 2008) and the Fourth Cohesion Report (2008).

thinking” (Vandermotten et al, 2008) which do not reflect the actual relationships on the ground.

More specifically: Market forces generate several types of spatial contradictions in Polycentric Potentials (PP) areas which should be regulated by appropriate spatial policies / spatial planning. A first contradiction is that between polycentric developments of PPs in morphological terms (population) and weak degree of polycentricity in functional terms (economy). Another contradiction of functional polycentricity nature is based on the knowledge intensive business flows in Advanced Producer Services. Last, but not least important is the contradiction between the dynamics of the service provision to enterprises - potential, location- and the service provision to the population at different urban / spatial levels.

More detailed hypotheses will be described in next.

## **8.2 Polycentricity: Analytical and policy aspects, functional content and morphology**

Often to a large extent, it is not easy to define polycentricity policies according to the conclusions of the polycentricity analyses as both (analyses and policies) are to a large extent dependent on the *scale / territorial level*, the *functional content* as well as the *morphology* of different polycentric / monocentric spatial patterns and the overall economic and social context in which they are embedded.

A recent widespread literature (in ESPON and outside) has examined different aspects of polycentricity. As for the *analytical aspect*, many researchers examined which indicators, criteria and types of analyses give a better picture not only of the hierarchies but also of the networking (of activities and of cities) at different territorial scales. Concerning the polycentricity *policy aspect*, they discussed in many ways contradictions of polycentricity policies (developed mostly in the line of the ESDP) which are restrained to the support of more morphological polycentricity. For example, Davoudi (2003 pp 991–995) demonstrates that the ESDP uses polycentricity in a normative approach, not as an existing condition that can be measured (see also in Taylor et al 2003, Hall & Pain 2006).

We should remark that a great number of publications, researches etc have studied polycentricity only in one region or one country or they have examined a limited part of questions raised by the polycentricity approach. Therefore, while we will discuss their results, we will prioritise the examination of the conclusions of three researches which have covered all EU space or a very wide range of polycentricity aspects:

(a) The ESPON 2006 projects on polycentricity and urban functions, 1.1.1 -“Potential for polycentric development in Europe”- and 1.4.3 -“Urban Functions”- , which have recently studied in depth the EU-27 space<sup>17</sup>.

(b) The POLYNET project which has recently examined, from the scope of polycentricity, a big part of West Europe and went in depth in most of the aspects of the polycentricity discourse. POLYNET studied eight “Mega-city Regions” (MCRs) of West Europe; its conclusions were presented in a book: (Hall and Pain, *The polycentric metropolis; learning from mega-city regions in Europe*, 2006) and a number of publications<sup>18</sup>.

<sup>17</sup> Plus Norway and Switzerland

<sup>18</sup> See, indicatively in: Halbert et al 2008.

These three projects contributed considerably in the polycentricity discussion not only through their results but also through a great number of following publications.

We also put specific attention on the results of other ESPON 2006 projects which examined some aspects of polycentricity in EU as the projects 1.1.2, 1.1.3, 1.4.1, 1.4.4, 2.1.1, 3.2 and 3.4.2<sup>19</sup>.

### 8.2.1 Definition / identification of FUAs, MUAs and Large Urban Zones (LUZs)

The definition of the basic urban areas constituting the building blocks of wider urban aggregates / networks is of primary importance for the study of polycentricity.

*ESPON 1.1.1* (2006) defined from this scope the **Functional Urban Areas** (FUAs) as consisting of an urban core and the area around it that is economically integrated with the centre, e.g. the **local labour market**. In countries that have definitions of travel-to-work areas, commuter catchment areas, urban poles etc., these are used for the identification of FUAs. In countries lacking official definitions, the identification of FUAs was based on insights provided by national experts. It resulted that the total number of functionally significant urban areas in Europe is 1595 (see in the Map on the "Typology of Functional Urban Areas (FUAs) in ESPON 1.1.1 2006, Final report).

According to *ESPON 1.4.3* (2007) the **density** and the **morphology** of urban areas are of crucial importance for the definition of the "city": "... basically a city is organised around a densely populated node, with a true urban landscape and even better a historical core". Therefore, they have approached those characteristics by considering at first all the municipalities (NUTS-5 level) with more than 650 inhab./km<sup>2</sup>. Then all the contiguous municipalities with this threshold of density, as well as the municipalities not reaching the threshold but enclosed by the others, were added to define central or **Morphological Urban Areas** (MUAs –see the Map "FUAs / European FUAs from the morphological point of view in ESPON 2006 project 1.4.3, Final Report).

*Urban Audit*, the data of which will be extensively used in FOCI, also stressed the need for a delimitation of functional urban region, wider than the "core city". It defined, for this purpose, the **Larger Urban Zone (LUZ)** which corresponds to an estimate of the Functional Urban Region (FUR). The definition of FURS varies according to the national and local context, although the FUR is very often identified as being an employment zone or a commuting area (EC/ Eurostat, Urban Audit Methodological Handbook, 2004)<sup>20</sup>.

### 8.2.2 Clarification of the concepts of "concentration" and "agglomeration"

Before entering the discussion on polycentric potentials it is necessary to better clarify the concepts of "centre" and "concentration" as well as of "agglomeration" economies and diseconomies on which many spatial aspects of the polycentricity discourse are founded to a

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<sup>19</sup> 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", 1.4.1: "The role of small and medium sized towns (SMESTO)", 1.4.4: "Preparatory Study on Feasibility of Flows Analysis", 2.1.1: "Territorial impact of EU transport and TEN policies", 3.2: "Spatial Scenarios and Orientations in relation to the ESDP and Cohesion Policy" and 3.4.2: "Territorial impacts of EU economic policies and location of economic activities".

<sup>20</sup> Of great importance for the study of cities in the frame of FOCI are also the Urban Morphological Zones (UMZ) - defined using CLC 2000 data.

large extent.

A **first step** in this direction is to remind the quite older literature evaluating the implementation of polycentric spatial policies which were based more or less on the “growth poles” theory, which is a “concentration” based theory, combining analytical and policy aspects. According to a widespread literature concentration in (growth) poles has multiplying effects in the pole as well as its surroundings due to the gain that enterprises have from the proximity to each other as well as from functional cooperation among them. More widely, *agglomeration* (of activities and working population) has also multiplying effects mainly due to the clustering of particular activities in specific locations.

On the other hand, a wide literature criticised spatial development policies, implemented mainly from '60s to '80s, on the basis of the “growth poles” theory, through the creation of new poles ex nihilo or the further development of existing ones. As they stressed, these policies often led to “over - urbanization” of the reinforced (“over-developed”) poles. In many cases *diseconomies from congestion* were created in the growth poles. In addition, in some of the latter cases, growth poles have weakened their surrounding areas because they have absorbed a part of the potential in working population, activities etc of these areas; therefore they have limited their development potential. More specific, the creation from scratch of secondary growth poles in wide urban regions has led to the formation of urban areas (i.e. “new towns”) without identity and social life. These policies did not allow the already existed smaller city-poles to take advantage from the endogenous development potentials / assets of their wider areas nor to regenerate / enlarge this endogenous development. That means that *in these cases, concentration did not have positive effects*.

Therefore, this resulted to the need of supporting the existing small poles / centres / cities in order to contain the development of the “first importance” pole (the “First city”) and to contribute to the further development of second order poles<sup>21</sup>.

In other words, a key issue on the concentration / agglomeration approach is that *in some cases concentration / agglomeration has positive effects while in others it has negative ones*.

Both ESPON projects 1.1.1 and 1.4.3, underlined the importance of agglomeration<sup>22</sup> among several urban areas. They also stressed the need to distinguish the “polycentric” patterns from the angle of positive or negative effects of deconcentration. However, both projects referred mainly to the functional and / or morphological aspects of cities and *not to the whole economic, social and environmental content of the “concentration” in cities as development poles* (the kind of activities, working populations etc which are concentrated as well as on the specific characteristics of the regional as of the national context in which centres are embedded). They did not also investigate enough *the precise characteristics of policy implemented in cities assumed as growth poles*. In other words, whether the effects of the city as growth pole in the integrated territorial development of its wider region might be positive or negative depends on the specific “content” of the pole and of the policy implemented in each case.

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<sup>21</sup> See, among others, for a spatial planning oriented understanding of these issues in the “Green paper of territorial cohesion (EC 2008): “...The key challenge is to ensure a balanced and sustainable territorial development of the EU as whole, strengthening its economic competitiveness and capacity for growth while respecting the need to preserve its natural assets and ensuring social cohesion. This implies avoiding excessive concentrations of growth and facilitating the access to the increasing returns of agglomeration in all territories”.

<sup>22</sup> As well as of complementarities – see in next section.

POLYNET project, as we have already stressed, gave answers to this question depending on the pole and policies implemented content, based on evidence which, however, referred only to the areas it had studied and not to the rest of Europe.

Therefore, a better, based on evidence for the whole ESPON territory, answer needs further research in the frame of FOCI.

One more factor, which complicates even more the attempt to come to a conclusion on the *effects of the polycentric versus monocentric structures*, is that many sub-sectors of activities (located in a specific city) influence not only on the local level but also, simultaneously, on the regional and national level. In addition, the influence areas of a great number of sub-sectors of service activities differ from each other. Attempts to bring these areas into a common denominator through modelling very often failed to give an accurate result.

Regarding more specifically the recent debate on polycentricity, ESDP and some subsequent policy and research reports stress that the polycentric structures are more efficient than the monocentric ones. However, is that so? In order to better answer to this we should introduce territorial complementarities. Therefore we will come back to this in the next respective section.

### 8.2.3 The different spatial levels of polycentricity

As it is well known, a main characteristic of the polycentricity analysis and policy formulation is the need to take into account different spatial levels. If, for example, we support the development of a national capital less competitive at European level, to improve polycentricity at this level we reduce the polycentricity at the level of the country concerned –and so on. This is crucial not only for the polycentric aggregates of cities themselves but also for different activities, networking and complementarities which have different effects on polycentric structures at each spatial level.

According to ESPON 2006 1.1.1 project (2005), polycentricity should be approached at **four spatial levels**:

- At the **European level** (*macro*), polycentricity is seen as a useful alternative model to enhance regional development more evenly across the European territory. Thus, a polycentric Europe is seen as an attractive alternative to a European space dominated by the “Pentagon”.
- At the **interregional or meso level**, *urban complementarities* are important. “Two or more cities can complement each other functionally by offering the citizens and companies in their conjoined hinterlands access to urban functions that would be usually only offered by higher-ranking cities”<sup>23</sup>.
- In the context of **intra-regional development** (*micro*), urban functional and economic complementarities are emphasised. An urban region can improve its economic performance through better co-operation and improved links within the region. “An intra-regional application of polycentricity thus promotes integrated spatial development strategies for city clusters”.

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<sup>23</sup> «..Rather than competing to build up the same urban functions, the ESDP recommends that cities should co-operate by joining existing assets, in particular assets that are complementary...”.

- The ***intra-urban scale*** and the polycentric structures of FUAs at the local level<sup>24</sup>. From this point of view even more important is the case of *large metropolitan areas*. In general terms, analyses at this level use the same logic as for the three higher spatial levels: *polycentric / monocentric structure, policy aiming to reinforce second level centres to better distribute development and provision of services throughout the city / FUA*.

From the above mentioned levels, *ESPON 1.1.1 and 1.4.3 focused more on the European level*, based on sufficient evidence. They also studied the interregional and intra-regional levels which together could be included in a ***"regional polycentricity"*** concept; however, they did not answer several crucial questions since they did not have enough data to use. Therefore, they did not exploit some of the relevant appropriate methods, especially regarding the networking and complementarities between cities at this level.

*POLYNET study* emphasized the "regional" level. However, as already mentioned, it studied only a part of the West Europe.

Consequently, at this level, further research is needed for the entire ESPON territory –which could be carried out by FOCI.

While specific interactions among cities and their hinterland are approached in WP3, in WP4 we could mainly analyse the multi-directional (and multi-level) ties between cities with specific insights on medium sized towns/cities and their opportunities for synergies by cooperation in relation to the question of provision of equal quality services to the population and businesses.

### **8.3 Urban networks in relation to territorial complementarities**

From a spatial planning point of view, a particularly useful step is to go beyond the "concentration" component of polycentricity by further exploiting the concepts of *existing and potential activities (firms) networks and urban networks* in relation to *territorial complementarities*.

#### **8.3.1 Existing and potential activities and urban networks**

The role of cities in polarising spatial development is complemented by the role of urban networks based on proximity effects or operating at distance. Therefore, polycentricity at different spatial levels should be approached *in interrelation with economic and spatial / urban networking as the basis for the analysis and policy making*. Until the 1960s, the development of a great number of dynamic cities was based on industrial development. However, a more limited number of cities, the international metropolises, while often retained a developing industrial sector, have based their development on *high level activities* such as the decision-making functions or RTD activities etc.

In the ***new framework of globalisation*** (and European integration), which is related to the growing influence of new technologies (focused mainly in Information / Teleinformatics /Internet activities), *economic networks operating on proximity or independently of distance –mainly the globalised ones–have a raising influence on a growing number of cities*.

Castells (1996) introduced in late '80s the concept of the "space of flows" meaning the material and immaterial components of the global information networks through which the world economy is coordinated across distances. Sassen (2002, page 8) emphasized the role

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<sup>24</sup> ESPON 2006 projects did not investigate this level enough.

of these *flows in the creation of new centralities*. As she argues: “A growing number of cities today play an increasingly important role in directly linking their national economies with global circuits. As cross-border transactions of all kinds grow, so do the networks binding particular configurations of cities. This in turn contributes to the formation of *new geographies of centrality in which cities are the key articulators*”.

An important number of researches, publications etc following this line pointed out that work on evaluation of the present situation as well as of the evolution of the urban systems –in particular their “global nodes”- should be based on flows rather than on attributes and take a global rather than a national perspective. However, they provided very often evidence based on global cities attributes because the respective data were abundant and not on global cities relationships where the relevant data were poor.

For the study of direct relationships (flows) data on air traffic and telecommunications traffic among cities were mainly used. One of the recent very interesting such attempts was this one of ESPON 1.1.1 project (2003)<sup>25</sup>. As they concluded from the analysis of the evolution of the number of passengers between 1960 and 2000 on the main European network (see the Map “Evolution of main air flows” in ESPON 2006 project 1.1.1 TIR), while “the density of connections is still maximal between the cities of the European axis, the relations between the “peripheral” capitals -political and economic- are also important. The highest growth in number of passengers can be observed between the “peripheral” capitals and the “central” capitals”.

Amiel, Melancon and Rosenblat (2005) also studied international flows of airlines passengers. They developed an approach based on weighted graphs (representing inter-city traffic) from which highly connected groups of nodes (cities) are inferred. The approach can be iterated within each group (or cluster). They discovered that some groups appear to be based on spatial rules, but other specialised subgroups are emerging in response to economic, institutional or more specialized reasons, such as tourism.

An important step on the approach of urban networking based on “global nodes” relationships was made by the Globalisation and World Cities – **GaWC** – Study Group and Network at Loughborough University, led by P. Taylor<sup>26</sup>. They stressed the necessity to *measure actual flows of information among cities using the internal structure of large APS (Advanced Producer Services) firms as a proxy*, expressed by the relationship between head office and other office locations. On this basis they divided world cities in three categories, Alpha, Beta and Gamma world cities and they presented evidence on other world city formulation (relatively strong evidence, some evidence, minimal evidence) -see in Table 1 in Annex. About a half of these “global cities” are in Europe, a high proportion of these last being in the central part of the North West Europe while the rest are often capitals of countries outside NE Europe.

However this classification is based on highly important functional relationships, as Hall and Pain (2006 – POLYNET study) remarked they are not based on real flows of information among the APS firms branch offices; in other words, among different “places”, locations. POLYNET workgroup tried to examine “real” flows among APS into the respective study area using, among others, interviews with firms’ managers. Among the most interesting of the findings are: the communication flows occurring within First Cities, and articulated through them, are of a far superior intensity and value compared to those occurring within firms across the wider MCRs; there is limited evidence of functional linkages within MCRs; there is no evidence that global functions are deconcentrating from POLYNET First Cities; e-communication increasing, but face-to-face remains still critical; quantitative measurement of information flows can never present an accurate picture of the volume and value of interactions, many of which are ‘invisible’: the most intense and important exchanges take

<sup>25</sup> This work was undertaken by N. Cattani and G. Leseco (CNRS Géographie-cités workgroup).

<sup>26</sup> See, among others, in Taylor P. 2003.

place within globally networked First Cities; mobility is crucial both within, and into and out of, MCRs – car travel via motorway, as well as rail travel, are very important for intra-regional travel and access to airports for international travel, especially from First Cities.

Rozenblat and Pumain (2007) also provided interesting conclusions on the effects of firm linkages and innovation on the evolution of urban systems. They stressed that “two distinct processes are superimposed on the classical hierarchical diffusion process: one is a reinforcement of specialisation in multinational activities for cities already engaged in international business, especially financial business (as is the case for Brussels, Luxemburg and Zurich); the other, even more effective, process is linked to the existence of national borders, which guide the location of foreign firms towards national capitals, regardless their relative size within the European urban system, and towards cities located close to international borders (which also gives an advantage to cities in the smallest countries, which are on the whole more “open” to external exchanges than the largest countries). These two processes have the potential to reshape the European urban system...”<sup>27</sup>.

The ESPON 2006 projects focusing on polycentricity and urban functions (ESPON 2006 1.1.1, 1.1.3 and 1.4.3 projects) while emphasized the need to implement the approach of new economic and urban networking, they did not exploit it enough in practice. In the case of proximity economic networking, they took into account only a few indicators addressing indirectly urban networking. They made even less work for the case of networking at distance which influenced even less the relevant conclusions.

More specifically, as we referred previously, *ESPON 1.1.1 project* analysed the air travel flows among cities and in the world. Apart from this, it analysed urban networking linked to universities’ cooperation through the examination of the ERASMUS students exchanges<sup>28</sup>; however both these analyses did not come in depth of this issue as their authors remarked. All the above mentioned researches and publications (both in ESPON and outside ESPON) emphasized the need for further research on the activities / firms networking, focusing on real flows of information, transport, inter-firm exchanges etc.

*ESPON 2006 1.4.4 project on “Flows”* while underlined the need to take more deeply into account the effects of the *real flows* among cities (in addition to the accessibility indicator) did not provide data and analyses on that.

We will further discuss the data and methods needed for this next.

### **8.3.2 Territorial complementarities in urban networks**

Promoting *territorial complementarities* is a *planning concept* meaning that territories, by combining into their entire space appropriate activities and infrastructures can reach critical mass to profit from agglomeration economies, ameliorate the services provided to their enterprises and population, thus, better use their assets and address actual social and environmental challenges. *Local and regional authorities acting in common to create complementarities limit negative effects of fragmentary actions undertaken in the context of their own administrative borders.*

Territorial complementarities constitute, in essence, an enlargement of the growth poles concept, having taken into consideration the criticisms in the implementation of territorial development policies based on “over-developing” growth poles (see previously).

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<sup>27</sup> See also in: Rozenblat C. & Pumain D., 2004 as well as in Rozenblat C., 2009.

<sup>28</sup> As well as urban networking furthered by INTERREG programmes cross- border and transnational cooperation, issue which is discussed here in next section.



European and national territorial policy and planning documents very often argue on the importance to create territorial complementarities<sup>29</sup>.

More specifically, concerning urban networks:

The intensified networking among the cities-nodes of the contemporary “Polycentric” Urban Regions is closely related to the presence of complementary relationships between the cities-nodes. Inversely, *enhancing complementarities by integrating infrastructures through planning implementation could enhance cities networking and its positive effects.*

A relatively recent theoretical attempt to characterise complementarity in urban networks states that *“different settlements or regions can fulfil different and mutually beneficial roles, through simultaneously embracing the advantages of competition but also overcoming the associated disadvantages”* (Hague and Kirk, 2003 cited in Meijers 2006). *Complementarity can be about the whole range of urban functions, not just business and economic development* (ibid). According to Meijers (2006a), in order for cities in PURs to be complementary, there must be *differentiation between the cities in terms of urban functions or activities as well as the geographical markets of demand for their urban functions/activities or environments must at least partly overlap.* Activities in one city should provide their services also to businesses or citizens located in the other city. *Businesses and households should consider the working and residential environments in several parts of the PUR with respect to their location decisions.*

### 8.3.3 Two basic levels of complementarities at the “regional polycentricity” level

In our view the above approach of complementarity in PUR is restrictive. As it results from the latter a PUR in this sense could not be very wide, which means that it could not surpass the geographical limits that are defined by a relatively unified working and residential environment<sup>30</sup>. It concerns smaller in extent (lower level) spatial units as the Polycentric Integration Areas (PIAs) -which are defined in next. We could name it as **complementarity type (a)**.

In cases of urban networking in very wider spatial units as, indicatively, the NUTS2 regions or the POLYNET “Mega-city regions”, complementarity concerns necessarily different issues. We could name it as **complementarity type (b)**. Here the focus is on the activities / firms network (which constitutes the basic element of a regional “production system”) and to the coordination of creation of very large scale infrastructures (as well as to social and environmental issues at this scale). There is less need for daily commuting for the less qualified workers and therefore for complementarity of the respective residential environment. On the other hand, there is a need for daily commuting mainly concerning the managers / executives etc. It is more important for the firms that their executives have the possibility to move from one pole of this type of PUR to the other in a working day to cooperate with executives of the other subsidiaries of the firm etc –see in the POLYNET study.

These complementarity types should be seen as two extremes, type (a) focused on daily commuting, lower level transport and other infrastructures and services, type (b) focused on cooperation in business and higher level infrastructures. Between these there are several intermediary cases of inter-city relationships.

<sup>29</sup> See for instance in «Green paper on territorial cohesion» (EC 2008): “Public policy can help territories to make the best use of their assets. In addition, it can help them to jointly respond to common challenges, reach critical mass and realise increasing returns by combining their activities, exploit the complementarities and synergies between them, and overcome divisions stemming from administrative borders”

<sup>30</sup> Furthermore, it is not possible to create “working and residential complementarities” in a very wide PUR through planning implementation and creating infrastructures.

### 8.3.4 The polycentric or monocentric structures efficiency dilemma seen from the scope of complementarities

ESPON 1.4.3 correctly underlined that territorial complementarities do not benefit all territories and stressed the importance of distinguishing, from this point of view, several “polycentric” patterns, as for example, relatively equal distribution of cities from a strong city/FUA surrounded by weak cities/FUAs. In the latter case, focusing on complementarities could reduce the competitiveness of both the strong city and the overall network. POLYNET project gave also a first answer on that. As they concluded: more concentration of APS (Advanced Producer Services) in “First” cities is preferable by economic actors compared to less concentration. Meijers (2006a), based on relevant research gave a similar answer as other researchers also had done.

Therefore, we could come to the preliminary conclusion that in some cases of “polycentric” URs where the main pole is not strong (meaning that it does not contain certain supra-local activities with concentrated potential in the pole) they are seen by the firms as less competitive than a more monocentric UR. In our view, this is something expected. Also, in certain more polycentric URs, cultural and other amenities being dispersed in the smaller cities are in total of smaller value compared to the big concentrated amenities in a more monocentric UR. This is also something expected. But, obviously, *this aspect of the polycentricity discourse needs further research for the whole ESPON territory.*

At this point, it is needed to make some remarks of vital importance from the scope of FOCI.

(a) Nowadays, it is not necessary for a “Polycentric” urban region to have highly differentiated complementary activities. What is important is to enhance complementarity and, thus, “*integration*” of the urban region. Therefore, it is preferable use the terms “Potentially Integrated” UR or “Potentially Polycentric Integrated” UR instead of “Potentially Polycentric” UR.

(b) We should not obligatorily strengthen some *specific* activities in the “weaker” cities of the “unified” urban region (to achieve complementarity) which could result in the loss of effectiveness of the main pole as well as of the total of the urban region<sup>31</sup>. According to a planning driven approach, in every sense, it is useful (since we will have “added value”) to strengthen complementarity through a suitable influence on the localisation (spatial arrangement) of activities and services depending mainly on the kind of infrastructures and the spatial configuration of infrastructures to be created or improved<sup>32</sup>; in some cases, which will result from the analysis of this particular context and from the characteristics of the urban region, it would be necessary to strengthen some functions and infrastructures of the main pole while in other cases we should favour the smaller cities of the urban region. These specific analyses and spatial strategy proposals are undertaken by planners working in each specific case. It has no sense to propose in the frame of FOCI detailed guidelines for a multitude of urban regions patterns and possible combinations of infrastructures and actions to enhance complementarity. Inversely, it is very useful to provide guidance to planners (as well as to local authorities and so on) on which type and scale of UR reside

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<sup>31</sup> As correctly pointed out ESPON 1.4.3 and other research papers –see above

<sup>32</sup> As well other actions to be realised

enhanced complementarity strengthening potentials and which kind of policy objectives on infrastructures and services (potential, territorial configuration) and actions is better to be implemented in each type of potential “polycentric”<sup>33</sup> UR.

### **8.3.5 Measuring complementarity in “polycentric potentials” regions<sup>34</sup>**

Meijers (2006a) stresses that *complementarity can be considered the opposite of duplication*. Therefore, it is needed to measure the extent of differentiation between the cities of a polycentric urban region. This differentiation can be related to a wide variety of urban functions (see the argument of Meijers previously). A limited extent of differentiation is synonymous with duplication, while a high extent of differentiation is similar to complementarity.

In our view, *there is a need to distinguish the two above types of complementarities (a) and (b)*. The above mentioned –complementarity opposite of duplication– mostly concern type (a). For the analysis of this specific type, several statistical methods were developed. Among them, methods of comparison of the profiles of the relevant cities - see more details in: Meijers 2006a. We should remark that these statistical analyses often premise the use of many data for the division of economic activities of each city of the UR. However, in our point of view, the results will depend a lot on the context, so, it is better to use such a method in the framework of the case studies where we will analyse the respective contexts enough. Also, we should remark that the latter statistical analysis will provide us an accurate estimation of the degree of functional differentiation among the cities of the PUR. However, this degree of differentiation could be measured for all the cities of potential PURs or potential unified PURs by a simpler indicator. According to everything mentioned above, we should underline that, despite some PUR cases have a low degree of differentiation, a policy of support / creation of complementarities should also be applied. Even though, the implementation of such a policy in these cases can be much more difficult, it also can be proved more useful.

*The most important conclusion is that, to study territorial complementarities, as well for type (a) as for type (b) of complementarities, it is more useful to use data on real flows among the cities of the PUR.*

### **8.3.6 Service provision in “polycentric” entities at different spatial scales**

The issue of service provision in “polycentric” entities at different spatial scales / levels is very important. National / regional / local authorities as well as other stakeholders interested in promoting better “polycentric” structures attempt basically through appropriate *policies* to combine the location and potential of infrastructures and services provided by the private sector to the enterprises and to the population with those provided by the public sector at different territorial scales.

More specifically, *as actual development driving forces disadvantage provision of services to the population of the remote rural areas, the sparsely populated, island and mountainous*

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<sup>33</sup> Complementary, more unified

<sup>34</sup> Or in “potentially unified through complementarities” regions

*regions* (see, among others, in Dijkskra –Poelman 2008 and Nordregio, 2004), research should pay more attention to this issue.

Most of the relevant research referred to the national, regional or local level while research at European level was very rare. It mainly concerned the provision of services to the enterprises, as it was the case for example of POLYNET which studied mainly APS and much less other kind of services. Especially poor is the research concerning the provision of services to the population (health, education etc) covering the entire EU space. Data collected at this scale for the services to the population from respective EU networks as well as from EU studies<sup>35</sup> remain poor, concerning mainly the NUTS2 level. Urban Audit contains data only on the number of hospital beds and the number of students of higher education in LUZs. Data on the number of students also exist in ESPON 1.1.1 project and other sources outside ESPON.

Previous research was often limited to the study of the allocation of the population at different urban nodes and territories as well as of some simple indicators of location of activities providing services. This was the case also for the ESPON 2006 projects which made few work and dealt with only some aspects of this issue.

The *provision of services by distance* (through telecommunications, Internet etc) changes considerably the actual territorial patterns of provision of services through proximity links. While there is pioneer research on this issue, it is limited until now to specific cases where these new patterns were promoted, as for example tele-medicine.

## 8.4 The “Polycentric Potential” areas

### 8.4.1 Typology of FUAs as development centres by influence range

The influence of cities in spatial development is clearly referred at **different territorial levels**. **ESPON 1.1.1** divided, from this point of view, ESPON space urban areas in **Metropolitan European Growth Areas (MEGAs) transnational / national<sup>36</sup> and regional / local<sup>37</sup> importance FUAs** (see the Map on the typology of FUAs in ESPON 1.1.1 op.cit.). This typology was based on the average scores of five features and functions of the FUAs, i.e. population, transport, industry, knowledge and decision-making.

Then, the **76 MEGAs** are divided into five groups: Two *global nodes* (London and Paris), 17 *Category 1 MEGAs*, 8 *Category 2 MEGAs* and 26 *Category 3 MEGAs* and 23 *Category 4 MEGAs*.

**ESPON 1.4.3** emphasized the distinction of urban areas according to their role from the European or the national point of view. From this scope it first identified **Polycentric Metropolitan Areas (PMAs)** considering as such two large cities distant one from the other less than 30 km and reaching together the level of 500,000 inhabitants.

<sup>35</sup> See, among others in Dijkskra –Poelman 2008 and Nordregio, 2004, for the remote rural areas and mountainous areas, respectively.

<sup>36</sup> 219 in total

<sup>37</sup> 1312 in total.

PMAs constitute a first category of **poly-FUAs** (see the Map “FUA distribution inside and outside the poly-FUA structure 2002” in ESPON 1.4.3), groups of relatively equal potential FUAs with intense relationships among them. They have also identified a very small number of poly-FUAs of lower importance compared to PMAs<sup>38</sup>. According to the comparison that we made among the ESPON 1.1.1 MEGAs’ wider areas and the ESPON 1.4.3 PMAs it resulted that the MEGAs’ wider areas correspond to PMAs. Almost all the remaining PMAs are poly-nuclear.

FUAs which are more relevant at a national scale planning than from the European point of view have been divided by level in *large FUAs -with population more than 250.000 inhabitants-*, *medium FUAs -100.000 - 250.000 inhab.-* and *small FUAs -50.000 – 100.000 inhab.-*.

**POLYNET project** used a division of cities according to their role as development poles and service provision centres which has taken more appropriately into account the recent evolutions in networking and complementarities among cities –which were described previously. This division of cities together with their areas of influence based on corresponding interactions and flows answer more appropriately the question on how to combine “places” (points) with flows / relationships (lines) in the polycentric potentials discourse – we will come back to this next.

#### 8.4.2 Further discussing on Polycentric Potential areas

Promoting Polycentric Potentials is a quite old spatial planning idea based on the hypothesis that strengthening complementarities among cities, which enhance urban networking, lead to the formation of entities that would be able to profit from positive effects comparable to those of single strong cities. This approach was emphasized by ESDP (European Spatial Development Perspective, 1999). *ESPON 1.1.1 project* followed at a considerable extent this line: “... where can we find the most promising potential for development towards a more polycentric urban system for Europe? *The preconditions for polycentricity are best where cities are located in proximity to each other...* Morphological proximity is of course no guarantee of co-operation, but proximity does nevertheless provide cities with a better opportunity for functional integration...”.

In this sense, they suggested **Potential Urban Strategic Horizons (PUSHs) and Potential Polycentric Integration Areas (PIAs** -Map 35 in Annex). For each of the FUAs, they have calculated *the area that can be reached within 45 minutes by car from the FUA centre*. The resulting areas are labelled **PUSH**. In a next step, they have identified **PIAs**, based on the *hypothesis that neighbouring cities with overlapping travel-to-work-areas can be functionally integrated and can gain from co-operation*. A total of 249 PIAs were found where at least two PUSH areas shared more than 1/3 of their area with each other. These areas concern 1,139 PUSHs, while the remaining 456 PUSHs are more isolated. There are many PIAs in West Europe, while there are few in South and East Europe –because in W Europe population densities are much higher and distances between cities are much smaller. PIAs in West Europe are strong while they are weak in the rest of Europe.

<sup>38</sup> Such as Strasburg – Offenburg and Basel (constituting of medium cities) in Germany, Enschede-Almelo (constituting of larger cities) in Netherlands.

A first critic of this approach took place in *ESPON 1.4.3*, which stressed that " .... *the function of PIA units is not clear*. Questions pertain to their embeddedness within national territorial planning systems. The *ESPON 1.1.1* report seems to consider the PIAs as spaces for reflection, but also for action, in order to re-balance the European urban system. It seems, however, that this objective has not been fulfilled, owing mainly to methodological issues. First of all, the PUSH and PIA systems reflect all the inconsistencies, primarily the differences among individual countries, in the way the FUA units were identified and delimited. Secondly, ***it was not realistic to assume that all FUA centres, including the smallest ones, can extend their zones of influence over the area situated within the 45 minutes travel time isochrone***. If clusters of PUSH and PIA areas were to form magnets for further concentration of economic and demographic potential, they would have to be based upon the network of large cities which offer real attracting power in terms of labour market and the range of specialized services. Thirdly, as presented in the report, *the pattern of PUSH areas reflects mainly variations in the overall density of urban settlement. Countries with high population densities are almost completely covered by the PUSH and PIA units*. This says little about the structure of the urban systems..."

*ESPON 1.1.1* and *1.4.3* did not go in depth in the analysis of the internal structures and external linkages of the "Polycentric Potentials" areas **at regional level**, due to the lack of data and lack of time and resources for their research. Therefore, it is interesting to examine here from the scope of the regional level "polycentric potentials", the already mentioned work of the POLYNET project.

Particularly interesting in the frame of the previous discussion on the definition of PIAs is the *definition of MCRs by POLYNET study* (ibid. pp. 19-20). They started from the ascertainment that "increasing commuting distances and increasing complex cross-commuting patterns mean that built-areas no longer describe the functional reality. So, *comparable definitions using functional, not morphological,, criteria are essential for comparative analysis of urban systems and urban development patterns*". They finally adopted a variant of the Group of European Metropolitan Areas Comparative Analysis (GEMACA) (IAURIF 1996) criteria for defining FURs in the eight study areas:

- **FURs:** comprise **a core** defined in terms of employment size and density, and **a ring** defined in terms of regular daily journeys (commuting) to the core:

(1) *Cores:* using NUTS5 units, define cores on the basis of 7 or more workers per hectare, and minimum 20,000 workers in either single NUTS 5 units or in contiguous NUTS 5 units.

(2) *Rings:* using NUTS 5 units, where possible, define rings on the basis of 10 per cent or more of the residentially based workforce commuting daily to the core. Where they commute to more than one core, they are allocated to the core to which most commuters go.

- The **MCR:** having defined FURs ... the POLYNET study then needed to aggregate them into the basic units for comparative study: the eight MCRs<sup>39</sup>. In a sense, *there is a significant element of circularity here: since the objective was to study functional polycentricity, the study could logically only seek to define MCRs when the research was complete; but it was necessary to start with a working definition*. ... They adopted as basic criterion for the initial

<sup>39</sup> MCRs are "...a series of anything between ten and 50 cities and towns, physically separate but functionally networked, clustered around one or more larger central cities, and drawing enormous economic strength from a new functional division of labour. These places exist both as separate entities, in which most residents work locally and most workers are local residents, and as parts of a wider functional urban region (FUR) connected by dense flows of people and information carried along motorways, high-speed rail lines and telecommunications cables". (Hall and Pain, 2006, chapter 1)

mapping of the MCRs *the one of contiguity*. MCR was defined in terms of contiguous FURs<sup>40</sup>. There may be functional relations (cross-commuting) between the constituent FURs, or there may not; this could not form a basis for the definition, since it has emerged only in the course of the analysis. For individual FURs, each study team assembled, among others, data on commuting (including cross-commuting between FURs in MCRs).

POLYNET project studied eight of the most populated and economically important mega-regions of Europe<sup>41</sup>. Therefore, its conclusions on polycentricity potentials cover from this scope to a large extent the evolution of a major part of the West Europe. POLYNET emphasized the growing role of Advanced Producer Services (APS) in the patterns of polycentric development of the entire “polycentric metropolis” as well as its constituent MCRs. This evolution has been situated in the specific monocentric or polycentric contexts of each one MCR. *We should although underline that the rest of the ESPON space has not been covered until now with a comparable in depth study as well as that only some of the results of the study could be generalised for the entire Europe regions, as the authors of the study remarked.*

Apart from the valuable answers given by this project to methodological issues (which will be presented next), it focused on the approach of some very important contradictions at different spatial levels in relation with “polycentric” cooperation policy dilemmas<sup>42</sup>. A first such contradiction is that between polycentric development of MCRs in morphological terms and weak degree of polycentricity (see the example of MCRs in North West Europe) in functional terms defined by daily commuting. Another contradiction of “regional” functional polycentricity nature is based on the knowledge-intensive business flows in *Advanced Producer Services (APS)*: as they found while e.g. Rhine-Ruhr and Randstad are functionally polycentric from this point of view, Randstad region did not seem to have developed important functional linkages”. Last but not least important is the contradiction between the dynamics of the service provision to enterprises -potential, localisation- and the service provision to the population at different urban / spatial levels. POLYNET study gave, according to its authors, first answers on these which question the simplistic general scheme of the ESDP for supporting cooperation in “polycentric potentials”; although they emphasized the need for further research on these issues.

#### 8.4.3 Linking cities with “polycentric potential integration” areas

We have already seen that relevant studies have discerned, more or less clearly, two types of “regional” complementarities between cities –(a) and (b)- corresponding to different spatial levels, an “upper level” associated to wider areas and a “lower level” associated to smaller areas. Each Polycentric Potential / PP area includes, apart from the cities / FUAs, a number of smaller settlements. It constitutes a whole zone which cities provide with services. More generally, cities are related through multiple linkages with the entire

<sup>40</sup> And thus similar to the so-called Combined Metropolitan Statistical Areas (CMSAs), used in the US.

<sup>41</sup> *South East England*, where London is now the centre of a system of some 30–40 centres, *the Randstad* in The Netherlands, *Central Belgium*, comprising Brussels and a surrounding ring of large and medium size cities, with 7.8 millions inh., *RhineRuhr*, embracing 90 towns and cities, with 12 million people, the *Rhine-Main Region* of Germany, the *EMR of Northern Switzerland*, the *Paris Region* and *Greater Dublin*,

<sup>42</sup> See, among others, in Halbert, L., Convery, F., Thierstein, A., (2006). “Reflections on the Polycentric Metropolis” *Built Environment*, vol. 32, pp 110-113.

surrounding PP area. The content of complementarities and networking among the cities of the PP depends on the kind of interactions between the cities and the PP area.

In all PP areas, whether they are monocentric or polycentric, the First city of the PP area has a more or less first role in providing the PP area with services. The First city role is very often related to its prime position in the administrative system of each country.

All relevant researches, in order to study the interactions of the urban systems to the respective PP areas, divide these last per spatial level in accordance with the role and potential of the First city of the PP area<sup>43</sup>.

This starting hypothesis on a "*combined*" typology of First "cities" and the corresponding "*areas of interest*" constitutes obviously a necessary methodological choice in studies (as FOCI) focusing on interactions / complementarities among cities (as "places", "points) as well as between the cities and their wider areas. As POLYNET study (as well as others researches) pointed out this is somehow tautological: they define the extent of the "area of interest" while this is something they try to precise with their work.

We have already mentioned the typology used by the POLYNET study which has taken into account recent evolutions in networking among cities as well as provision of services to territories at different spatial levels - see for the correspondence of these categories to the Loughborough terminology: "alpha", "beta", "gamma" global cities, in the POLYNET study (op. cit.).

(a) *Global cities* typically with 5 million and more people within their administrative boundaries and up to 20 million within their hinterlands, but effectively serving very large global territories: for the ESPON space: London, Paris.

(b) *Sub-global cities*, typically with 1–5 million people and up to perhaps 10 million in their hinterlands.

According to the POLYNET study "they perform an almost complete range of similar functions as global cities for more restricted national or regional territories, as well as certain specialized global service functions (banking, fashion, culture, media). In this category come all European capitals apart from the global cities, together with 'commercial capitals' in nations that divide top political and commercial functions (Milan, Barcelona) as well as major provincial cities in large nation states (Glasgow, Manchester, Lyon, Marseille, Hamburg).

We remark that for the ESPON space they correspond to a considerable extent –however, not fully- to the 76 ESPON 1.1.1 MEGAs defined by ESPON 1.1.1 project.

(c) "*Regional*" cities -population 250,000–1,000,000- . Their areas of interest are *territories with more than 500.000 inhab* - see in Map 36 in Annex.

We remark that these territories coincide more or less to the PIAs defined by ESPON 1.1.1 project with more than 500.000 inhab.

(d) "*Provincial*" cities -population 100,000–250,000-. Their areas of interest are *territories with less than 500.000 inhab*. According to the POLYNET study "they are the typical county market towns of rural Europe, found across much of southern England, southern Germany, and most of France. They have grown because they provide the local services for their populations -including services once provided by smaller lower-order places, as mobility has increased Christaller's "range of a good"- and sometimes national services (such as universities)".

We remark that these territories coincide more or less (however not fully) to the PIAs defined by ESPON 1.1.1 project with less than 500.000 inhab. - see in Map 37 in Annex. In this category, rural areas remote from big urban centres are mainly included, situated mainly outside the EU "blue banana" (mainly in Southern and Eastern Europe).

<sup>43</sup> They obviously used the results of previous research as a guide.



Two categories which are important for spatial planning because service provision to them is more difficult (as relevant research has demonstrated -see previously), are:

- *Rural areas which are more remote from cities of any size*<sup>44</sup>.
- *Specific areas: mountainous, island, dispersed population areas.*

This discussion (mainly for the above levels (b)-(d)) is included in a more general one on typologies of existing or potential integration areas (polycentric or monocentric) in relation to the European urban system. Several efforts have been made in this direction, often having transposed, to some extent, national particularities to the approach of the entire European territory. They prioritise a specific kind of spatial patterns, often the urban-rural one. We mention, among the more successful ones: (a) two typologies produced by Mathian - Pumain - Rosenblat (see in SPESP 2000, section: Regions and urban-rural partnership, especially Map 2 in page 25): (1) Regional types of urban-rural spatial patterns: regions dominated by a large metropolis, polycentric regions with high urban and rural densities, polycentric regions with high urban densities, rural areas under metropolitan influence, rural areas with small and medium – sized towns, remote rural areas, (b) Types of urban-rural settings: metropolitan areas / regions with medium-sized cities / regions dominated by smaller cities, divided according to their cities' population class and their degree of polycentricity (monocentric / polycentric), (b) the urban-rural typology of NUTS3 regions produced by Dijkskra –Poelman 2008 which distinguish: predominantly urban regions, intermediate regions close to a city, predominantly rural regions close to a city, predominantly rural remote regions. These typologies, while they are very useful to study the links among cities / cities networks and "polycentric potential integration" areas are not fully focused on these specific links. Therefore, further research is needed in this direction.

Finally, as POLYNET and other studies have remarked, the correspondence of "regional" and "provincial" cities to relevant territories *depend, apart from the existing territorial structures, on the national planning realities.*

#### **8.4.4 Types and scales / levels of linkages interesting regional polycentricity**

A *first type* of linkage concerns the MEGAs and their territories, both inside these territories and towards the lower levels territories. These linkages were analysed to a small extent by the ESPON projects 1.1.1 and 1.4.3 and in much more depth by POLYNET study for its respective area.

A *second type* refers to "regional" cities in territories with more than 500.000 inhab. Linkages mostly studied in this case are: (1) the internal to each territory (among its cities/ poles with specific focus on the linkages to its "first" city), (2) the linkages to the MEGAs level, (3) the linkages to the (d) level.

Here, ESPON project 1.1.1 made some first attempts based on data for cities, not on real flows (firms, research, and transport), while POLYNET worked on real flows, as well as a

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<sup>44</sup> According to the "Green paper on territorial cohesion (EC 2008): "... *in rural areas which are more remote from cities of any size, small and medium-sized towns often play a more important role than their size might suggest. The role these towns play in providing access to services including the infrastructure necessary to invest in the adaptability of people and enterprises, is key to avoiding rural depopulation and ensuring these areas remain attractive places to live*".

number of other studies done, very often at national level. POLYNET emphasized also to linkages of the First City of the MCR to its other cities. They focused on the interactions among the APS subsidiaries. They also put specific attention to the telecommunications / Internet flows; however, as they have remarked, relevant data were poor. They mostly emphasized in interviews with APS firms executives on the inter-firm and firms-locations linkages. Here, they had less answers than they had expected except the case of web based interviews made in one case of MCR.

A *third type* refers to “provincial” cities in territories with less than 500.000 inhab. Here, previous research worked relatively less on transport, telecommunications, inter-firms linkages as very often relevant data are missing. Relatively important work has been done on the service provision both internally (in the respective territory) and from the level (c) to the level (d). Relevant work has been done in the frame of respective national, regional or local planning studies and cases studies research.

*Linkages of the second and third type correspond to the “intermediate” regions, concept used by several researches as well as by the “Green paper on territorial cohesion (EC 2008)*<sup>45</sup>. These types of linkages concern provision of services not only to the previously defined territories (c) and (d) but also to the surrounding rural areas.

#### **8.4.5 Territorial identity and territorial context in “Polycentric Potentials” research**

In addition to the approach of the concentration as well as the urban networking / territorial complementarities, it is essential to take into consideration, apart from the diversity of their effects mentioned above, the particular historical and cultural conditions of evolution of various regions which constitute part of their identity; in other words, *the need to maintain the diversity of European identities requires a different solution in different identity cases*. All these lead us to shape tailored made solutions; as it is well known, this is common practice in the spatial planning everywhere: spatial plans at national, regional or local level are essentially tailored made shaped. However, in the framework of FOCI, it is useful to give policy recommendations by *wider territorial contexts, scales / levels and types of regions* which will be used by the professional planners (and corresponding stakeholders) for the shape of spatial policy recommendations from transnational to local level.

In this framework, in order for our analysis to be able to be implemented by proposals which will be applied by consortiums of stakeholders in a politically established European macro-territorial base, it is preferable to refer to the INTERREG IV *areas of transnational cooperation*: Northern Periphery, Baltic Sea, North West Europe, North Sea, Atlantic Coast, Alpine Space, Central Europe, South West Europe, Mediterranean, South East Europe, Caribbean Area, Açores-Madeira-Canarias. These areas could also be used as “contexts” for the analyses at lower spatial levels. The *national level* should also be used as “context”.

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<sup>45</sup> According to the “Green paper on territorial cohesion” (EC 2008): “Intermediate regions, which have more small cities and towns, can also benefit from increasing returns if they create a strong network of cities and towns and develop their strengths in a coordinated manner. *Towns and cities in intermediate and rural regions also provide essential services for the surrounding rural areas*”.

## **8.5 Territorial governance / cooperation in relation to the polycentric urban systems policies**

Territorial cooperation becomes more efficient when the definition of the cooperation area is related to Potential Integration areas; that happens in cases interested stakeholders exploit identified “Polycentric Potentials” by improving complementarities in their common territory (by combining appropriate infrastructures and services -see previously). Obviously, the spatial extent of the territorial cooperation depends also on the political will of the interested authorities<sup>46</sup>.

Previous relevant researches identified existing cooperation among cities and urban networks mainly on the basis of the cooperation initiatives developed under the trans-border, transnational and interregional parts of INTERREG (see indicatively, in INTERACT and METREX documents).

They more precisely evaluated both the approaches of polycentricity used in different situations and the possible impacts of the respective projects on polycentric development. Further research is needed on the evaluation of the strategies of territorial cooperation programmes (including the 2007-2013 period’s ones)<sup>47</sup> from the scope of the “regional polycentricity” approach developed previously.

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<sup>46</sup> As previous research demonstrated, regional and local authorities usually prioritise the metropolitan level or the regional level inside each country at the expense of transnational or trans-border cooperation. They also prioritise “traditional” or “well-known”, relatively smaller, spatial units at the expense of much wider regions.

<sup>47</sup> Focusing at transnational and interregional levels.

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**Polycentricity: mainly analytical aspect (firms / activities networks, urban networks etc)**

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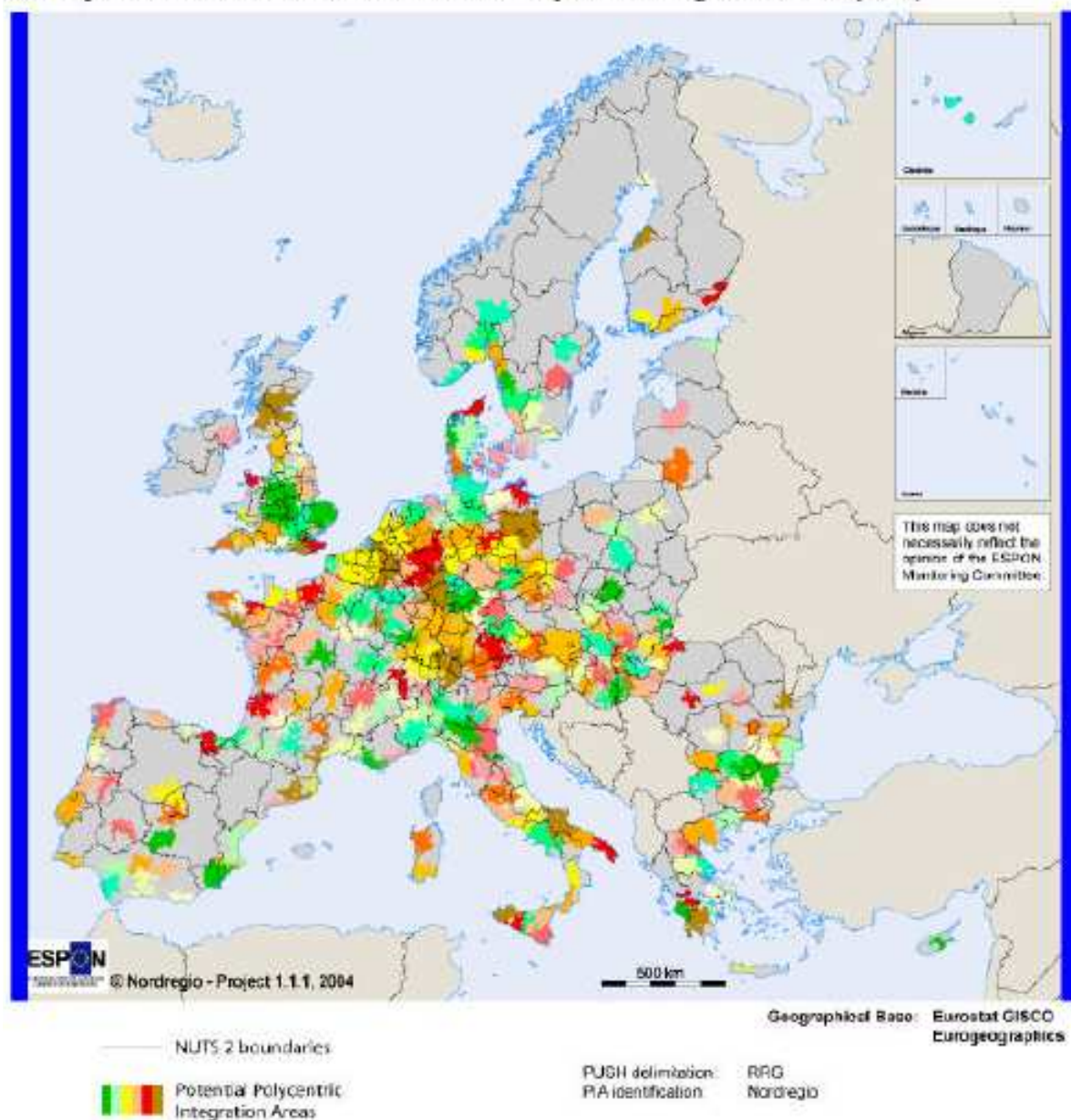
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**Annex – Tables and Maps**

**Overlay of NUTS 2 boundaries and Potential Polycentric Integration Areas (PIAs)**



**Figure 35 ESPON 1.1.1 project (2004): Potential Polycentric Integration Areas (PIAs) overlaid by NUTS 2 boundaries**



### **ESPON 1.1.1 MEGAs**

**- Global nodes**

London, Paris

**- Category 1 MEGAs**

Munich, Frankfurt, Madrid, Milan, Rome, Hamburg, Brussels, Copenhagen, Zurich, Amsterdam, Berlin, Barcelona and Stuttgart.

**- Category 2 MEGAs**

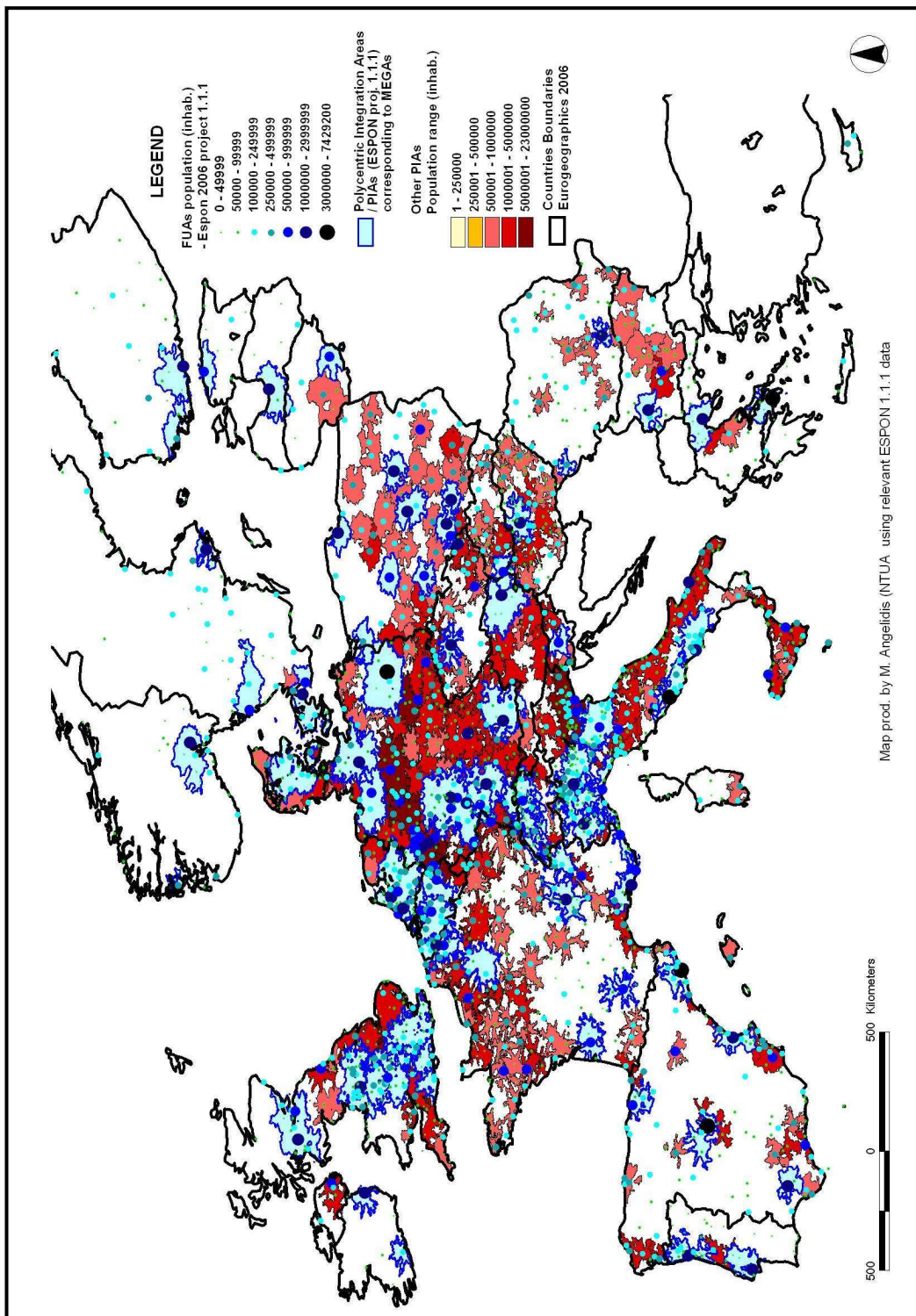
Stockholm, Helsinki, Oslo, Düsseldorf, Geneva, Vienna, Cologne, Manchester, Athens, Dublin and Gothenburg.

**- Category 3 MEGAs**

Prague, Warsaw, Budapest, Bratislava, Bern, Luxembourg, Lisbon, Lyon, Antwerp, Turin, Rotterdam, Aarhus, Malmö, Marseille, Nice, Bremen, Toulouse, Lille, Bergen, Edinburgh, Glasgow, Birmingham, Palma de Mallorca, Bologna, Bilbao and Valencia.

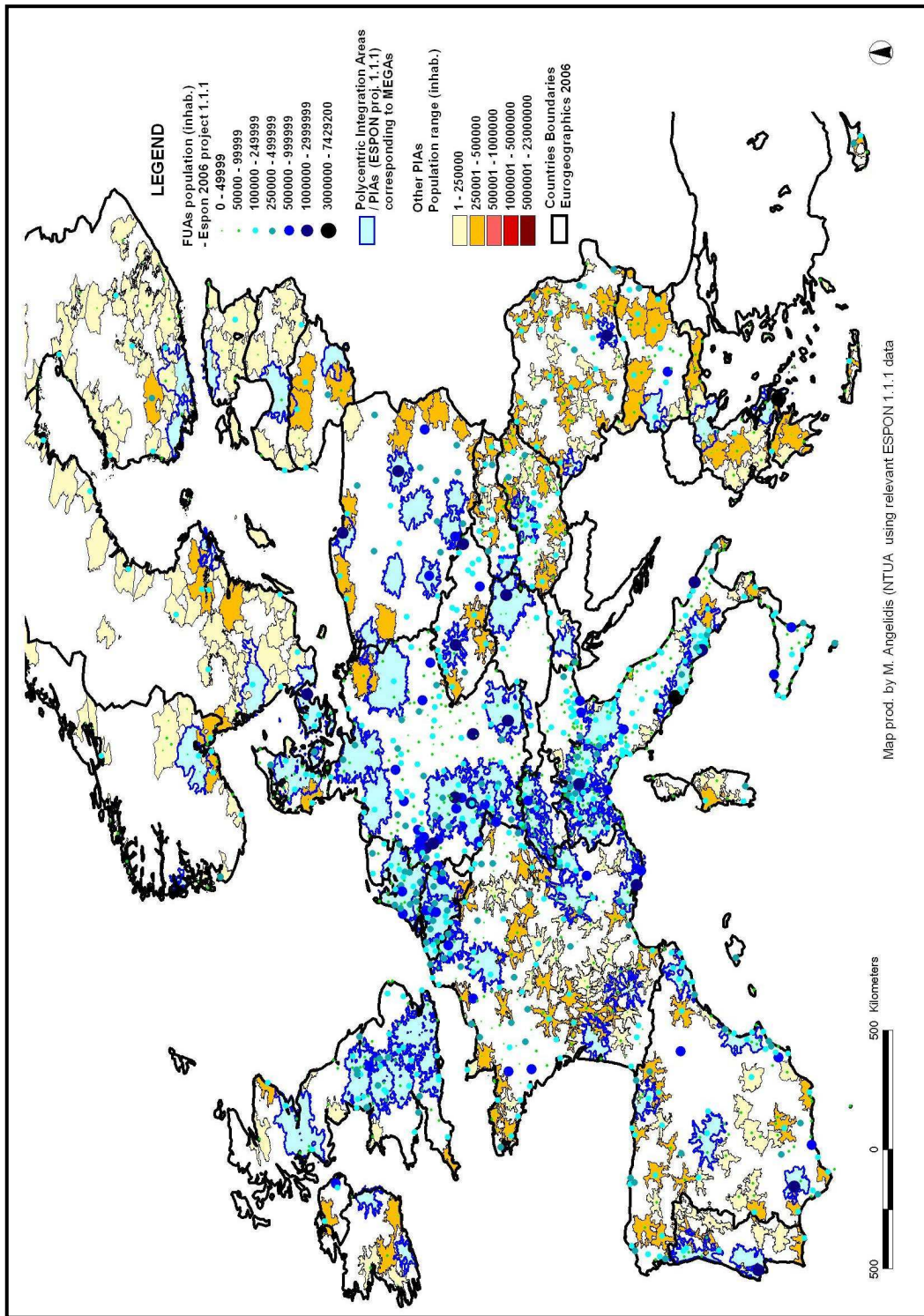
**- Category 4 MEGAs**

Bucharest, Tallinn, Sofia, Ljubljana, Katowice, Vilnius, Krakow, Riga, Lodz, Poznan, Szczecin, Gdansk-Gdynia, Wroclaw, Timisoara, Valetta, Turku, Cork, Southampton, Le Havre, Naples, Bordeaux, Seville, Porto and Genoa.



**Figure 36 Attempts to build a typology of EU ‘Polycentric Potential’ areas to be used in FOCI**

**ESPON 1.1.1 PIAs with population more than 500.000 inhab. (except PIAs of MEGAs)  
They correspond to a considerable extent to “regional” cities / territories in “Intermediate” regions**



Map prod. by M. Angelidis (NTUA) using relevant ESPON 1.1.1 data

**Figure 37 Attempts to build a typology of EU ‘Polycentric Potential’ areas to be used in FOCI**

**ESPON 1.1.1 PIAs with population less than 500.000 inhab.  
They correspond to a considerable extent to ‘Provincial’ cities / territories in  
‘Intermediate’ regions.**

## **Annex 9. Scenario process and stakeholder Engagement**

### **9.1 Scenarios and Stakeholder Engagement**

FOCI aims to analyse the current state, trends and development perspectives for the largest cities and urban agglomerations within the European territory. The project will identify the driving forces of urban development which are the most relevant for understanding urban evolution and offer scenarios for the development of Europe's cities leading to alternative policy options and the design of policies, that stand the test of time. A number of impending policy initiatives will impact on future socio-economic and environmental developments in Europe's regions, and the particular concern here is with the planned mid-term review of European Cohesion policies in 2010.

Many studies concerned with such future assessments are still built around the extrapolation of current trends into the future, the so-called business-as-usual or baseline scenario-approach, against which alternative policies are tested.

However, there are major shortcomings with such approaches. Most of these studies focus only on one sector or one dimension of a problem, at the expense of analysing inter-linkages of the many socio-economic driving forces that contribute to problems in an increasingly complex and fast changing world. It is doubtful, therefore, whether they are sufficient for understanding potential long-term trend developments.

Furthermore, business-as-usual scenarios struggle to represent the complexity of future dynamics and its potential for disruptive change. This is evident today in the unanticipated the major global economic shock of the credit crunch and global recession. Such trend discontinuities may become the norm, rather than the exception, due to disruptive events or political action itself.

Long-term contrasting scenarios analyse a whole range of plausible, but very different futures. They help organisations to rethink the robustness of existing strategies and to discuss potential options to adapt or successfully survive fundamental changes in society, economy or the environment. They can provide the context and a backdrop against which the debate on trends and development perspectives for the largest cities and urban agglomerations within the European territory land use can take place.

Scenario narratives, or storylines illustrate the impact of possible events and developments that cannot be represented with state of the art models, and tend to be ignored in policy discussions. The scenarios are neither predictions nor forecasts. They describe a range of possible futures, which are meant to inspire strategic thinking about some of the key challenges that Europe's cities and regions may face in the future.

Scenario studies differ from other assessment studies as they typically deal with so many uncertainties and the direction of developments in the future is unknown. Different future developments are all possible, even though they may be contradictive. A scenario thus cannot be judged as right or wrong.

Nonetheless, there is widespread agreement on the assumption that scenario development are a useful tool to support decision-making in the context of uncertainties that are beyond our control. In spite of many different definitions there is also a clear tendency to agree on the understanding that a scenario is neither a forecast nor a prediction but should be

understood as 'coherent, internally consistent and plausible description of a possible future state of the world' (ref).

On the basis of the above review a credible and persuasive scenario should challenge prevailing mindsets of experts and policy-makers, and thereby stimulate strategic discussions about policies that are robust enough to stand the test of time. Overall the requirements for sound and successful scenarios include:

- fulfil the objectives of the scenario exercise;
- be plausible and internally consistent;
- tell an appealing story that is not easily dismissed by experts and policy-makers;
- refer to sound data and provide a convincing comparative analysis.

## 9.2 Participatory Scenario Development

FOCI will create a participative scenario building process, engaging with a carefully selected group of stakeholders from across Europe, representing a wide variety of interests and perspectives.

Involving different societal stakeholders helps meeting these criteria, and such participatory scenario development aims to:

- give access to practical knowledge and experience about new problem perceptions and identify new challenging questions, i.e. avoid narrow thinking;
- bridge gaps between the scientific communities and governments, businesses, interest groups or citizens, and thus provide a reality check for research assumptions and methodology;
- improve communication between scientists and stakeholders and facilitate collaboration and consensus-building on problem-solving strategies;
- increase the salience and legitimacy of the scenario and thus the acceptance among end users.

Scenarios should be relevant for potential end users, and it is therefore useful to involve them in the design process from the outset. This is even more relevant, as with FOCI, if scenarios address large, complex and rather uncertain problems that affect the interests of many different societal groups and are thus likely to stimulate controversial discussions.

## 9.3 FOCI Stakeholder Engagement Methodology

**Scenario Development** - FOCI project experts develop the alternative scenarios.

**Scenario Validation Workshop** – to be held in Brussels in the Autumn 2009 and involving selected key European stakeholders from the various European and related institutions with distribution across policy sectors and geographical regions including DGRegio, ESPON etc. The workshop will review key uncertainties, driving forces and the scenario logics, as well as considering potential land-use related environmental impacts. Aim to provide creative input into the scenario development process. Stakeholders develop the qualitative storylines, based on in-depth discussions about key uncertainties and underlying driving forces of social, political, economic, technological and environmental development. Outcomes to include validation of the main drivers identified and to formulate the most policy-relevant hypotheses building on the initial choice of scenarios made by the project team in cooperation with ESPON.

**Scenario Iterations** - stakeholders, experts and scenario writers engage in an iterative process of refining storylines until a set of compelling, coherent, plausible and relevant stories and simulations about the future are reached. The methodology offers time for iterations and the refining of qualitative and quantitative assessments, combining participatory-driven storyline development, scientific rigour, imagination and expertise from different perspectives. It can create well-founded and provoking scenarios that really represent a wide range of angles about possible future developments.

**Policy Options Development** – engagement with key stakeholders of the policy making community including relevant DG's of the European Commission as well as the pan European city networks (Eurocities, UBC, CEMR, Metrex, ICLEI etc) in the development of alternative policy options for the scenarios. This process will address the specification of alternative policy options and the design of policies that can contribute to the planned mid-term review of European Cohesion policies in 2010.

**Scenario Development Outreach** - in parallel with the above a process of open scenario development outreach is instigated. The main objective was to have the widest possible diversification in terms of interests and perspectives on the issues, comprising stakeholders and experts from across Europe with a broad diversity of backgrounds, i.e. policy-makers representing important levels of decision-making, i.e. European, national and regional, the pan European city networks (Eurocities, UBC, CEMR, Metrex, ICLEI etc), researchers, as well as representatives of interest groups and independent thinkers. This outreach uses a variety of meeting opportunities created in collaboration with the City Networks and other agencies to solicit comments and contributions to the scenarios, to secure regional validation of the knowledge base i.e. the main trends and driving forces and of the hypotheses, and to communicate scenario results.



## Annex 10. Technical Report: Semantic Expertise on Urban Audit delineations (provisional version, ESPON Data Base, April 10<sup>th</sup> 2009)

Urban objects are complex geographical objects which result from an aggregation of elementary units according to different possible measure of relation in space. One of the tasks devoted to Espo Data Base 2013 consists to elaborate a semantic expertise on the rules used to build these objects, for each urban data base that could be potentially used by Espo Projects. Among the different urban data bases that have been collected by Espo DB 2013, the Urban Audit ones (Sub-Districts, City Core and Larger Urban Zone) are very specific in the sense that *they don't use harmonised criteria for building urban objects, but national ones*. This specificity leads to a major spatial heterogeneity in the definitions used by each country.

An illustration is given for LUZ 2001 and LUZ 2004 in the following tables. Starting from the different official sources giving some information on the rules used to delineate LUZ (Methodological Handbook 2004, National Final Reports, Urban Audit Gisco...), a classification has been realized according to the level of functionality in the definition, with a gradient going from pure functional criteria (travel to work areas, labour markets...) to pure administrative criteria (NUTS 3, NUTS4).

Two results appear clearly on the Tables. First, a functional gradient, which is illustrated by the diagonal structure of the table, and which enlighten a great spatial heterogeneity, as well in Urban Audit 2001 as in Urban Audit 2004. This spatial heterogeneity may have a major impact on comparisons results made at a European scale. Secondly, a comparison between the two tables shows a temporal variability in the criteria used by some countries (Portugal, Spain...), which turn from administrative delineations to functional ones. Again, this temporal variability may have a major impact on dynamic comparisons based on time series.

NAME	Clear functional definition	Probable functional definition (to be precised)*	Administrative definition, except for Capital city	Administrative definition
Belgium				
France				
Sweden				
United Kingdom				
Finland				
Ireland				
Luxemburg				
Netherlands				
Germany				
Austria				
Denmark				
Greece				
Spain				
Italy				
Portugal				

\*: The methodology used to build LUZ is described very shortly in *Methodological Handbook* or other official sources and need to be clarified by furthered research. Sources: *Urban Audit, Methodological Handbook, 2004 Edition*; *Office for Official Publication of the European Communities, 2004, pp. 11-12*; *Urban Audit GISCO shape files*.

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NAME	Clear functional definition	Probable functional definition (to be precised)*	Administrative definition, except for Capital city	Administrative definition
Belgium				
Croatia				
France				
Netherlands				
Poland				
Portugal				
Spain				
Sweden				
Finland				
Germany				
Norway				
United Kingdom				
Austria				
Cyprus				
Denmark				
Slovakia				
Slovenia				

\*: The methodology used to build LUZ is described very shortly in *National Final Reports* or other official sources and need to be clarified by furthered research. Sources: *Final Reports on Urban Audit Round III (collection of countries), 2008*; *European Regional and Urban Statistics - Reference Guide*; *Office for Official Publication of the European Communities, 2008, pp. 16-17*; *Urban Audit GISCO shape files*,

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## **Annex 11. NUTS approximations of LUZ**

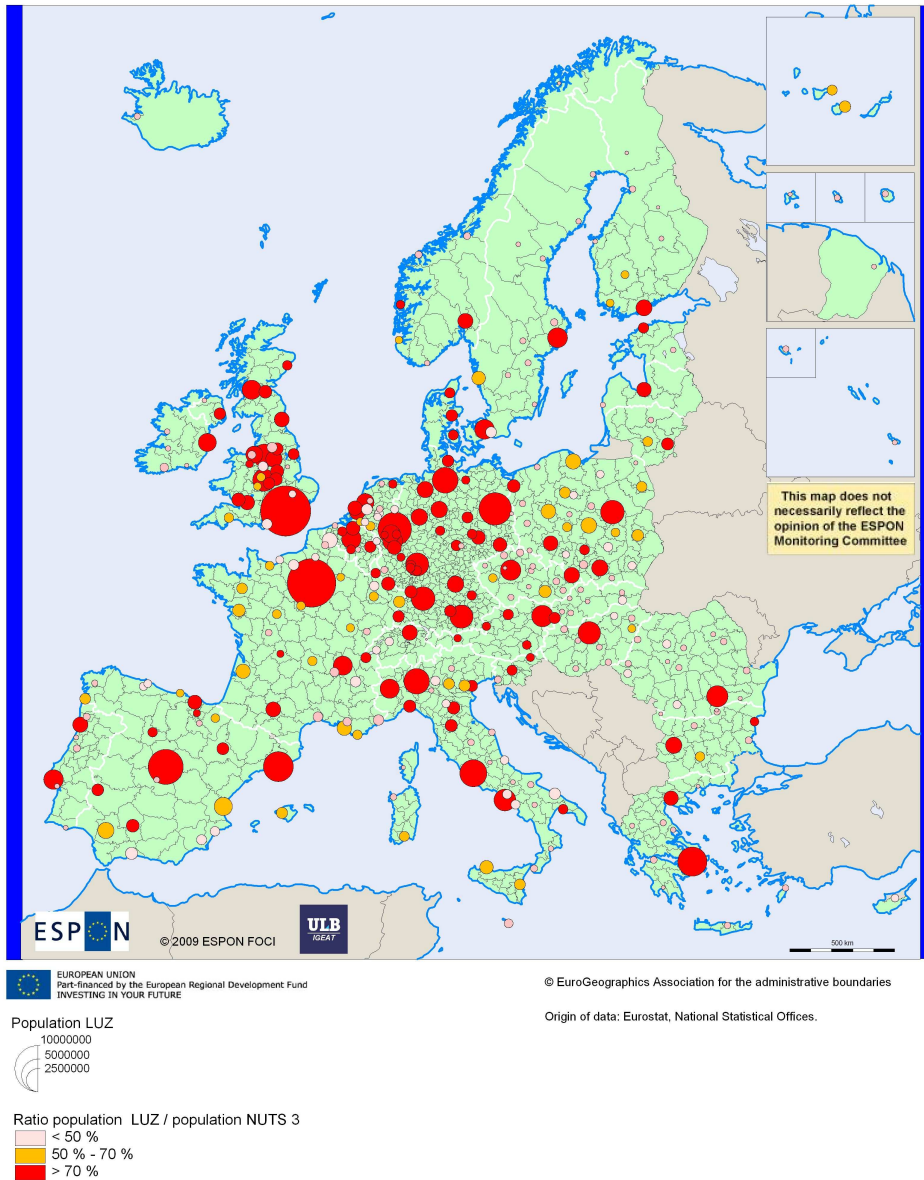
As a result of the difficult situation concerning the Urban Audit, we had decided to use NUTS approximations of cities in order to gain access to larger amounts of data. In a first step, we have used the LUZ as a starting point for this approximation. However, it would obviously be possible to use a more general, and more harmonised starting point such as the ESPON FUA. This choice will have to be discussed with the ESPON community.

### **11.1 NUTS3**

The methodology used for approximating LUZ by NUTS 3 is that explained in the annex on city-hinterland relations. We preferred this method to the one used by DG Regio as the latter used a threshold population (40%) which seems too low to really approximate the reality of the city. In brief the method entails the following steps:

- Only LUZs exceeding 70% of the population threshold of NUTS3 have been included in the city-region analysis.
- In case of LUZs consisting of more than one NUTS3, only regions with at least 50% of the population living within LUZ were considered as a part of the metropolitan area.

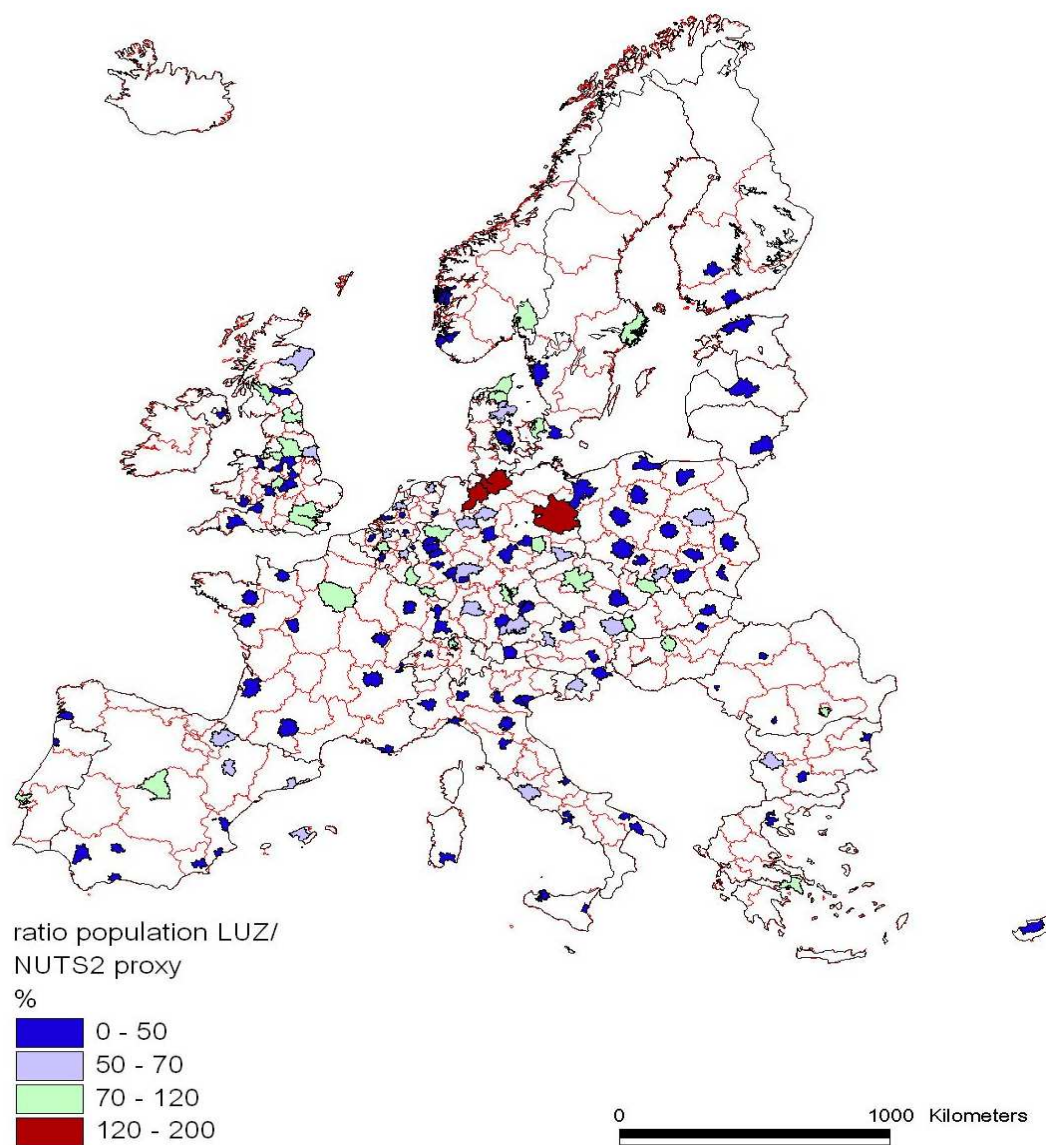
Figure 38 shows the approximations of LUZ in NUTS3 areas with size of circles proportional to LUZ population and colors indicating the percentage of LUZ population in the total NUTS3 population.



**Figure 38 NUTS3 approximations of UA cities with proportion of LUZ population in NUTS3 population**

**11.2 NUTS2**

We used a similar method for NUTS, but obviously with less issues of grouping of NUTS units at that scale. Figure 39 shows the approximation of LUZ in NUTS2 areas with the respective LUZ/NUTS population ratio. It appears that good NUTS2 proxies (ratio between 70% and 120%) are available for most of the major (mostly capital) cities in Europe. The table shows the cities within this threshold with their respective ratios.



**Figure 39 NUTS2 proxy of the LUZ**

In green, the approximation is satisfactory.

Using the threshold of 70-120% leads to the following table of NUTS2 approximations of LUZ:

NUTS2_2006	NUTS Population	LUZ Population	LUZ code	LUZ name	Ratio LUZ/NUTS
BE10	1012330	1763564	BE001	Bruxelles / Brussel	86%
BE24	1040501		BE001		
CH04	1243332	1050188	CH001	Zürich	84%
CZ01	1175894	1941488	CZ001	Praha	83%
CZ02	1150889		CZ001	Praha	
CZ08	1251797	1164354	CZ003	Ostrava	93%
DE25	1710510	1243240	DE014	Nürnberg	73%
DEA3	2623383	5359288	DE038	Ruhrgebiet	84%
DEA5	3768342		DE038		
DEC0	1053287	867268	DE040	Saarbrücken	82%
DED3	1074569	911269	DE008	Leipzig	85%
DK01	1632469	1790845	DK001	Kobenhavn	73%
DK02	808669		DK001		
DK05	576996	483566	DK004	Aalborg	84%
ES30	5879732	5423262	ES001	Madrid	92%
FR10	11445126	10947477	FR001	Paris	96%
GR30	3980004	3777783	GR001	Athina	95%
HU10	2848325	2448431	HU001	Budapest	86%
LU00	465200	437513	LU001	Luxembourg	94%
MT00	403403	330083	MT001	Valletta	82%
NO01	977490	1067103	NO001	Oslo	109%
PT17	2769899	2319511	PT001	Lisboa	84%
RO32	2211663	2131102	RO001	Bucuresti	96%
SE11	1881515	1716321	SE001	Stockholm	91%
SK01	602428	616006	SK001	Bratislava	102%
UKC2	1395097	1036424	UK013	Newcastle upon Tyne	74%
UKD3	2543090	2476130	UK008	Manchester	97%
UKD5	1356671	1349476	UK006	Liverpool	99%
UKE4	2140513	2361704	UK201	Bradford-Leeds	110%
UKG3	2592180	2330681	UK002	Birmingham	90%
UKH2	1637244	11571967	UK001	London	77%
UKH3	1656795		UK001		
UKI1	2941588		UK001		
UKI2	4510632		UK001		
UKJ2	2596990		UK001		
UKJ4	1624068		UK001		
UKM3	2282706	1737420	UK004	Glasgow	76%

**Table 23 NUTS 2 approximations of LUZ**

## **Annex 12. Analysis of the availability and the quality of data on Western Balkans and Turkey – Preliminary selection of cities to be included in the FOCI / Urban Audit sample**

**National Technical University of Athens (NTUA) / Minas Angelidis<sup>48</sup>**

### **Introduction**

The part of the WP 1.2 referred to the **Candidate Countries (CC)** aims to extend the pool of UA data on CC cities as well as to ensure that the relevant data be harmonized with the data on current UA cities. CC are the Western Balkans countries -Albania, Bosnia and Herzegovina, Croatia, FYROM, Serbia, Montenegro and Kosovo- and Turkey.

According to the overall enlargement strategy document adopted by the Commission on November 8th 2006 ([http://ec.europa.eu/enlargement/countries/index\\_en.htm](http://ec.europa.eu/enlargement/countries/index_en.htm)) Croatia and Turkey are candidate countries. In December 2005, the European Council granted the Former Yugoslav Republic of Macedonia (FYROM) the status of a candidate country; accession negotiations have not started. Albania, Bosnia and Herzegovina, Montenegro and Serbia including Kosovo (Under UN Security Council Resolution 1244) are potential candidate countries: See in more detail in the 8.11.06 document.

Since the situation in the CC varies considerably from country to country, it was necessary to make an in depth assessment per country using primarily data provided by the Statistical Offices of the CC as well as data from a wide range of other sources: Eurostat, ESPON 2006 1.1.3 project, other ESPON 2006 projects, ESTIA-SPOSE programme, other relevant INTERREG programmes, Urban Audit, Wikipedia etc – see in References - Sources.

### **12.1 General assessment**

For the Inception Report, we had to accomplish two different but complementary tasks:

- (a) To assess as long as it is worthwhile to include the cities of each of the CC in the FOCI / Urban Audit (UA) sample.
- (b) To describe the methodology to be used for the selection of cities in the particular conditions of each one of the CC.

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<sup>48</sup> Author of the Report and main researcher. Contributions: G. Karka (in parts of the Report), K. Santimpantakis (in specific parts of data process and map creation), E.Tsigkas, C. Kapsopoulou (in specific parts of data process).

### 12.1.1 The question of inclusion of CC cities in the FOCI / UA sample

Our first attempt here is to check ***whether the FUA as well as the UA Larger Urban Zone ("LUZ") definitions could be reliably implemented in the CC.***

According to the UA Methodological Handbook, the ***Larger Urban Zone ("LUZ")*** is an approximation of the functional urban zone centred around the town/ city. "...The concept of ***"Functional Urban Regions" (FUR)*** would be used as a ***proxy*** for the ***Larger Urban Zones (LUZ)*** in the Urban Audit. FURs are also most commonly defined by grouping together LAU (Local Administrative Unit) level 2 (municipalities; former NUTS 5 regions), without further consideration of administrative delineations on higher levels. Thus, it is questionable to what extent the information requested by the Urban Audit is available for the FUR. ...For this reason, ***the FURs are approximated using NUTS level 3 or, if available, LAU level 1 data. Definitions of the LUZ by LAU level 2 regions are also accepted provided the availability of statistical data is sufficient at this detailed level***".

Therefore, we first had to assess ***the conformity of the CC spatial administrative divisions to the EU NUTS / LAU classification criteria.*** Identification and delimitation of cities in the CC are closely related to the implementation of the relevant EU criteria of classification of spatial units on NUTS / LAU levels in those countries. The NUTS Regulation lays down the following minimum and maximum thresholds for the average size of the NUTS regions.

- NUTS 1: 3 - 7 million,
- NUTS 2: 800 000 - 3 million,
- NUTS 3: 150 000 - 800 000.

At a more detailed level, there are the districts and municipalities, called, respectively: LAU (Local Administrative Units)-1 and LAU2. The LAU are not subject of the NUTS Regulation. Turkey, Croatia and FYROM have already adopted this classification. The rest of the CC are at the present in the procedure of adopting it.

*According to the assessment, in the majority of these last the existing administrative divisions (regions, districts, municipalities etc) could be associated to the EU NUTS, LAU definitions without considerable problems -see in section 2.*

Second, we examined the ***availability / quality of existing data (for the FOCI / UA needs) at NUTS3 and LAU1,2 levels*** in the CC (including data allowing us to make diachronic comparisons).

In the current UA, most of these data are given by the national / local authorities, directly or after specific processing, from ***already done*** official national censuses and inventories (population, buildings) or official national surveys. Therefore, we paid particular attention in finding out if there exist at each of the CC, at NUTS3 and LAU1,2 levels, at least a number of "basic" data / indicators -from censuses, inventories and surveys ***already done and comparable with those realized in the EU-27 countries.***

In more detail:

The data required are mainly referred to the following aspects of cities:

(a) Demographic and social:

Population, households, dwellings etc per appropriate categories

(b) Economic aspects, employment: Active population, employment / unemployment, GDP etc

(c) Environmental aspects.

We give in Table 35 of the Annex - Notes and Tables a list of data / indicators which are of primary importance for FOCI / UA<sup>49</sup>.

We also give in the Annex - Notes and Tables the Table 36 of the existing data per Candidate country, per group of themes and per census / survey in which are based.

*Usually realised censuses and specific statistical surveys concerning the FOCI / UA data indicators:*

- Population census, building / dwellings census / inventories
- Labour force survey, household budget survey etc.

According to the assessment we have made, for the majority of categories and countries "basic" data for FOCI/UA exist at the appropriate for the country spatial level: "similar NUTS3" or LAU. In addition: all CC except Turkey and Kosovo are included in CORINE Land Cover and other land based EU programs providing useful land use and environmental data.

### **12.1.2 Modalities of selection of the CC cities to be studied by FOCI / UA**

#### ***The total of urban regions in the CC***

The cities of the CC, which will be included in the sample, will be selected from the *total of the CC Urban regions with population more than 50.000 inhabitants*. According to the assessment we have made, the number of such urban regions exceeds 120<sup>50</sup>.

In more detail:

- More than 42 urban regions in the W. Balkans countries and
- 78 urban regions in Turkey.

For a very small number of cases it is not sure that the population of the respective urban regions exceeds 50.000 inhabitants today –see *in section 2*. It is not difficult to check these cases during the project to consolidate the total number of CC' urban regions (with more than 50.000 inhabitants)

We then considered the cities per country with 20.000-50.000 inhabitants together with the cities with 50.000 inh., from which a relatively restrained number should be selected in order the small and medium-sized cities be represented in the sample.

Two of the CC: Turkey and Croatia, participate in the current UA.

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<sup>49</sup> As well as a list of indicators deriving from the latter.

<sup>50</sup> The number of cities did not change significantly from 2000 to 2007.

A small number of these could be assimilated with MEGAs or FUAs with transnational / national significance while the others have a regional/local importance.

**Turkey** has already participated in Urban Audit since 2000 with **26 cities**, the LUZ population of each of them amounts in more than 100.000 inhabitants: Adana, Ankara, Antalya, Balikesir, Bursa, Denizli, Diyarbakir, Edirne, Erzurum, Gaziantep, Hatay [Antakya], Istanbul, Izmir, Kars, Kastamonu, Kayseri, Kocaeli [Ismir], Konya, Malatya, Manisa, Nevsehir, Samsun, Siirt, Trabzon, Van and Zonguldak.

Some cities of **Croatia** participated in the Perception survey on quality of life in 70 European Cities (2006). **Urban Audit included recently in its sample five cities in Croatia:** Zagreb, Rijeka, Split, Osijek and Slavonski Brod.

*Therefore, for these countries, we should complete the sample with some small and medium-sized cities.*

### **Method of selection of cities to be included in the FOCI / UA sample**

#### **1st step:**

(a) The total number of cities to be included in the sample per country should be proportional to the total population as well as the urban population of the country. The respective rate should be similar to those for the countries already participating in UA. For small countries, having a small number of cities, the number of cities to be selected should be relatively bigger in order the conclusions to be sufficiently representative at the national level.

(b) In order the whole national urban system to be well represented, the selected cities should express relatively representative geographical / regional allocation: (i) among cities located in different types of regions or regions with different ethnic communities (ii) among the central, northern, southern, eastern and western parts of the country as well as among coastal cities, mountainous cities, cities-gates etc and the rest of the cities of the country.

(c) We begun, for each country, from the most suitable for working spatial level: in case the required data exist only at NUTS3 level we worked at this level; in case the required data exist at LAU level -usually, the municipality level for most of the CC- we worked at this level.

#### **2nd step:**

We examined whether each "city" located into a respective "**surrounding administrative unit (SAU) -NUTS3 or LAU-** for which necessary basic data exist could be reliably "represented" by this later.

We used for this purpose two criteria, at first:

(a) The **ratio of the population of the "city" to the population of the SAU**. In case this ratio comes close to 1 (in case it exceeds -indicatively- 0,75-0,80) the approximation of the city to the SAU is satisfactory.

(β) The **population density of the SAU**: in case this density is low, indicatively: lower than 150 inhabit. / Km<sup>2</sup>, the SAU is not "urban", thus it could not "represent" the "city" (it can not be used as an approximation of the city).

#### **3rd step:**

We examined, in addition, **the shape, the area and the population of the UMZ / Urban Morphological Zones**, located into the SAU. In case there is only one UMZ much bigger -in extent and population- compared to the remainder scattered zones into the SAU, the



approximation of the city to the surrounding unit is satisfactory. In opposite case, the surrounding unit contains one city or settlement or two or more cities / settlements the magnitude of which is low compared to the surrounding countryside: in other words, we have a *small city* or a *network of settlements embedded in the countryside* (in a rural area), not a city.

We used for this step, the existing UMZ data (shape, area, population) for the West Balkans countries except Serbia and Kosovo. For the case of *Serbia* we created a "similar UMZ" shapefile from the CLC2000 data using similar rules for the creation of UMZ - see Map 47.

According to the assessment, satisfactory NUTS3 / LAU approximations to LUZ can be used for the majority of the CC cities, while for the rest of the cities corresponding approximations are "bad". This criterion does not comply in a number of cases with the criterion of representation of the national urban system in the sample. In addition, we were often obligated to choose among cities having the same role in the national urban system. In other words, for almost all CC there is not an "ideal" selection of cities. Therefore, we propose in next for each country appropriate -"balanced"- solutions including some cities with "bad approximation" to LUZ but necessary in order the national urban system to be well represented. In addition to this **"basic" set of cities**, we propose a second set of **"complementary / alternative" cities** which could be included in the sample additionally or alternatively to those of the "basic" sample.

## 12.2 Assessment per country

### 12.2.1 Albania

#### **Spatial units' levels:**

The **total population of the country** amounted up to **3.069.275 inhab.** in **2001** (census).

Albania is divided into 12 prefectures (counties), 37 districts and 351 municipalities.

According to the Statistical Institute of Albania 74 cities and 2962 villages are included in the 37 districts.

Albania' prefectures could be eventually assimilated to NUTS3 – Table 24

EU regulation for NUTS 3: 150 000 - 800 000 inh.; all Albania' prefectures, except two, have 150 000 - 800 000 inh. in 2001.

	Prefecture	Popul. 2001	District where the capital of the pref. is located	Pop. 2001 of the District where the capital of the pref. & the district is located	Pop. density (inh./km <sup>2</sup> ) 2001 of the District where the capital of the pref. & the district is located	<b>Urban Pop. 2001</b> of the District where the capital of the pref. & the district is located	Capital of the Pref.	Popul. 2008 of the capital / "metro" - Wikipedia
1	Tiranë	597.899	Tiranë	<b>519.720</b>	<b>420</b>	<b>352.581</b>	Tiranë	<b>598,000</b>
2	Fier	382.544	Fier	<b>199.082</b>	<b>234</b>	<b>76.166</b>	Fier	<b>383,000</b>
3	Elbasan	362.736	Elbasan	<b>221.635</b>	<b>172</b>	<b>95.554</b>	Elbasan	<b>363,000</b>
4	Shkodër	256.473	Shkodër	<b>185.395</b>	114	<b>85.798</b>	Shkodër	<b>257,000</b>
5	Durrës	245.179	Durrës	<b>181.662</b>	<b>399</b>	<b>113.465</b>	Durrës	<b>245,000</b>
6	Vlorë	192.982	Vlorë	<b>147.128</b>	138	<b>85.180</b>	Vlorë	<b>193,000</b>
7	Korçë	265.182	Korçë	<b>142.909</b>	66	<b>58.911</b>	Korçë	<b>265,000</b>
8	Berat	193.020	Berat	<b>127.837</b>	140	45.572	Berat	<b>193,000</b>
9	Dibër	189.854	Dibër	<b>85.699</b>	113	14.017	Peshkopi	<b>14,100</b>
10	Gjirokastër	112.831	Gjirokastër	<b>54.647</b>	48	22.866	Gjirokastër	<b>34,800</b>
11	Kukës	111.393	Kukës	<b>63.786</b>	67	16.621	Kukës	<b>16,600</b>
12	Lezhë	159.182	Lezhë	<b>67.734</b>	141	16.592	Lezhë	<b>16,600</b>
	Total Alb.	3.069.275			107			

**Table 24 Population per prefecture, per District where the capital of the pref. & the district is located etc 2001, popul. 2008 of the capital / "metro" -Wikipedia 2008**

**Existing data (required by FOCI / UA) at "similar NUTS3" level and below**

(1) Official statistical data:

Data at the level of prefectures ("counties") / similar NUTS 3:

- From the *population censuses of 1989 and 2001*:

(a) Population: total, distributions: per sex and age group, per education level

(b) Active population (total, distributions: per sex), number of employed and unemployed persons, employment per primary secondary and tertiary sector.

- From the housing census of 2001

The *Labour Force Survey of 2007* refers to the national level.

Moreover, some research about *population projections 2001-2021, gender perspectives, people and work and living conditions and inequality* exist only for national level or the level of regions (north, centre except from Tirana – Durres, South and Tirana – Durres).

(2) Data on land uses and environment -from CLC, UMZ.

### ***The national urban system, "cities" and LUZs***

#### *The national urban system*

##### *Detailed classification of cities by population size*

The exact population of cities in LAU units according to the year 2001 census has not been published by the Institute of Statistics of Albania.

In the above Tables 24 and 25 we referred to:

- The population 2001 of the prefectures,

- The population and the population density in 2001 of the Districts (Table 25)

- The population and the population density in 2001 of the districts where are located the capitals of the prefectures (Table 24) and

- The urban population 2001 of the district where are located the capitals of the prefectures and the district.

We have also taken into account: (a) The population of the municipalities which form "cities"<sup>51</sup>

(b) Additional data –mainly from Wikipedia with more recent population estimations- Table 26.

Finally, we have taken into account the area, the shape and the population of the **UMZ 2000** (pop.2001) – see in the Table 25 and the Map 40, from where it results that for the cities with less than 50.000 inh. ("urban" population of the respective district) the UMZ pop. 2001 was smaller; it is thus confirmed that the majority of these cities are small.

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<sup>51</sup> We have worked preliminarily on that at this stage of the project.

<b>Prefecture</b>	<b>Nb</b>	<b>District</b>	<b>Districts popul. 2001</b>	<b>Districts area Km2</b>	<b>Districts Pop. Density 2001 Inh./</b>	<b>Cities</b>
Berat	1	<b>Berat</b>	<b>127.837</b>	915	<b>140</b>	2
	2	Kucovë	35.338	112	316	1
	3	Skrapar	29.845	775	39	2
Dibër	4	<b>Dibër</b>	<b>85.699</b>	761	<b>113</b>	1
	5	Mat	61.187	1.028	60	3
	6	Bulqizë	42.968	718	60	2
Durrës	7	<b>Durrës</b>	<b>181.662</b>	455	<b>399</b>	4
	8	Krujë	63.517	372	171	2
Elbasan	9	<b>Elbasan</b>	<b>221.635</b>	1.290	<b>172</b>	2
	10	Peqin	32.964	191	173	1
	11	Gramsh	35.750	695	51	1
	12	Librazhd	72.387	1.102	66	2
Fier	13	<b>Fier</b>	<b>199.082</b>	850	<b>234</b>	3
	14	Mallakastër	39.529	325	122	1
	15	<b>Lushnje</b>	<b>143.933</b>	712	<b>202</b>	2
Gjirokastrë	16	<b>Gjirokastrë</b>	<b>54.647</b>	1.137	<b>48</b>	2
	17	Tepelenë	32.404	817	40	2
	18	Përmet	25.780	929	28	2
Korçë	19	<b>Korçë</b>	<b>142.909</b>	2.180	<b>66</b>	2
	20	Devoll	34.641	429	81	1
	21	Kolonjë	17.161	805	21	2
	22	Pogradec	70.471	725	97	1
Kukës	23	<b>Kukës</b>	<b>63.786</b>	956	<b>67</b>	1
	24	Has	19.660	374	53	1
	25	Tropojë	27.947	1.043	27	3
Lezhë	26	<b>Lezhë</b>	<b>67.734</b>	479	<b>141</b>	2
	27	Kurbin	54.392	235	231	3
	28	Mirditë	37.056	867	43	4
Shkodër	29	<b>Shkodër</b>	<b>185.395</b>	1.631	<b>114</b>	2
	30	Malësi e Madhe	36.692	897	41	2
	31	Pukë	34.386	1.034	33	2
Tiranë	32	<b>Tiranë</b>	<b>519.720</b>	1.238	<b>420</b>	3
	33	Kavajë	78.179	393	199	2
		Bashkia Tiranë*				1
Vlorë	34	<b>Vlorë</b>	<b>147.128</b>	1.069	<b>138</b>	4
	35	Sarandë	35.089	730	48	2
	36	Delvinë	10.765	367	29	1
Total Alb.	36+1		3.069.275	28.636	107	74

**Table 25 Population, population density and number of cities per District/ Districts where the capital of the prefecture is located are marked in Bold**

	Pop. City 2008 – Wikip.	Pop.Metro 2008 – Wikip.	<b>Pop. UMZ 2001</b>
Tiranë	343,000	598,000	343.078
Durrës	99,600	245,000	99.546
Elbasan	87,800	363,000	87.797
Shkodër	83,600	257,000	82.455
Vlorë	77,700	193,000	77.691
Fier	56,300	383,000	56.297
Korçë	55,100	265,000	55.130
Berat	44,200	193,000	40.112
Kamëz	44,600		
Lushnjë	37,900		32.580
Gjirokastër	34,800		-
Sarandë	30,400	40,200	

**Table 26 The 12 Largest Cities / Wikipedia – 2008 Population estimate of “city” and “metro”**

Therefore, we come to the following:

- It's certain that eight (8) urban regions have population greater than 100.000 inhab. today: Tirana (capital), Durrës, Elbasan, Fier, Shkodër, Korçë, Vlorë and Berat.

All of those cities had surely more than 50.000 inh. in 2001 and probably they had a population greater than 100.000 inh. in 2001.

All of the cities above correspond to UA cities selection rules.

- It is probable that seven additional cities had more than 50.000 inh. in 2001. Today, it is a little more probable for these cities to be populated by more than 50.000 inh. We refer to: Lushnje<sup>52</sup>, Librazhd, Pogradec, Lezhe, Kukes, Kruje and Gjirokaster.

These are essentially small - medium cities,

*Albania Smaller Towns and Villages (Wikipedia – for 2008)*

Pogradeci: 23,700, Laçi: 23,400, Patosi: 21,000, Kruja: 19,400 Kuçova: 18,000

Kukësi: 16,600 Lezha: 16,600 Peshkopia: 14,100 Burreli: 13,900 Cërrik: 13,200

Çorovoda: 13,200 Shijak: 12,800 Librazhdi: 11,500 Tepelenë: 11,300 Gramsh: 10,400

Poliçan: 10,200 Bulqizë: 10,000 Përmet: 9,800 Fushë-Krujë: 9,600 Borshi: 9,500

### **Selection of cities for the FOCI / UA sample**

We used the criteria set in section 1 for the selection of cities:

(1) Based on the total population of the country, around 4 to 6 cities should be included in the FOCI/UA sample.

In order the whole national urban system to be well represented, the selected cities should express relatively representative geographical / regional allocation: between different types

<sup>52</sup> According to Wikipedia the population of the city itself is 37.900 inh. and of the district where Lushnje is the capital 143.000 inh. in 2004

of regions, among the central, northern, southern, eastern and western parts of the country or among tourist cities / coastal cities / cities-gates and the rest cities –see in section 1.

(2) We have taken into account (a) the *ratio of the population of the "city" to the population of the district / SAU ("surrounding" administrative unit)* as well as the *population density of the district / SAU* (b) *the shape, the area and the population of the UMZ, located into the district / SAU.*

As there is not an "ideal" selection of cities for the sample –see in section 1-, we propose in next a *balanced* solution –"basic" set of cities- and a second set of "complementary / alternative" cities which could be included in the sample in addition or alternatively to those of the "basic" sample.

**"Basic" set of cities -to be included in the sample:**

- The capital (Tirana),
- Bigger cities: Durrës (coastal city, city-gate), Elbasan, Shkodër
- Other smaller cities: Vlore (coastal city, city-gate)

**"Complementary / alternative" cities**

Korce (located in the Eastern part of the country), Fier, Berat, Gironkaster.

## 12.2.2 Bosnia and Herzegovina

***Spatial units' levels:***

The ***total population of the country*** amounted up to ***3.836.920 inhab.*** in ***2007*** (Official estimate of the population).

Bosnia and Herzegovina is divided into three entities: Federation of Bosnia and Herzegovina (FBiH), Republic of Srpska (RS), and Brčko District, which was established in 2000 out of land from both entities.

FBiH is divided in 10 cantons and 79 municipalities; Republic of Srpska has 62 municipalities; City of Brčko is a separate administrative unit - District.

It is difficult to associate the Bosnia and Herzegovina administrative units with corresponding NUTS levels, because the magnitudes of the population of the units belonging to each administrative level are dissimilar. An additional difficulty relies on the fact that for the RS there is no census or official estimation after 2001; consequently, the estimations occurred by several sources differ significantly among each other. For FBiH there is a very recent (2007) official estimation of the population (from the FBiH's Federal Office of Statistics) that we use in the following.

FBiH (population 2007: 2.328.000), RS (population 2007 estimate: 1.439.700) and Brčko (population 2007 estimate: 68.860) could be assimilated to NUTS1 and / or NUTS2.

The cantons of FBiH could be eventually assimilated to NUTS3;

EU regulation for NUTS 3: 150.000-800.000 inh; 6 FBiH' cantons have 227.000-496.000 inh, while 4, have 34.000 - 82.000 inhabitants in 2007. *Obviously the 4 smaller cantons could be difficultly assimilated to NUTS3 units.*

See in Table 27 and Map 41 in Annex Maps

The municipalities of both FBiH and RS could be eventually assimilated to LAU1.

### **Existing data (required by FOCI / UA) at "similar NUTS3", LAU levels**

(1) Official statistical data:

*Data at the level of 3 entities:* Federation of Bosnia and Herzegovina (FBiH), Republic of Srpska (RS) and Brčko District.

- From the population census of 1991: population per sex age etc, active population etc (same as in the case of Albania).

- From the population official estimate 2008 (for the FBiH): population per sex age etc, active population etc

- From the Labour Force Survey, carried out in 2007: total active population and its sex distribution, number of employed and unemployed persons, employment per primary, secondary and tertiary sector.

Data on the GDP exist for the FBiH and RS – at entity level.

*Data at the level of cantons and cities – centres of cantons:*

Population 2008 from the population official estimate 2008 – only for the FBiH

(2) Data on land uses and environment -from CLC, UMZ.

### **The national urban system, "cities" and LUZs**

*The national urban system*

Apart from Sarajevo, the capital, which has a really primary role in the national urban system, there are four very important regional centres: Mostar, Banja Luka, Tuzla and Zenic and a number of secondary regional centres.

*Detailed classification of cities by population size*

We proceed by the basic entities: FBiH, RS and Brčko District.

*FBiH*

As for the cities - centers of respective cantons (Table 28), there are:

- 4 cities with more than 100.000 inh.: Sarajevo (304.065), Tuzla (131.444), Zenic (127.334) and Mostar (111.198)

- 2 cities with 50.000-100.000 inh.: Bihać (61.035) and Travnik (55.217).

- 4 cities with less than 50.000 inh.: Livno (32.354), Goražde (30.743), Široki Brijeg (26.198) and Orašje (20.680).

*RS*

There are:

- 3 cities with more than 100.000 inh.: Banja Luka (250.000), Bijeljina (140.000) and Prijedor (112.000).

- 2 cities with less than 50.000 inh.: Srebrenica (36.666) and Pale (30.000).

*Brčko District*

One city - Brčko- with 68.000 inh. (non off. Estimate).

In total, nine (9) urban regions with a population greater than 50.000 inhabitants in 2001 could be assimilated to LUZs (including Sarajevo / capital).

### **Selection of cities for the FOCI / UA sample**

To respect the particularities of the country (three entities), the following cities could be included in the Urban Audit / FOCI sample in order the whole national urban system to be well represented:

*FBiH*

- Sarajevo (capital)

- One other city with more than 100.000 inh. (to choose among: Tuzla, Zenic and Mostar)
- One city with less than 50.000 inh. It is preferable to choose among Bihać (61.035) and Travnik (55.217). We could alternatively choose one city among the 4 cities with less than 50.000 inh.

RS

- One city with more than 100.000 inh. (to choose among: Banja Luka, Bijeljina and Prijedor)
- Probably, one city with less than 50.000 inh. It is preferable, for this category, to choose Pale, the RS capital.

*Brčko District*

We could include in the UA / FOCI sample, the city of Brsko, only if this is necessary for national reasons.

Concluding:

**"Basic" set of cities -to be included in the sample:**

- Bigger cities: Sarajevo (BH capital, FBiH), Tuzla (FBiH), Banja Luka (RS).
- Other smaller cities: Travnik (FBiH), Pale (RS).

**"Complementary / alternative" cities**

Zenica (FBiH, high municipality population density, "good approximation"), Brsko (Brsko district / entity).

	Surface area km <sup>2</sup>	Population, 2007 <sup>1)</sup>	Population density per km <sup>2</sup>
Federacija Bosne i Hercegovine	<b>26.110,5</b>	<b>2.328.359</b>	<b>89,2</b>
Unsko-sanski kanton	4.125,0	287.878	69,8
<b>Bihać</b>	900,0	<b>61.035</b>	67,8
Kanton Posavski	324,6	41.187	126,9
Orašje	121,8	<b>20.680</b>	169,8
Tuzlanski kanton	2.649,0	496.830	187,6
<b>Tuzla</b>	294,0	<b>131.444</b>	<b>447,1</b>
Zeničko-dobojski kanton	3.343,3	401.796	120,2
<b>Zenica</b>	558,5	<b>127.334</b>	<b>228,0</b>
Bosanskopodrinjski kanton	504,6	33.662	66,7
<b>Goražde</b>	248,8	<b>30.743</b>	123,6
Srednjobosanski kanton	3.189,0	256.339	80,4
<b>Travnik</b>	529,0	<b>55.217</b>	104,4
Hercegovačko-neretvanski kanton	4.401,0	227.473	51,7
<b>Mostar</b>	1.175,0	<b>111.198</b>	<b>94,6</b>
Zapadno-hercegovački kanton	1.362,2	82.095	60,3
<b>Široki Brijeg</b>	387,6	<b>26.198</b>	67,6
Kanton Sarajevo	1.276,9	419.030	328,2
<b>Sarajevo</b>	141,5	<b>304.065</b>	2.148,9



Kanton 10	4.934,9	82.069	16,6
<b>Livno</b>	994,0	<b>32.354</b>	32,5

**Table 27 Official estimate of the population of cantons and cities 2007**

Sarajevo	304.065
Tuzla	131.444
Zenica	127.334
Mostar	111.198
Bihać	61.035
Travnik	55.217
Livno	32.354
Goražde	30.743
Široki Brijeg	26.198
Orašje	20.680

**Table 28 FBiH Cities population 2007**

### 12.2.3 Croatia

#### *Spatial units' levels*

The **total population of the country** amounted up to **4.437.460 inhab.** in **2001**.

- Croatia has already adopted the EU NUTS (1,2,3) classification as follows:  
NUTS 1: Country (Hrvatska), NUTS 2: Regija (3), NUTS 3: Counties / Jupanija (21).  
Only 11 counties had a population ranging between 150.000 and 800.000 inh, in 2001, which are the EU regulation limits for NUTS 3. The 10 remaining counties had a lower population: 54.000-142.000 inh. (in 2001).
- The 546 municipalities (Gradovi I Opcin) of the country correspond to the LAU level.

#### **Existing data (required by FOCI / UA) at NUTS3 level and below**

(1) Official statistical data:

Data at NUTS3 level:

- From the population censuses of 1991 and 2001- population per sex age etc, active population etc (same as in the case of Albania).
- From the population, *households and dwellings* census 2001 (31<sup>st</sup> March 2001).

Data at National level: Labour force survey -First Quarter of 2008.

(2) Data on land uses and environment -from CLC, UMZ.

#### **The national urban system, "cities» and LUZs**

##### *The national urban system*

Apart from Zagreb, the capital, there are several primary and secondary regional centres; some of these last are located in the tourist coastal zone and / or they are "cities-gates"

while the rest are located in the inland. The particularities of the national urban system are well reflected in the composition of the UA national sample – see in next.

*Detailed classification of cities and municipalities by population size*

As for other countries, the limits of “LUZ” of some Croatian cities surpass the limits of the “core” municipalities. We use here the “core” municipality population as well as the “metro” area -as defined by Wikipedia for the Croatia cities- population for 2001 -see in table 29. There is not a considerable differentiation as for the classification of cities in the following categories according to their population:

- 4 cities with more than 100.000 inhabitants: Zagreb, Split, Rijeka and Osijek
- 6 cities with population ranging between 50.000 and 100.000 inh.: Zadar, Slavonski Brod, Sisak, Šibenik Karlovac and Varaždin.
- 7 cities with population ranging between 23.000 and 44.000 inh.: Dubrovnik, Bjelovar, Vukovar, Požega, Koprivnica, Virovitica and Čakovec.

<b>County of:</b>	Pop. 2001	<b>Capital *</b>	Pop. 2001	
Split-Dalmatia	463.676	<b>Split</b>	221.456	Metrop.: 408251
Primorje-Gorski-kotar	305.505	<b>Rijeka</b>	143.033	Metrop.: 270000
Osijek-Baranja	330.506	<b>Osijek</b>	114.616	
Zadar	162.045	Zadar	72.717	
SlavonskiBrod-	176.765	<b>Slavonski</b>	61.823	
Sisak-Moslavina	185.387	Sisak	52.236	
Šibenik-Knin	112.891	<b>Šibenik</b>	51.553	
Karlovac	141.787	Karlovac	49.082	Metrop.: 59.395
Dubrovnik-Neretva	122.870	Dubrovnik	43.770	
Bjelovar-Bilogora	133.084	Bjelovar	41.869	
Varaždin	184.769	Varaždin	41.434	Metrop: 80991
Vukovar-Sirmium	204.768	Vukovar	31.670	
Požega-Slavonia	85.831	Požega	28.201	
Koprivnica-Križevci	124.467	<b>Koprivnica</b>	25.776	
Virovitica-Podravina	93.389	Virovitica	22.618	
Međimurje	118.426	Čakovec	18.000	Metrop.: 35000
Lika-Senj	53.677	Gospic	12.980	
Krapina-Zagorje	142.432	Krapina	12.950	
Istria	206.344	Pazin	9.227	
City of Zagreb	779.145	<b>City of</b>	779.145	Urban: 1094596
Zagreb	309.696	<b>City of</b>	[779145]	
<b>Zagreb + City of Zagreb =</b>			<b>1.088.841</b>	
REP. OF CROATIA	4.127.764			

\* The names of the cities which are included in the UA sample are marked in Bold.

The names of the cities we propose to be included in the sample are marked in italic.

**Table 29 Croatian counties and county capitals population in 2001.**

### **Selection of cities for the FOCI / UA sample**

The last sample of the Urban Audit<sup>53</sup> contains five cities of Croatia: Zagreb, Rijeka, Split, Osijek and Slavonski Brod. These cities correspond to the following categories:

- Cities with more than 100.000 inh.: **Zagreb, Rijeka, Split** and **Osijek** (4 from 4).
- Cities with 50.000-100.000 inh.: **Slavonski Brod** (1 from 6).

This sample does not include any Croatian city with 20.000-60.000 inh.

Therefore, we could include in the FOCI project sample one or two / maximum city / cities with 20.000-60.000 inh. (see previously the list of these cities) in order the small cities of the country to be represented.

#### **"Basic" proposal (city to be added to the sample)**

Šibenik (tourist, coastal city, 55.000 inh.)

#### **"Complementary / alternative" cities**

Koprivnica (inland, 20.000 – 50.000 inh.)

## **12.2.4 FYROM**

### **Spatial units' levels**

The **total population of the country** amounted up to **2.022.547 inhab.** in **2002**.

FYROM has already adopted the EU classification of spatial units in NUTS; by level: NUTS 1 and NUTS 2: Country, NUTS 3: Statisticki Regioni / Statistical Regions (8).

Seven (7) from the 8 Statistical Regions had a population ranging between 150.000 and 800.000 inh, in 2002 –which are the EU regulation limits for NUTS 3. The one remaining had a lower population: 133.000-inh. in 2002 (Table 30).

<i>Regions / NUTS3</i>	<i>Pop. 2002</i>
Skopje	571.040
Eastern	203.213
Northeastern	173.814
Pelagonia	221.019
Polog	304.125
Southeastern	171.416
Vardar	133.248

**Table 30 Population 2002 of the FYROM regions / NUTS3**

In August 2004, FYROM was reorganised into 85 municipalities (10 of which comprise Greater Skopje) which could be assimilated to LAU (1) level.

This is reduced from the previous 123 municipalities established in September, 1996. Prior to this, local government was organised into 34 administrative districts (source: Wikipedia).

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<sup>53</sup> Also: some cities of Croatia participated in the Perception survey on quality of life in 70 European Cities (2006)

*Most of the data concerning censuses of the population and building, specific surveys etc are aggregated and published on the level of municipalities –since the government seeks to strengthen the planning at this level.*

### **Existing data (required by FOCI / UA) at NUTS3, LAU level**

(1) Official statistical data:

Data at the level of **municipality** / LAU and “Statistical Regions” / NUTS 3 (by aggregation of municipalities’ data):

- From the population censuses of 1991 and 2002: population per sex age etc, active population etc (same as in the case of Albania).
- From the population, *households and dwellings* census 2002

Data at country level (only): from the GDP annual estimations of 2004-2006.

Specific surveys: labour force survey etc.

(2) Data on land uses and environment -from CLC, UMZ.

### **The national urban system, “cities” and LUZs**

#### *The national urban system*

Apart from Skopje, the capital, which has a really primary role in the national urban system, there are four very important regional centres: Bitola, Tetovo, Prilep and Kumanovo (very probably with more than 90.000 inh. today in their wider urban area) and a number of secondary regional centres.

#### *Detailed classification of cities and municipalities by population size*

Since the population of the big and medium-sized cities of FYROM is relatively small in the majority of cases –less than 120.000 inhab. except from Skopje- and the population of the respective municipalities is usually much smaller than that of the respective NUTS3 Statistical regions, it is preferable to use for the classification of cities the population of the respective municipalities in 2002. Furthermore, the majority of the basic data / indicators needed for both UA and FOCI are provided by the country’ statistical institute at the municipality level.

Therefore, we discern the following classes of cities (Table 31 and Maps 44 and 45 in Annex - Maps):

- Two cities with more than 100.000 inhab.: Skopje and Kumanovo.
- 8 cities with 50.000-100.000 inhab. in 2002 (population of municipalities) - see in Table 31.

There are also a number of cities with 20.000-50.000 inhab.

### **Selection of cities for the FOCI / UA sample**

We used the criteria set in section 1 for the selection of cities:

Based on the total population of the country, around 4 cities should be included in the FOCI/UA sample.

We take into account the municipalities population and the municipalities population density as well as the area, the shape and the population of UMZ (Table 31). It emerges, among others, that a «city», Struga, consists of very scattered residential areas - probably it’s not a «city» and therefore it should not be chosen. Additionally, the UMZ of Gostivar has a

much smaller population than the respective municipality (49.500 and 81.000 inh., respectively), which is a disadvantage. The population of the remaining UMZ amounts roughly the population of the respective municipalities.

Under respect of the country particularities (two major ethnic groups), the following cities could be included in the UA / FOCI sample in order the whole national urban system to be well represented:

**"Basic" proposal (city to be added to the sample)**

*Bigger cities:*

The capital (Skopje, North), Bitola (South), Tetovo (Albanian ethnic group majority) and Gostivar (Albanian ethnic group majority); we referred the disadvantage for the selection of Gostivar: the population of the "real" city zone is much less than the one of the respective municipality

**"Complementary / alternative" cities**

- *Other smaller cities* (less than 50.000 inh.): Strumica

*Bigger cities:*

Prilep (South-Center of the country), Ohrid (South-West), Kumanovo (North, near Skopje), Veles.

	<b>Area Km2</b>	<b>Munic. Population 2002</b>	Density Inh./Km2	<b>UMZ Population 2002</b>	Majority per ethn.
Skopje		506926			
Kumanovo	432	105484	244	103205	
Bitola	790	95385	121	86408	
Tetovo	262	86580	330	70841	Albanians
Prilep	1198	76768	64	73351	
Gostivar	375	81042	216	49545	Albanians
Struga	469	63376	135	0	Albanians
Ohrid	392	55749	142	54380	
Veles	518	55108	106	57602	
Strumica	311	54676	176	45087	

**Table 31 FYROM cities with more than 50.000 inhab.: area, population 2002 and population density of the respective municipalities 2002**

**12.2.5 Serbia**

***Spatial units' levels***

The **total population of the country** amounted up to **7.411.569 inhab.** in **2006** (official estimate).

Serbia is divided into two parts: the **Central Serbia** and the autonomous province of **Vojvodina** and further into 25 districts and 157 municipalities.

The Municipalities, the Districts and the two parts could eventually be assimilated to LAU1, NUTS 3 and NUTS 2 (and / or NUTS1).

More in detail, **districts** could be reliably assimilated to **NUTS3**; 21 from the 25 districts had a population ranging between 150.000 and 800.000 inh, in 2002 (EU regulation limits for NUTS 3). The four remaining had 102.000-147.000 inhab. in 2002 (Table 37 in Annex and Maps 46 and 47 in Annex - Maps).

Most of the data concerning censuses of the population and building, specific surveys etc are aggregated and published on the level of **municipalities (LAU1)**, therefore we could reliably use in next analysis both the district and the municipality levels.

### **Existing data (required by FOCI / UA) at "similar NUTS3", LAU levels**

(1) Official statistical data:

Data at the level of municipalities and districts / similar NUTS 3 (by aggregation of municipalities' data):

- From the population censuses of 1991 and 2002 – population per sex age etc, active population etc (same as in the case of Albania).

*There also data on population (distribution per age, sex etc) from a very recent -2006-official estimate, which are very useful as the more appropriate approximation of LUZs is the aggregation of municipalities – see next.*

(2) Data on land uses and environment -from CLC. There is not data on UMZ.

We created a "similar UMZ" shapefile from CLC2000 – see previously.

### **The national urban system, "cities" and LUZs**

#### *The national urban system*

*Vojvodina* has two big cities: *Novi Sad* and *Subotica*, two other cities with 50.000-100.000 inh.: *Zremjain* and *Pancevo* and 4 cities with 30.000-50.000 inh.

Apart from the capital –*Belgrade*–, *Central Serbia* has two other big cities: *Nis* and *Kragujevac*. The rest of the system of cities is balanced with around 10 cities with 50.000-100.000 inh. and a considerable number of cities with 20.000-50.000 inh.

#### *Detailed classification of cities and municipalities by population size*

Since the part of the municipality population that corresponds to the big and medium-sized cities of Serbia is usually much smaller than that of the respective NUTS3 Statistical regions, in order to classify the cities by size it is preferable to use the population of the respective municipality in 2006 (Official estimation) -except the cities of Belgrade and Nis, where we use the Official "city zones", which are aggregates of municipalities- see in Tables 32 and 33 and Map 46 in the Annex - Maps). As we have already noted, the majority of the basic data / indicators needed for both UA and FOCI are provided by the country's statistical institute at the municipality level.

Therefore, we discern the following classes of municipalities according to their population in 2006:

- 13 municipalities with more than 100.000 inhab.

- 20 municipalities with 50.000-100.000 inhab.

There are also a considerable number of municipalities with 20.000-50.000 inhab.

In a great number of cases the population of the cities in 2002 (we have not official data at city level for 2006) differ considerably from that of the respective municipalities. Usually in these cases the municipality population density is low –see in Table 32.

### **Selection of cities for the FOCI / UA sample**

We used the criteria set in section 1 for the selection of cities:

(1) Based on the total population of the country, around 8 to 10 cities should be included in the FOCI/UA sample.

In order the whole national urban system to be well represented, the selected cities should express relatively representative geographical / regional allocation: (a) between Serbia and Vojvodina and (b) among the central, northern, southern, eastern and western parts of the country etc.

(2) We should examine whether each "city" located into a respective "surrounding" administrative unit (SAU) – Municipality / LAU1 for the case of Serbia- for which necessary basic data exist could be reliably "represented" by this last. We used for this purpose two criteria: (a) the ratio of the population of the "city" to the population of the municipality / SAU. (b) The population density of the municipality / SAU.

(3) We should examine, in addition, the shape, the area and the population of the UMZ, located into the municipality / SAU.

AA2	City / Municipality	Area, km <sup>2</sup>	Population of the municipalities - 30.6.2006 (1)	Pop. density of munic. Per 1 Km2	Pop. 2002 city (not for munic ). Source: Wikipedia	Rate: pop.city 2002 / pop. Munic. 2006 %
1	<b>City of Belgrade</b>	<b>3 227</b>	<b>1602861</b>	<b>497</b>		
2	Novi Sad - city	699	314192	449	299294	95
3	<i>City of Nis</i>	596	254164	426	255180	100
4	Kragujevac - city	835	174920	209	180252	103
5	Kraljevo	1 530	120304	79	121707	101
6	Cacak	636	116534	183	105092	90
7	Subotica	1 007	146238	145	99981	68
8	Zrenjanin	1 327	128527	97	79773	62
9	Smederevo	484	109379	226	77808	71
10	Pancevo	755	126388	167	77087	61
11	Krusevac	850	129370	152	75256	58
12	Užice	667	81323	122	63577	78
13	Leskovac	1025	153084	149	63185	41
14	Valjevo	905	94752	105	61600	65
15	sabac	795	120626	152	55163	46
16	Vranje	860	87174	101	55052	63
17	Novi Pazar	742	92471	125	54604	59
18	Sombor	1 177	92887	79	51471	55
19	Kikinda	782	64119	82	41935	65
20	Pozarevac	482	75118	156	41736	56
21	Pirot	1 232	61578	50	40678	66
22	Zaječar	1068	63398	59	39491	62
23	Bor	856	52751	62	39387	75

24	Sremska	762	83939	110	39041	47
25	Vrsac	800	53579	67	36623	68
26	Jagodina	470	70204	149	35589	51
27	Ruma	582	58459	100	32229	55
28	Bačka Palanka	579	58738	101	29449	50
29	Smederevska	421	54367	129	26100	48
30	Paraćin	542	57306	106	25292	44
31	Loznica	608	84725	139	19863	23
32	Stara Pazova	351	72321	206	18645	26
33	Aleksinac	705	55094	78	17171	31

(1) For Belgrade and Nis : aggregates of municipalities

**Table 32 Municipality area, population and population density 2006, city population 2002, rate: pop. city 2002 / pop. munic. 2006 % for the municipalities of Serbia with more than 50.000 inh. in 2006**

- We firstly notice that the density in only 13 of the 33 bigger municipalities (including Grand Belgrade and Nis-city) exceeds the magnitude of 150 inh./km<sup>2</sup>. These municipalities are: City of Belgrade, Novi Sad -city, City of Nis, Kragujevac-city, Leskovac, Subotica, Kruševac, Pancevo, Šabac, Cacak, Smederevo, Požarevac, Stara Pazova. That is to say that the above municipalities feature an adequate "urban" density and probably the municipality boundary does not fall away from the boundary of the respective "real" Urban Zone. Therefore, in these cases the available data at the municipal level reflect adequately the features of the respective city. The examination of the shapes and the areas of the respective UMZs strengthened these results.

For the remaining municipalities (20 from 33) these two checks have not given satisfactory results. Some of them -as for example Subotica- contain undoubtedly one (or more) urban region(s), but we should in the next phase of the project use for some basic data needed a not satisfactory approximation (that of the municipality) or go more in depth by using some data at UMZ level / area or use data at LAU2 level if any (or projections of municipality / LAU1 level to LAU2 aggregates (FUA) if this is possible).

In other words, in case we absolutely prioritise the criteria of municipality population density and of the ratio of the population of the "city" to the population of the municipality / SAU we may exclude some cities, therefore the sample will be less representative of the national urban system. Inversely, in case we choose some cities with "bad approximation" at municipality level, the data / indicators for these cities will be less satisfactory.

As there is not an "ideal" solution to this problem -see in section 1-, we propose in next a balanced solution including some cities with "bad approximation" but necessary in order the national urban system to be well represented. In addition, we propose a second set of "complementary / alternative" cities which could be included in the sample in addition or alternatively to those of the "basic" sample.

**"Basic" set of cities -to be included in the sample:**

- Bigger cities: Belgrade, Nis, Kragujevac, Novisad (Vojvodina), Subotica (Vojvodina, "bad approximation"), Cacak.



- Other smaller cities (less than 100.000 inh.): Pozarevac, Novi Pazar (South, "bad approximation"), Sabac (West, good approximation),

**"Complementary / alternative" cities**

Kraljevo (big city, West, "bad approximation"), Uzice (West), Kikinda (Vojvodina, N-E, "bad approximation"), Krusevac Centre – South), Leskovac (South).

<b>"Basic" set of cities</b>							
AA2	City / Municipality	Cities of Vojvodina	Regional allocation: Centre, W, E, N, S	Population of the munic. 2006	Pop. density of munic. Per 1 Km2	Pop. 2002 for the city	Pop.city 2002 / pop. Mun. 2006 %
1	Belgrade		C	1602861	497		
2	Nis		C-S	254164	426	255180	100
3	Kragujevac		C-S	174920	209	180252	103
4	Novi Sad	Vojvod.	N-C	314192	449	299294	95
5	Subotica	Vojvod.	N	146238	145	99981	68
6	Cacak		W	116534	183	105092	90
7	Pozarevac		E	75118	156	41736	56
8	Novi Pazar		S-W	92471	125	54604	59
9	Sabac		W	120626	152	55163	46
<b>"Complementary / alternative" cities</b>							
1	Kraljevo		S-W	120304	79	121707	101
2	Užice		W	81323	122	63577	78
3	Kikinda	Vojvod.	N-E	64119	82	41935	65
4	Krusevac		C-S	129370	152	75256	58
5	Leskovac		S	153084	149	63185	41

**Table 33 Serbia "Basic" set of cities and "Complementary / alternative" cities: Vojvodina / Ventral Serbia, Regional allocation, Municipality population and population density 2006, city population 2002, rate: pop. city 2002 / pop. munic. 2006 %**

**12.2.6 Montenegro**

**Spatial units' levels**

The **total population of Montenegro** amounted in **620.100 inhab.** in **2003**, therefore the total of the country could be assimilated to NUT1, NUTS2 and NUTS3, as according to the EU regulation limits for NUTS 3 spatial units their population should range between 150.000 and 800.000 inh. and only the municipality of Podgorica had more than 150.000 inh. (169.132) in 2003.

The country is divided in 21 **municipalities** which could be assimilated to **LAU1** level. Their population ranges between 3.000 and 75.000 inh. (2003) except from Podgorica.

### **Existing data (required by FOCI / UA) at "similar NUTS3", LAU levels**

(1) Official statistical data:

Data are available *mainly for the total of the country*

- From the population censuses of 1991 and 2003 – see in the case of Albania.
- For the education level, the available data exist only in the census of 2003,

(2) Data on land uses and environment -from CLC, UMZ.

### **The national urban system, "cities" and LUZs**

#### *The national urban system*

Only the capital (Podgorica) has a population greater than 100.000 inhabitants (municipality: 169.132 inh., city: 136.473 inh. in 2003).

In the inland, bigger cities are: Niksic (munic.: 75282 inh., city: 58212 inh. in 2003), Cetinje and Bijelo Polje (munic.: 50284 inh., city: 11776 inh.).

In the Adriatic belt there is a relatively dense network of tourist (mainly) urban settlements. Bar (munic.: 40037, city: 15883 inh. in 2003) and Kotor (23481 and 12739 inh. respectively) are the stronger urban centres in this area.

### **Selection of cities to be included in the FOCI / UA sample**

Therefore, the following cities could be included in the UA / FOCI sample in order the whole national urban system to be well represented:

#### **"Basic" set of cities -to be included in the sample:**

- The capital (Podgorica),
- Niksic (50.000-100.000 inhab. –see previously)
- Bar (with less than 50.000 inh.) representing the cities / towns of the tourist Adriatic belt.

#### **Alternatively / complementarily:**

Cetinje, Bijelo Polje, Kotor – see previously

## **12.2.7 Kosovo**

### **Spatial units' levels**

The **total population of the country** amounted up to **1.8-2.0 millions inhab. last years** (different estimates by Serbia and Kosovo).

Republic of Kosovo is divided in seven districts and 30 municipalities.

According to the EU regulation limits for NUTS 3 spatial units their population should range between 150.000 and 800.000 inh; the population of more than the half of the Kosovo districts surpasses 150.000 inh., therefore the districts could be (difficultly) assimilated to NUTS 3 units.

Municipalities could be assimilated to LAU1 level.

**Existing data (required by FOCI / UA) at "similar NUTS3" level and below**

(1) Official statistical data:

Data at the level of districts / similar NUTS 3:

- From the population census of 1991 (only) - see in the case of Albania.
- No data available on GDP.

Data at national level:

Labour force survey 2002, Labour Market Statistics 2007

(2) There is not data from CLC

**FUAs / LUZs, "cities":**

*The national urban system*

Kosovo presents a high urbanisation rate. Bigger urban regions are: Pristina (capital), Prizren, Podujevo, Gnjilane, Kosovska Mitrovica, Djakovica, Vucitrn and Pec with a population between 50.000 and 250.000 inh. in 2001 (Map 49 in Annex - Maps).

Some other urban regions have today more than 50.000 inh., but recent population' estimates are not reliable enough.

**Selection of cities to be included in the FOCI/ Urban Audit sample**

Therefore, the following cities could be included in the UA / FOCI sample in order the whole national urban system as well as the two ethnic communities (Kosovo Albanians, Serbs) to be well represented:

**"Basic" set of cities -to be included in the sample:**

- The capital: Pristina
- Mitrovica (Serbian maj.) and Prizren (Alb. Maj.) with 50.000-250.000 inhab.
- One smaller city as Decani (Alb. maj.) with around 50.000 inh.

**Complementarily:**

Strpce (Serbian majority).

### **12.2.8 Turkey**

The **total population of Turkey** amounted in **67.803.930 inhabitants** in **2000** (census data), while according to an official estimate (Address Based Population Registration System) the country population amounted in **70.586.260 inh.** in December **2007**.

**As Turkey participates in Urban Audit with 26 cities with more than 100.000 inh., we should whether smaller cities should be included in the sample.**

**Spatial units' levels:**

Turkey which adopted the EU NUTS/LAU system, has:

- 12 NUTS1 units (BΦLGELER),

- 26 NUTS2 units and (ALT BÖLGELER) and
  - 81 NUTS3 units (ILLER) (Map Tu.1).
- 78 of these last have (in 2000 and beyond) a population greater than 50.000 inhabitants.

**Existing data (required by FOCI / UA) at NUTS3, LAU level and below**

(1) Official statistical data:

-Data at *district* level:

From 1990 and 2001 censuses and from the *2007 Population Census which used the Address Based Population Registration System*:

Population by age group and sex, Age dependency ratio, City and village population, Sex ratio, Population density.

- Data from periodic results of households Labour Force Survey for Turkey, Urban and Rural regions. (results of 1988 – 1999 terms, results of 2000- October 2007, results of November 2007 and after = Address Based Population Registration System)

(2) There is not data from CLC.

**"Cities" and LUZs**

Turkey has already participated in Urban Audit since 2000 with 26 cities:

Ankara,, Adana,, Antaya, Baikesir, Bursa, Denizi, Diyarbakir, Edirne, Erzurum, Gaziantep, Hatay, Istanbul, Izmir, Kars, Kastamonu, Kayseri, Kocaei, Konya, Maatya, Manisa, Nevsehir, Samsun, Siirt, Trabzon, Van and Zongudak.

The LUZ population of these cities ranges from 102.100 inh. for Kastamonu to 10.018.700 for Istanbul (Map TU.1)

**Selection of additional cities to be included in the FOCI / UA sample**

As all the current UA Turkish cities have more than 100.000 inh., we need to add to the sample some (a few) cities with 50.000 – 100.000 inh., as well as some smaller cities.

*Taking into account the time-frame of FOCI and the fact that the urban system of Turkey is already quite well represented (with 26 cities) it is questionable whether it is appropriate to add other Turkish cities in the FOCI sample. The completion of the UA sample for Turkey could be made during 2009 and the corresponding data could be exploited by UA (not by FOCI) afterwards.*

*In case decision is made to complete the Turkey sample at this stage, we could select the additional cities in the first month after the submission of the Inception Report, using the same method we applied for the case of the other CC.*

Here we give some first elements which will be used for this task as well as a first indication for the number and type of smaller cities which could be added in the sample.

In almost all of the 78 NUTS3 units mentioned above, there is at least one urban region with a population greater than 50.000 inhab. From those 6 NUTS3 (units) had 50.000 – 100.000 inhab. In 2006.

The Turkish Statistical Office has published a Table with the "city population" in 2000 of 81 3<sup>rd</sup> level units – see in Table 38 in Annex - Notes and Tables.

From those units, 3 had in 2000 less than 50.000 inh., 6 had 50.000-100.000, while the rest 72 had more than 100.000 inhabitants.

First, only indicative proposal for the selection of smaller cities by population size:

- One or two cities with less than 50.000 inh.
- 4 or 5 cities with 50.000-100.000 inh.

### **12.3 Conclusions**

#### **(a) Inclusion of CC in FOCI / UA.**

Taking into account that necessary reliable data at the appropriate NUTS / LAU level exist for all CC except Kosovo, *we advice to include cities from all CC except Kosovo in FOCI / UA.* The decision for Kosovo is basically political, since missing data could be (even difficultly) provided by respective local authorities.

#### **(b) Selection of cities to be included in the FOCI/ UA sample.**

As we have already stressed in section 1:

(a) The total number of cities to be included in the sample per country should be proportional to the total population as well as the urban population of the country. The respective rate should be similar to those for the countries already participating in UA. For small countries, having a small number of cities, the number of cities to be selected should be relatively bigger in order the conclusions to be sufficiently representative at the national level. See in the Table 34 the total population per CC.

(b) In order the whole national urban system to be well represented, the selected cities should express relatively representative geographical / regional allocation: (i) among cities located in different types of regions or regions with different ethnic communities (ii) among the central, northern, southern, eastern and western parts of the country as well as among coastal cities, mountainous cities, cities-gates etc and the rest of the cities of the country.

(c) According to the assessment, satisfactory NUTS3 / LAU approximations to LUZ can be used for the majority of the CC cities, while for the rest of the cities corresponding approximations are "bad". This criterion does not comply in a number of cases with the criterion of representation of the national urban system in the sample. In addition, we were often obligated to choose among cities having the same role in the national urban system. In other words, for almost all CC there is not an "ideal" selection of cities. Therefore, in section2 we proposed for each country appropriate *"balanced"- solutions* including some cities with "bad approximation" to LUZ but necessary in order the national urban system to be well represented. In addition to this **"basic" set of cities**, we proposed a second set of **"complementary / alternative" cities** which could be included in the sample additionally or alternatively to those of the "basic" sample.

The following aggregate Table 34 contains, for each country, the corresponding:

- *"Basic" set of cities -to be included in the sample:*
- *"Complementary / alternative" cities.*

Countries	Country population	Census pop. year	"Basic" set of cities selected for the sample / Number	"Complementary / alternative" cities / Number
Albania	3.069.275	2001	5	4
Bosnia & Herzegovina	3.836.920	2007[1]	5	2
Croatia	4.437.460	2001	(5[4]) +1	1
FYROM	2.022.547	2002	4	5
Serbia	7.411.569	2006[1]	9	5
Montenegro	620.100	2003	3	3
Kosovo	1.8-2.0 mill.	Last years[2]	4	1
Turkey	70.586.260	2007[3]	(26[4]) + 5	
Total			68	

- [1] Official estimate of the population [2] Different estimates by Serbia and Kosovo  
[3] Official estimate using the Address Based Population Registration System  
[4] Already in the UA sample.

**Table 34 Population per country, census population year, number of the basic set of cities selected for the sample, number of the "complementary / alternative" cities**

***(c) Cities selected for the sample per country***

**Albania**

***"Basic" set of cities:***

**Tirana, Durrës, Elbasan, Shkodër, Vlore**

***"Complementary / alternative" cities***

Korce, Fier, Berat, Gjirokastra

**Bosnia & Herzegovina**

***"Basic" set of cities:***

**Sarajevo, Tuzla, Banja Luka, Travnik, Pale**

***"Complementary / alternative" cities***

Zenica, Brsko

**Croatia**

***"Basic" set of cities:***

**Already in the UA sample: Zagreb, Rijeka, Split, Osijek, Slavonski Brod**

**In addition: Sibenik**

***"Complementary / alternative" cities:***

Koprivnica

**FYROM**

***"Basic" set of cities:***

**Skopje, Bitola, Tetovo, Gostivar**

**"Complementary / alternative" cities:**

Strumica, Prilep, Ohrid, Kumanovo, Veles

**Serbia**

**"Basic" set of cities:**

**Belgrade, Nis, Kragujevac, Novi Sad, Subotica, Cacak, Pozarevac, Novi Pazar, Sabac**

**"Complementary / alternative" cities:**

Kraljevo, Užice, Kikinda, Krusevac, Leskovac

**Montenegro**

**"Basic" set of cities:**

**Podgorica, Niksic, Bar**

**"Complementary / alternative" cities:**

Cetinje, Bijelo Polje, Kotor

**Kosovo**

**"Basic" set of cities:**

**Pristina, Mitrovica, Prizren, Decani**

**"Complementary / alternative" cities:**

Strpce (only complementarily)

**Turkey**

**"Basic" set of cities:**

**Already in the UA sample:**

**Ankara, Adana, Antaya, Baikesir, Bursa, Denizi, Diyarbakir, Edirne, Erzurum, Gaziantep, Hatay, Istanbul, Izmir, Kars, Kastamonu, Kayseri, Kocaei, Konya, Maatya, Manisa, Nevsehir, Samsun, Siirt, Trabzon, Van, Zongudak.**

**In addition: 5 or 6 cities.**

*In case decision is made to complete the Turkey sample at this stage, we could select the additional cities in the first month after the submission of the Inception Report, using the same method we applied for the case of the other CC.*

## References- Data sources<sup>54</sup>

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[http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=1996,45323734&\\_dad=portal&\\_schema=PORTAL&screen=welcomeref&open=/noneu/cpc&language=en&product=EU\\_MASTER\\_non\\_EU\\_countries&root=EU\\_MASTER\\_non\\_EU\\_countries&scrollto=18](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/noneu/cpc&language=en&product=EU_MASTER_non_EU_countries&root=EU_MASTER_non_EU_countries&scrollto=18) as of 14.12.08
- United Nations (UN) / Statistical division (2008), *Several Tables from the UN Statistical Databases: Population and housing censuses: census dates, Population of capital cities and cities of 100,000 and more inhabitants etc.*

### **Eurostat publications, EC Regulations etc**

- EC (2003) Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 *on the establishment of a common classification of territorial units for statistics (NUTS)* (Official Journal L 154, 21/06/2003)
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- Eurostat (2008), *Introduction to the NUTS and the Statistical regions of Europe*, [http://ec.europa.eu/eurostat/ramon/nuts/introduction\\_regions\\_en.html](http://ec.europa.eu/eurostat/ramon/nuts/introduction_regions_en.html) as of 16.12.08
- Eurostat (2008), *Statistical regions in the EFTA countries and the Candidate countries (CC) 2008* [http://ec.europa.eu/eurostat/ramon/nuts/statistical\\_regions\\_en.html](http://ec.europa.eu/eurostat/ramon/nuts/statistical_regions_en.html) as of 16.12.08
- Eurostat / Methodologies and working papers - EC (2008), *Statistical regions for the EFTA countries and the Candidate countries*, Office for Official Publications of the EC, ISSN 1977-0375.
- Eurostat / Methodologies and working papers - EC (2008), *European Regional and Urban Statistics Reference Guide*, Office for Official Publications of the EC, ISSN 1977-0375
- Eurostat / Pocketbooks (2008), *Pocketbook on candidate and potential candidate countries*, Office for Official Publications of the EC.
- Eurostat Leaflets, *Several leaflets on candidate and potential candidate countries (2008): economic development, population and social conditions etc*, Office for Official Publications of the EC.
- Eurostat / Statistical books (2008), *Eurostat regional yearbook 2008*.

### **Official Statistical data sources for the CC**

*Several online publications on economic development, population and social conditions, dwellings, environment etc – see in detail in Chapter 2: assessment per country.*

- Albania: Albania Institute of Statistics: <http://www.instat.gov.al> .

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<sup>54</sup> An exhaustive list of references and data sources will be submitted for the First Interim Report



- Bosnia and Herzegovina: Agency for statistics of Bosnia and Herzegovina:  
<http://www.bhas.ba>, Federation of Bosnia and Herzegovina Federal office of Statistics:  
<http://www.fzs.ba> and Republika Srpska Institute of Statistics: <http://www.rzs.rs.ba>
- Croatia: CROSTAT, Republic of Croatia – Central Bureau of Statistics: <http://www.dzs.hr/>
- FYROM: Republic of Macedonia State Statistical Office: <http://www.stat.gov.mk/>
- Serbia, Montenegro and Kosovo: Serbia Republic Statistical office:  
<http://www.statserb.sr.gov.yu/> and Serbia and Montenegro Statistical Office:  
<http://www.szs.sv.gov.yu/>
- Montenegro: Statistical Office of the Republic of Montenegro – MONSTAT:  
<http://www.monstat.cg.yu/EngPrva.htm>
- Kosovo: Statistical office of Kosova: [www.ks-gov.net/ESK/](http://www.ks-gov.net/ESK/)
- Turkey :Turkey Statistical office: <http://www.tuik.gov.tr>  
*Regional and Turkey Urban Audit statistics:*  
<http://www.tuik.gov.tr/BolgeselIstatistik/menuAction.do?dil=en>

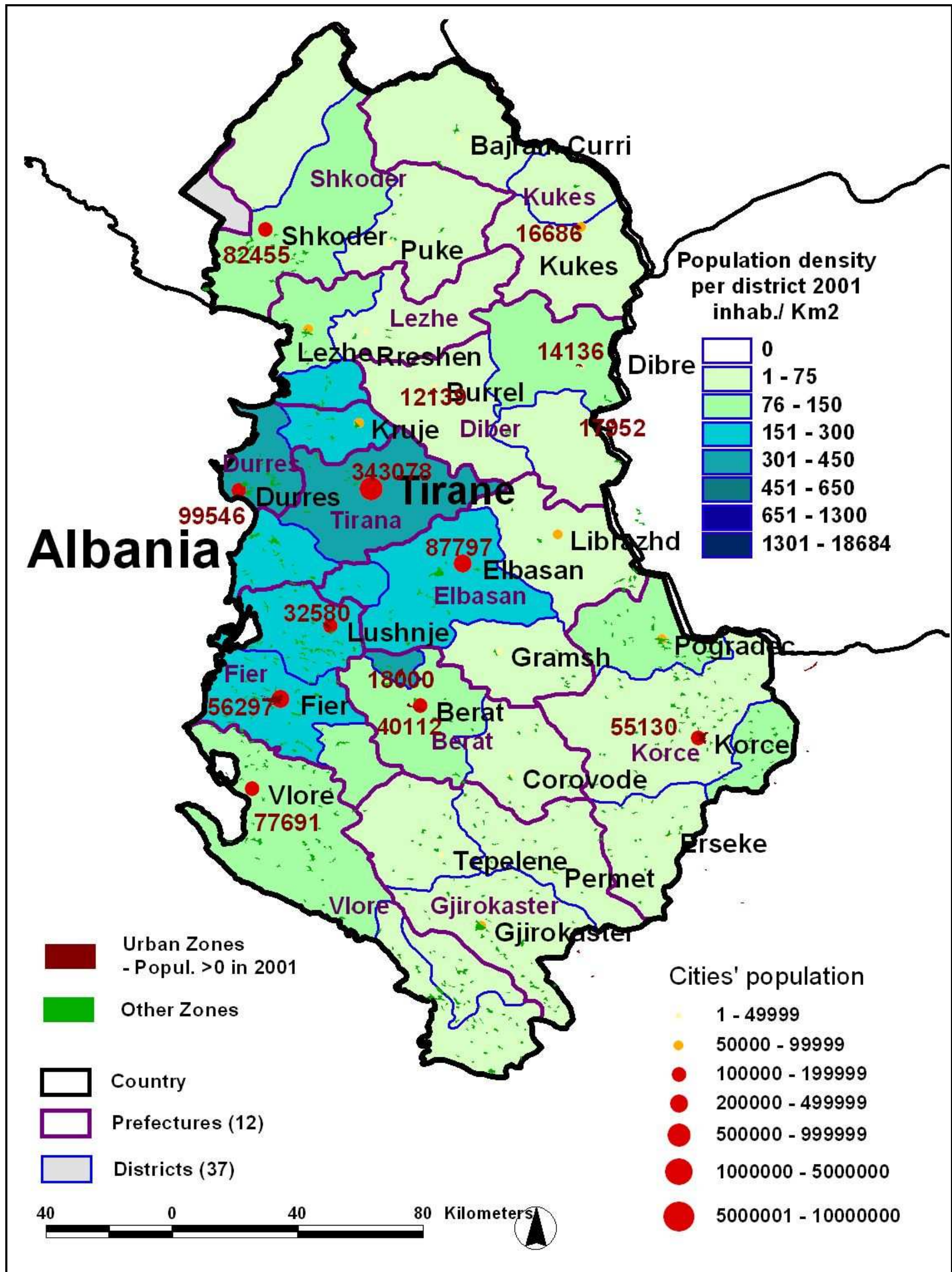
### **Other documents, research works, publications and data sources**

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[http://ec.europa.eu/enlargement/countries/index\\_en.htm](http://ec.europa.eu/enlargement/countries/index_en.htm)
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- European Environment Agency / EEA (2007), *Technical report No 17/2007 CLC2006 technical guidelines*, Office for Official Publications of the EC, ISSN 1725-2237
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- TPG (2004-2006), *ESTIA – SPOSE Programme: First Interim Synthetic Report (WP2) Polycentric Growth Thematic Study Final Report (WP2.2), National Reports of Albania, FYROM, Serbia and Montenegro etc*, UEHRI / Panteion University Athens.
- TPG (2006), *ESPON ECPs Transnational Networking activities 097/2005 Data and Indicators of Western Balkans Final Report\**, ECP Greece, Athens (\*data at NUTS0, 1 and 2 levels).
- Wikipedia (2008) [www.wikipedia.org](http://www.wikipedia.org), several data on the CC: statistical territorial division, population per regions, prefectures, municipalities, cities etc, other data –until 2008.

Annex- Maps

Albania

Figure 40 Albania: districts, cities population 2007 and UMZ popul. 2001



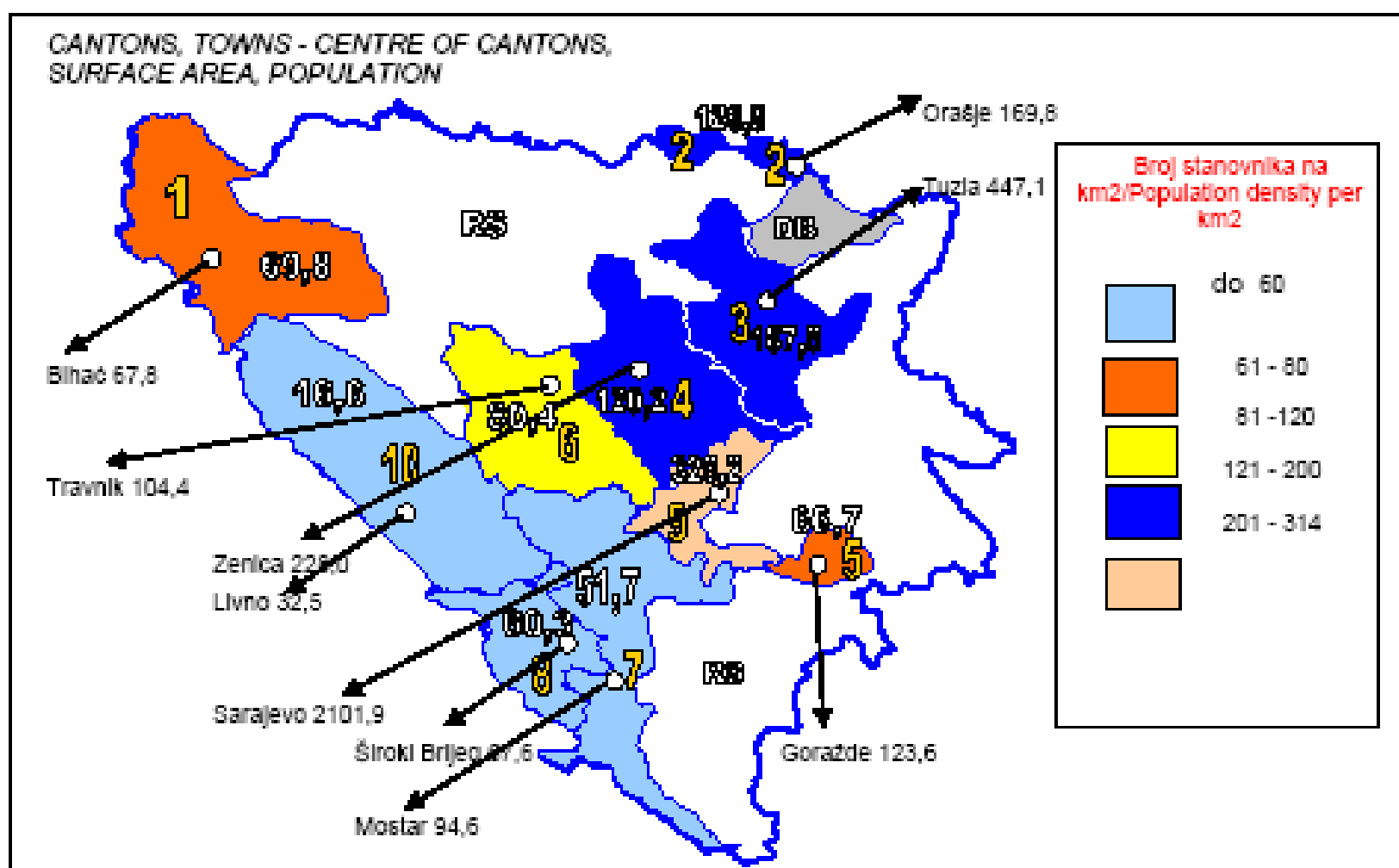


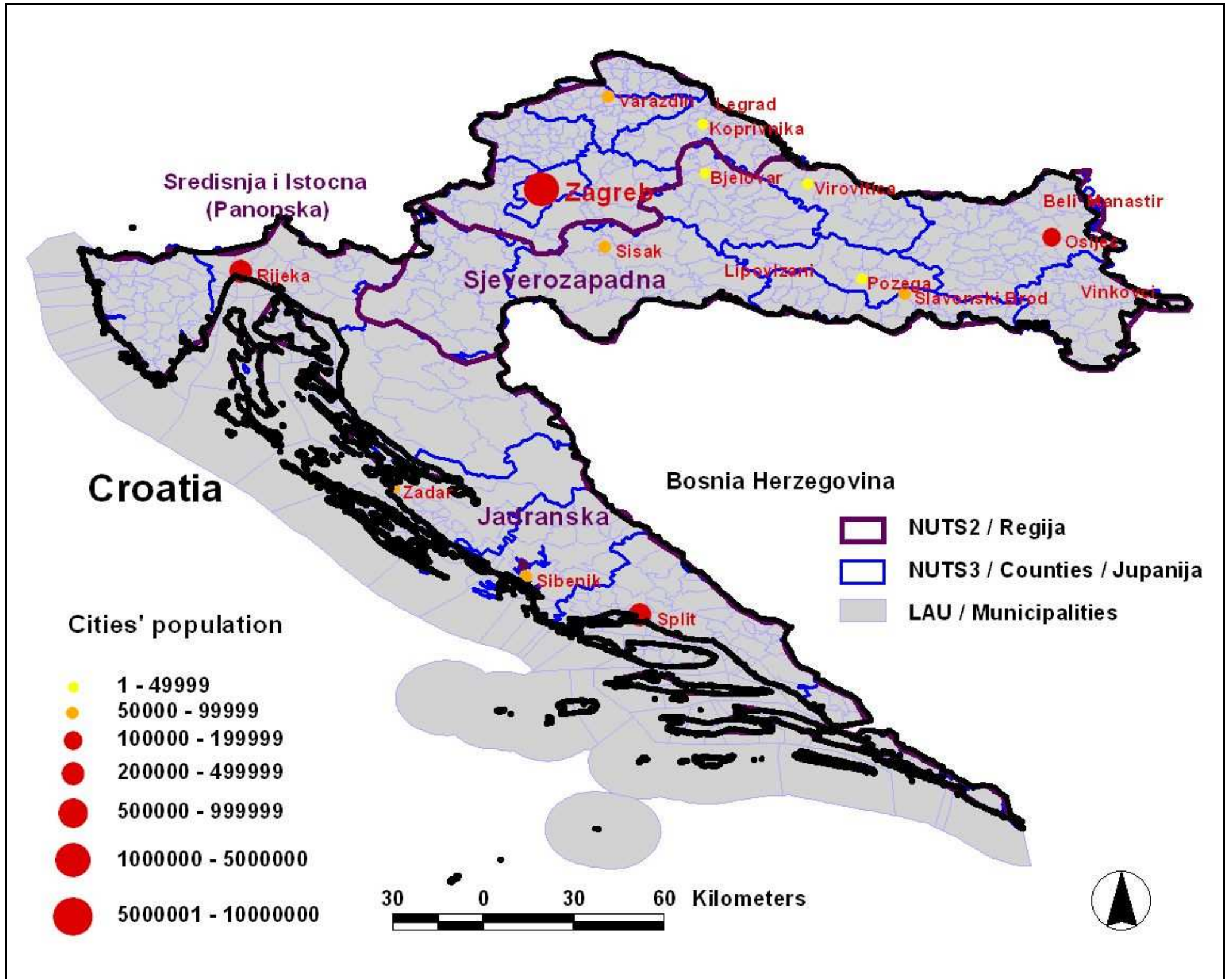
Bosnia and Herzegovina

Figure 41 Bosnia and Herzegovina: cantons and cities population 2007

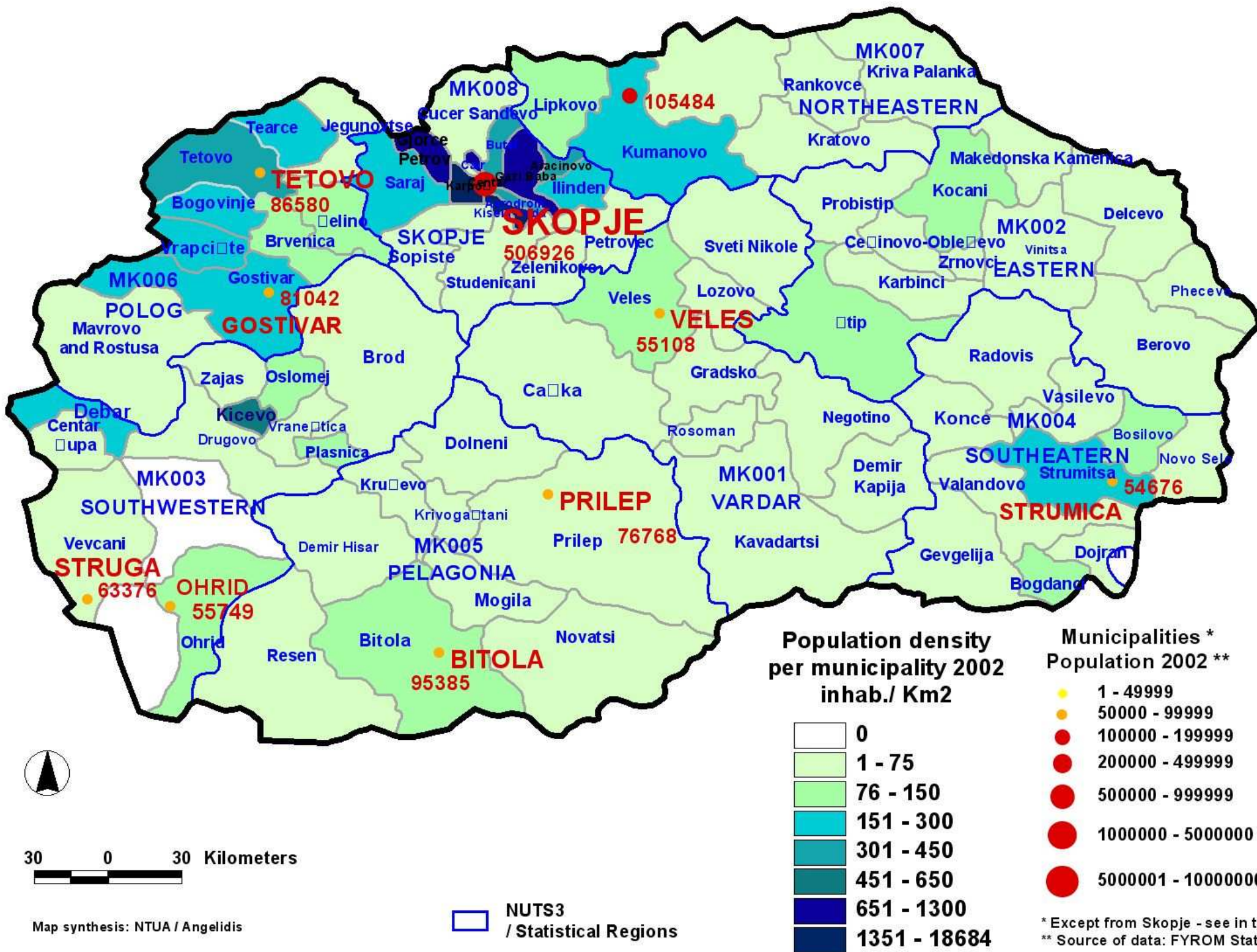


Figure 42 Federation of Bosnia and Herzegovina (FBiH) cantons and cities population 2007 Source: FBiH Stat. Office 2008

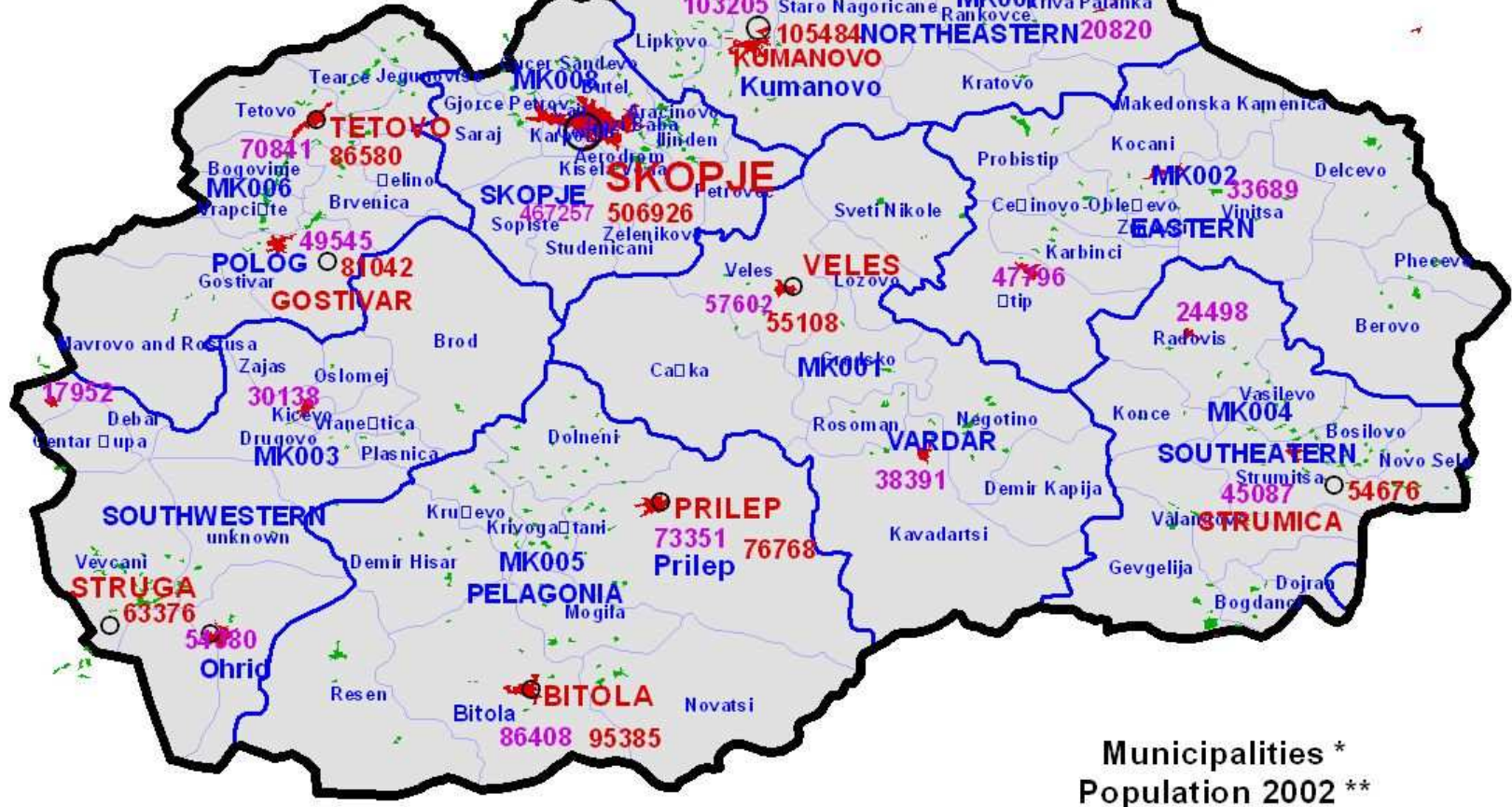












**Municipalities \*  
Population 2002 \*\***

- 1 - 49999
- 50000 - 99999
- 100000 - 199999
- 200000 - 499999
- 500000 - 999999
- 1000000 - 5000000
- 5000001 - 10000000

\* Except from Skopje - see in text  
 \*\* Source of data: FYROM Stat. Inst.



30 0 30 Kilometers

Map synthesis: NTUA / Angelidis

- Other Zones
- Urban Zones  
- Popul. >0 in 2001
- NUTS3  
/ Statistical Regions
- Municipalities



Administrative Districts

- 1 North Bačka
- 2 Central Banat
- 3 North Banat
- 4 South Banat
- 5 West Bačka
- 6 South Bačka
- 7 Srem
- 8 Mačva
- 9 Kolubara
- 10 Podunavlje
- 11 Braničevo
- 12 Šumadija
- 13 Pomoravlje
- 14 Bor
- 15 Zaječar
- 16 Zlatibor
- 17 Moravica
- 18 Raška
- 19 Rasina
- 20 Nišava
- 21 Toplica
- 22 Pirot
- 23 Jablanica
- 24 Pčinja
- 25 Kosovo
- 26 Peć
- 27 Prizren
- 28 Kosovska Mitrovica
- 29 Kosovo-Pomoravlje



Names of municipalities signed with numbers:

CITY BELGRADE

- 1 Stari Grad
- 2 Vračar
- 3 Savski Venac
- 4 Novi Beograd
- 5 Zvezdara
- 6 Rakovica
- 7 Voždovac
- 8 Čukarica
- 9 Zemun
- 10 Palilula
- 11 Surčin
- 12 Barajevo
- 13 Obrenovac
- 14 Grocka
- 15 Sopot
- 16 Lazarevac
- 17 Mladenovac

Grad Niš

- 18 Mediana
- 19 Palilula
- 20 Pantelej
- 21 Crveni Krst
- 22 Niška Banja

- 23 Sremski Karlovci

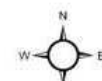
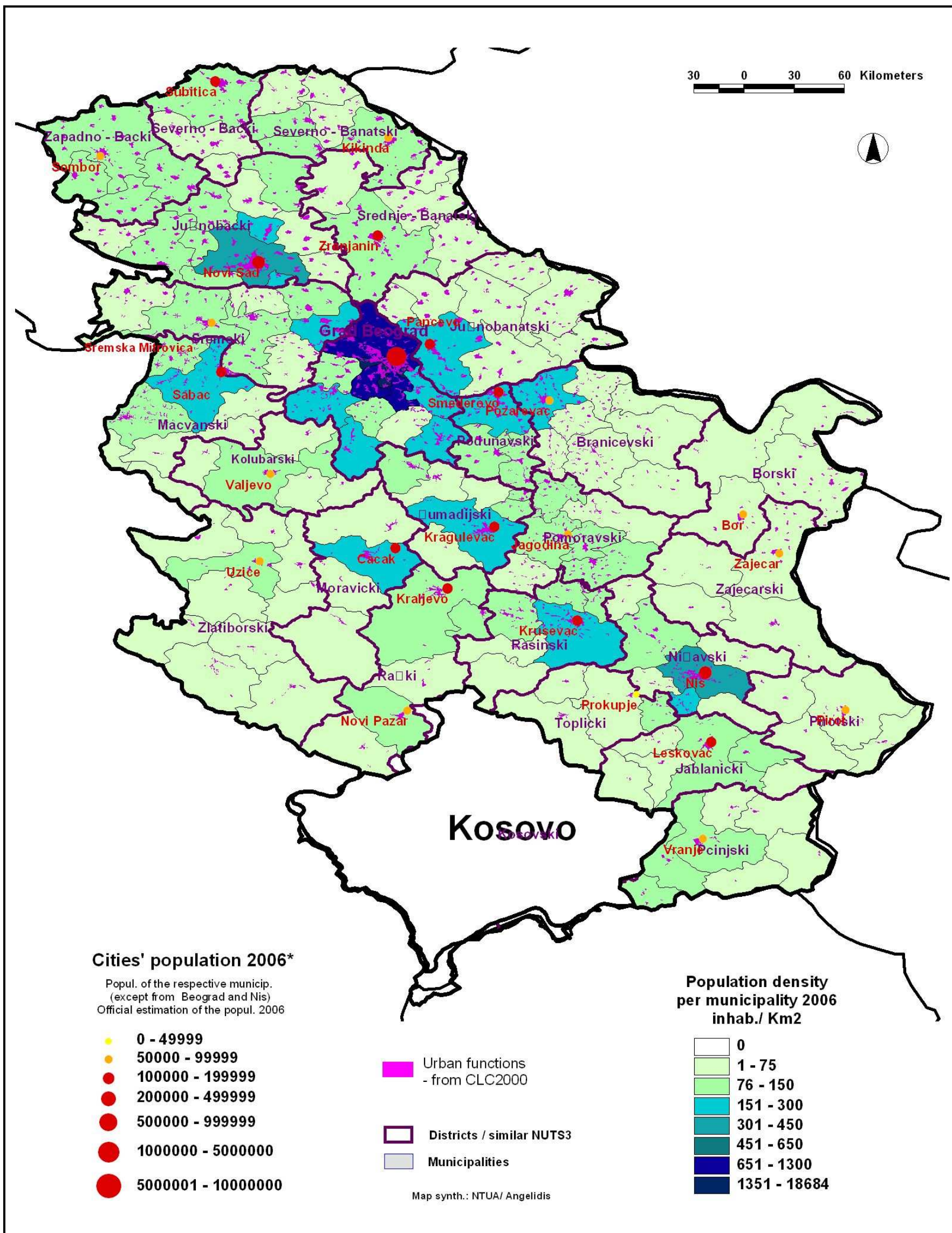




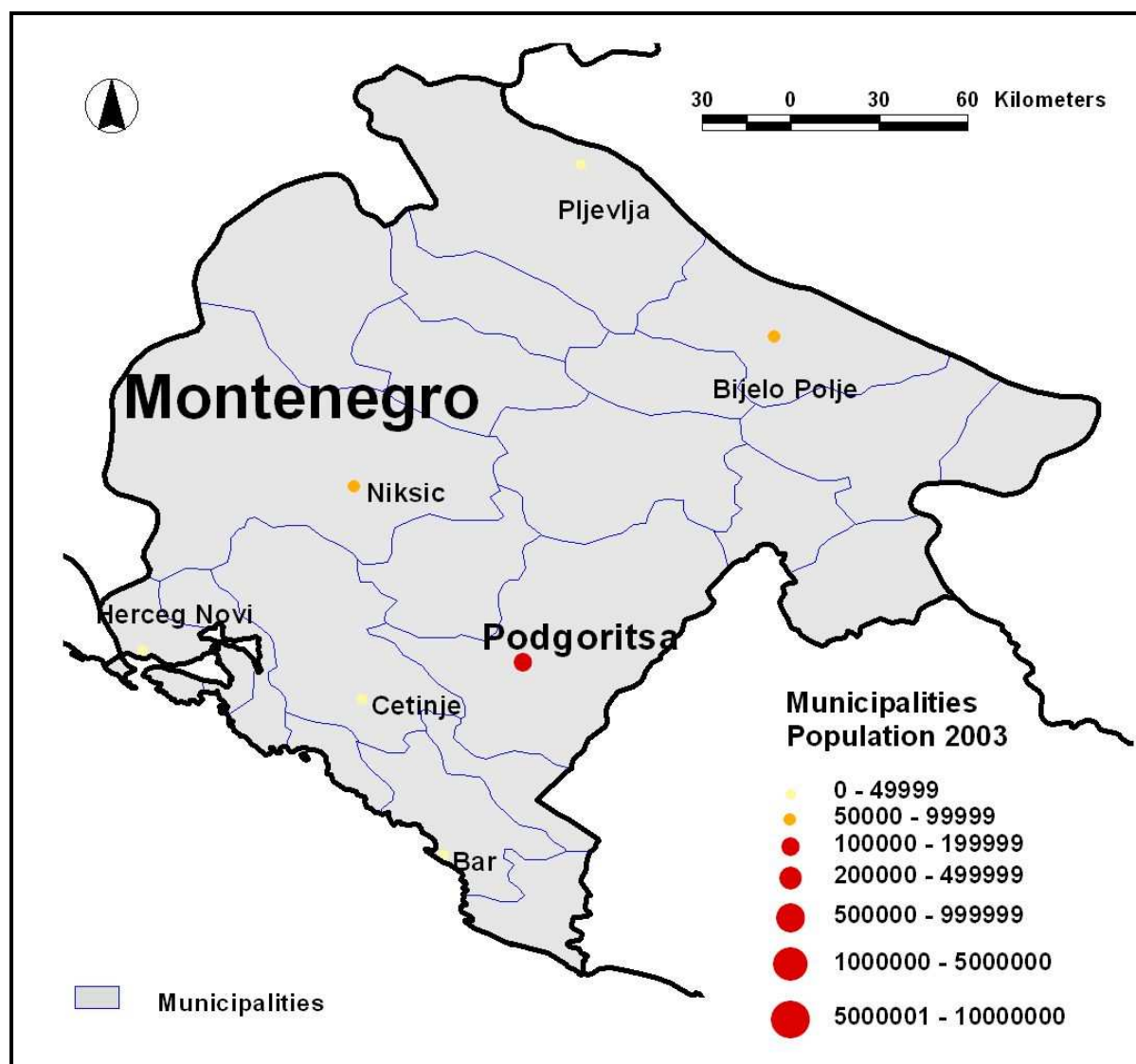
Figure 47 Serbia: Districts / similar NUTS3, municipalities, municipalities' population 2006, population density 2006: inhab. / Km2





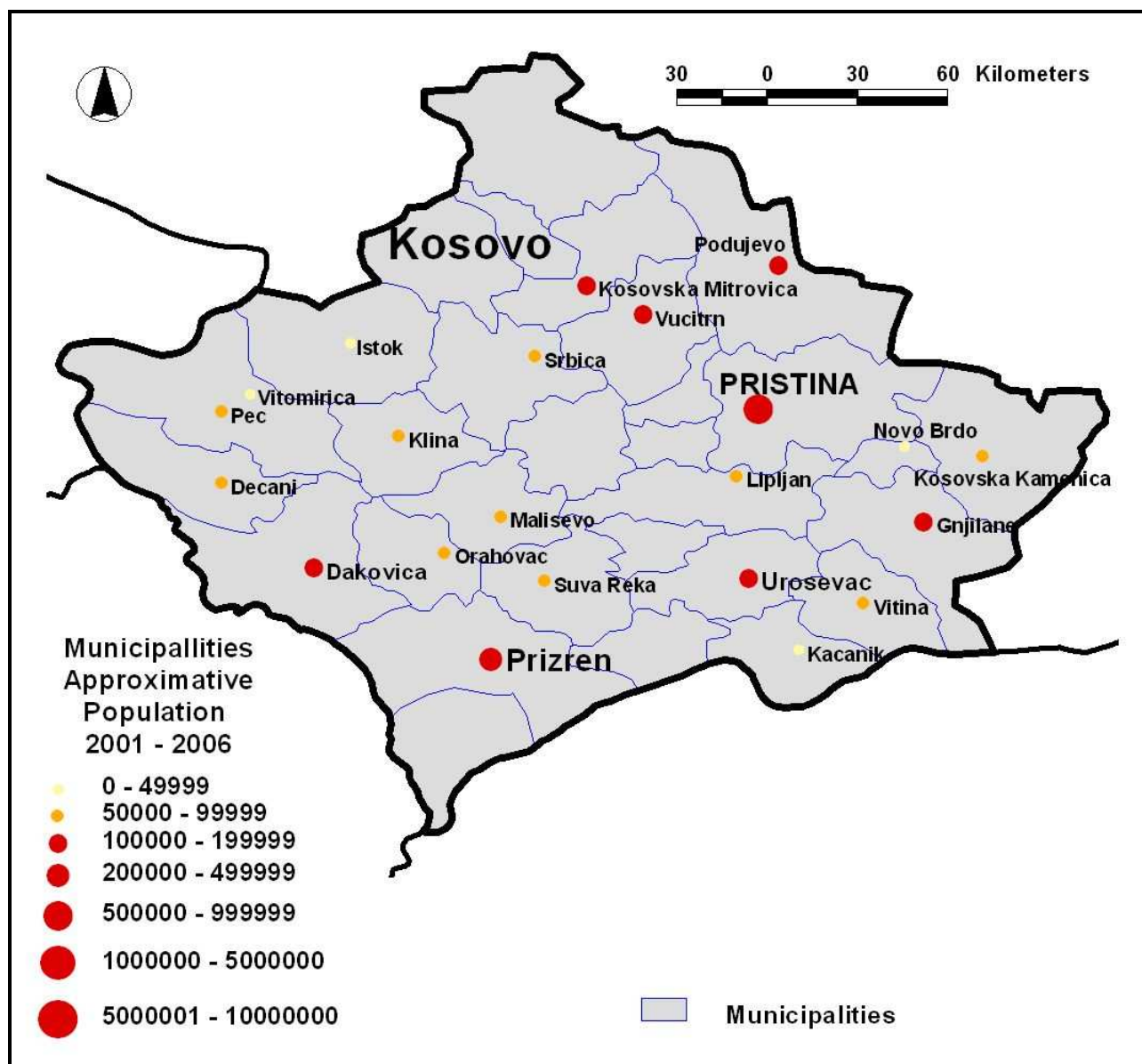
Montenegro

Figure 48 Montenegro: municipalities and cities and municipalities population 2003

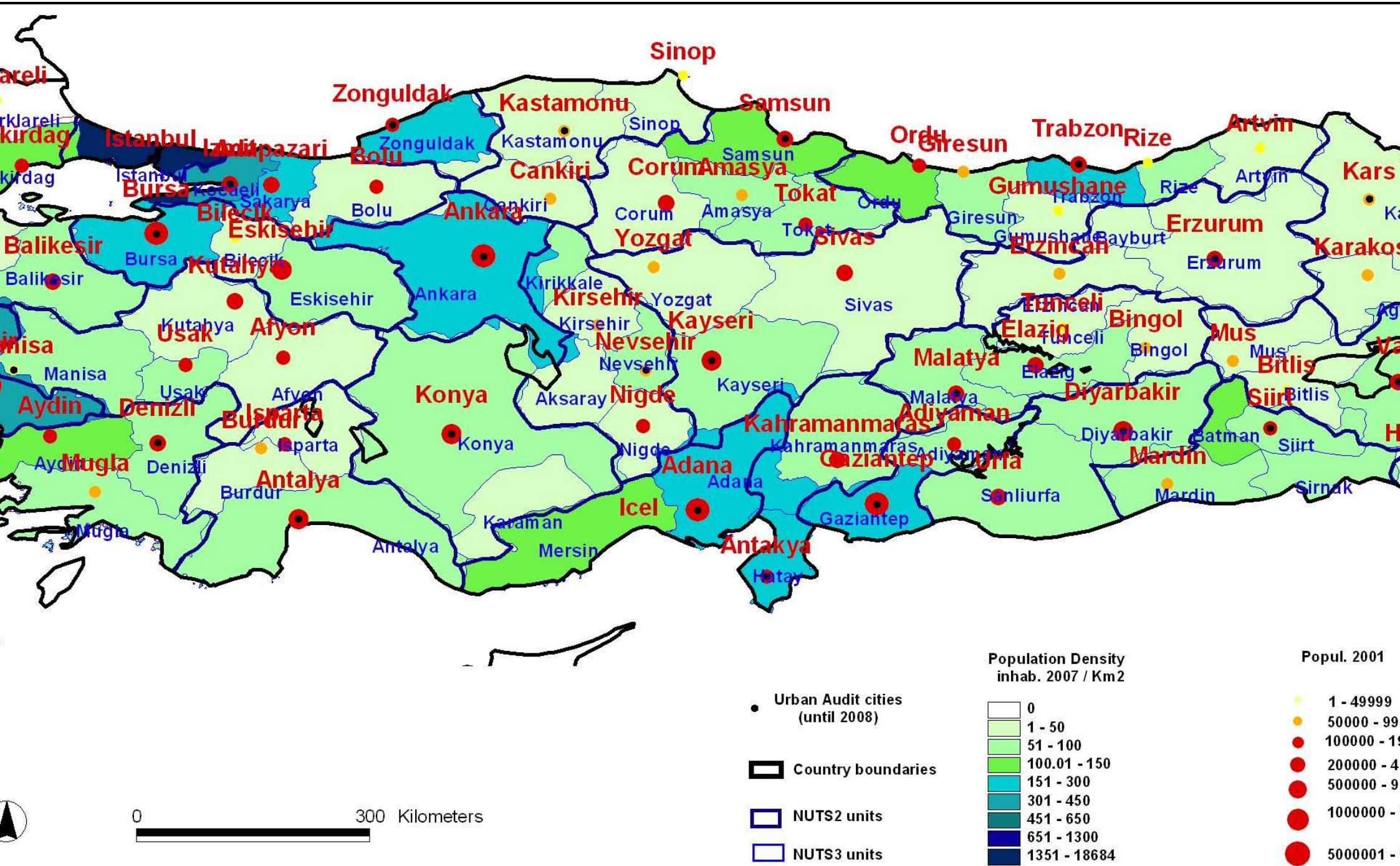


Kosovo

Figure 49 Kosovo municipalities, cities and Municipalities population



Map of Turkey showing NUTS 2 and NUTS3 regions, Urban Audit (UA) cities UNTIL 2008, and population of cities in 2001.





## Annex - Notes and Tables

Complementary remarks on the UA LUZ definition (UA Methodological Handbook)

"...An **advantage** of this approximation approach is the **wealth of statistical data** available for NUTS regions, in particular at **NUTS level 3**. These regions are already widely in use for regional statistics, and in most cases they correspond to unique administrative areas/regions. Therefore, data availability is relatively high. Another advantage is that as the NUTS classification is relatively **stable over time**, statistical time series may be used for the "proxy agglomerations". Provided that data for the different variables are available at **LAU level 2** (commune/ward/Gemeinde or similar units), a number of LAU level 2 units can be used to approximate the LUZ. It is important to bear in mind that the target unit is the *functional* urban region, not the *morphological* agglomeration (built-up area). In several cases, Urban Audit cities are situated very near each other and form part of one conurbation. In such cases, a common LUZ has been defined for 2 or more cities of the Urban Audit. Examples are the "Ruhrgebiet" in Germany, West Yorkshire in the UK and Katowice-Zory in Poland. A special situation in France must be mentioned. Since the city concept in France is the political "cooperation bodies" covering several "communes" and the LUZ concept corresponds to the true functional regions ("Aire Urbaine" defined with criteria of commuting intensity), there is a poor relationship between the city and the LUZ. In occasional cases the city stretches further away than the LUZ. This is the case in Marseille and Nice and in several medium sized cities..."

**Table 35 Some of the primarily important UA data, simple and derived indicators for LUZ and "core" city**

Data, simple indicators	Derived indicators	
<b>(a) Data provided usually in EU-27 countries by censuses or by annual, bi-annual etc surveys</b>		
<b>Urban Audit / demografy</b>		
totan resident population per year	total population change over 1 year	
totan resident population per census year	total annual population change over 5 years	
<b>Popul. by sex: males, females</b>	propotion of females to males in total population	
<b>Population by age:</b> 7 groups:5-14, 15-19, 20-24, 25-54, 55-64, 65-74, 75 and over	proportin of total population aged 0-4	propotion of total population in 7 age groups:5-14, 15-19, 20-24, 25-54, 55-64, 65-74, 75 and over
	demografic dependency: (<20+ >65)/20-64 years	demografic old age dependency: >65 / 20-64years
	demografic young age dependency: <20 / 20-64years	
<b>Popul. By sex and age</b>	proportion of females to males - aged 75 and over	proportion of total / male / female resident population aged by the following age groups: 0-2, 3-4, 25 -34, 35-44, 45-54,
	proportion of total / male / female population aged by the following age groups: 15-64, 55-64, 65-74	life expectancy at birth for males and females
<b>total population of working age</b>		
<b>Popul.: nationals, EU nationals, Non - EU nationals</b>	nationals as a proportion of the total population	EU nationals as a proportion of the total population
	Non - EU nationals as a proportion of the total population	nationals born abroad as a proportion of total population
<b>Total number of households</b>	average size of households	

Lone - person households (total number)		
Lone - parent households - total / male/ female number		
Lone - pensioner (above retirement age) households - total / male / female		
Households with children aged ) to under 18		
<b>moves to city / moves out</b> during last 2 years		
<b>Nationals, EU nationals, Non-EU nationals that have moved into the city</b>	as a proportion of the population	
<b>Non - EU nationals Nationals, citizens of a country with high mid or low HDI</b>		
<b>Urban Audit / social aspects</b>		
number of <b> dwellings</b>		
<b>number of homeless people</b>	number of homeless people / total resident population	
<b>dwellings lacking basic amenities</b>	proportion of dwellings lacking basic amenities	
<b>households living in owned housing,</b> in social housing, in private rented housing, in apartments, in houses	proportion of households living in owned housing	proportion of households living in private rented housing
	proportion of households living in social housing	proportion of households living in apartments
	proportion of households living in houses	
non - convention dwellings	proportion of non - convention dwellings	
average occupancy per occupiers dwelling		
empty conventional dwellings		
<b>Urban Audit / economic aspects</b>		
number of <b>unemployment</b>		
<b>Unemployment by age and sex</b>	unemployment rate (total, male - female)	

	proportion of residents (total, male - female) unemployed by 2 age group (24-55, 55-54)	proportion of unemployed who are under 25
<b>long term unemployed by age and sex</b>	proportion of long term unemployed (>6mnths), 15 -24 years old (total, male - female)	proportion of long term unemployed (>1year), 55-64 years old (total, male - female)
<b>Employment by age and sex</b>	employment rate (total, male - female)	
<b>self - employment</b>	self - employment rate (residents)	
<b>activity by age and sex</b>	activity rate (total, male - female)	activity rate by 2 age groups (15-24,55-64) (total, male - female)
<b>part - time employment by age and sex</b>	proportion in part - time employment (total, male - female)	proportion in part - time employment by 2 age groups (15-24,55-64) (total, male - female)
number of <b>companies with HQs in city quoted on stock marketing</b>		
average employment per company		
proportion of companies gone bankrupt	nes businesses registered as a % of existing companies	
<b>net office spave that is vacant</b>	proportion of net office space that is vacant	
median dispoable annual household <b>income</b>	ratio of first to fourth quintile earnings	percentaga households with < half national average income
<b>proportion of households reliant upon social security</b>	proportion of individuals reliant on social security	
<b>Urban Audit / enviroment</b>		
<b>Temperature, number of days of rain or sunshine</b>	average temperature of warmest month	number of days of rain per year
	average temperature of coldest month	average number of hours of sunshine per day
	rainfall (litre/m2) om the reference year	

<b>Summer Smog, ozone and NO2 concentrations</b>	summer Smog: number of days ozone exceeds 120µg/m3	number of days NO2 concentrations exceed 200mg/m3
	number of days PM10 concentrations exceed 50mg/m3	
consumption of water (m3 per annum) per capita		
% dwellings connected to potable water system		
% dwellings connected to sewerage treatment system		
number of water rationing cases, days per year		
<b>Waste process method</b>	proportion of solid waste processed by landfill	proportion of solid waste processed by recycling
	proportion of solid waste processed by incinerator	proportion of solid waste processed by other methods
<b>total land area (KM2) - from the green space to which the public has access</b>		
Green space, sports and leisure, agricultural	proportion of the area in green space	proportion of the area in sports and leisure use
	proportion of the area used for agricultural purposes	
<b>Total land, residential land, for commercial activities, for transport, for other purposes (Km2)</b>	population density: total residential population per km2	net residential density - population per land area in housing
	proportion of the area used for commercial activities	proportion of the area used for transport road, rail, air, ports
	proportion of the area use for other purposes	land m2 in recreational sports and leisure use per capita
<b>land area of core city based on modelling</b>		

<b>proportion morphological city area outside administrative limits</b>		
accumulated ozone concentration in		
<b>annual average concentration of NO2, PM10</b>		
<b>proportion residents exposed to aircraft, rail, road noise</b>	proportion residents exposed to daytime aircraft noise >65 dB(A)	proportion residents exposed to daytime road noise >65 dB(A)
	proportion residents exposed to d aircraft noise >55 dB(A) night	proportion residents exposed to rail noise >65 dB(A) night
	proportion residents exposed to daytime rail noise >65 dB(A)	proportion residents exposed to road noise >65 dB(A) night

**% urban waste water treated to water and wetland**



**Table 36 Data in NUTS 3, LAU levels in the Western Balkans and Turkey [some findings are not yet reported in the Table]**

**Data, simple indicators**

Data - Indicators / Country	Albania	Bosnia-Herzegov.	Croatia	FYROM	Serbia	Serbia	Montenegro	Kosovo	Turkey
	12 Prefectures ("counties")	FBiH, RS, and Brsko District (3)	Jupanija (21)	8 Statisticki Regioni /	Districts (4b)	Municipalities	total of the country	seven districts	81 ILLER
<b>Population census' years 1985 - 2008</b>	1989, 2001	1991	1991, 2001	1991, 2002	1991, 2002 (5)	Same as for districts	1991, 2003	1991	1985, 1990, 1997 (6), 2000 (6)
<b>Buildings / dwellings census 1985 - 2008</b>									
<b>Labour force survey 1985 - 2008</b>		2007							
<b>Demographic and social aspects</b>									
<b>Total Population</b>	1989c, 2001c	1991,1995, 2001 -2002 FBiH 2007	1991c,1995, 2001c, 2002 - 2008	1991c, 2002c	1991c, 1995, 2002c, 1998-2005a.e.	Same as for districts	1981c,1991c, 2003c	<b>1981,1991c, 2006, 2007</b>	1990c, 2000c
<b>Popul. by sex: males, females</b>	2001c	1991c, 2000 - 2003, FBiH 2007	1991,1995,2001 -2008	1991c, 2002c	1991c, 1995, 1998-2007, 2002c		1981c,1991c, 2003c	1991c, 2006, 2007	1990c, 2000c
<b>Population by age group</b>	2001c	1991c, 2000-2003 - FBiH 2007	1991c, 2001c	1991c, 2002c	1991c, 1995, 2002c, 1998-2005a.e.		1991c, 2003c	1991c, 2006, 2007	1990c, 2000c
<b>Population by sex and age group</b>	2001c	1991c	1991c, 2001c	1991c, 2002c	1991c, 1995, 1998-2005, 2002c		1991c, 2003c	1991c	1990c, 2000c

<b>Population per education level</b>	2001c	1991c	1991c, 2001c	1991c, 2002c	1991c, 1995, 1998-2005, 2002c		2003-2008, 2003c	1991c	1990c, 2000c
Total number of <b>households</b>									
Lone - person households									
Lone - parent households - total / male/ female number									
number of <b>dwelling</b> s									
<b>Economic aspects, Employment</b>									
<b>Total Active Population</b>	2001c	1991c, 2007 Labour force survey (lfs)	1991c, 2001c	1991c, 2002c	1991c, 1995, 2002c		1991c, 2003c	1991c	1990c, 2000c
<b>Male, Female Active Population</b>	2001c	1991c, 2007 lfs	1991c, 2001c	1991c, 2002c	1991c, 1995, 2002c		1991c, 2003c	1991c	1990c, 2000c
<b>Number of Employed persons</b>	2001c	1991c, 2007 lfs	1991c, 2001c	1991c, 2002c,	1991c, 1995, 1998-2006, 2002c, 2006 (7)		1991c, 2003c, 2004-2007	1991c	1990c, 2000c
<b>Number of unemployed persons</b>	2001c	1991c, 2007 lfs	1991c, 2001c	1991c, 2002c,	1991c, 1995, 1998-2006, 2002c, 2006 (7)		1991c, 2003c, 2004-2007	1991c	2000c, 2004-2007
<b>Employment per primary, secondary, tertiary sector</b>	2001c	1991c, 2007 lfs	1991c, 2001c	1991c, 2002c,	1991c, 1995, 1998-2006, 2002c, 2006 (7)		1991c, 2003c, 2004-2007	1991c	1981-2001
<b>Gross Domestic Product (GDP) (Euros)</b>		FBiH 2005-2007		2004-2006			2000-2004	no data	1990c, 2000c

(1) a.e.=annual estimations

(2) c=census(es)

(3) Federation of Bosnia and Herzegovina (FBiH), Republic of Srpska (RS), and Brsko

(4a) Existing results are per municipality, we can provide by aggregation results

per SR

- (4b) Existing results are per municipality, we can provide by aggregation results per Districts
- (5) Census not carried out on the territory of Kosovo and
- (6) Turkey: 1997: Housing census only, 2000: Population census only
- (7) Serbia Survey of employed per municipality 2006, we can provide by aggregation results per Districts

## Tables per country

### Serbia

**Table 37 Serbia: Per district population 1991 and 2001, pop. density 2002, NUTS**

Territory	Area km2	Number of localities	Population according to the Census, 1991	Population according to the Census, 2002	Pop. Density 2002 - inh./Km2	NUTS
<b>Republic of Serbia without</b>	<b>88361</b>	<b>6155</b>	<b>7581437</b>	<b>7498001</b>	85	<b>1</b>
Central	55968	4239	5611242	5466009	98	1
Vojvodina	21506	467	1970195	2031992	94	2
<b>Central</b>	<b>55968</b>	<b>4239</b>	<b>5611242</b>	<b>5466009</b>	98	<b>1</b>
City of	3224	157	1552151	1576124	489	2
Distr. of	3268	228	329226	329625	101	3
Distr. of	2474	218	196556	192204	78	3
Distr. of	1248	58	216056	210290	169	3
Distr. of	3865	189	220225	200503	52	3
Distr. of	2387	174	303484	298778	125	3
Distr. of	2614	191	240715	227435	87	3
Distr. of	3507	90	163229	146551	42	3
Distr. of	3623	173	154176	137561	38	3
Distr. of	6140	438	332470	313396	51	3
Distr. of	3016	206	228093	224772	75	3
Distr. of	3918	359	293311	291230	74	3
Distr. of	2668	296	272834	259441	97	3
Distr. of	2729	282	389838	381757	140	3
Distr. of	2231	267	109608	102075	46	3
Distr. of	2761	214	115970	105654	38	3
Distr. of	2769	336	251301	240923	87	3
Distr. of	3520	363	241999	227690	65	3
<b>Vojvodina</b>	<b>21506</b>	<b>467</b>	<b>1970195</b>	<b>2031992</b>	94	<b>2</b>
Distr. of	1784	45	202493	200140	112	3
Dis. of	3256	55	216754	208456	64	3
Distr. of	2329	50	177542	165881	71	3
Distr. of	4245	94	315633	313937	74	3
Distr. of	2420	37	210679	214011	88	3
Distr. of	4016	77	543878	593666	148	3
Distr. of	3486	109	303216	335901	96	3

## Turkey

**Table 38 Turkish 3<sup>rd</sup> level units "city population in 2000**

AA	Region Code [Level 3 / 81 cities *]	Region Name	City and village population : City population 2000	AA	Region Code [Level 3 / 81 cities *]	Region Name	City and village population : City population 2000
1	TR100	İstanbul	9.085.599	41	TR723	Yozgat	315.156
2	TR211	Tekirdan	395.377	42	TR811	Zonguldak	250.282
3	TR212	Edirne	230.908	43	TR812	Karab�k	157.756
4	TR213	K�rklareli	189.202	44	TR813	Bart�n	48.002
5	TR221	Bal�kesir	577.595	45	TR821	Kastamonu	174.020
6	TR222	Hanakkale	215.571	46	TR822	Hank�r�	141.186
7	TR310	İzmir	2.732.669	47	TR823	Sinop	101.285
8	TR321	Ayd�n	493.114	48	TR831	Samsun	635.254
9	TR322	Denizli	413.914	49	TR832	Tokat	401.762
10	TR323	Munla	268.341	50	TR833	Horum	311.897
11	TR331	Manisa	714.760	51	TR834	Amasya	196.621
12	TR332	Afyon	371.868	52	TR901	Trabzon	478.954
13	TR333	K�tahya	318.869	53	TR902	Ordu	416.631
14	TR334	U�ak	182.040	54	TR903	Giresun	283.316
15	TR411	Bursa	1.630.940	55	TR904	Rize	205.245
16	TR412	Eski�ehir	557.028	56	TR905	Artvin	84.198
17	TR413	Bilecik	124.380	57	TR906	G�m��hane	77.570
18	TR421	Kocaeli	722.905	58	TRA11	Erzurum	560.551
19	TR422	Sakarya	459.824	59	TRA12	Erzincan	172.206
20	TR423	D�zce	130.632	60	TRA13	Bayburt	41.356
21	TR424	Bolu	142.685	61	TRA21	Anr�	252.309
22	TR425	Yalova	98.661	62	TRA22	Kars	142.145
23	TR510	Ankara	3.540.522	63	TRA23	İnd�r	81.582
24	TR521	Konya	1.294.817	64	TRA24	Ardahan	39.725
25	TR522	Karaman	139.912	65	TRB11	Malatya	499.713
26	TR611	Antalya	936.240	66	TRB12	Elaz�n	364.274
27	TR612	Isparta	301.561	67	TRB13	Bing�l	123.470
28	TR613	Burdur	139.897	68	TRB14	Tunceli	54.476
29	TR621	Adana	1.397.853	69	TRB21	Van	446.976
30	TR622	Mersin	999.220	70	TRB22	Mu�	159.503
31	TR631	Hatay	581.341	71	TRB23	Bitlis	219.511
32	TR632	Kahramanmara�	536.007	72	TRB24	Hakkari	139.455
33	TR633	Osmaniye	311.994	73	TRC11	Gaziantep	1.009.126
34	TR711	K�r�kkale	285.294	74	TRC12	Ad�yaman	338.939
35	TR712	Aksaray	200.216	75	TRC13	Kilis	74.985
36	TR713	Ninde	126.812	76	TRC21	�anl�urfa	842.129
37	TR714	Nev�ehir	136.523	77	TRC22	Diyarbak�r	817.692
38	TR715	K�r�ehir	147.412	78	TRC31	Mardin	391.249
39	TR721	Kayseri	732.354	79	TRC32	Batman	304.166
40	TR722	Sivas	421.804	80	TRC33	��rnak	211.328
				81	TRC34	Siirt	153.522

## **Annex 13. Additional cities in Urban Audit countries**

### **13.1 Introduction**

In some cases, the selection of cities of the Urban Audit is seen as insufficient as it leaves out some territories just because local cities are below the population size threshold, even though they play an important role for their respective regions. We, therefore, propose to add a few cities to the existing Urban Audit data, in order to « fill » some of the « holes ».

### **13.2 Criteria of selection**

We decided to limit the selection to cities whose functional urban area (not only the city itself, so the criteria includes clusters of smaller cities forming a FUA) has at least 50,000 inhabitants in order to only take FUAs which have a true regional impact. As a second criteria we only took those cities which are at least 150km away from the nearest Urban Audit city. Finally, we had to limit the number in order not to make data collection and harmonisation a too heavy task which would take away time and resources from the actual analysis. We, therefore, focused on cities which have a regional importance beyond their own FUA, based on assessments by local experts.

### **13.3 Proposal of cities to add**

Iceland: Reykjavik should have been included in the latest UA round, but was not, so it will have to be covered by the project. We decided to limit ourselves to Reykjavik at this stage.

Sweden: Kalmar, Östersund, Luleå, Sundsvall

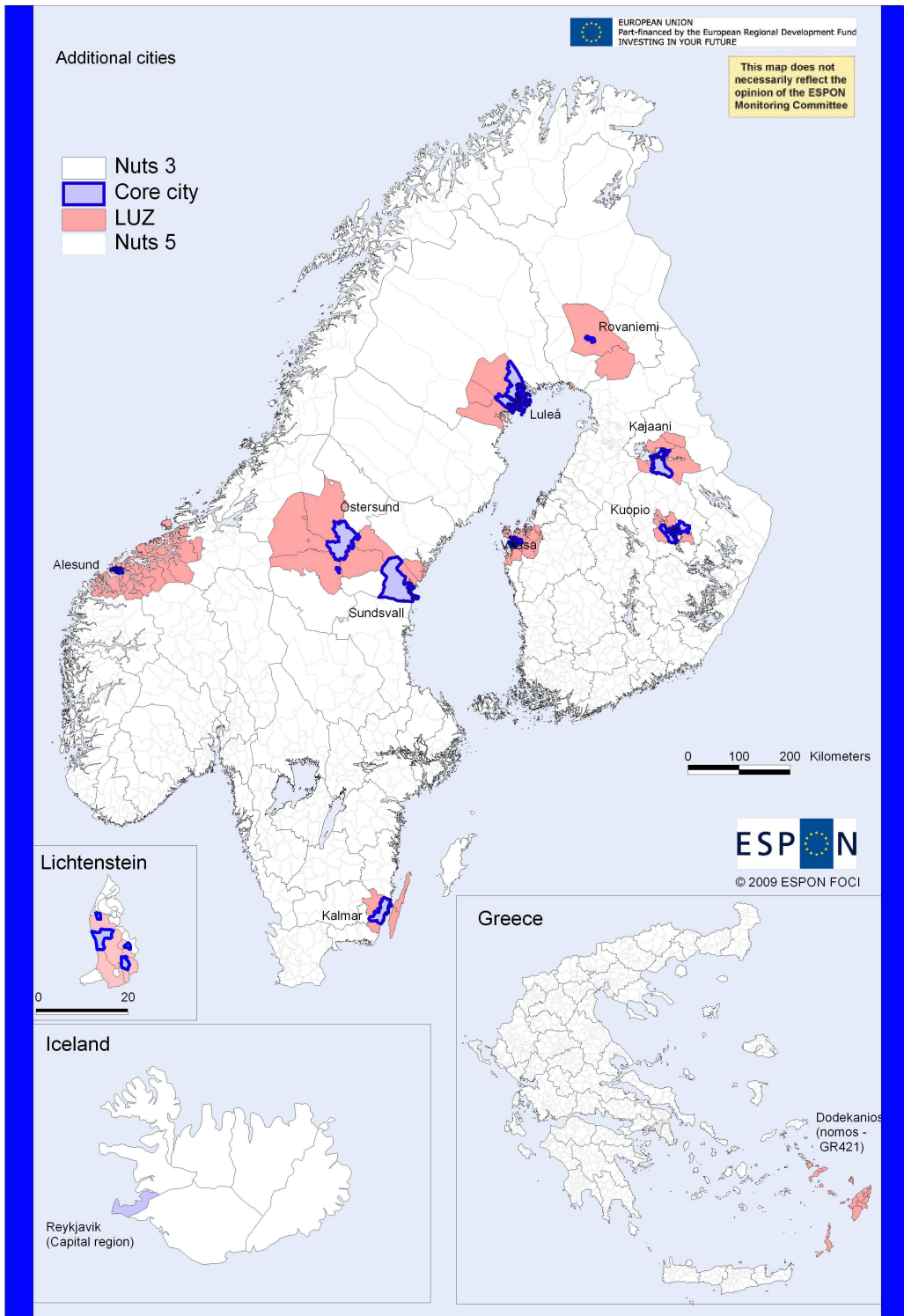
Finland: Rovaniemi, Kuopio, Vaasa, Kajaani

Norway: Ålesund

Greece: Rhodos

### **13.4 Delimitation**

As already mentioned, we will mostly work with NUTS3 approximations. However, we did use the respective national criteria to propose a first delimitation shown on map 51. The only exception is Rhodos for which we propose the NUTS3.



**Figure 51 Delimitations of additional cities to be included**