

Version 30/09/2010



The ESPON 2013 Programme

FOCI Future Orientations for Cities

Applied Research Project 2013/1/1

Draft final Report



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

This report presents the interim results of an Applied Research Project conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on www.espon.eu

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

This basic report exists only in an electronic version.

© ESPON & ULB, 2010.

Printing, reproduction or quotation is authorised provided the source is acknowledged and a copy is forwarded to the ESPON Coordination Unit in Luxembourg.

Coordination: IGEAT - Moritz Lennert, Gilles Van Hamme, Catherine Patris

Contribution:

EUROREG: Maciej Smętkowski, Adam Płoszaj

Géographie-cités: Marie-Noëlle Comin, Denise Pumain

GeoVille: Stefan Kleeschulte, Mirko Gregor

IGUL: Céline Rozenblat, Daniele Ietri, Alexandre Liechti

NTUA: Minas Angelidis, Vivian Bazoula

TERSYN: Jacques Robert

UAB: Jaume Fons, Alejandro Simon

Université Paris-Est, LVMT, Inrets: Sandra Bozzani-Franc, Alain L'Hostis, Laurent Terra

UWE: David Ludlow

Table of Contents

Introduction.....	7
Cities as objects of study: a general review of the state and perspectives of cities based on the scientific literature.....	8
Introduction.....	8
Evolving demographic and spatial structures of cities	8
Cities as focal points of economic growth.....	10
Urban competitiveness	10
Future perspectives.....	13
BOX 1: The growing importance of networks in the context of globalization	14
Cities as motors of growth for their hinterlands, their countries and Europe	15
A growing social polarization.....	16
The drivers of polarization.....	16
Future perspectives.....	18
BOX 2: Trends in social polarization in European cities.....	19
Cities concentrating emissions and pollution	21
Air	21
Noise	22
Waste.....	22
Land	22
Future perspectives.....	23
BOX 3 : The impact of urban structure on economic, social, environmental performance	24
Inter-urban cooperation	25
Cities as objects of policies: a review of policy visions and policies on cities in Europe.....	26
Changes in metropolitan regions and related policies.....	27
Intra-urban issues and related policies	28
New knowledge on cities: Attempts at furthering the empirical knowledge on European cities	30
Introduction.....	30
Urban extension and urban form	30
Introduction	30
A typology of population development between core cities and LUZ	30
A typology of urban spatial development based on Corine Land Cover	32
How reliable is Corine Land Cover for analysing urban sprawl ?	33
The impact of urban form on urban "performance".....	34
Social cohesion	35
Introduction	35
The relation between economic wealth and social cohesion	35
Socio-spatial polarisation	37
Conclusions.....	37
Economic development.....	39
Introduction	39
A typology of the sectoral structure of European cities.....	39
The hierarchy of cities according to their participation in global and European networks	41
Intermediate cities at the inter-continental level	43
Cities in networks of contactability	46
Economic differentiation of cities in national and European contexts.....	49

Conclusions.....	50
City-hinterland relationships	51
Introduction	51
Is there a relation between cities and their hinterland in terms of economic and demographic evolutions ?	51
Mechanisms underlying metropolis-region relations.....	54
Policy conclusions	56
Cooperation	57
Introduction	57
Measuring functional polycentricity: an impossible quest ?	57
Cases of cooperation: some very preliminary conclusions from case studies.....	59
The future of cities: Scenarios to assess the upcoming challenges for cities	61
Description of the scenarios	61
The territorial impacts of the scenarios.....	65
Policy conclusions.....	67
General policy messages	67
Territorial messages.....	68
Future perspectives	68
Research recommendations	69

Tables and Figures

Table 1.	The relevance of the city level for different factors of competitiveness	11
Table 2.	Major trends of urban dynamics in regions of Europe for the period 1950-2005	23
Table 3.	Relationship between typologies of city compacity and transport mode to work, and air quality parameters. Data source: Urban Audit.....	34
Table 4.	Correlation (R Pearson) between economic wealth and unemployment rates, in the years 2000, in static and dynamic terms	36
Table 5.	Correlation (R Pearson) between economic wealth (GDP/head) and some social indicators, in the years 2000	37
Table 6.	Global ranking of the top 30 gatekeepers, representatives and platforms in the networks of the 3000 largest multinational firms...	44
Table 7.	Share (%) of the variance in GDP/inhabitant (pps) between cities in 2005.....	49
Table 8.	Share (%) of the total variance in total GDP (pps) growth between cities.....	49
Table 9.	Differences between economic growth of the main European national cities and European or national average, 1995-2006.....	50
Table 10.	The hypotheses underlying the scenarios.....	64
Table 11.	The territorial impact of the scenarios	66
Figure 1.	Typology of intra-urban dynamics in European LUZ, in the years 2000	31
Figure 2.	Typologies of urban development (1990-2000).....	33
Figure 3.	District inequalities in European cities	38
Figure 4.	A typology of European cities in terms of sectoral structure 2006 (6 sectors, NUTS 3 approximations of cities).....	40
Figure 5.	Hierarchy of FUAs according to their participation in global and European networks.....	42
Figure 6.	FUAs according to their participation in global and European networks and their population.....	43
Figures 7.	Position of European cities as intercontinental (a) gatekeepers, (b) representatives and (c) platforms.....	45
Figure 8.	City network daily accessibility by rail, air or a combination of air and rail between a proposed list of MEGA between 5h and 23h.....	47
Figure 9.	Change of disparities in the development level between the metropolis and its regional hinterland in 1995-2004	52
Figure 10.	Typology of metropolitan macroregions (selected types).....	54
Figure 11.	The degree of divergence (correspondence analysis: total inertia) based on NUTS3 sectoral structure in PP urban networks in the ESPON territory.....	58
Figure 12.	a) FUA centralities in the network of multinational firms with a distance below 100km; b) Selected CORDIS research projects cooperation in Eastern Balkans.....	59

Introduction

This is the second version of the draft final report of the project. We now think that we have a coherent structure allowing to distinguish the general work based on the literature, the very specific empirical contributions and the foresight work in the form of scenarios.

From the outset, the project has had two, complementary, but not always easily reconcilable orientations: it is supposed to provide a broad overview of the current and future issues relevant to urban development in all of Europe. At the same time, our desire was to advance scientifically beyond the established and well-known data and analyses and provide innovative research. However, the latter, although providing new and interesting insights, generally does not have the temporal, and sometimes not even the spatial, breadth necessary for a general policy-oriented review of the state of affairs. As this report was elaborated in parallel to the new State of European Cities report to be published by DG Regio, we also aimed at complementarity with that report, not wanting to repeat the same analyses based on the same data.

In this project, we, therefore, worked in three parallel strands. First, all teams went through the current literature to extract the knowledge about trends, perspectives and, most importantly, driving forces for urban development in their thematic fields. Second, each of the teams focused on one or two innovative empirical research questions, generally tapping new data sources. Finally, our scenario team has taken the work of the other teams, and substantially augmented it through additional literature review, aiming at covering an even larger horizon and to provide a complete knowledge base on urban development, necessary for integrated prospective thinking. On this basis the scenarios were developed. The structure of the report reflects these three strands, adding a fourth, new strand, which consists in an assessment of the current national policy visions on urban issues across Europe. Details of all the literature reviews and analyses are presented in the scientific report.

A few notes for the reader:

- We have deliberately left out all literature references from this main report in order to facilitate the reading. All references are noted in the scientific report.
- Links across this main report allow easy access to the relevant sections of that scientific report.

Cities as objects of study: a general review of the state and perspectives of cities based on the scientific literature

Introduction

Urbanisation has been a secular process shaping the European settlement structure heterogeneously in time and space, so that the present, synchronic observation reveals a patchwork of quite different situations, reflecting both the various phases of the process and the geographic and historical peculiarities of the areas concerned.

We intend here to show, based on the current literature, what have been the major trends of urban development in recent years as well as the geographical differences at macro-regional scale in these trends.

Evolving demographic and spatial structures of cities

The demography of the cities – especially when not considering the biggest ones – is very much in accordance with the regional and national trends in which they are embedded.

However, cities in general – at least beyond a certain level of the urban hierarchy – have a specific position in the migratory process. They attract young populations (students, young active and foreign immigrants) and expulse older active (active adult's households with children, old active people, and young pensioners). According to the position of the cities in the urban hierarchy, 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 coastal Spain for example); at a lower hierarchical level, cities may 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.

Concerning 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 and gentrification.

Considered at intra-regional scale, the long-term "urbanisation cycle" started a long time ago with a phase called "urbanisation phase", driven by rural-urban migrations and industrialisation. It was followed by the "suburbanisation phase", mainly after WWII, during which the suburbs of agglomerations grew faster than the core areas. During the third phase, suburbanization has intensified and has sometimes been called counter-urbanization, a process mainly observed in the most urbanized and dense parts of Europe. In this phase, the shifts take place to the urban periphery and beyond towards the small and medium-sized towns of less urbanised metropolitan surroundings, while the core areas loose more people and jobs than the suburbs gain.

The last phase is generally one of re-urbanisation, driven by revitalisation policies of inner cities and socio-cultural evolutions. In the present period, suburbanisation trends are still very topical in southern and Eastern Europe, while re-urbanisation is progressing in the cities along an axis stretching from northern England to northern Italy where core cities often show higher population growth than suburban areas. However, even in this part of Europe, it does not necessarily mean the slowing down of suburbanization process, notably in land use.

The demographic results of the intra-urban migratory movements can be synthesized as follows:

- A younger population in the city centres, 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).

At European level, we should not expect major evolutions in the structural trends in terms of the evolution of fertility rates and life expectancy. Hence, given the current age structure, demographic evolutions are well predictable at the European, national and regional level. Some are of particular importance for the 15 to 20 years to come. The number of European regions where population will stagnate and then decline will be growing. The ageing process, which will generally be slower in large cities than elsewhere, will generate growing demand for health care and other services.

Within this context migratory trends are much more unpredictable. For Western Europe as a whole, the question is whether, in the context of the crisis, the extra-European immigration will continue in the next years. Two scenarios are possible. First, because of push factors, immigration remains at high level despite the political will to control it. Second, because job opportunities are declining, immigration slows down and is limited to family reunification, which has been the evolution observed during the seventies crisis in north-west European countries. However, in both scenarios, we may also suppose that the most attractive countries for immigration, except for family reunification, will not be the same as in the last decades because most of these countries have been more severely hit by the crisis (Spain, Greece, Ireland and, to a lesser extent, the UK).

Cities as focal points of economic growth

As data on cities is still very scarce, notably when covering the entire ESPON space, literature on the economic development of cities is generally based on approximations by NUTS 3 or even NUTS 2 regions. Thus, most of the information available is very similar to general analyses on regional economic development. We will not, therefore, relate here the many studies on regional development across Europe (see, for example, the ESPON 2006 projects 3.3 and 3.4.2, but also the many studies elaborated for DG Regio), but we will look at the implications for cities of the general regional development literature. In a second step, we will focus on some of the urban specificities in terms of economic development, notably their insertion as nodes into international economic networks, and the economic relationship to their hinterland.

Urban competitiveness

Competitiveness is one of the fundamental notions in European policy making, as witnessed by the Europe 2020 policy currently debated. In its territorial form, as regional or urban competitiveness, it has been the main focal point of attention of territorial development policy discussions. However, the notion in itself is quite contested and it is not always clear how useful it is in terms of policy making. We will not go into this difficult question here (see section XXX of the scientific report for a more in-depth discussion of the issues).

1. In first approximation, we can assimilate general key-drivers of regional competitiveness and interrogate on the policy levers at urban level. Hence, we will build on existing works about regional competitiveness to see the implication for cities. ESPON 3.4.2 identified nine “key drivers of competitive performance” at regional scale. On that basis, we begin by assessing what levers exist at that scale to influence them (table 1).

Driver	Levers at city level
Economic diversity / specialisation	The mix of activities in a city is difficult (and some would argue even dangerous) to steer politically. State-aid rules have reduced the ability of public authorities to lead industrial policies. The literature can show some success stories of cluster-oriented policies, but there are just as many failures, and factors of success can often only be identified a posteriori, making the formulation of clear policy recommendations difficult, as path dependency seems to play an important role here.
Human capital	The main lever concerning human capital is the general education system, and with the exception of a few city-states, this is not the competency of city level governance structures. Cities may attract better qualified people, for example through housing policies, but such approaches are generally to the detriment of other, more fragile parts of the population. Moving up a scale, attractiveness policies of one city might lead to the loss of population in another city or area, thus instigating a zero-sum game which higher governance levels have to be aware of.
Connectivity / accessibility	Connectivity at European and national scale is generally not decided at city-level, except of cities lobbying transportation and network

	companies. More local and regional connectivity can, however, often be influenced at the city level and can constitute an important factor of the integration of a hinterland, the capture of human resources, etc. Risks of backwashing have to be taken into account, though.
Quality of life	This is probably one of the main factors relevant at city level. Cities can influence many factors of quality of life, be it the build and natural environment, mobility within the city, urban aesthetics, accessibility to services, etc. How much this factor actually influences competitiveness remains an open question. Ideas on the attraction of a creative class have been seriously questioned by many empirical analyses.
Innovation / Creativity	Cities that have the ability to invest in higher education and research can attempt to create the necessary momentum for launching specific research clusters. However, as already mentioned in the part on specialisation, the literature cannot at this stage identify a priori the factors determining success or failure of such attempts, as path dependency seems to play an important role.
Strategy / Vision / Mobilisation / Inclusion	On these two issues, strategy and mobilisation of actors on common projects, city governments can play a role as mediator and as animator of such visions. How much of this can actually create economic dynamics, instead of being more a consequence of it, is not clear from the literature.
Synergy / Proximity / Milieu	Issues of synergy or "milieu" are also highly path dependant and the literature is not clear on how governance can influence the creation of these characteristics. No recipe exists as these factors are highly place-specific.
Implementation capability	The governance capability is an important factor, and one that seems to play an important role, notably in central and eastern Europe. The capability of a city to influence any of the above factors depends on the competencies of its civil servants in the relevant fields and in their capacity for integrated and strategic planning. Here cities obviously have a role to play in the education of their employees and the maintenance of institutional knowledge.

Table 1. The relevance of the city level for different factors of competitiveness

It is also important to note that all the above factors only play on one side of the economic equation: supply-side. While even on these issues national forms of economic regulations still seem to play a major role (education system, labour market regulations, etc) demand-side policies (mostly determined at national level) such as social redistribution policies and more generally, the distribution of revenues between labour and capital play a major role in explaining the economic evolution of regions and of cities.

Even at the city-level, however, it is necessary to go beyond the competitive supply-side approach. Big cities are large autonomous entities in economic terms. The largest part of their economies concern untradeable services. Progresses made in these sectors have the same impacts on cities' economies than those catering to external markets. The relationship between competitiveness – in the narrow sense of expanding external markets for the economic actors of the cities – and global economic performances of a city is a complex question, however: in line with the economic base theory many theorists insist on the fact that the competitive

specialized segments of the economies play a leading role in explaining global performances.

2. However, urban competitiveness cannot exactly (or only) be assimilated to regional competitiveness and we need to better understand what makes the cities' specificities. Cities are the result of agglomeration effects, with different types of externalities relevant to location:

- **Localisation economies**, i.e. marshallian or industrial districts or clusters.
- **Activity-complex economies**, i.e. subcontracting and supply networks.
- **Urbanisation economies**, i.e. linked to the general availability and diversity of resources in a location with high density of different activities

In this logic, the two first types of economies are not specific to cities, but can also be found in non urban districts. It is, thus, the third type of externalities which seems a particular advantage of urban agglomerations, and more so of the larger ones. However, exactly how these externalities come to play and interact and what might be critical quantitative thresholds for different elements is not known, again leaving the concept in a vague state, and thus difficult to operationalise. This is also the conclusion of the ESPON Priority 2 project CAFE on agglomeration economies which highlights the many intangible factors and the multiscale character of economic processes.

However, concentration linked to agglomeration seems highly related to the type of accumulation regime of the capitalist economy. During the fordist accumulation regime (1950-1975), the spatial pattern of growth in Western Europe has been a decentralization process, while in the flexible accumulation regime which arises from the eighties, big cities seem to have recovered their decisive advantages. This economic recovery of (big) cities has been described as the metropolitanization process.

Several factors explain this re-concentration of wealth. First, in a context of more flexible accumulation, the city offers a range of services an enterprise needs when re-centring on their *core-business*. The city brings together all those players within a more horizontal economy than before. Second, in the context of a knowledge-based economy, the city offers a large and diversified basin of qualified (and also low-qualified), flexible and available workforce. Third, the context of globalization and new information technologies give big cities the decisive advantages of interconnectivity. In this perspective the economic concentration of control is the key of the dual spatial process of dispersal of basic or production activities vs. concentration of strategic functions. This vision is particularly interesting because it does not necessarily affirm that big cities will perform better than the others but sheds light on the possibility that they concentrate more power and commanding functions, and that their competitiveness relies on this specific capacity.

Congestion effects may play a counter effect to agglomeration, which can result in a decentralization process at different scales. To a large extent, these congestion effects are related to quality of life (pollution, insecurity, cost of commuting...). However, the current literature is not very clear on their actual impacts. We, thus, do not really know whether or not there are certain thresholds of urban concentration which lead to a decrease in economic performance.

Future perspectives

Future perspectives for the economic development of cities are very difficult to discern. Most of all, they depend on the way the EU and the global economy come out of the current economic crisis. This will have fundamental impacts on how cities and their respective roles will evolve. However, the necessary knowledge about this crisis exit will only be available in several years, while currently several possibilities are open, including a complete crash of the European financial system.

A major element for the short-term, however, is the fiscal crisis faced by many cities. This will seriously decrease the room for manoeuvre of policies. Again, the extent and duration of this crisis will depend on the crisis exit strategies developed at European and national scales.

BOX 1: The growing importance of networks in the context of globalization

In the context of globalization, it is argued that the prosperity of cities and the dynamics of urban systems depend upon the level of connections of urban nodes to multiple networks as well as upon changes taking place within the networks. Networks are generating cumulative effects on specific nodes and poles. In this logic, the centrality of cities in the global economic networks constitutes an important component of urban competitiveness. For example, multinational firms are supposed to confer power to cities not only through their locations but also through their connectiveness. This power is enhanced by several urban accumulation processes improved by the location of multinational firms, such as activity support, employment growth, investment, and technological and social innovation spillovers. These processes are an essential component of urban adaptation to socio-economic changes through firms' external relations. Global centrality clearly denotes a positive local urban resource. Thus, these worldwide networks provide crucial resources for urban development.

Conversely, systems of cities form a set of resources for multinational firms. Cities allow multinational firms to connect and to take advantage of inter-firm and social networks, thanks to spatial proximity to other agents and to some organized sets of agents, while reducing transaction costs, fostering access to the networks, and increasing transactional mutual values. These social and economic networks span at a variety of geographical scales. In addition, local intra-urban interactions increase the effective weight of inter-urban linkages, because they improve their efficiency: when one single relation incorporates a city composed of substantial interactions between foreign or local actors, the benefit is multiplied in proportion to the ability to mobilize these local interactions. Local interactions between multinational firms consist in different levels of involvement in local networks: subcontracting, industrial or technological strategic alliances, access to markets, use of a skilled workforce and local know-how, use of services, institutions, infrastructures.

In parallel, research networks also are considered as revealing potential capacities of cities to invest in future technological and economical development. The relative position of cities in such networks can be considered a proxy of their ability to enter the next cycle of innovation through the established linkages between research centers and high tech start-ups, not only at local level (as implied in the concept of cluster) but within the whole global economic space. The position in research networks appears somehow as a pre-figuration of the position of cities in the early process of adoption of future innovation.

When looking at the functional relationships between urban entities (macro-scale), it appears that the emergence of this new paradigm materialised by the networking of metropolitan areas at wider distances and its superposition to the traditional Christallerian urban hierarchy, occurred earlier in the regions of the European pentagon (London-Paris-Milan-Munich-Hamburg) than elsewhere. This evolution reached more recently the metropolitan areas of the southern and eastern peripheries, where multifunctional networking is less intense and advanced.

Networking activities as already observed at macro-scale between metropolitan areas under the influence of multinational firms, have also emerged, from the 1980s onwards, at intra-regional scale, between metropolitan areas and the surrounding medium-sized and small towns as well as between medium-size towns themselves in a number of less urbanised regions. In numerous cases, they are publicly driven. Networking activities at intra-regional scale are more common in Western Europe than in Central and Eastern Europe, where the growth of metropolitan areas often induces of a backwash effect on the metropolitan hinterlands. Networking of cities at cross-border scale is strongly developing in a number of European areas.

Cities as motors of growth for their hinterlands, their countries and Europe

(see section XXX of the scientific report for more details and literature references)

Metropolisation processes defined as 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. These 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. 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, and is therefore undergoing a relative marginalisation, while the differences in the development level between the metropolis and its regional surroundings are increasing.

More differentiated hypotheses about the evolution of the city-hinterland relationships exist. Certain authors see flows of services occurring 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. Others reveal a difference between metropolises 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 globally 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 the significance of ties with regional surroundings for development processes of the metropolis. Furthermore, the regional surroundings seem to 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.

To sum up, some differences between 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 and strongly depend on the regional and national context.

We may expect different development prospects in metropolitan macroregions that follow two general models. In a polarisation and diffusion development model assuming an increase in developmental disparities between the metropolis and the surrounding region a growing depopulation of peripheral rural areas is the most likely. This trend can be reversed based on the local resources or investments to disseminate the scale of the metropolis' development. In another, complementary model associated a high degree of socio-economic similarity across the whole metropolitan

macroregion, regions will function as a whole. Another probable scenario envisages the emergence of a polycentric metropolitan area which may foster development processes across the region.

A growing social polarization

(See section XXX of the scientific report for more details and literature references)

It seems clear that in the last decades, social polarization has increased in nearly all rich countries, including the new member states of the 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 from one country to another.

Because of the lack of comparable data across European cities, there is no systematic empirical assessment of 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. 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 creating mainly highly qualified jobs. At the same time, welfare cutbacks and the intense extra-European immigration towards major West European cities have reinforced this social polarization. Box 2 presents an overview of case studies found in the literature.

The drivers of polarization

From the scientific literature, we identify several major driving forces on the social polarization in the city.

The economic and labour market driving forces of social polarization in the city

The major restructuring of economic process occurring in many cities has led to a growing demand for highly skilled labour (professionalization process), but some authors highlight that there is also a growing demand for low qualified personal services in low unionized, female, precarious and part-time jobs.

Some authors focus less on the qualification aspects related to the knowledge-based economy or informational technologies, but more on the reorganization of work after the blockages faced by the fordist economy. In this perspective, the social polarization is not the result of a new offer/demand equilibrium for qualified and unqualified workforces 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 made the workers more flexible and produced worse situations for them than in the previous period.

In conclusion, we can probably argue that the new forms of economic growth and the new institutions of capitalism lead to growing social polarization through different mechanisms. Hence, 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.

The socio-demographic evolutions and the impact of real estate

Three major driving forces are at play in the socio-demographic field:

- Household composition, with a general tendency of household size to decrease and the share of single-person households to increase
- International immigration which concentrates in the cities and particularly the biggest ones
- Intra-urban migrations which play a major role in the socio-spatial polarization process, notably through suburbanization and gentrification

Generally, socio-spatial polarization in cities seems also to have increased in the last decades with growing gaps in well-being between city districts. This can be explained by composition effects linked to global economic changes and cut-backs on welfare. However, it is clear that the spatial configuration of this process is very different according to the socio-residential heritages of the cities. The socio-spatial configuration of a city is not unimportant since some authors argue that the place of residence has an impact on the social exclusion processes.

These evolutions cannot be understood without taking into account house prices. First, rising prices in the housing market have a clear impact on living standards and poverty of the households, especially the most deprived ones. Second, suburbanization is pushed by high prices in central areas. Third, renovation processes (often linked to gentrification) raise housing prices and lead to the expulsion of the most fragile populations.

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 and, as a consequence, welfare policies explain a part of the level of social inequalities and social exclusion. In addition, as cities often concentrate the extreme ends of the social ladder, the effect of redistribution policies is exacerbated in urban areas.

Public policies at the city level are decisive in three different perspectives:

- social housing system: 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.
- economic development policies: These policies often favour the attraction of high-level services and qualified jobs, thus reinforcing the already existing polarisation tendencies on the labour market.
- place-based policies: Some authors doubt that these policies really have an impact on the poor populations of the deprived neighbourhoods which are targeted, but rather that they are simply forced to move elsewhere, mainly through rising housing costs.

Future perspectives

What can we expect in the future according to these major trends and their driving forces?

1. The crisis has changed the conditions in the past few years. It is thus very difficult to tell whether social polarization processes will continue in the near future, while it is certain that the crisis will intensify social exclusion. The answer to this question mainly relates to the level of welfare state we may expect in the future. The end of the crisis might either imply a new reduction of social redistribution because of the state of public finances or the emergence of a new social compromise.
2. According to the socio-spatial polarization, we believe that its geographic reshaping – if not its intensity – will continue in the future. This mainly concerns “urban renewal” or “gentrification” which relates to the new attractiveness of core areas of the cities for the wealthy populations. This process often results in negative consequences for the most deprived populations.
3. One of the main questions, in line with the literature, concerns the apparent decoupling between social cohesion indicators and economic evolutions. This would mean that, having reached such a high development level, social cohesion in European cities is no more related to pure economic wealth of the population.

BOX 2: Trends in social polarization in European cities

To assess the trends at the city level, present here an overview of a series of urban monographs across Europe, representing cities of different sizes and different contexts (See section XXX of the scientific report for the literature references)

Cities	Social inequalities	Socio-spatial inequalities	Processes
Paris	Increase since 1980	Strong increase since 1980, with a growing immigrant concentration in deprived neighbourhoods	Deindustrialization and professional polarization Gentrification to the detriment of low social classes
London	Increase since 1980	Highest level for all British cities and increasing	- Professionalization process - gentrification
Berlin	Increase in the 90's	Opposition between East and West Berlin	- transition toward market economies has accelerated deindustrialization and unemployment - gentrification in East Berlin
Milan	Slow increase since 1980	No spatial segregation at the neighbourhood scale	- Limited deindustrialization because of the economic dynamics based on small and medium enterprises - poverty is sparse and peripheral rather than concentrated
Zurich	Increase since 1990	Increasing	Social polarization with the weakening of the middle classes Spatial polarization and increasing difficulties for poor neighbourhoods to access to the desired district
Athènes	Decrease since 1990	Like Milano, poverty is dispersed and social disparities persist within the districts rather than between districts	Increasing middle class with the economic development
Oslo	Decrease in the 70's and polarization in the next decades. Nevertheless, poverty is very limited	Low but growing spatial segregation	Limited social inequalities are related to the strong Providence-State and the directive territorial planning
Helsinki	Decrease from the 60's and increase after the 90's	Low but growing spatial segregation	- Progressive taxation and social redistribution explains the limited social inequalities until the 90's - after the 90's, the weakening of the providence-State and the knowledge-based growth has increased significantly social (and spatial) polarization.

			- important share of social housing throughout the city
Lodz		Growing since the WWII	Spatial polarization after the collapse of communism with the suburbanization of middle classes and the concentration of poor in the deprived core areas
Naples	Increasing since the 70's	Strong spatial polarization between a middle class core city and deprived suburban areas	strong immigration concentrated in the deprived suburbs neglect of deprived suburbs by public bodies
Luxemburg	Increase since the 60's	Spatial polarization process, notably with the concentration of poor Portuguese immigrants	Polarization between middle class suburbs and some deprived core areas.
5 biggest Belgian cities	Strong increase since the 80's. Highest level in Brussels	Increasing gaps between districts in terms of unemployment rates but stable in terms of incomes	Professionalization process, especially in Brussels.

Cities concentrating emissions and pollution

(for more details and literature references see section XXX of the scientific report)

As main centres of energy consumption, cities are at the forefront of challenges and possible changes concerning the sector. The global debate on the need to drastically reduce greenhouse gas emissions converges with the perspective of a possible depletion of oil resources in a number of years. Drastic changes in mobility patterns, transport systems, architecture and urban planning may result from this, which are of primary importance for the future of cities. Urban environment emerged as a key issue partly related to people's health. However, the recognition of the multiple and complex interactions influencing the environment has led to a more integrated perspectives, from which sustainability is a paradigm. In order to approach this integrated perspective empirically, several approaches have been developed in recent years, notably those of ecological footprint and of urban metabolism. However, both of these approaches are highly complex in their application and require a very exhaustive and detailed data set, thus making them inappropriate for a pan-European approach.

The more classical approach of environmental vectors thus seems more adequate for an ESPON project. Relevant vectors to study are air, noise, waste and land, with energy an additional or underlying factor. Many efforts exist, notably by the European Environmental Agency, to analyse the situation along these vectors in Europe, including from an urban perspective.

Air

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. Many European urban areas experience daily average PM₁₀ concentrations higher than 50µg/m³ 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 (O₃) 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 NO₂ limit value. The percentage of the urban population exposed to SO₂ concentrations above the short-term limit values decreased to less than 1% and the EU limit value is thus close to being met. As a result, bad air quality seriously increased respiratory and cardiovascular diseases, in particular with young children or elderly people. These health effects are also linked to high economic losses in form of higher costs for medical treatments and losses for employers for sick workers.

Any actual reductions of emissions have resulted from implementing different policies targeted at specific point sources (e.g. industries), changing fuel types, or regulations for best technologies. However, emissions from transport are still increasing. Car ownership is increasing in many cities, especially in Western and Southern countries, although restrictions to private transport tend to extend in the city centres. Number of

commuters and commuting distances are still high or even increased during the last 20 years, resulting in chronic problems of traffic congestion in many European cities.

Noise

Noise is another environmental issue indirectly related to the city form. More than 47 millions people (i.e. 52% of the population living in cities with more than 250 000 inhabitants) are exposed to daily road noise levels exceeding 55 dB Lden (the lower benchmark settled by the Environmental Noise Directive). People exposed to daily railway and airport noise are less but still significant, with respectively nearly 6.5 and 3.7 million. 33,7 million people are exposed to levels exceeding 50 dB Lnight which has been identified as a dangerous threshold by the World Health Organisation.

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. The target was far from ever being reached and was not repeated in the 6th EAP. The average amount of municipal waste generated per capita per year in many western European countries still exceeds 550kg. Municipal waste generation rates in new Member States are lower than in western European countries.

Land

The spatial dimension of city development is a key component of land sustainability and has a strong influence on other environmental aspects. As such, land consumption, and the form of land take can be seen as an important driver for at least some of the other vectors.

European cities have been growing in the last 50 years at different pace with marked regional differences. For example Eastern countries inherited a more compact structure from the central planning system and until mid 90's they did not start a process of clear expansion of lower dense urban areas. However, some general trends can be identified: increased homogenisation of the landscape, most of the new development is on previous agricultural land, and more and more urban development is decoupled from demography extending to the outskirts of the core city. Some measures have already been taken to limit urban development and sprawl in some countries (e.g. Germany) although it is expected that this trend will continue at lower pace.

The following table gives more details about the trends and their geographic variations.

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 2. Major trends of urban dynamics in regions of Europe for the period 1950-2005

Future perspectives

The main drivers for the observed environmental trends in European cities are:

1. **Positive:** Good land use planning, implementation of policies related to health and air quality, environment consciousness
2. **Negative:** Land prices in a free market can't be controlled and can determine to a great extent where and how cities are developed; cheap energy; poor public transport; consumption.
3. **Possibly both:** tourism, consumption, car ownership.

BOX 3 : The impact of urban structure on economic, social, environmental performance

(see section XXX of the scientific report for literature references)

Concerns about environmental problems in cities include a more general question about the relevance of urban form and design for resource-efficiency, focussed at least in two aspects: land and energy consumption, but also social aspects.

Urban form and transport

Public transport seems to be strongly influenced, both in terms of efficiency and competitiveness, by the structural organisation of an urban area: the more dispersed and less structured the development, the lower its level of efficiency and competitiveness and, consequently, its share of the mobility market. The variables most used in the literature to describe these linkages are population density, house density, street density and mix of uses (economic-residential). Higher rates of walking and cycling are directly linked to street density, land use mix, commercial density and commercial diversity.

Use and travel time of private transport shows a greater variety of factors depending on the case analysed. However, the age of the building stock is very often identified, with the presence of recent housing development as an important factor indicating the emergence of new models of lifestyle and mobility which are very different from those of the past. Promotion of relatively compact urban structures can have positive effects on walking, cycling and the use of public transport.

Urban form and health

Housing quality and design and location of neighbourhoods have been found to have a positive impact on health, understood as a state of complete physical, mental and social well-being. In particular, the factors more relevant are as follow:

- Aesthetics, which are related to cultural factors. Very often it has been simplified considering that the dominant preference is for single detached homes. However, the aesthetical values included in the surveys provide a broader perspective like the valorisation of historical centre.
- Pedestrian friendly streets. This factor does not necessarily relate to a particular form of city, but as mentioned, compactness seems to favour walking.
- Land use mix: easy accessibility to services, shops and public amenities. The link with health has been explained by some of the following factors: engagement in local life (sense of community and well-being), higher rate of walking and cycling.

Finally, choices of people are to a great extent determined by cultural values. There are favourable conditions that will promote the more compact and efficient cities like mixed uses, quality of the space, proximity of public services and amenities. Other factors like proximity to public transport, somewhat related to density, is a precondition to reduce private transport.

Inter-urban cooperation

The notion of polycentric cooperation is a prominent concept in European territorial development documents, notably since the ESDP in 1999. As many European policy concepts, however, polycentricity is such a vague and broad concept that it encompasses many different possible meanings and operationalisations, especially when approaching it at different scales. ESPON has attempted to respond to this challenge through several projects (notably ESPON 2006 1.1.1 and 1.4.3). However, many of these attempts have been limited to measuring polycentricity based on morphological or rank-size-related criteria, without being able to go into functional analyses of the actual level of linkages and cooperations between nodes of polycentric cooperation.

At the trans-European scale, such an approach might work, when polycentricity is seen as the simple balancing out of large territorial inequalities. However, when going down to the regional scale, this becomes more problematic. The policy goal of exploiting “regional polycentric potentials” aims at improving networking and complementarities between cities at the inter-regional and intra-regional levels. Generally, however, at this scale data is not available. Where an empirical (quantitative) approach exists, evidence on global cities and, even more, on lower level urban networking, remains very often based on attributes because the relevant data are abundant while data on direct links, or even flows, which could more clearly inform on the relationships among the cities as nodes of networks are poor. In this respect, recent research has attributed growing importance to the use of the internal structure of firms as a proxy to measure actual flows of information among cities. The analysis of the territorial effects of real flows through transport means (air-lines, TGV and motorways) also becomes important. However, research on all the latter has been mainly conducted on regional and national case studies, not covering the entire ESPON space.

In this context, case studies are generally the only available option. Most of the time, however, such case studies are based on interviews with stakeholders involved in the cooperation networks and very rarely provide any “objective” evidence concerning the functioning and the impact of the policy-driven cooperations. It is, thus, currently very difficult to evaluate the actual impacts of cooperation between cities in an objective and empirical manner.

Obviously, this does not mean that these cooperations are not useful or necessary, but that it is currently very difficult to find literature that evaluates them in a structured, non-anecdotic and empirically sound manner. In this context, it is also difficult to elaborate policy-related conclusions when both the actual nature and the impact of inter-urban linkages are not known.

Cities as objects of policies: a review of policy visions and policies on cities in Europe

The above literature review gives an idea of some of the main issues concerning urban development in general. However, it does not include much reference to the actual policies implemented across Europe. Based on reports elaborated in 2010 by national ministries for the Council of Europe Conference of Ministers Responsible for Spatial/Regional Planning (CEMAT) we, therefore, summarise here the vision that national policy makers have of their respective urban issues and policies. Many of them reflect the issues raised in the previous chapter. For a detailed synthesis of these reports, including a more territorially differentiated analysis, see section XXX of the scientific report.

Changes in settlement systems at macro-territorial scale and related policies

Recent trends

Generally, all countries see a trend of growth in metropolitan areas, accompanied by an enlargement of their catchment areas. Some types of medium-sized cities, mostly in economically successful regions, or those that act as relays towards larger centres also show population growth. Smaller centres, however, suffer from population decline, especially those that are far away from larger metropolitan areas.

Recent changes in the macro-territorial aspects of settlement systems in Central and Eastern Europe have not been significantly different in nature from western Europe, but their intensity has generally been stronger. They reflect the fundamental transformation of the economic system and the abolishment of political constraints regarding the movements of people and capital. Trends have however not been linear during the transition period and up to now. In various countries, several stages can be identified.

Macro-territorial policies related to settlement systems

Settlement systems in the context of macro-territorial policies are generally considered by regional policies and by national territorial development strategies. The latter do not exist in every country. They are more numerous in Central and Eastern Europe than in Western Europe due to the stronger influence of Structural Funds. The main issues considered by such policies and strategies are territorial balance at national scale and polycentricity, while maintaining competitive and sustainable development, thus reflecting the general European *leitmotif*.

The policies adopted range from very general national strategies to the designation of specific priority zones aimed at balancing the territorial development of the country. Examples of the latter include the Northern Way strategy and South-East growth areas in the UK or the regional growth poles in Romania. In some countries (such as France and Norway, for example) the settlement system is addressed through thematic policies.

Many of these strategies are fairly recent, so the evaluation of their success will only be possible in a mid- to long-term future. Those strategies that exist for a certain number of years, however, often do not show the expected results (example the "Atlantic corridor" in Ireland or the "Spatial Development Strategy" of Slovenia) often due to countering effects of market forces and limitations in the implementation capacities.

Perspectives for the macro-territorial development of urban settlements

Although the identification of common perspectives for settlement systems in their micro-territorial dimension is not easy, the following can be mentioned:

- The economic/financial crisis has accentuated the divide between urban settlements with a growing knowledge economy and others facing difficulties in modernising their production systems. Urban entities of Central and Eastern Europe with recent, but neo-fordist production plants might become more and more affected by external competition.
- The number of European cities with shrinking population will significantly increase during the coming decades. The divide will mainly be between Western and Eastern Europe, with however a growing number of regions with declining population in Western Europe, mainly in the peripheries (northern Nordic regions, North-West Spain, Mediterranean peripheries), but also in more central regions with a long tradition of outmigration (old industrial regions, landlocked rural regions).
- Settlements located in regions with a prosperous residential/tourist economy are likely to be more and more favoured, especially if there are capable to attract retirees and a growing number of people belonging to a higher income groups.

Changes in metropolitan regions and related policies

Suburbanisation and densification

The past 10 to 15 years have been characterised by significant trends of suburbanisation around large and medium-sized cities as well as of densification in particularly attractive areas (not necessarily urban, yet). These trends have developed at Europe-wide scale. Main differences between countries and regions are related to the intensity of the process, which itself depends, among others, upon the stage of cities in the urbanisation cycle, upon the economic situation in the respective regions and upon the type of territorial governance applied, notably the level of implementation of strict land use regulations. In Central and Eastern Europe, the suburbanisation process around mainly large cities has been particularly strong during the past 10 to 15 years

Territorial policies related to metropolitan regions

At the scale of metropolitan regions, a variety of policies are being implemented, with a variable degree of success and efficiency, to contain urban sprawl, promote compact cities, strengthen the economic competitiveness and improve territorial governance through stronger cooperation.

Containing urban sprawl and ensuring coherent and sustainable development

Policies in the field of urban sprawl include densification of already built-up areas, the focus on concentrated growth areas in the surrounding of large cities (Italy, England), explicit linkage of development to transport and other infrastructure provisions (France, Norway) and horizontal cooperation at inter-municipal level (Slovenia, Germany, France, Austria, Netherlands).

Promoting economic efficiency and competitiveness through networking of cities and stronger urban rural links within and around metropolitan regions

More and more current policies attempt to target territorial competitiveness through stronger cooperation between urban entities belonging to the same urban or metropolitan region. Underlying many of these strategies is the notion of "critical mass" and the idea that some form of increased (network-based) agglomeration economies can be reached through such cooperation. The networking of cities is also starting in some countries of Central and Eastern Europe, but at a modest scale. The fact that most countries have a strong monocentric settlement structure and lack powerful second-rank cities, is not a favourable prerequisite.

Perspectives for the territorial evolution of metropolitan regions and related policies

A number of factors are now converging to slow down the process of de-urbanisation/suburbanisation: progressive population ageing and decline in a growing number of countries, the impact of the economic/financial crisis on the purchase power of citizens and on real estate speculation (Spain, Portugal, Ireland, UK, various central and east European countries) and the fact that the "catching up process" in Central and Eastern Europe in terms of de-urbanisation and suburbanisation is rather advanced and might slow down in the future.

Against this background, the tasks of public policies in the coming decades will most probably concentrate, on the one hand, on the reshaping and restructuring of suburbs and suburban areas, which have developed chaotically. The aim will be to create new centrality nodes in areas of urban sprawl, to mobilise and enhance their potentials and to improve the quality of life in terms of sustainability. In urban regions with shrinking population, the restructuring of suburbs and of urban sprawl areas will be confronted with additional difficulties, with regard to the real estate market and the shaping of new centrality nodes.

Intra-urban issues and related policies

De-urbanisation and urban devitalisation processes

In the context of the de-urbanisation phase of the urbanisation cycle, numerous European cities and metropolitan areas have been and still are confronted with the devitalisation/depopulation process of their core areas, and sometimes of the entire city. This process has started earlier in north-west Europe, so that since then re-urbanisation processes have been at work there. Similar trajectories are starting into cities of other parts of Europe. Today, much of the decline of core cities in Western Europe is happening in mid-size cities. In Eastern Europe many large cities also have declining city centres linked with strong suburbanisation.

Social polarisation in cities

Social and socio-spatial polarisation of cities is seen as an increasing issue for most European cities, linked to the accelerated development of "gated communities" and

socio-spatial segregation through suburbanisation of higher-income groups.

Territorial policies addressing intra-urban regeneration and social polarisation

Public policies addressing the regeneration of inner city areas and the related problems of social polarisation are progressing in numerous European countries. In some of them, they already have a rather long tradition. Such policies involve more and more the dense urban settlements of urban peripheries built in the 1960s and 1970s, subject to severe social problems and to multiple deprivation. In most European countries such policies are place-based and often aim some form of "integrated" development, combining policies concerning the built environment with social and economic policies. In many cities these take the form of regeneration policies, more or less explicitly aimed at changing the social composition of the concerned areas.

Perspectives for inner-city areas and related policies

In the context of growing population ageing and social polarisation, the regeneration of inner city areas is becoming an increasing task for public policies of various levels. Although public authorities largely recognise the social issues related to urban regeneration and renewal, the risk is not small that the socially most vulnerable groups will be pushed out of inner city areas towards more peripheral areas in the vicinity of cities. Private interests, for which solving social issues is not a priority, will be more and more involved in regeneration. The example of inner-city gated communities witnesses about this risk.

The economic/financial crisis will have a long-lasting negative impact on urban restructuring and renewal activities, as the financial capacity of local authorities has significantly been reduced on the background of indebtedness.

New knowledge on cities: Attempts at furthering the empirical knowledge on European cities

Introduction

As mentioned in the general introduction to this report, the empirical part of the project was guided by two main ideas: first of all we wanted to avoid redundancy with the many existing efforts, be they within ESPON, within the Commission (such as the Second Report on the State of European Cities - due to be published more or less at the same moment as the final report of this study), or elsewhere (e.g. the report on urban competitiveness by the OECD). Second, in light of the difficult situation in terms of data availability for cities across Europe, we wanted to tap new data sources and see how they can inform urban policies. This endeavour obviously implied that we went out into the unknown, and much still remains to be done. We, therefore, present here our empirical results both in order to assess what they tell us about policy questions, but also in terms of the methodological issues at hand when using these data, in the hope that future projects will profit of our experiences.

Urban extension and urban form

Introduction

As mentioned in the general overview, cities face many environmental issues, from air quality to waste management, without forgetting air quality and noise. In terms of territorial planning and development, however, the land take and the morphological form of cities is often cited as an important driver of urban environmental sustainability. We, therefore, present a typology of the spatial dynamics of cities based on Corine Land Cover data, which we then critically analyse based on Urban Atlas data. The final section then uses Urban Atlas data for a tentative analysis of the impact of urban form on different elements of urban "performance".

Before going into the actual analysis of urban sprawl, however, it is interesting to get a general picture of the intra-urban dynamics of population development in Europe's metropolitan areas, as represented by the Urban Audit LUZ.

A typology of population development between core cities and LUZ

(For more details about the demographic evolution of cities see section XXX of the scientific report.)

We propose a typology in which we distinguish first between growing and declining LUZ, and then we take into account the dynamics in the core cities as opposed to the rest of the LUZ. On this map, we can distinguish several major types of evolution:

- i. in the dense urban and central parts of Europe, many cities are characterized by their population growth in both core and peripheries, with often higher growth rates in the core cities;
- ii. in Eastern Europe, most of the cities are characterized by the decline of their population with an intense process of suburbanization, except mainly Warsaw and Praha;

- iii. in Mediterranean LUZ, we observe population growth with an intense process of suburbanization.

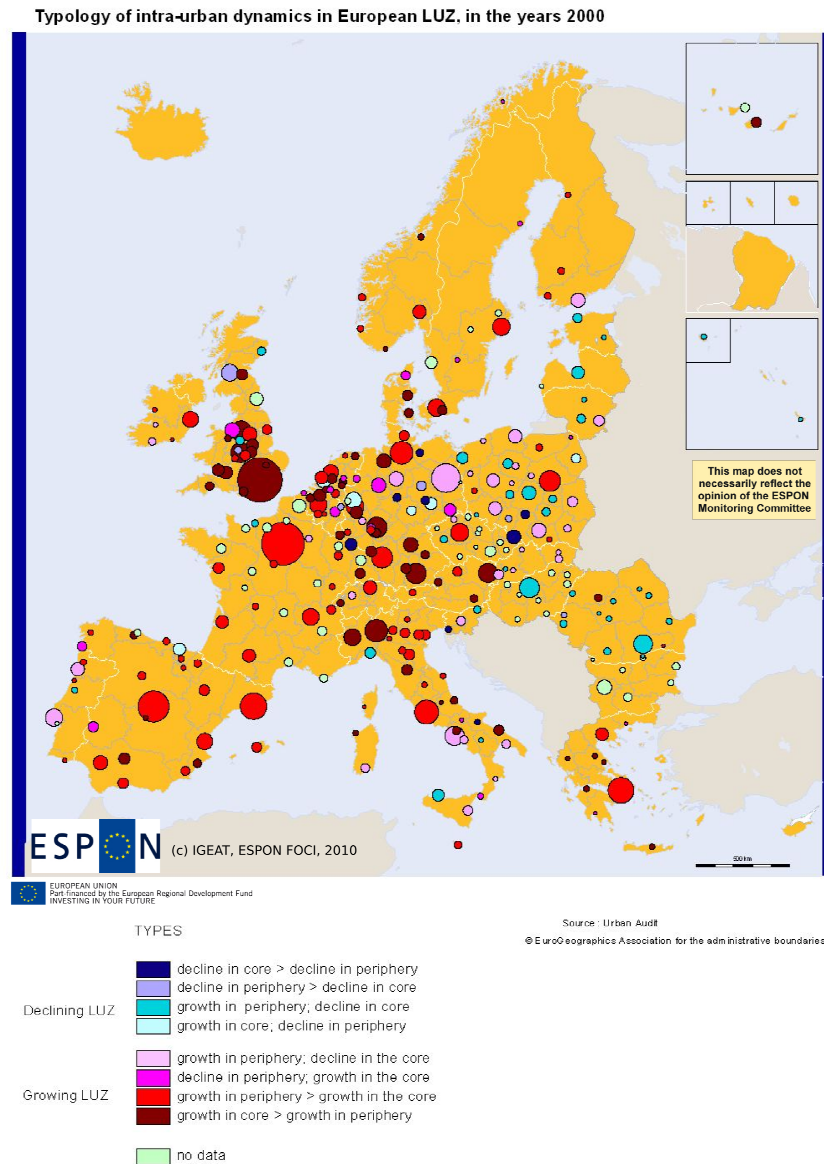


Figure 1. Typology of intra-urban dynamics in European LUZ, in the years 2000

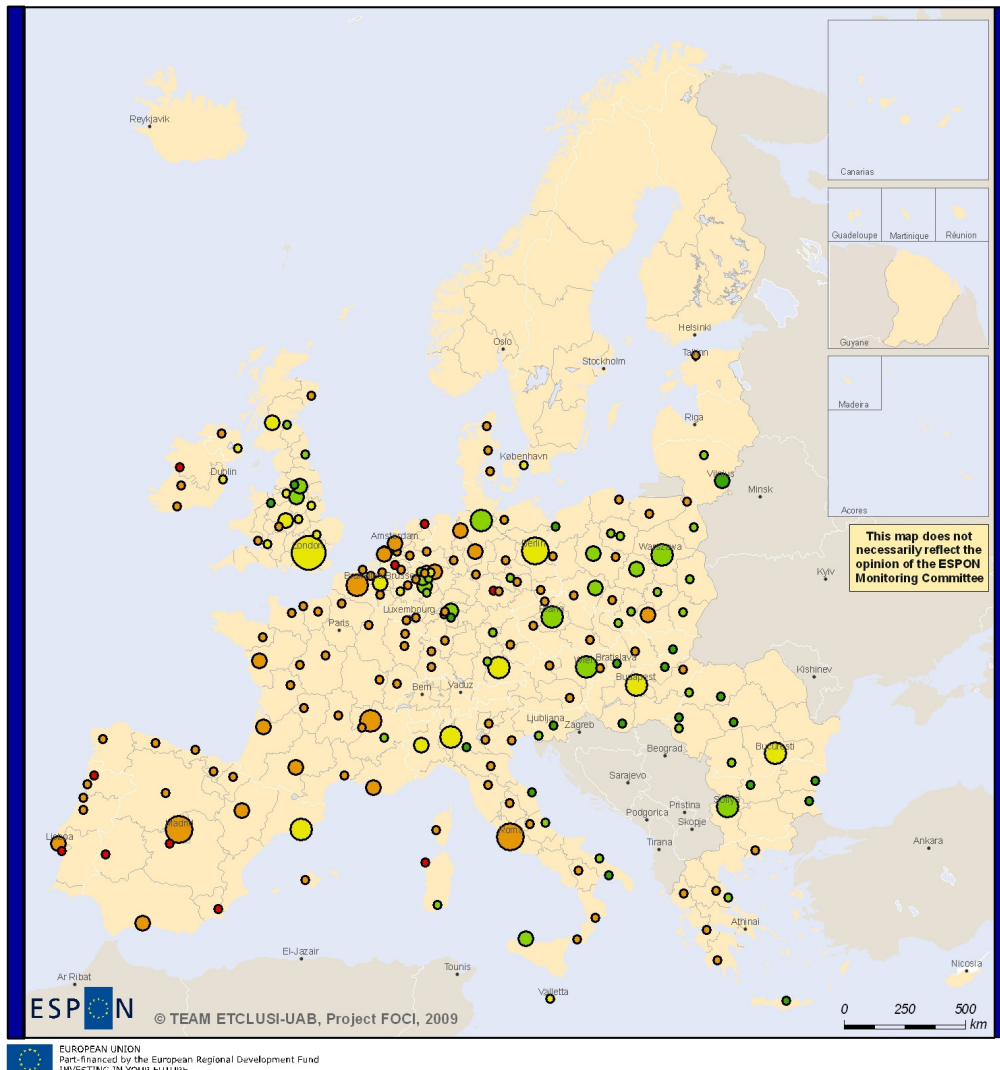
A typology of urban spatial development based on Corine Land Cover

In this section we present a typology of urban spatial development, or urban sprawl based on Corine Land Cover data. Three groups of descriptors have been taken into account to analyse city development: size and form, urban development and destination of new urban areas.

Relevant indicators were analysed for the period 1990-2000 for which the best geographical coverage was available at the time of the analyses and which allows for a comparison with 2000-2006 in a second step. Three main types were identified with the following distinctive features:

- **Type 1.** Slowly growing cities.
 - **a.** Slowly growing cities densifying the existing urban areas. Cities below 600 000 inhabitants and low degree of sealing. Some of these cities are losing population both in the core city and LUZ.
 - **b.** Slowly growing cities with diffuse urban development. Those cities are also growing slowly. The rate of growth is about three times higher in the LUZ compared to the core city. The risk for those cities would be to increase the pace of urban development that would lead to more sprawled system.
- **Type 2.** Rapidly growing cities. This group represents almost half of the European cities. Because of their variety they do not have any particularity regarding size and form. This group is defined by an intermediate rate of growth and low level of recycling. New developments in the core city are mainly residential areas, whereas in the LUZ the new developments are for industrial and commercial activities. However, there is a small group of cities (**2b**) that have a relatively large LUZ.
- **Type 3.** Very rapidly growing cities with diffuse urban development. This group includes the cities with the highest degree of urban development, far beyond the average of the other types.

Considering these typologies as a baseline, their evolution in the period 2000-2006 tends to homogenise and reduce the distance between different development paces. Generally speaking, stable cities or the ones with slow development in the 90s have experienced a relatively rapid increase while the cities that were very rapidly growing have slowed down. Reuse of previous urban land has significantly increased in both core cities and LUZ. The development of new residential areas has been reduced, while industrial and commercial areas are still increasing and becoming the main source of urban expansion.



Class	Population
1a	0 - 500000
1b	500000 - 1000000
2a	1000000 - 2000000
2b	2000000 - 3500000
3	3500000 - 8000000

Figure 2. Typologies of urban development (1990-2000)
 Typologies Sources: CORINE Land Cover 1990, 2000, 1990-2000 changes.

How reliable is Corine Land Cover for analysing urban sprawl ?

There are some important methodological constraints linked to the use of Corine Land Cover, namely the minimum mapping unit and the minimum change detection. In addition, the methodology used for CORINE is known to underestimate linear features like roads and rails. In this context, the development of the Urban Atlas is a great improvement, since the Urban Audit cities will be mapped at higher resolution. However, this is an ongoing project and for the moment data is only available for 2006, and only for 200 cities in July 2010. We, therefore, proceeded to an evaluation of the Corine Land Cover results on the basis of the available Urban Atlas data. For

more details on methodologies and results see section XXX of the scientific report.

The main conclusions of this analysis are the following:

- CLC provides systematic underestimation of commercial and industrial areas, compared with higher resolution Urban Atlas, resulting in deviations up to 30% of the actual value.
- Deviations are less accentuated for the rest of artificial classes.
- There may be important errors on the stocks (percent of different land cover areas).
- The implications for changes are not known since Urban Atlas only has one time shot.
- The conclusion that urban sprawl is more driven by commercial and industrial areas compared to residential ones should be questioned given the discrepancies found between CLC and Urban Atlas.

These results confirm that new approaches are needed. Necessary technologies and data are now there and efforts are currently being made to increase the level of available information.

The impact of urban form on urban “performance”

To further understand what the implications of city form are, a compacity index has been analysed for the subset of cities available in Urban Atlas (see section XXX in the scientific report for details). This index shows how far a city is from a circular form with the same area and ranges from 0 (more irregular and less compact city) to 1.

Comparison of transport patterns and air quality between the different types of city compactness reveals that differences are only relevant between the extreme groups (dispersed – compact). Most significant differences are encountered in percentage of people using public transport and in PM10 and NO2 concentrations.

Compact class	Percentage of journeys to work by car and motorcycle	Percentage of journeys to work by foot or cycling	Percentage of journeys to work by public transport	Annual average concentration of PM10	Annual average concentration of NO2
1. Large irregular cities	64	12	24	34	32
2. Large irregular cities with intensive land use	62	10	28	31	27
3. Intermediate compact cities	57	11	32	30	26
4. Compact cities	56	10	34	25	22

Table 3. Relationship between typologies of city compacity and transport mode to work, and air quality parameters. Data source: Urban Audit

Social cohesion

Introduction

An important question for urban (and regional) policies in Europe is whether social cohesion still depends on economic wealth in European cities and thus whether we can expect competitiveness policies to improve social cohesion, notably through trickle down effects. From the literature, we can raise the hypothesis that within new forms of growth in the globalized and knowledge-based economy, social cohesion is more and more decoupled from economic performances. However our data do not allow giving a definitive and unambiguous answer to this question. On the one hand, social cohesion data are very incomplete in Europe. On the other hand, as we will see in our analyses, the answer depends on the social indicator we look for. Despite the poverty of the data, this analysis provides a unique assessment of this question in European cities.

The relation between economic wealth and social cohesion

Economic wealth and unemployment

According to table 1, there is a significant but low correlation between GDP/head and unemployment rate in the years 2000: the higher the GDP/head, the lower the unemployment rate. Results are very similar when Eastern and Western Europe are divided, which means that these correlations are not related to the East/West gap inside Europe.

We would expect a stronger relationship in dynamic terms (growth rates), especially because, in a given territory, there are strong evidences that economic growth allows reducing unemployment rates. However, this is not the case. Several explanations can be proposed:

- Unemployment rates are much related to the national context in which the city is embedded, notably because of the type of labour market regulations. However, this explanation is clearly not the most relevant;
- Unemployment rate is not only related to economic wealth but also to socio-demographic structures. For example, all things being equal the evolution of the age structure has an impact on the dynamics of unemployment rates. Moreover, the participation in the labour market differs significantly from one country to another or one city to another, for example concerning women;
- Based on the literature review presented in the first part of this report, our main hypothesis, however, is that economic wealth is partly decoupled from labour market participation, mainly because the new forms of economic growth are more and more intensive in knowledge, and could be more and more excluding for the low qualified population.

	All cities (LUZ) with a NUTS3 Proxy	All West European cities (LUZ) with a NUTS3 Proxy	LUZ > 1000000 inhab. (1)
GDP/head and unemployment in 2006	-0.482(**)	-0.435(**)	-,447(**)
GDP/head and unemployment according to national average in 2006	-0.440(**)	-0.383(**)	-,567(**)
Evolution of GDP/head and unemployment between 2001 and 2006	-0.008	0.033	-0.129
Evolution of GDP/head and unemployment according to national average between 2001 and 2006	-0.131(*)	-0.151(*)	-0.162
N	239	180	80

Significant ** at 0.01; * at 0.05

Table 4. Correlation (R Pearson) between economic wealth and unemployment rates, in the years 2000, in static and dynamic terms

(1) the analysis has been made on 80 cities of more than 1000000 inhab. allowing a NUTS3 proxy of the LUZ.

Economic wealth and other social cohesion indicators

In addition to the simple analysis of unemployment, we propose here to assess the relationship between economic development and diverse social cohesion indicators across European cities. Again, we would expect that economic wealth is correlated with social indicators usually described as "development indicator" in the international literature: health, education or quality of and access to infrastructures (table 5).

Infant mortality rate, an indicator reflecting fairly well the general level of health in a society, is correlated with GDP/head, but not at the intensity we might expect. This means that beyond a certain level of GDP/head, social or health indicators are not related to national income. Indeed, when Eastern countries are excluded, the observed correlation disappears, meaning that the correlation between GDP/head and infant mortality rate is only due to the gap between Eastern and Western Europe in both GDP/head and infant mortality rate. When we turn to education indicators, we reach similar conclusions: correlation is weak and inexistent if we focus only on West European cities.

We also explore other indicators. The Urban Audit perception survey allows assessing the level of satisfaction of people for a number of big cities across Europe. Interestingly, we do find here significant correlations between GDP per head and a synthetic index of satisfaction which does not disappear when excluding East European cities. However, when looking more closely at the data, we find that this correlation is actually mainly due to the general dissatisfaction in most of the Mediterranean cities included in the perception survey.

	LUZ according to NUTS2 or NUTS3 proxy	N	all available Urban audit cities	N	excluding New Member States cities	N
Infant mortality rate	-.494(**)	45	-.426(**)	139	-0.041	97
Share of higher diploma	0.279	45	.399(**)	102	-0.012	68
Share of students leaving without diploma	-	-	-0.017	84	0.114	70
General level of satisfaction (1)	.431(**)	62			.387(**)	44
District gaps in unemployment (1)			-0.074	188	-0.090	146

Significant ** at 0.01; * at 0.05

Table 5. Correlation (R Pearson) between economic wealth (GDP/head) and some social indicators, in the years 2000

(1) Data come from perception survey or the district statistics of the Urban Audit and only concern core cities while GDP level is defined at the LUZ level

Source: Eurostat, urban audit; Eurostat, Perception Survey; Eurostat, Regional Statistics. While *Urban Audit* data allow considering more cities, they are biased because only some countries are available for the indicators while NUTS2 proxy data allow a complete picture for cities allowing such proxy (that is 45 LUZ).

Socio-spatial polarisation

One of the aspects of social cohesion in the city is related to the gaps between neighbourhoods. Whether these inequalities provoke more social difficulties in general is subject to scientific debate. However, we raise the hypothesis that the concentration of social difficulties in some specific areas of the cities may indeed reinforce the social problems of the resident population. This is why it seems necessary to assess socio-spatial inequalities in the cities. However, it is important to insist on the fact that low neighbourhood inequalities do not mean necessarily a better social cohesion. The spatial configurations of the social problems are only one aspect of social inequalities.

The availability of data obliges us to focus on unemployment rate to measure district inequalities. Figure 1 shows the weighted variance of unemployment rates by district. It shows huge differences in the socio-spatial inequalities in the cities: the highest levels are reached in UK, France, Belgium and some cities of southern Europe while we find low levels in most of Eastern countries (except Poland), in Nordic countries, in Western Germany and Northern Italy. Low socio-spatial inequalities in Eastern cities are the result of real estate mechanisms and are still to a certain extent a heritage of the communist period. In any case, it is important to notice the absence of correlation between socio-spatial inequalities and the level of GDP per head in European cities (see table 5 above).

Conclusions

From these analyses, it can be said that social cohesion indicators are poorly related to competitiveness indicators. This result has political consequences since it means that at the level of development reached in the EU (at least the EU-15), social cohesion indicators related to health and education poorly depend on economic development strictly defined but rather to other factors, notably through the quality of the health or education systems, urban housing policies or redistribution policies at national level. Only the development gap between East and West European has a strong impact on health and education.

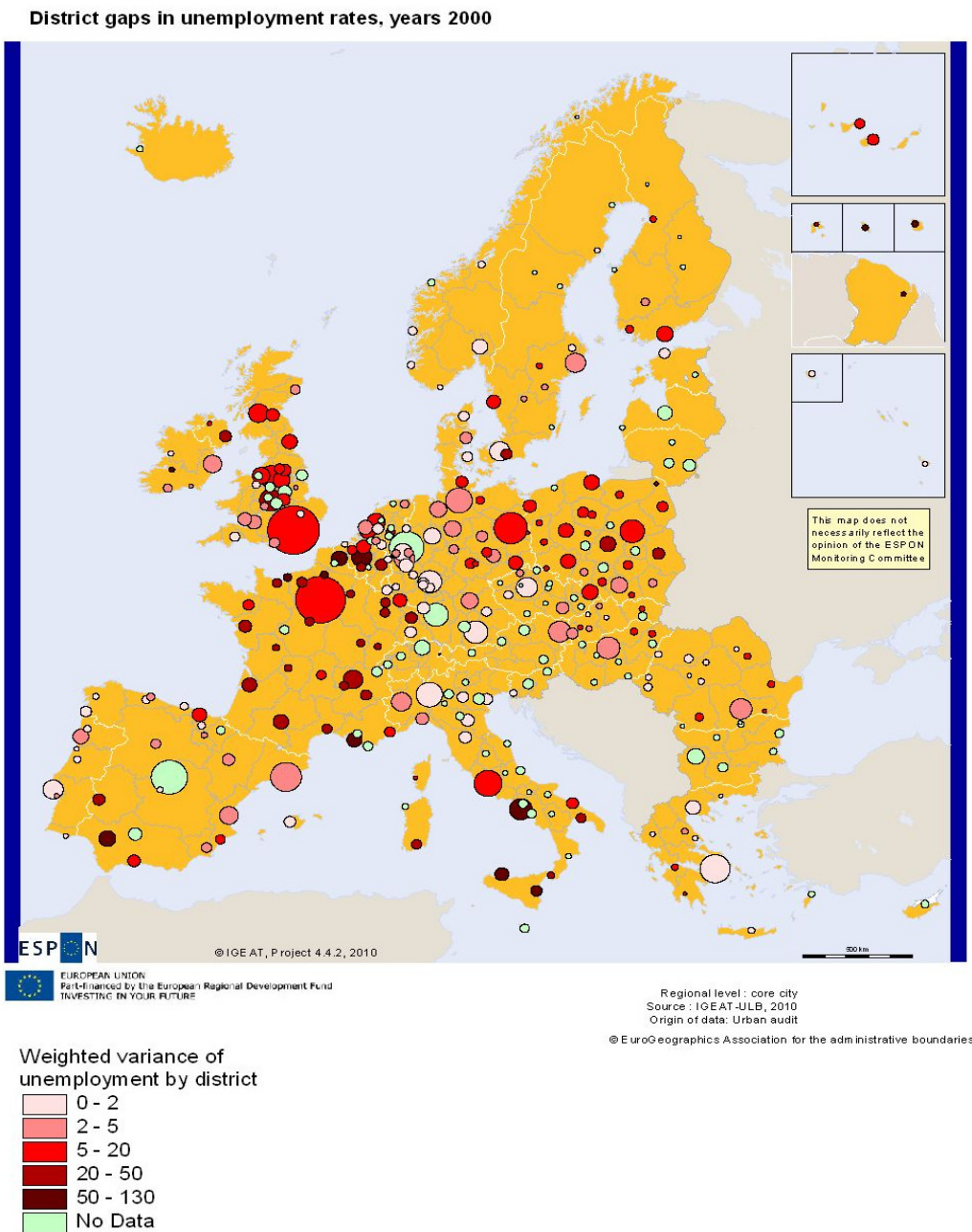


Figure 3. District inequalities in European cities

Note: For each city, unemployment rates of each district have been compared to the average. These differences are weighted by the total active population and summoned. As a result, it gives a synthetic index of the intensity of the differences between districts in the core city.

Economic development

Introduction

As mentioned in the literature review, many studies about regional economic development exist in Europe, and as most data available for cities are at NUTS 3 or even NUTS 2 level, it does not seem particularly interesting to provide yet another study of all the factors of competitiveness at these scales. We, therefore limit the presentation here to a typology of the sectoral structure of Europe's cities as this sectoral structure can be seen both as a factor of competitiveness, but also as a proxy for the historical paths these cities have taken. For more analyses of the basic factors of competitiveness see section XXX of the scientific report. In the rest of this section we show the results of some new approaches to urban economies, mostly based on innovative data. We begin by analysing their insertion into global and European networks, be it research or global firm networks, based on CORDIS and ORBIS data. We then analyse their respective contactability for one-day business trips based on a collection of time table data. Third, we attempt to understand the link between urban economic performance and the respective national context.

A typology of the sectoral structure of European cities

We propose a typology of 8 groups of European cities according to their sectoral structure in 2006 (Figure 4). The main added value of this typology compared to those on all NUTS 3 is to allow an easier reading of the specific situation of cities and to focus on the differentiation between cities, by ignoring rural regions. Types 1 and 2 group together big metropolises with high share of high level function. The latter has generally lower share of high functions and keeps a solid manufacturing base: it mainly concerns big German and North Italian cities. In type 1, some cities like Lisboa, Napoli, Budapest or some medium French and English cities have indeed lower of high function but are included because of other similarities with the biggest commanding cities. Type 3 distinguishes from the previous one by lower share of high function but even higher share of manufacturing than type 2: it includes many West German cities. Type 4 includes more peripheral capital cities with high share of basic market services (Athens, Sofia, Bucharest, Madrid, Warsaw, and Baltic capitals). In this group, Madrid has however much higher share of high functions than the other cities. Type 5 includes cities characterized by high share of non market services, mainly peripheral cities of big rich countries (East German cities, South Italian cities, small and medium French and British cities). Type 6 groups together cities with high share of basic market services (trade), notably from Spain. Type 7 is near the average with a manufacturing specificity: we find here cities from "Third Italy", Porto and medium Polish cities. Barcelona is also part of this group but is not far from the red type 3. Finally, type 8 includes all small Central and Eastern cities with very high share of manufacturing industry.

Typology of European cities in terms of structure

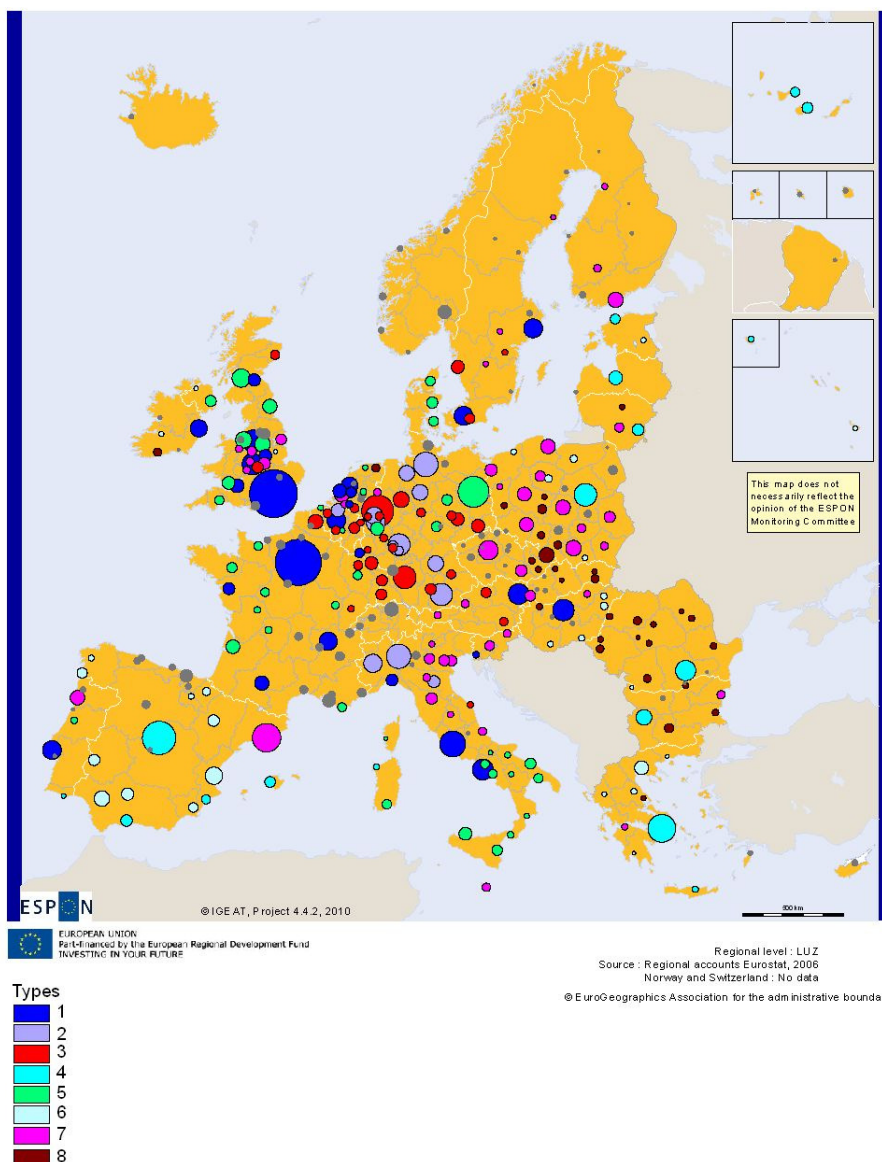


Figure 4. A typology of European cities in terms of sectoral structure 2006 (6 sectors, NUTS 3 approximations of cities)

	Share (%) of each type in total European added value	Economic structure: share of (%)					
		agriculture	manufacturing industry and energy	construction	Trade and transport	Finance and business services	Other services
Type 1	36.2	0.4	11.4	5.0	22.1	37.7	23.3
Type 2	13.5	0.4	20.9	3.2	21.8	35.8	17.9
Type 3	12.3	0.8	25.5	4.7	18.3	27.4	23.4
Type 4	7.2	0.9	11.9	9.1	32.3	24.6	21.1
Type 5	12.3	2.0	14.7	6.3	19.8	27.2	30.0
Type 6	4.4	4.5	19.2	11.6	22.7	19.1	22.9
Type 7	11.9	1.4	23.3	6.8	25.0	23.6	19.9
Type 8	2.3	4.0	37.1	7.0	20.8	14.9	16.1
Total		1.1	17.2	5.7	22.4	30.9	22.7

The hierarchy of cities according to their participation in global and European networks

(For more details about the methodology, the ranking of individual cities and a first typology of specialisation, see section XXX of the scientific report.)

One possible way to assess the “competitiveness” of cities is to analyse their relative position in the global networks that convey the exchanges of information and investment in leading economic activities as revealing their potential for a future development. We have applied this methodology using the empirical information about multinational firms and research networks provided by a European (CORDIS) and global (ORBIS) databases.

In a quantitative way, the total number of connections in a variety of networks is a first indicator of cities general integration in global and European networks. A ranking of European cities has been constructed from their indices of centrality in several networks. We have selected in this respect meaningful centrality indicators both within European research networks (CORDIS) and in global firm ownership hierarchies (ORBIS). In figure 5, we have represented the global position of European cities in economic and research networks, ranking them in five classes that exhibit a visible hierarchical pattern. The global cities Paris and London have the highest ranks, far ahead from six other European cities well integrated in global networks of leading activities: Madrid, Stockholm, Amsterdam, Zurich, Helsinki, Dublin; 16 other cities ranking from 9th to 24th rank still have noticeable international participation. Most of cities, 200 out of 271, have only a modest participation in these research and economic networks.

Hierarchy of FUAs according to their participation in global and European networks

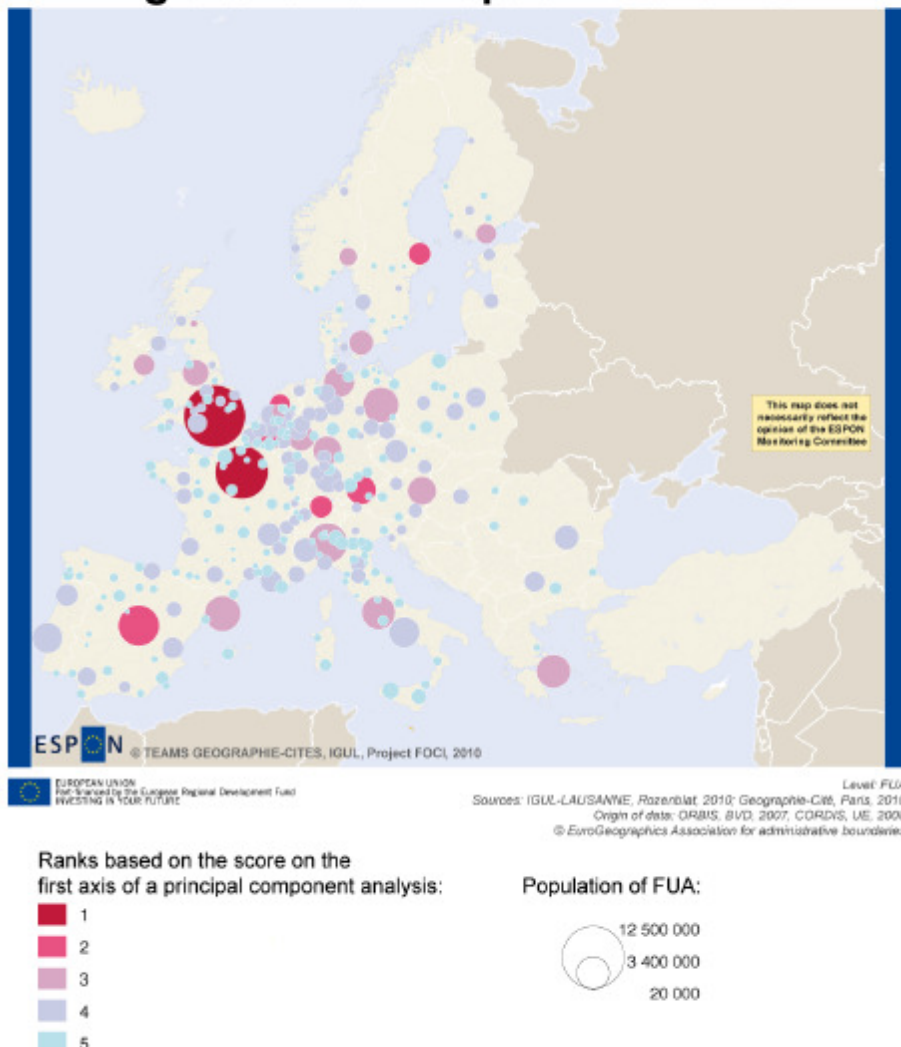


Figure 5. Hierarchy of FUAs according to their participation in global and European networks

As already mentioned, the accessibility of cities within the networks of economic activities as well as research networks is on the whole highly correlated with the local accumulation of population, wealth and skill. It is thus not surprising that the observed ranking closely reflects the order expressing the strength of cities on a majority of economic indicators. To illustrate this correlation (that actually is an expression of the path dependence in the dynamics of the system of cities) we have plotted the position of cities in the network hierarchies against the population of the FUAs (figure 6). The graph exhibits a clearly positive trend showing the dependence between the total participation of cities to the recent and future cycles of economic development and their total size. But a few cities are clearly above the line, illustrating their higher participation in leading economic sectors. At first Paris and London that are both hierarchically dominant and specialized in leading activities. But also state capitals or major cities as Madrid, Stockholm, Amsterdam, Oslo and Frankfurt are clearly ahead of the other European cities in this diffusion process, as well as technopoles and university cities like Utrecht, Heidelberg or Cambridge. Below the line

the position of capitals of the periphery like Sofia or cities heavily engaged in former cycles of urban development as Marseille, Lille or Genova is not surprising.

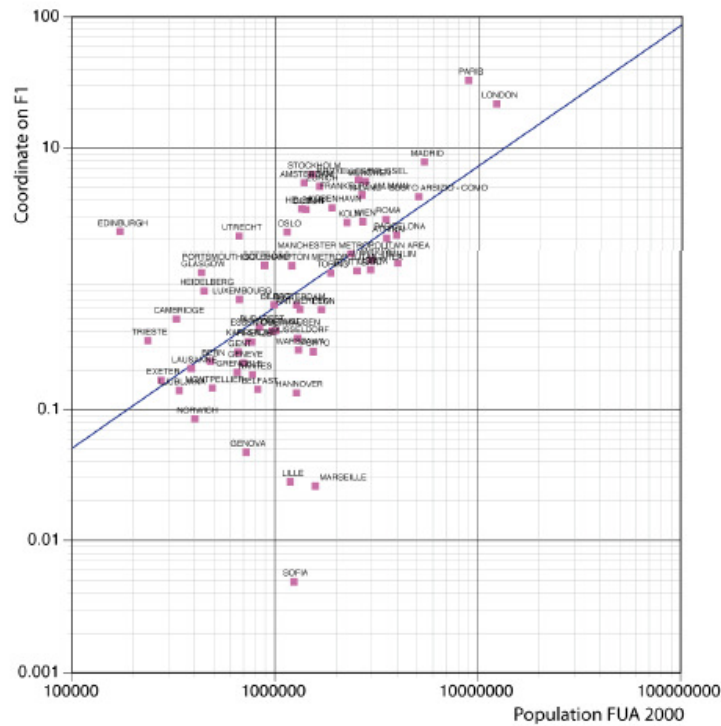


Figure 6. FUAs according to their participation in global and European networks and their population

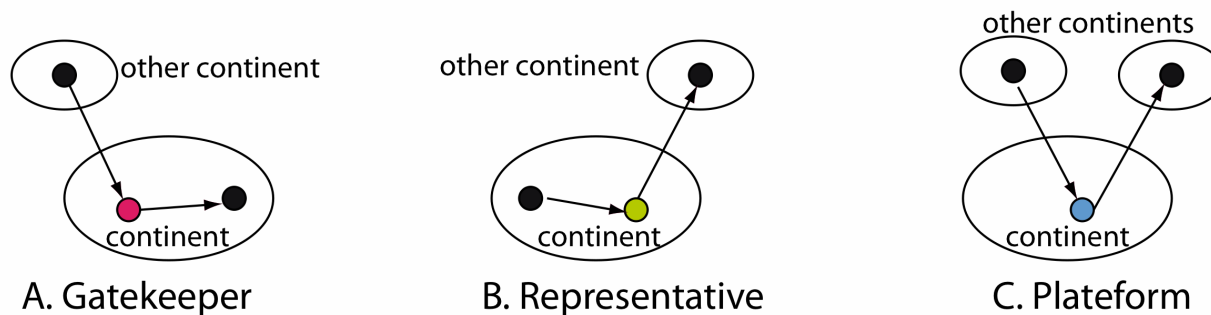
Intermediate cities at the inter-continental level

(See section XXX for more details on methodologies and results.)

Multinational firms networks use gateways for internationalization. In particular for overseas investments arriving in Europe, “*continental gatekeeper places*” are privileged to receive the investment, spreading it in a second step to the continent: they represent. In the other direction, “*continental representative places*” offer to multinational firms the means to reach places outside Europe. Finally, “*international platforms*” play the role of intermediaries between other continents, in general for financial or organizational function. Table 6 and figures 7 (a, b, c) present these three cases and the top 30 world cities in each of the roles, based on the sample of 3000 networks of multinational firms.

In Europe, London largely dominates the “gatekeepers” especially with the host of North American and Asian headquarters in Europe. Amsterdam, Edinburgh, Munich and Zurich appear much better than one expect according to their size. In the opposite role of “representative city” for ownership of companies outside the continent Paris and London are at the same level. London offers an ideal stepping stone for European banks to overseas, while Paris, also a gateway for banks, seems to diversify a bit more. In terms of “platforms”, London and Paris again dominate the game with Amsterdam, Zurich and Munich and Rotterdam following.

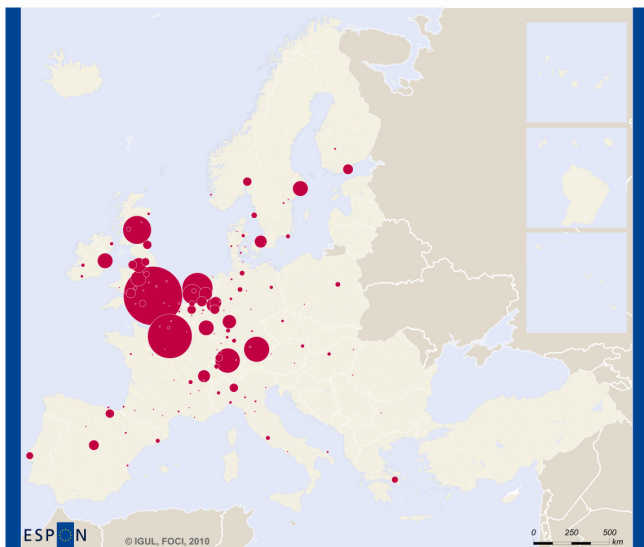
Understanding the roles of cities in the global firm networks should allow to better target policies to their specific needs.



RANK	CITY	CONTINENTAL GATEKEEPER	CITY	CONTINENTAL REPRESENTATIVE	CITY	INTER-CONTINENTAL PLATFORM
1	LONDON	17589	NEW YORK	14581	PARIS	5104
2	PARIS	9858	PARIS	6000	LONDON	4048
3	AMSTERDAM	4774	LONDON	5512	BERMUDA KINDLEY	3967
4	EDINBURGH	4050	TOKYO	3873	MEXICO CITY	3482
5	MUNICH	3278	FRANKFURT	3719	AMSTERDAM	2401
6	ZURICH	3069	ZURICH	3113	ZURICH	1935
7	NEW YORK	2884	MUNICH	2523	MUNICH	1560
8	ROTTERDAM	1940	CHICAGO	1829	ROTTERDAM	1096
9	HONG KONG	1658	MADRID	1826	NEW YORK	838
10	BIRMINGHAM GB	1195	SAN FRANCISCO	1767	TOKYO	685
11	TAIPEI	1178	BRUSSELS	1623	GENEVA	606
12	STOCKHOLM	1175	DALLAS	1582	GRAND CAYMAN	529
13	LUXEMBOURG	1164	CHARLOTTE	1304	HONG KONG	453
14	DUBLIN	1138	STOCKHOLM	1105	ENSHEDA	433
15	MANCHESTER	1059	STUTTART	997	DETROIT	416
16	SYDNEY	1027	AMSTERDAM	990	SINGAPORE	353
17	DALLAS	1024	CINCINNATI	987	JOHANNESBURG	347
18	FRANKFURT	918	BOSTON	928	EINDHOVEN	339
19	DUSSELDORF	917	MINNEAPOLIS	886	SAN ANTONIO	325
20	TOKYO	887	BALTIMORE	874	STOCKHOLM	322
21	GENEVA	837	SYDNEY	806	DUBLIN	320
22	ENSHEDA	792	TORONTO	772	MANCHESTER	315
23	SEOUL	778	ST LOUIS	750	BOSTON	304
24	COPENHAGEN	726	HARTFORD/SPRINGFIELD	744	LUXEMBOURG	280
25	CHICAGO	725	DENVER	738	EDINBURGH	276
26	ESSEN	684	ROTTERDAM	721	TAIPEI	263
27	SINGAPORE	650	TORINO	710	CHICAGO	255
28	JOHANNESBURG	638	LUXEMBOURG	708	LAGOS	236
29	DETROIT	606	LOS ANGELES	706	FRANKFURT	212
30	BERMUDA KINDLEY	582	MILANO	694	SEOUL	202

Table 6. Global ranking of the top 30 gatekeepers, representatives and platforms in the networks of the 3000 largest multinational firms

Continental FUA Gatekeepers for Worldwide networks of multinational firms



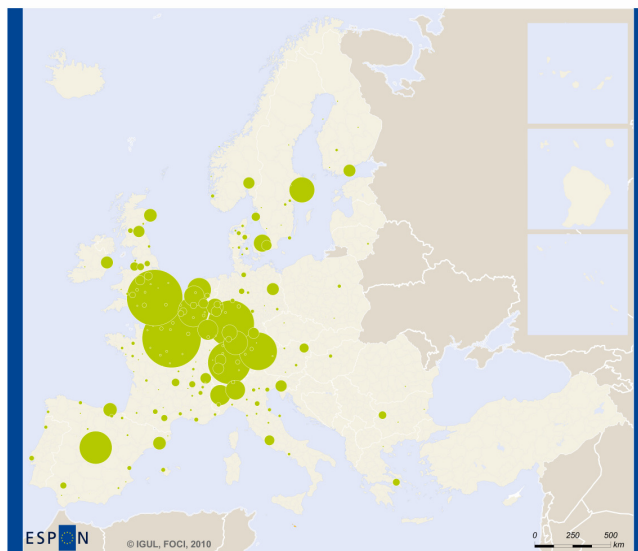
ESPON
 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE
 Level: FUA
 Source: IGUL-LAUSANNE, Rozenblat, 2010
 Origin of data: ORBIS, BVD, 2007
 © EuroGeographics Association for administrative boundaries

Total number of Intercontinental subsidiary links passing by the FUA to another European city:



* in the sample of the 600,000 direct or indirect subsidiaries in the world of the first 3,000 first worldwide multinational firms

Continental FUA Representatives for Worldwide networks of multinational firms



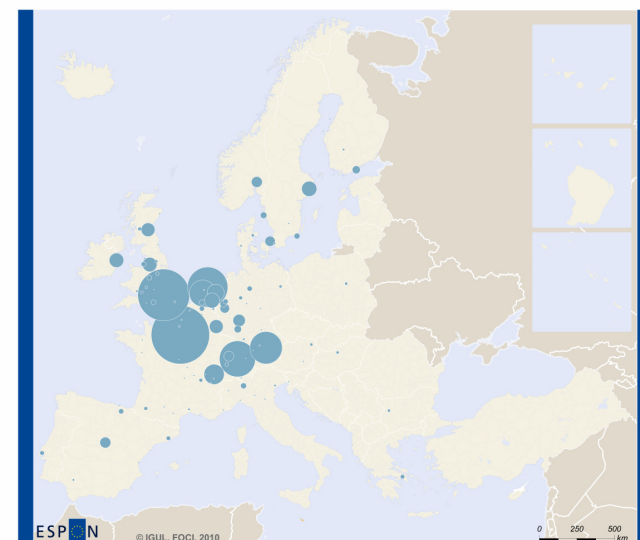
ESPON
 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE
 Level: FUA
 Source: IGUL-LAUSANNE, Rozenblat, 2010
 Origin of data: ORBIS, BVD, 2007
 © EuroGeographics Association for administrative boundaries

Total number of continental subsidiary links passing by the FUA to another city outside Europe:



* in the sample of the 600,000 direct or indirect subsidiaries in the world of the first 3,000 first worldwide multinational firms

Inter-continental FUA Platform for Worldwide networks of multinational firms



ESPON
 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE
 Level: FUA
 Source: IGUL-LAUSANNE, Rozenblat, 2010
 Origin of data: ORBIS, BVD, 2007
 © EuroGeographics Association for administrative boundaries

Total number of extracontinental subsidiary links passing by the FUA to another city outside Europe:



* in the sample of the 600,000 direct or indirect subsidiaries in the world of the first 3,000 first worldwide multinational firms

Figures 7. Position of European cities as intercontinental (a) gatekeepers, (b) representatives and (c) platforms

Cities in networks of contactability

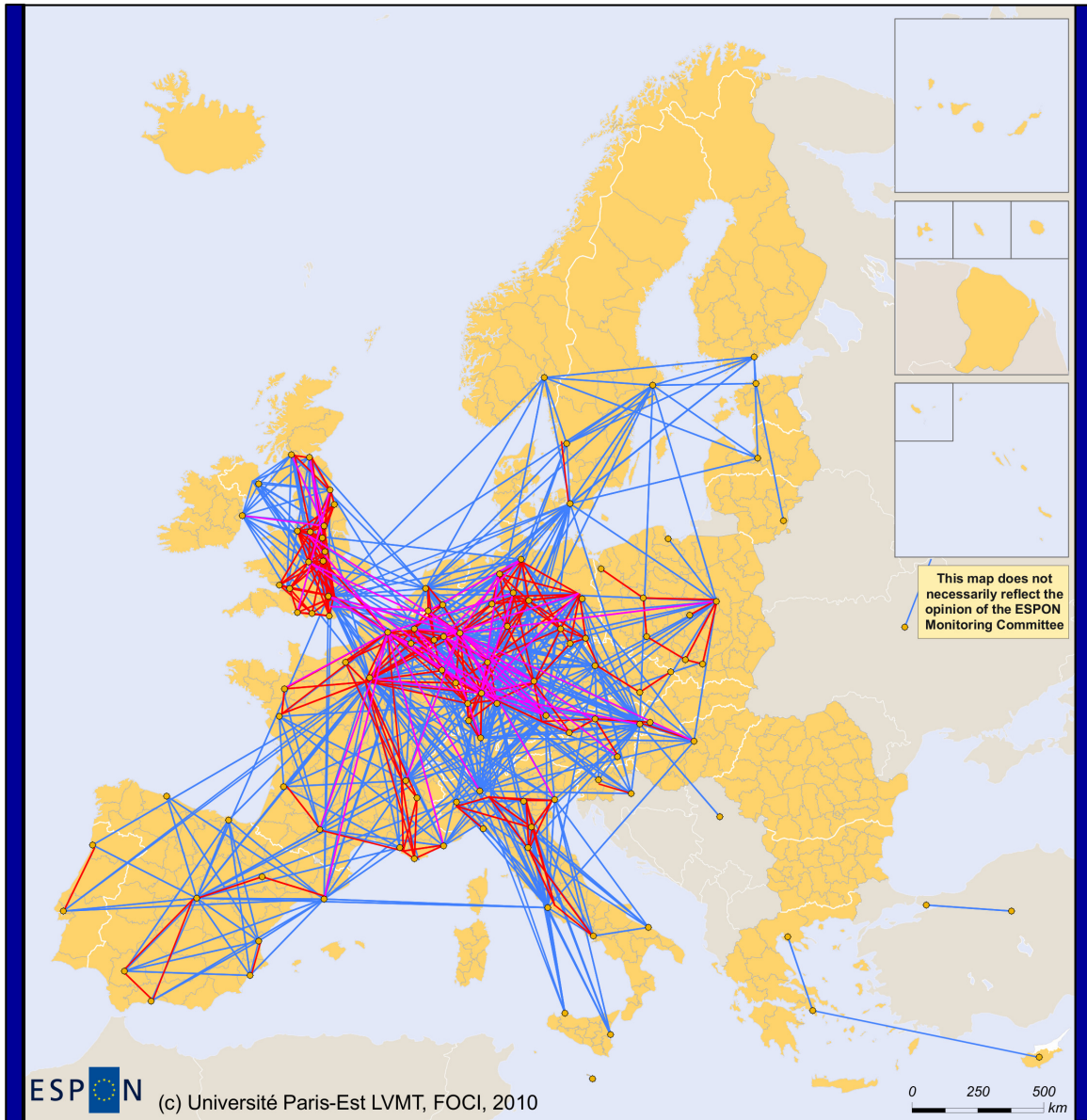
(For more details on methodologies and results see section XXX of the scientific report.)

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 also 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 accessibility is then a major issue for decision-support dedicated to urban stakeholders.

Generally, however, accessibility indicators are limited to theoretical, network based accessibility, not taking into account the actual supply. We develop here indicators which allow considering the real supply of transport between pairs of cities in Europe by air, by rail and combining air and rail, and based on actual time-tables.

On the one hand, the indicator expresses the attractiveness of a city to organize an event with several persons. A high level on this indicator will be necessary to develop a congress activity of a city and 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. On the other hand, the indicator express the possibility from a city to reach other locations; then an economic activity can be fostered in this place, by allowing for remote interaction. This type of interaction is used by headquarters and firms in general. Consequently, and following the approach adopted in earlier ESPON projects (1.2.1), we propose to evaluate the possibility of single day business trip with 6 hours available at destination and within the time windows 6h-22h and 5h-23h, in a door to door approach.

City network contactability by rail, air or a combination of rail and air between MEGAs
Return trips between 5h and 23h



EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

- MEGA**
- Reciprocal return trip by rail**
- Reciprocal return trip by air**
- Reciprocal return trip by combination of air and rail**

Structure of the return trips:

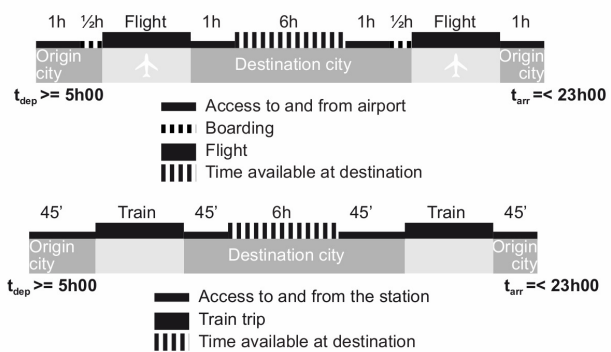


Figure 8. City network daily accessibility by rail, air or a combination of air and rail between a proposed list of MEGA between 5h and 23h

Several key elements can be seen on the map of contactability. We can discuss the spatial distribution of the links and the transport mode distribution throughout Europe. First element the very high importance given to rail, especially when we consider that links appearing on the map express the best spatio-temporal performance; this means that rail is able to compete with air for a large set of proximity relations. The high level of the role of rail in the inter-metropolitan relations is remarkable. One must notice though, that the national logic is very present as can be seen in the Italian case; the high-speed rail line opened recently between Naples and Milan allows for strong integration of the national city network with rail. Nevertheless Italian cross border links rely mostly on the air mode. The second element is the high level of integration of most of the European space. The Iberic peninsula is strongly linked to the Pentagon, and the relations towards eastern countries like Poland or Hungary are clearly shown, even if their intensity is much lower than what can be seen inside the Pentagon. The integration of the Eastern Balkans proves more difficult; in this part of the territory the peripheral character and a lower density of MEGAs lead to a much less intense level of potential relations. Thirdly the combination of rail and air plays a decisive role in the integration of the network. In order to better discuss this point we proposed to measure in each MEGA the number of other reachable MEGAs by each modal chain.

The role of each modal chain in every city gives indications on the transport modes that are determinants in cities accessibility. For most metropolises, air is the privileged transport mode concerning inter-metropolis linkages. Nevertheless, for those metropolises that do not possess a strong international airport, accessibility levels are not necessarily poor and rail allows the connection of quite a few cities across Europe. Several intermediate MEGAs like Lille, Den Haag, German Ruhr and Rhein cities benefit of high levels of accessibility by the combination of high-speed and classical rail and efficient connection to airports. It is clearly an opportunity to build high levels of inter-metropolitan accessibility without relying only on airport equipment. The indicator clearly demonstrates the potential of rail for this type of cities. Successful cases suppose to consider the position regarding the high performance rail network and the efficiency of the rail/air exchange poles.

Economic differentiation of cities in national and European contexts

In current policy debates, cities are often defined as the motors of growth for their respective countries, and for Europe as a whole. At the same time, when discussing the economic performance of cities, it is important to understand which part of the differences in these performances actually comes from differences between the cities and which part is due to their embeddedness in national contexts of economic regulation. This part thus proposes a simple analysis in order to shed some light on these questions.

GDP per head at the LUZ scale highlights first the gap between Eastern and Western Europe. Second, it shows lower GDP per head in Southern cities. Third, in Eastern and Mediterranean countries, big metropolitan areas have reached the average EU average GDP per head, except for Sofia and Bucharest.

The following table confirms the very important differences between cities, in terms of GDP/inhabitant, even within the same country which is the result of a long history of agglomeration and concentration of resources.

	EU27+2	EU15
Share of inter-national variance (i.e. of variance of per country means)	48%	22%
Share of sum of intra-national variances	52%	78%

Table 7. Share (%) of the variance in GDP/inhabitant (pps) between cities in 2005

Source: Eurostat

However, in terms of dynamics, i.e. growth of GDP between 1995 and 2006, the picture largely reflects macro-regional and national dynamics. According to the general process of catching up in Eastern Europe, Eastern cities had much higher growth rate than Western cities. Inside the EU-15 space, strong differences appear between German, Italian or Swiss cities, on the one hand, and Irish, Spanish and to lesser extent British cities on the other hand, largely in line with national economic dynamism during this period.

This is confirmed by the same decomposition of variance as above, this time for GDP growth (table 8). The national context seems to have contributed between 60 and 75 percent to the differences in GDP growth between European cities. This shows the continued importance of national regulation systems which influence many of the factors determining the growth rates of European cities.

	1995-2006	1995-2001	2001-2006
Share of inter-national variance (i.e. of variance of per country means of urban growth rates)	74%	59%	82%
Share of sum of intra-national variances	26%	41%	18%

Table 8. Share (%) of the total variance in total GDP (pps) growth between cities

Source: Eurostat

Nevertheless, table 9 clearly shows that bigger cities have performed better than average since 1995, and thus play a role of motor of their respective national economies. This also highlights a process of concentration of wealth in the biggest cities. However metropolitanization thus defined is mainly to be observed during the nineties and is slowing down in the years 2000, at least in Western Europe. This result is also coherent with table 8 since, during the second half of the nineties, the strong

process of metropolitanization – concentration of wealth in the main city(ies) – went together with a more limited impact of national context on urban performances.

		1995-2006	1995-2001	2001-2006
Difference with international average	EU27+2	0.7	1.0	0.4
	NMS	2.1	2.4	1.8
	EU15+2	0.6	0.9	0.3
Difference with national averages*	EU27+2	0.9	1.2	0.6
	NMS	1.9	2.0	1.8
	EU15+2	0.5	0.8	0.1

Table 9. Differences between economic growth of the main European national cities and European or national average, 1995-2006

Source: personal calculations on the base of Eurostat regional accounts and Espo DB data

Conclusions

We can draw the following preliminary conclusions out of this entire chapter on economic development:

- The use of new data sources is promising, but more analyses are needed to understand all aspects behind these data. However, it seems desirable that these sources (firm data, actual transport time tables) should become a regular source in European analyses
- Rail links and thus more sustainable connectivity are still very national and more trans-border connections of high-speed rail would increase the connectivity of European cities with less impact on CO₂ emissions.
- Eastern Europe, even though its capitals seem fairly well connected to the pentagon, lacks internal connectivity between its cities. This would seem one of the prerequisites for any possible rebalancing of the European territory.
- The position of cities in hierarchical firm networks, but also their sectoral structures, seem highly path-dependent, and thus anchored in long historical agglomeration processes that are not easy to modify. Understanding the different types of insertions into the economy should, however, allow more targeted policies.

City-hinterland relationships

Introduction

An important issue in the current policy debates is the question to what extent cities play a role of motor of economic development for their wider hinterland. The German notion of "large communities of shared responsibilities" is a perfect example of such an approach. At the same time, as the literature review has shown, theorists predict an increased decoupling of metropolises from their hinterland. However, very little empirical information exists about these phenomena. In this section we, therefore, present a first attempt at analysing the issue across Europe, both statistically and through a limited number of case studies. See section XXX of the scientific report for a very detailed description, both of methodologies (notably the caveats linked to the method of defining the metropolises and their hinterland) and of results.

Is there a relation between cities and their hinterland in terms of economic and demographic evolutions ?

Convergence processes in metropolitan macroregions

In the analysed sample of European metropolitan macroregions, trends for the increase of development disparities between the metropolis and the surrounding region could be observed in the period 1995-2004 (figure 9). This can be viewed as a consequence of metropolisation processes, which lead to a faster development of large urban centres which pool the resources indispensable for the development of information economy than that of their regional hinterlands, which in many cases function in the previous, industrial and agricultural development paradigm. Similarly, middle-sized cities "eclipsed" by the large metropolis are developing more slowly. Nevertheless, opposite processes were taking place in some of the macroregions, but this was usually either a consequence of enormous intraregional disparities or of a lower rate of economic growth in the countries in which they were located. The national context plays an important role in analysing the development dynamics of metropolises as the nationwide rate of growth is as a rule strongly correlated with the rate of development of metropolitan areas.

Change in disparities in the development level between the metropolis and its region

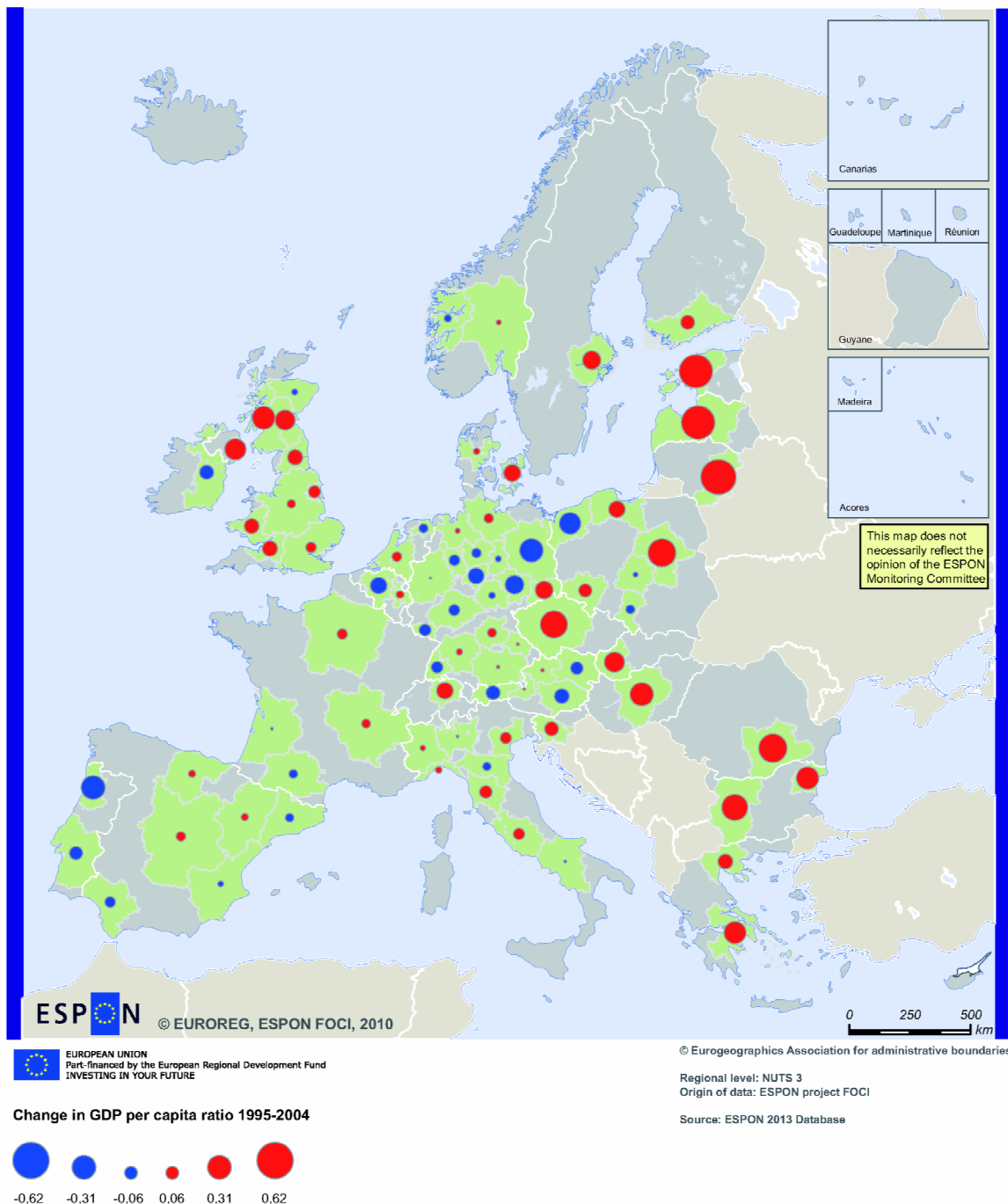


Figure 9. Change of disparities in the development level between the metropolis and its regional hinterland in 1995-2004

Typology of metropolitan macroregions

In order to understand the diverging evolutions, we analysed the disparities within metropolitan macroregions in terms of the correspondence of demographic processes, structural changes and labour market fluctuations. Results of our analyses point to a significant role of the national and regional contexts, which prove a clear *differentia specifica* of each of the surveyed macroregions. Nevertheless, taking into account the above dimensions of disparities, we identified several main types of conditions determining the economic relationships between the metropolis and the region observable in Europe (figure 10). The capital city macroregions of Central and Eastern

European countries were the most conspicuous of metropolitan macroregions. In this group, it could be clearly observed how metropolises break the ties with their regional hinterlands. This was probably caused by the rapid pace at which the capital city metropolises joined the mainstream of an open networked economy, with a dominance of traditional functions such as low-productivity agriculture and declining traditional industries in the economies of their regional hinterlands. To some extent, this type was imitated by other, usually smaller cities with peripheral locations, where similar processes took place but with a lower degree of macroregional divergence. At the same time, highly industrialised regions ("industrial" or "problem" regions) were relatively the most internally coherent. However, during the process of adapting their economic structures to the conditions of global information economy, their intraregional convergence would as a rule decrease. The remaining types of regions were quite varied despite a similar scale of intraregional disparities in the economic development level. Divergence could be observed both in highly developed monocentric and in polycentric regions. Nevertheless, in the former type of regions, this process took place in the conditions of an extensive and complex network of flows both regarding migration and local labour market linkages, whereas in monocentric regions the degree of complexity of these relationships was much smaller. In contrast, metropolitan regions situated in Germany, Austria and Slovenia manifested the greatest stability in terms of development disparities between the metropolis and the region, which was largely a result of a similar situation in the macroregional labour markets and could be seen as a proof of considerable integration of regional production systems. However, capital city macroregions yielded the least to such attempts at generalization – particularly those in smaller countries, where the relationships between the metropolis and the region were uniquely distinctive.

The most common types of metropolitan macroregions

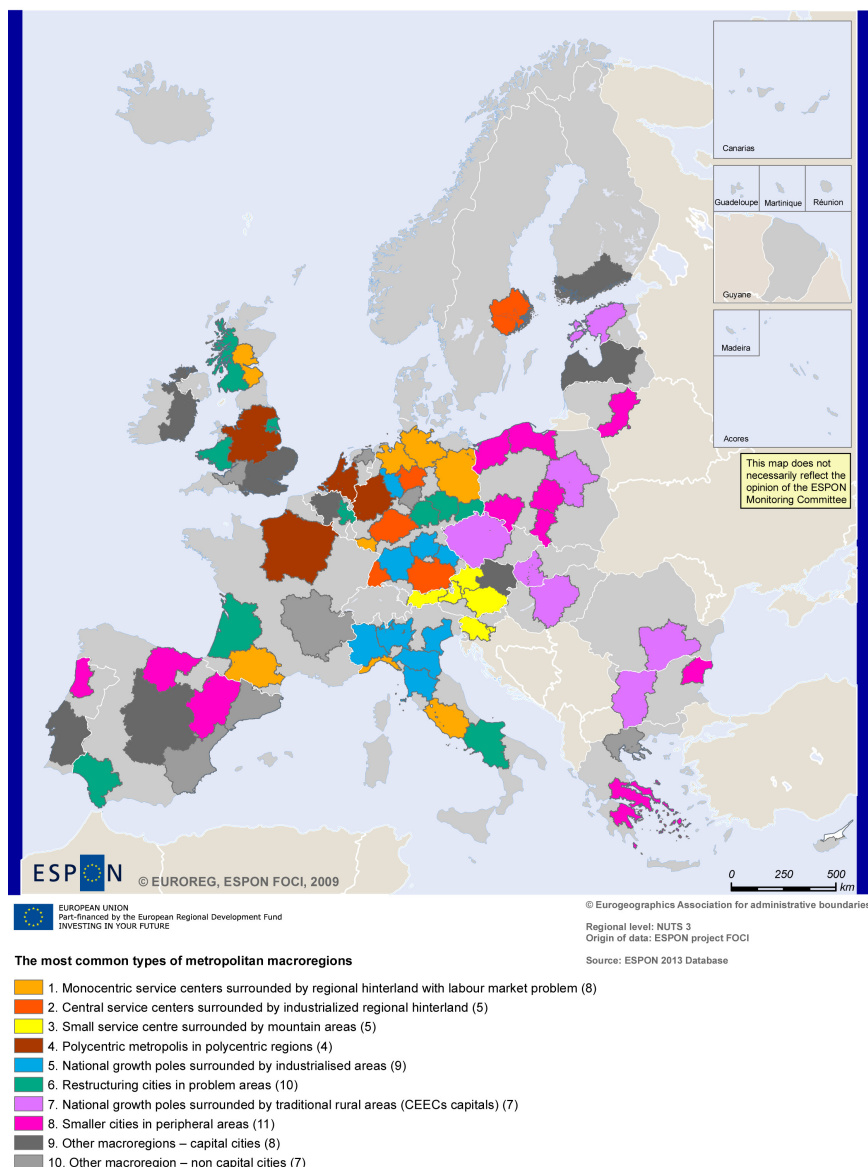


Figure 10. Typology of metropolitan macroregions (selected types)

Mechanisms underlying metropolis-region relations

In order to identify which factors are the most important in explaining the co-evolution of a city and its hinterland, we use both quantitative methods (regression analysis) and qualitative case studies.

Regression analysis

The following key factors affecting the disparities in the economic development level and their change were identified based on regression models using data on demography, economic structure and labour market (see section XXX of the scientific report for more details):

- **economic structures:** A similar economic structure could point to the existence of direct or indirect linkages between metropolitan areas and their regional hinterlands which lessened the disparities in the development level.
- **labour market:** An improved situation in the metropolitan labour market with its simultaneous deterioration in the regional hinterland was the main reason

(or consequence) for the macroregional divergence in the development level. Seen together with the migratory outflow from the regional hinterland to the metropolis, this could testify to the backwashing of development resources (mostly human capital), from the periphery to the core.

- **labour productivity:** This was manifested inter alia by the differences in labour productivity in industry reflected by varied degree of capital intensity of the sector, and thereby probably to the level of its technological advancement.

It should also be pointed out that both the scale of intraregional disparities and their changes were quite strongly dependent on the national and regional contexts. Furthermore, the incorporation of indicators related to the quality of human capital and innovation of the enterprise sector into these models would have allowed for a better explanation of the observable intraregional disparities and their changes.

Case studies

(See section XXX of the scientific report for detailed analyses of the case studies.)

Metropolitan macroregions selected for case study analysis represented extreme situations regarding both the scale and the dynamics of intraregional disparities: Barcelona-Catalonia, Glasgow-Western Scotland, Stockholm-Mälars Region, Toulouse-Midi-Pyrénées, Warsaw-Mazowsze. Such a selection made it possible to present a broad spectrum of mechanisms underlying the relationships between the metropolis and the region. These studies showed those factors for which no comparable statistical data at the European level could be compiled, and which were pertinent for the relations between the metropolis and the region, while simultaneously taking into account the opinions of both regional and local authorities.

Level of linkages

In the analysed cases (except Catalonia), the regional hinterland did not play a significant role in metropolitan development. This proved inter alia that the strengths and weaknesses of the cities concerned were primarily related to their functioning in an international dimension. Moreover, economic processes were as a rule enclosed within the metropolitan areas, and the regional linkages of enterprises were poorly developed when compared to their linkages with the rest of the country or with the rest of the world. At the same time, the regional hinterlands in many cases were not able to take advantage of the opportunities created by the metropolitan centre, which typically led to the excess of the backwashing of developmental resources over diffusion processes.

Factors favouring linkages

The key factors which fostered strong linkages included intraregional similarities between the socio-economic structures (notably the quality of the human capital and innovativeness). Another major factor of intraregional integration was transport accessibility, which was particularly important at a distance of 80-160 km from the centre (with the special significance of the isochrone of 90 minutes' travelling time for the intensity of linkages with the metropolitan centre). In addition to that, the polycentric structure of the metropolitan area played a part as it facilitated access to the metropolitan labour market of the residents of the regional hinterland; it also fostered the development of linkages between enterprises regionally.

Public action for enhancing linkages

Activities which were most frequently undertaken by public authorities in the analysed regions included the development of transport infrastructure, particularly with regard to creating supra-regional connections between the central city and other metropolitan centres. In consequence, this led to the emergence of transport corridors (roads and railways) which acted as development networks, as well as growth poles or sectors located in the vicinity of regional airports. The development of transport infrastructure was also associated with efforts to develop a polycentric structure in metropolitan areas. Another important type of activities was human capital investments, which frequently were manifested by the development of academic centres in the regional hinterlands of the metropolises. Such undertakings have been successful to varying degrees since these centres as a rule were no competition for the academic potential of the metropolis as the quality of their educational offer would normally be lower, and the scope of the offered courses would be more limited.

Forms of governance

The situation regarding metropolitan governance is varied in analysed case studies and does not allow us to provide simple generalization. However, based also on results of the ESPON CAEE project, focused on the role of metropolitan/city-regional governance in agglomeration economies, we may expect that the impacts of public interventions are quite limited as public authorities can not directly affect location behaviour of firms and individuals. Furthermore, activities very often are targeted at improving quality of life or adapt to existing demand and do not implement strategic vision of development. Based on our survey of municipalities situated in five analysed metropolitan areas we found that the main fields of metropolitan governance include: public transport; environmental protection including waste management and spatial planning. However, the CAEE project highlights also other rarer types cooperation: human capital, R&D potential or international connectivity.

Policy conclusions

Based on selected case studies we may expect different development prospects in metropolitan macroregions that follow two general models. The first model assume an increase in developmental disparities between the metropolis and the surrounding region and this is associated with the polarisation and diffusion development model, which stipulates that the range of the spreading of development processes is usually small, with a simultaneous backwashing of resources from the more distant parts of the metropolitan macroregion. The other complementary model is associated with the functioning of modern industry outside the metropolitan areas. In general this model is more likely to appear in the condition of high degree of socio-economic similarity across the whole metropolitan macroregion.

The scenarios concerning further anticipated developments vary, and largely depend on the regional context. In the first model, a growing depopulation of peripheral rural areas is the most likely. This trend can be reversed based on the local resources or investments to disseminate the scale of the metropolis' development. Another probable scenario envisages the emergence of a polycentric metropolitan area which may foster development processes across the region.

Cooperation

Introduction

The specifications for this project called for an evaluation of the “possibilities for increasing development opportunities through territorial cooperation, establishing polycentric urban clusters at different scales and in different parts of the European territory that can support a better territorial balance and cohesion”.

As mentioned in the general overview, the current knowledge about polycentric development is very limited, and generally based on a morphological approach. This limits the available objective evaluations of actual cooperations, and thus makes policy conclusions often very limited. In the first part of this section we will, therefore, relate our attempts to move on to a more functional approach in order to enhance the empirical base of the polycentricity debate. Our success in this endeavour has been fairly limited, but we hope that some of the conclusions will help in the future efforts around this topic.

In addition to this quantitative approach, we have also launched a series of case studies in order to explore how actual cases of cooperation function. Many of these cases were based on the list of case studies elaborated by the ESPON 1.1.1 project in the hope to be able to build on the existing work and take it further. Our main aim in these case studies is a critical evaluation of the actual realities of cooperation, but also of the governance structures put into place to support them. It is important to note, however, that these case studies are still in a very preliminary stage and so we present only very tentative first conclusions.

Measuring functional polycentricity: an impossible quest ?

In order to test different methods for evaluating actual and functional polycentricity, we worked at different scales. Fairly detailed analyses were done at regional and national level for the Athens region and for Greece, and a second “case study” on a transnational scale covers the Eastern Balkans. But an attempt was also made to extend the methodologies to the entire ESPON space and to provide quantitative measures that would allow to assess both the actual functional linkages between cities, but also the potential for cooperation. For more details on all these analyses, see section XXX of the scientific report.

As an example, figure 11 shows an attempt at evaluating levels of functional differentiation within potential polycentric areas (similar to the PIA in ESPON 1.1.1) based on (coarsely defined) economic structure. At the same time, measures of the relationships of firms in certain branches, notably the most dynamic ones inform about the actual degree of clustering of firms which can be as an important driver of development (through agglomeration economies) in the specified system. Both aspects should be considered together as sources of potential for cooperation. As clustering (through networking) refers not only to each specific regional or local urban system but also to higher spatial levels, the respective polycentric cooperation policies should be deployed in a frame of multi-level territorial governance.

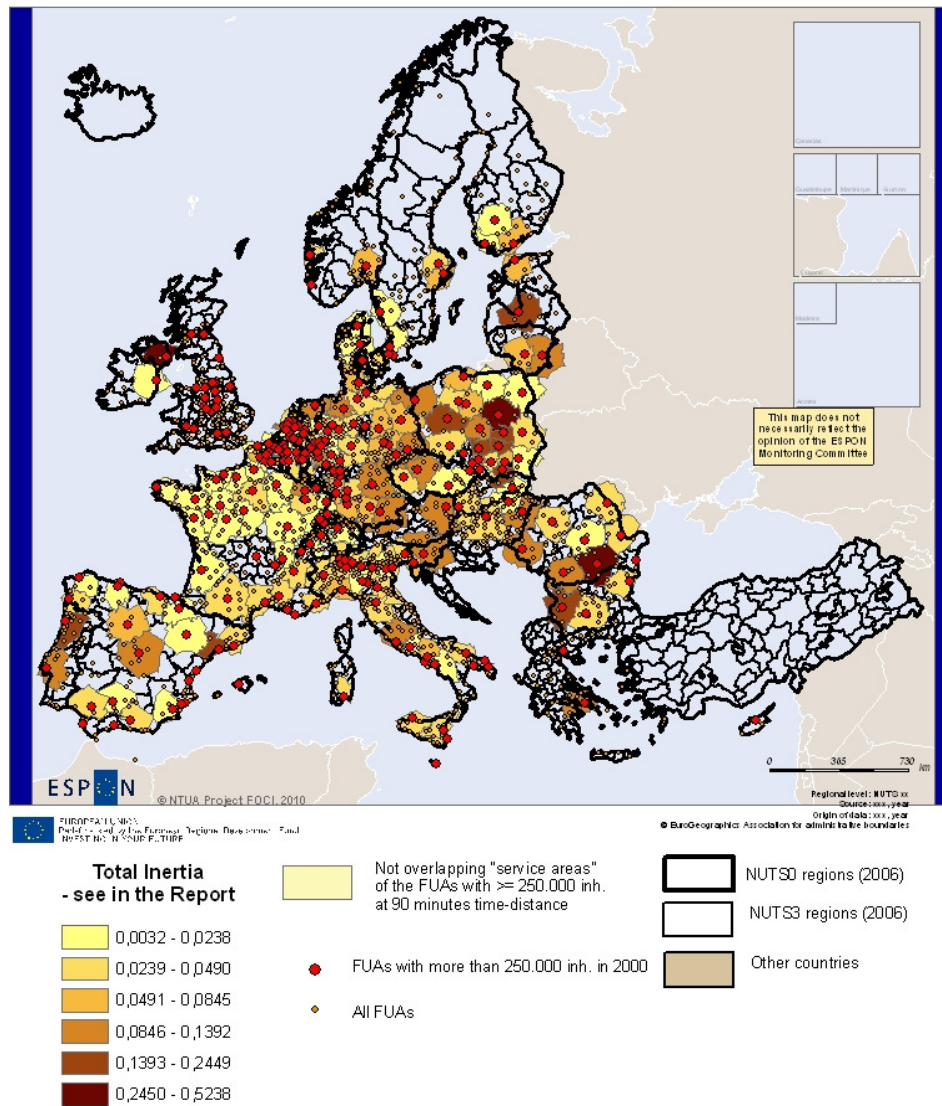


Figure 11. The degree of divergence (correspondence analysis: total inertia) based on NUTS3 sectoral structure in PP urban networks in the ESPON territory

Figure 12 shows attempts at defining actual functional relations at more local levels. The left map (a) shows the local centralities of cities in networks of multinational firms within a distance of 100km (see section XXX of the scientific report for details). Some interesting links or lacks thereof do appear: For example Toulouse is linked to Barcelona, while there's not a so much dense urban network there. The same phenomenon can be underlined at the Eastern border of Germany, for Madrid with Castille region, for Bretagne region in France, or for Denmark. At the opposite, some "potential" regional urban frameworks do not support enough networks like Poland, Hungary, Romania and Bulgaria.

On the right map (b) we see Framework Programme research cooperations in the Eastern Balkans case study area showing the strong role of the capital cities, but the weak participation of other cities, leading to possible conclusions on cooperation built at different scales.

FUA centralities in the networks of multinational firms with a distance below 100 km

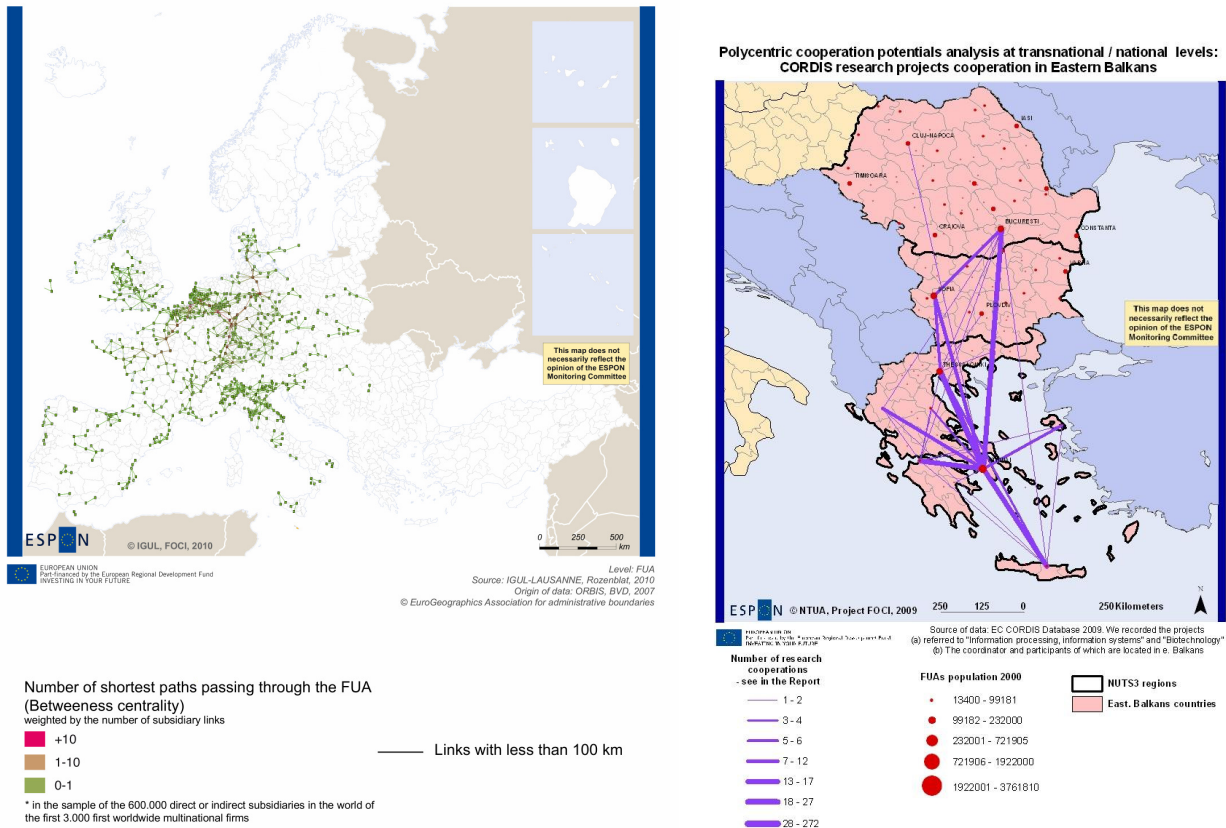


Figure 12. a) FUA centralities in the network of multinational firms with a distance below 100km; b) Selected CORDIS research projects cooperation in Eastern Balkans

At this stage it is still difficult to draw policy conclusions out of such maps, but they show the potential for more extensive research on functional relations between cities at different scales, in order to objectify some of the discourse about cooperation and polycentric relationships and to measure actual linkages between cities.

Cases of cooperation: some very preliminary conclusions from case studies

(see sections XX and XXX of the scientific report for more details on the case studies)

Several case studies are currently ongoing covering the following list of cities or groups of cities: Athens, Baltic Palette, Flemish Diamond, Liège – Aachen – Maastricht, Munich, Øresund, Randstadt Holland, Rhône-Alpes network, Saarland – Lorraine – Luxemburg, Torino/Piemonte, Vienna – Bratislava – Győr.

First returns from these case studies confirm the difficulty to obtain objective information both about the actual content and the results of cooperations, as most of the persons knowledgeable about these cooperations are involved in them and thus have vested interests.

The following very preliminary conclusions on factors supporting or hindering cooperation can be seen at this stage:

- Hindering factors linked to the institutional framework
 - heterogeneity of competences
 - limits of competencies
 - inadequacy of administrative boundaries in relation to the issues on the ground
 - limitations in financial resources of the respective administrative levels of the partnership
- Hindering factors linked to the relationship between partners
 - competition between partners of similar weight
 - mistrust of small vs. bigger partners
 - inadequacy between city links and firm links
- Limits of coherence
 - lack of coherence between multiple partnerships of a given city
 - lack of coherence between interests of partnership and interests at higher hierarchical levels, or between interests of one partnership that creates negative impacts for others cities or partnerships
- Favourable factors (besides the negation of above hindering factors)
 - Identification of concrete and reasonable objectives that are attractive for all partners
 - Identification of objectives requiring the joint intervention of all partners
 - Cross-border networks because of the particularly strong incoherences across borders, in fields such as transport, infrastructure provision, etc
 - Others: small distance, a common history or tradition, levels of education, etc.

The future of cities: Scenarios to assess the upcoming challenges for cities

The destiny of European cities is much too dependent upon the global context and upon macro-policies to envisage credible alternative scenarios of urban development, which are derived only from different urban development policies. This is why the two scenarios proposed hereafter have each its own logic in terms of global background and of macro-policy mix. The territorial development policies defined at each level pursue in each scenario specific objectives, but have to cope with the respective impacts of global factors and more general policies.

The scenarios take account of the Europe 2020 Strategy, but consider that it may be accentuated or even revised, according to changes in the international environment. The hypotheses chosen for the two scenarios differ mainly through the characteristics of the global context and the nature of policy responses to the most significant challenges. There are however common elements of reference in the two scenarios (demographic evolution, regionalization of the globalization process, growing disparities in the productivity of main economic sectors, emergence of a number of new technologies etc.). Both scenarios have a time horizon of 15 to 20 years, divided into two periods, the first being of 7 to 10 years.

Description of the scenarios

The “Green Economy” scenario is based on the assumption that the decisions adopted at international level aiming at curbing down the speed of climate change are efficiently used as an opportunity to generate significant economic growth throughout Europe. In the “Enhancing the European potential” scenario, the recovery from the economic/financial crisis is not sustainable at world scale. The global context being highly unstable and risky for trade and investments, Europe chooses the strategy of enhancing its own potential and to concentrate external cooperation on neighbouring countries and on few others, non-problematic ones.

The following table gives an overview of the most important differences between the scenarios.

Common changes and issues		
<ul style="list-style-type: none"> • Demographic stagnation and decline on the background of population ageing at European scale, with significant differences between European countries; • Regionalisation, up to a certain extent, of the globalisation process at the scale of world macro-regions; • Slower progress of real incomes in Europe than before the crisis of 2008/2009; • Growing disparities in the productivity of the main economic sectors; • Trend towards a change of energy paradigm, departing from fossil energy sources; • Emergence of a number of new technologies, especially in the field of energy production, nanotechnologies, biotechnologies, transport systems, communication technologies etc. which will affect, directly or indirectly, the territorial development; • Continuation of climate change with accentuation of territorial impacts 		
Global context		
Scenario "Green economy"	Scenario "Enhancing the European potential"	
<ul style="list-style-type: none"> • Important decisions adopted at international level aiming at curbing down the speed of climate change; • Global recovery from the crisis of 2008/2009; • Significant investments of the more developed economies and of BRIC countries in the less developed countries to develop local markets and create demand; • Efficient global coordination of macro-economic policies. 	<ul style="list-style-type: none"> • No sustainable recovery at world scale from the economic/financial crisis of 2008/2009 due to the incapacity of various countries to reimburse debts; • Emergence of new, large-scale crises affecting public budgets, banks, enterprises and individuals; • Growing inflation at world scale driven by highly indebted countries. 	
	Scenario "Green economy"	Scenario "Enhancing the European potential"
Macro-economic policies	<ul style="list-style-type: none"> • International decisions to curb down the speed of climate change are efficiently used in Europe as an opportunity to generate significant economic growth; • Well-coordinated public decisions (carbon taxes etc.) and active involvement of the civil society in a global context of economic recovery and stability; • Significant increase of technological investments, especially in sectors related to the "green economy" 	<ul style="list-style-type: none"> • Major efforts developed to reduce the economic fragmentation of Europe, to support the transnational cooperation of clusters and of individual enterprises and to facilitate the relocation of European enterprises into Europe; • Creation of European sovereign funds to safeguard European enterprises; • Strong development of neighbourhood policies; • Stronger protection against exacerbated external competition (anti-dumping measures; preference for European products etc.)

Technology and innovation policies	<ul style="list-style-type: none"> Support to the technological development and to the accelerated adoption of new solutions in the sectors pertaining to the green economy (energy, transport, housing and building etc.). 	<ul style="list-style-type: none"> Support to technology and innovation strongly related to the individual regional potentials (more regionalised innovation policies); Support to trans-European cooperation in a number of strategic sectors and initiatives. Efforts towards the economic use of innovations produced.
Education, labour and social cohesion policies	<ul style="list-style-type: none"> Significant efforts to enhance the education level and the qualification of human resources; Encouragement of labour mobility in order to alleviate unemployment in neo-fordist regions and to facilitate the transfer of manpower towards areas where the green economy and other sectors are developing; Concentration of public resources on the support to economic growth likely to generate jobs than on social cohesion 	<ul style="list-style-type: none"> Significant efforts to enhance the education level and the qualification of human resources; Education and labour policies are more regionalised and more directly related to the mobilisation of regional potentials. Safeguarding jobs, while making enterprises more competitive, through stronger intra-European cooperation is a priority objective. Social inclusion policies go far beyond the labour market and address particularly the deprived population groups.
Environment policies	<ul style="list-style-type: none"> The main environmental policy is the reduction of greenhouse gas emissions through a variety of measures (energy, transport, heating etc). It includes incentives but also restrictive measures and new norms (taxes, regulations etc) 	<ul style="list-style-type: none"> The reduction of greenhouse gas emissions has a lower priority; The environmental policy is more diversified and regionalised. It aims largely at enhancing the regional potentials and at increasing the regional attractiveness.
Transport policies	<ul style="list-style-type: none"> The objective of curbing down greenhouse gas emissions leads to an important shift in modal split in favour of rail and waterborne transport at the expense of road and air transport; Numerous innovative applications are developed in the field of information technologies aiming at reducing mobility needs. 	<ul style="list-style-type: none"> The shifting of modal split is not the primary priority; Attention is put on the accessibility of the various regions in relation to the mobilisation of regional potentials as well as to better integration of the European territory, especially with regard to the permeability of borders, to the overcoming of physical obstacles and to the improvement of transnational and interregional corridors in landlocked areas.
Territorial and local policies		
	Scenario "Green economy"	Scenario "Enhancing the European potential"
Macro-territorial policies	<ul style="list-style-type: none"> The macro territorial priorities favour the regions with significant resources in renewable energy as well as those with important and competitive clusters in the various sectors 	<ul style="list-style-type: none"> Regional policies favour the mobilisation and exploitation of regional potentials and the constitution of efficient interregional and transnational business networks; Regional and macro-territorial policies favour cities and

	<p>pertaining to the green economy. Cities located in such areas, rather independently from their size, benefit from such policies ;</p>	<p>regions with significant potentials to be developed as well as nodes belonging to the networks to be strengthened, with the aim to contribute to territorial cohesion.</p>
<p>Metro-politan and urban development policies</p>	<ul style="list-style-type: none"> • Policies favour compact settlement systems in order to minimise and rationalise transport flows and related energy consumption; • Policies pay particular attention to the control of land-use changes and urban sprawl, to the redevelopment of urban brown fields, to the improvement of the urban environment (greening of cities, promotion of public transport and of electric cars, reduction of mobility needs), to more energy-efficient town planning principles and building techniques; • Policies favour the development of medium-sized cities of the metropolitan hinterlands serviced by efficient public transport networks, corresponding to the objective of polycentricity. 	<ul style="list-style-type: none"> • Metropolitan development policies pay much less attention to the compactness of cities and invest fewer resources in sustainable transport systems; • In metropolitan areas, efforts are concentrated on the development of sites with good accessibility in relation to endogenous resources (science and technology; high level services); • Small and medium-sized cities are promoted according to their economic potential
<p>Local social cohesion policies</p>	<ul style="list-style-type: none"> • Social inclusion and cohesion are not the primary objective. • The aim is rather to rapidly improve the urban environment through a variety of measures (redevelopment, greening, reduction of traffic noise and air pollution etc). 	<ul style="list-style-type: none"> • Policies pay significant attention to social cohesion at local level. This is being promoted through a variety of measures (public housing policies, economic regeneration of deprived neighbourhoods, special training programmes for marginal groups etc.); • Application of such measures in metropolitan areas, but also in smaller towns and in more remote regions with specific social integration problems.

Table 10. The hypotheses underlying the scenarios

The territorial impacts of the scenarios

Each of the scenarios has a distinct impact on different territories and territorial structures. The following table synthesizes the most important of these impacts, allowing a direct comparison between the two scenarios.

	Scenario "Green economy"	Scenario "Enhancing the European potential"
Macro-territorial aspects	Growth is first concentrated in the pentagon and in a few others large cities, while neo-fordist regions are negatively affected, then it expands towards eastern Europe and peripheral regions of western Europe	First, no significant evolution of the settlement pattern (low economic growth; protection of manufacturing employment). Then, rather balanced development of urban systems, thanks to the promotion of regional potentials.
Metropolitan areas	Metropolitan areas benefit from the development of R&D activities, services and advanced manufacturing activities. International gateway cities benefit from further globalisation	The centres of national trade networks (mainly capital cities) are favoured + large cities along trans-European corridors.
Hinterlands of metropolitan areas	In industrial regions of western Europe, urban settlements in the hinterlands of metropolitan areas are involved in the development process. In the second phase, this happens also in a few cases in the eastern European countries.	The hinterlands of metropolitan areas change according to the level and mobilisation of regional potentials. Existence of very different situations. Weak overspill from metropolitan areas towards their hinterlands in central and eastern Europe.
Medium-sized and small towns outside metropolitan regions	Medium-sized and small towns with an industrial basis are generally negatively affected during the first phase. A number of them are involved in the development process in the second phase.	Thanks to the pro-active promotion of regional endogenous potentials, numerous small and medium-sized towns benefit from development opportunities
Networks of cities Cooperation/competition	Emergence of large-scale, specialised cooperation networks, also with large cities outside Europe. Growing competition at global scale.	Progress of intra-European networking, especially within transnational macro-regions (clusters, R&D institutions, businesses) benefitting also to medium-sized towns. Increasing networking also with EU neighbouring countries. Growing competition at intra-European scale.
Sustainability	Priority to more compact urban forms serviced by public transport. Decrease of air pollution in cities thanks to electric cars. Regeneration and greening of core areas of cities. Stronger environmental challenges in southern and eastern Europe (suburbanisation; motorisation)	Economic growth is limited because of unfavourable global conditions. No uncontrolled metropolitan expansion. The balanced evolution of the settlement pattern ensures sustainability. However, no significant environmental improvement in congested areas.

<p>Social polarisation and tensions</p>	<p>Tensions related to unemployment in the first phase, especially in industrial cities. Improvement in the second phase. Possible increase of social segregation in large cities.</p>	<p>Growing purchase power in the medium and low segments of the social hierarchy reduces social polarisation. Social policies in cities (housing, regeneration of problematic neighbourhoods) limit and reduce social segregation and tensions.</p>
<p>Competitiveness of the territorial organisation of settlement systems</p>	<p>Compact development in and around metropolitan areas and efficient networking between metropolitan areas and the surrounding medium-sized and small cities ensure higher competitiveness</p>	<p>More polycentric urban systems within and outside metropolitan regions. Efficient networking of cities in most regions (generation of network economies</p>

Table 11. The territorial impact of the scenarios

Policy conclusions

This report has highlighted some of the key trends and developments in European cities today. It has also shown some possible new paths for gathering knowledge on European cities. Finally, it has provided a future perspective and alternative scenarios for the future evolution of Europe's cities according to different perspectives on the interplay of the various drivers of change.

So what can we take from all this in terms of policy messages? The following presents a selection of some of the policy conclusions that we draw out of our work. For more information, see section XXX of the scientific report.

General policy messages

- Cities are strongly embedded into other scales of territorial and general development. Policies for cities should take account of the macro context and may vary according to new context situations. Monitoring these situations to be able to identify in which direction they seem to be moving is an important task for policy making.
- A combination of macro policies and territorial policies is necessary to promote a sustainable, socially cohesive and competitive development of cities.
- Cities (as regions) show a high degree of path dependency, reinforcing agglomeration effects. The same cities are found systematically in the top ranks of several different indicators, and this has been true for a long time. Those examples of new path *creation* that might exist in specific examples are difficult to generalise, and thus to extract *a priori* criteria of success. This does not mean that policies shouldn't try to attain such new path creations, but that at this point science cannot inform it very well about the best means to go about these policies.
- European cities differ as to their place in the urbanisation cycle. Policies have therefore to be differentiated.
- Higher levels of governance have to ensure the coherence of their policy objectives with the implementation of policies at city level. Several risks exist through horizontally non-coordinated policies
 - zero-sum games of competition: policies for the attraction of population, firms, etc, especially if based on factors such as price (e.g. taxes) or infrastructure provision might be successful for one city to the detriment of others, thus leading to increased difficulties in neighbouring cities. In order to avoid such zero-sum games, policies could focus on each city's specific particularities and potentials.
 - levelling effects: if every city improves its quality of life and builds, e.g., research parks for its competitiveness, then they will all again be at the same relative level as before. Obviously improvements for cities are worthwhile goals as such, but for the improvement of competitiveness, generalised policies across all cities might prove inefficient.

- To a certain extent, some of the potential horizontal conflicts presented in the previous point, cannot be resolved through win-win solution, but imply explicit political or moral choices. The scenarios help in formulating such choices and make more transparent decisions, but they cannot decide on the “right” option to take.
- Some case studies seem to show that institutional capacity is a difficult issue for cities which often lack the resources and levels of expertise to act efficiently. Institution building and institutional capacity improvement continues thus to be an important issue, notably for Eastern European cities.
- Based on the preliminary results of the case studies, several factors can be highlighted that constitute potential difficulties for cooperation between cities: differences in levels of competencies, competition, lack of necessary resources, inadequacy between administrative and territorial structures, etc. Factors that seem to favour cooperation include a concrete common project that requires the joint action of all partners and cross-border situations.

Territorial messages

- Cross-border inter-city linkages (firm ownerships, contactability, etc) seem particularly weak in Eastern Europe. Increasing these links might allow the development of new integrated growth areas outside the pentagon.
- There are a series of inter-urban links which could be ensured by more sustainable transport if efficient cross-border rail links are established. Many of them are already part of the TEN-T projects.
- Cooperations between cities should build upon increased collaboration between municipalities and other public entities at the metropolitan and functional urban area level (examples would be the cooperation around Munich, the Thames Gateway, Greater Paris, etc) in order to provide an increase in scale and a stronger mobilisation of all resources. The adequate governance structures for collaboration at this scale depend on the administrative structures of each country.
- Suburbanisation and urban sprawl are still a pressing issue in many cities across Europe, notably in the East and the South, even in cases where total populations are shrinking. Strict land use policies with a sufficient level of application capacity at city level as well as some public control over real estate and housing markets seem to be one of the most efficient levers for steering such processes.

Future perspectives

- New challenges are emerging which require new types of policy measures for cities (ageing, energy, climate change, scarcity of financial resources etc.)
- The crisis exit strategy of Europe, but also of other parts of the world, will be a strong determinant for Europe's cities' future.

- In those areas of Europe which have already gone through the complete urbanisation cycle, there will probably be less need in future to counteract suburbanisation and more need to regenerate cities, especially the core areas and the high-density suburbs.
- Social polarisation is likely to increase (also depending on crisis exit strategy), as well as socio-spatial polarisation, through the effects of suburbanisation and gentrification but also the creation of gated communities at different scales.
- New technologies should not be neglected for their potential impacts on cities. Examples would be new non-polluting vehicle types, increased usage of telecommunications. It is not easy, however, to forecast which technologies will experience significant breakthroughs in the near future, however. Monitoring of technological innovations with potential territorial impacts would be desirable.
- The same can be said for new values and behaviours (increasing cultural needs, more emphasis on quality urban environments, etc).

Research recommendations

- There seems to be somewhat of a gap in knowledge on the interactions between macro and local policies. To what extent do they converge or diverge, or even contradict each other? Specific research on that question would be helpful.
- The current data situation is insufficient for research on cities across Europe. Eurostat and DG Regio are pushing for more territorially detailed data, but the success of this endeavour will depend on the goodwill of the Member states. The Urban Audit has created a strong momentum and awareness, and other initiatives for more local data are on the way. It is, however, not understandable for the scientific community why very basic data at LAU2 level (e.g. total surface area and total population) would still be considered confidential data by some member states! If the desire to improve knowledge on European cities is sincere, then data dissemination policies will have to adapt.
- New data sources that have been explored in this project have shown interesting potential, but have also proven very difficult for individual teams to access and manipulate (e.g. ORBIS firm database, transport time tables, CORDIS database). A concerted effort at ESPON-level might be necessary for a more structured access and (pre-)treatment of data in order to provide the necessary resources to research teams.
- Because of the difficulties, much of the potential knowledge embedded into this data has not been brought to the surface, yet, and it would be worthwhile to continue to pursue on these paths.