ESPON 2006 PROGRAMME

TENDER ESPON PROJECT 1.4.3

STUDY ON URBAN FUNCTIONS

Part I

Table of contents

I. Introduction

ESPON Project 1.1.1 on *'The role, specific situation and potentials of urban areas as nodes in a polycentric development'* represents a major step in the foundations of an integrated vision of regional development and territorial cohesion. This project is inserted in the general framework of the ESPON research programme objectives, which carry out the ESDP guidelines aiming at improved territorial cohesion and more balanced and sustainable development in compliance with the Lisbon strategy for Europe's future.

Polycentrism is one of the basic principles of the European regional development policy as adopted in Leipzig in 1994. Meanwhile, in spite of the studies carried out within the framework of the ESPON programme in relation with the Lisbon strategy's objectives, it seems that some of the aspects that had already been dealt with in previous ESPON studies, especially in project 1.1.1, deserve reworking according to Member States' and Commission's comments and in the light of a more precise vision of the objectives of this research.

Project 1.4.3 '*Study on Urban Functions'* is first conceived as having to deepen the work and the results obtained in project 1.1.1, but also requires the elaboration of a proposal of research axes in order to deepen and develop our functional knowledge of the European urban structure in connection with the elaboration of the future ESPON II programme.

II. General objectives

The terms of reference define the general objectives of the project as follows:

- *The study should be built and expand upon the existing ESPON research framework and objectives within ESDP with regard to balanced sustainable development and territorial cohesion. This regards in particular the policy orientations on a polycentric development and the work on Functional Urban Areas (FUAs) and Metropolitan Economic Growth Areas (MEGAs) by ESPON project 1.1.1.*

- *The study should build on comments made, in particular by Member States and the Commission, related to the typology provided by project 1.1.1 on Polycentrism, and assess to what extent these comments should give rise to adjustments in the current delimitation of FUAs in the individual Member States.*

- *The study could propose (a limited number of) concrete adjustments consolidating the delimitation of FUAs in the European urban system.*

- *The study should investigate the feasibility of adding indicators to the existing 7 indicators compiled by project 1.1.1 for all 1 595 defined FUAs, which will include considerations on the availability of data within the 25 EU Member States as well as Bulgaria, Romania, Norway and Switzerland.*

- *The study should (preferably) collect data for all FUAs, seeking to add at least two more indicators related to the aims of the Lisbon strategy to make Europe a highly competitive, knowledge based economy.*

- *The study should update the existing typology of FUAs and MEGAs, and by doing so include necessary adjustments to the delimitation of FUAs and (preferably) some new indicators.*

- *The study should on the basis of the (adjusted) delimitation of FUA include a proposal for an applied research project within an ESPON II programme deepening further the functional and morphological understanding of the European Urban System, its FUAs and MEGAs, and the options for providing territorial cohesion and a better balance through territorial cooperation.*

In addition to the contributions of project ESPON 1.1.1, we propose summarizing the global objectives defined for the current project around four main axes:

1. Starting from the results obtained in ESPON 1.1.1 and on the basis of Member States and Commission's comments, we will state and update the delimitation of FUAs, which are the basic tools for European spatial construction, and we will in a second step improve the knowledge of their characterizations according to scale levels and objectives defined in the above documents.

2. We will supply a characterization of the structure of FUAs and their nodes on different scales as well as an updating and a measurement of their functional specializations. We will specify the measurement of polycentrism on the European territory, including a criticism of some indicators used in ESPON 1.1.1 project, and we will clarify the scales on which polycentrism is examined and the specific objectives linked with the quest for polycentrism at different levels. Depending on these objectives, considered at different levels, adequate criteria and indicators will have to be defined under constraint of existing or in future available statistics.

   Within these first two operational axes, it will be necessary:
   a) to try to use robust indicators connected as much as possible with the objectives defined in Lisbon to make Europe the most competitive area based on knowledge economy. Those indicators will have to be clearly defined according to the objectives aimed, the more so as comparative statistics are few for an investigation project which can imply a quest for data at NUTS 5 level and for which the delimitation of higher level NUTS are necessary but not very relevant frameworks, precisely analysed in ESPON project 3.4.3;
   b) that those indicators allow the most easy and quick updating as possible in order to reach an effective monitoring of territorial development;
   c) to couple static with dynamic performance indicators.

3. Initial assessments of the efficiency, equity and sustainable character of socioeconomic development depending on polycentrism levels measured at the different scales. We propose a critical reflection on whether common statistical divisions are appropriate to assess polycentrism and socioeconomic performances. It will be essential to put the assessment of performances, but also of the more or less mono- or polycentric realities themselves, in the context of the specific territorial frames peculiar to the different countries. Indeed, the historical weight of urban frames and their resulting specializations represent a key element on which policies can only have medium or long term repercussions.

1. 4. Once the delimitations of FUAs have been adjusted and updated, we will propose a concrete applied research project for the ESPON II programme. This proposal will aim at drawing up strategic development plans for the different types of urban areas in accordance with the Lisbon objectives. The present project will have to improve the understanding of the European urban network at functions level (specializations, firm networks, definition of cooperation-competition-competitiveness areas) in order to promote a sustainable regional development and to increase territorial cohesion through promoting cooperation-complementarity between urban areas.

III. Thematic scope and primary research issues

As reflected in the general objectives of the study the further deepening of elements of the analysis of Functional Urban Areas carried out by the ESPON 1.1.1 project should be focused on four aspects:

1) *Consolidate the delimitation of FUAs.*
2) *Further measuring of functional specialization.*
3) *Update of existing typology of FUAs and MEGAs.*
4) *Propose future research on the European Urban System.*

Sub-table of contents

1. Consolidating the delimitation of functional urban areas, defining their cores and updating the data

2. Measuring of functional specialisation & 3. Update of existing typology of FUAs and MEGAs

   A) Characterizing the structure of the FUA at different levels: updating and measuring the functional specialisation

   B) Defining the levels of polycentricity at different scales

      1) measuring morphological polycentricity
      2) measuring functional specialization

   C) Polycentricity and performances (efficiency, equity, sustainability)

      1) polycentricity and economic efficiency
      2) polycentricity and spatial equity
      3) polycentricity and efficiency in terms of sustainable development

4. Proposal(s) on future research on the European Urban System

1. Consolidating the delimitation of functional urban areas, defining their cores and updating the data

The work on an update and further development of the FUA typology needs foremost to start with a consolidation of the existing delimitation of functional urban areas assessing criticisms raised, particular by policy makers. Based on the work carried out by the ESPON 1.1.1 project, efforts are necessary to consider adjusting current FUA delimitations that are being questioned in relation to the work done by project 1.1.1. In carrying through this assessment a development towards a more EU-wide harmonized way of delimiting FUAs should be supported, being aware of the necessity to balance a diversity of national considerations and European wide perspectives.

How should the FUA delimitation be consolidated?

The project dos not plan to provide a new methodology to delimit FUAs. The challenge is to review the existing methodology in relation to the public and scientific relevance of the comments received, in particular from the ESPON Monitoring Committee, taking the methodology of project 1.1.1 for granted. The project needs to work on the current definition of functional urban areas and consider the results of its application in the member States were comments are made. The ESPON CU will provide an up-to-date list of these comments.

In addition, the project should by own initiative assess each country covered concerning the application of the methodology for delimiting FUAs. In this context, the lessons learned from the work in support of mapping potentials for cooperation between neighbouring FUAs, the so called Potential Urban Strategic Horizons (PUSH) and Potential Integration Areas (PIA) should be taken into account.

On this basis, the delimitation of FUAs needs to be consolidated, if necessary, including (a limited) number of adjustments.

This first point is particularly crucial as it is bound to rely as much as possible on the results of ESPON project 1.1.1, while trying to respond to most of the comments and criticisms raised by Member States and Commission on the delimitation of FUAs. What is more, the methodology used to delimit FUAs will have to be as homogenous as possible on the whole of the territory, while taking diversities, thus certain national specificities, into account. A particular attention will notably be paid to the polynodal FUAs definition methodology, a particularly hard exercise: indeed, if one examines attentively the nature of the problems and criticisms resulting from the FUAs delimitation, it is necessary to reconsider some of the aspects of the methodology used in ESPON 1.1.1. As we are quite aware of the necessity to limit the extent of the modifications, this part of the study will have to be the subject of a close discussion between Monitoring Committee and Lead Partner so as to reach the best compromise possible.

It is possible to follow the ESPON 1.1.1 report and consider that FUAs are the basic pieces of the European urban frame. Although FUA delimitations are established on the basis of

common criteria relying on the extension of labour pools in many countries and on informations from national experts in some other, it is recommended to carry out checks at national level. Indeed, the definition of Belgian FUAs in the ESPON 1.1.1 final report is somehow unsatisfying in spite of the fact that statistical sources are available in Belgium to apply the common methodology. It will thus be necessary, in order to avoid certain errors, to reflect on a way not to limit the definition of FUAs with predefined NUTS levels (as was the case for the Brussels-Capital Region), and not to hesitate, in some cases, to transcend national boundaries whenever justified (with MC permission of course). It would also be advisable to limit FUAs to a minimum common threshold, e.g. 50,000 inhabitants, without modifying definitions according to country size as was the case in project 1.1.1.

The above reflection means that, parallel to defining FUA populations, the weight of FUA nodes should equally be considered, because they represent a key element of FUAs' urban character and competitive positioning. For instance, a FUA whose node polarizes and structures its territory strongly must be considered differently, in terms of potentialities, urban policy and possible cooperation, from a FUA whose node structures its neighbouring territory weakly. Previous studies (GEMACA[1] and the "Atlas comparatif des villes européennes"[2]) have shown that a very good approximation of the population volume in morphological agglomerations – FUA nodes in other words – can be obtained when adding to the central NUTS 5 unit of the FUA all the contiguous NUTS 5 units of more than 650 or 700 inhab./km², a simple criterion indeed, but a criterion that seems to be confirmed by monographic analyses carried out in different countries and by a comparison with CORINE data, even if some minor adjustments have to be made in order to take account of specific situations (periurban forests, mountains, etc.). In the very densely urbanised areas and in areas close to core cities, FUAs, or even core agglomerations, can be contiguous. What matters in such cases is to decide if contiguous NUTS 5 units belong to one and the same (possibly multipolar) FUA or not. A first-rate method could consist in analysing the mono- or multipolar functioning of the labour market.
This first part of the study will make the most of ESPON 1.4.1 report's expertise on small and medium-sized cities, including their delimitation attempts in identifying FUAs nodes.

Summary of contents of WP 3

Our prior objective will be to reach a definition of FUAs as homogenous and operational as possible in order to, on one side, establish the most comparable statistical basis and, on the other side, to facilitate statistical data collection by the bodies in charge of this work.

1 Adjusted definition of FUAs so as to make it the most homogenous possible on the whole ESPON territory.

2 Examination of all cases in which the ESPON study has not been able to respect a homogenous rule and had to appeal to national experts, and comparison of results. In case some problems remain unsolved, we will enter into dialogue with national experts and ESPON MC so as to reach the best possible solution.

3 A solution will be found for polynodal FUAs (with several polarizing centres). To this purpose, we will have recourse to previous studies by the GEMACA team and the "Atlas comparatif des villes européennes".

4 Finally, we will add to the definition of FUAs a characterization of their node(s). Indeed, the "quality" of a FUA depends to a large extent on the weight of its centre, in other words its ability to polarize and structure its neighbouring territory. This part of our work will be facilitated by the results of ESPON 1. 4. 1.

2. Measuring functional specialization

In the current ESPON projects the socio-economic specialisation of FUAs is not considered in depth, although its importance for understanding territorial capital has been acknowledged. Knowledge on a broader range of indicators will support the challenge of seeing comparative advantage of FUAs, supporting the interest for strategic alliances and added value through territorial cooperation.

Which additional socio-economic indicators can be integrated in the FUAs typology and how?

Further work on the FUA typology updating the current information on socio-economic functions and adding new key functions to them, should concentrate on indicators in fields related to the Lisbon strategy. The aim would be to provide evidence helping understand the potentials of FUAs related to the Lisbon strategy. The aim would be provide evidence helping understand the potentials of FUAs related to the objective of the re-launched Lisbon agenda. In this respect the work done within ESPON project 2.4.2/Zoom, project 3.2/Scenarios and project 3.3/Lisbon will be particular importance.

The work on additional indicators needs also to address the relevance the socio-economic functions currently used for the FUA definitions.

The existing functional information on FUAs should preferably be complemented by new functions, preferably by at least two new indicators. Even if it might only be possible to introduce a very few selected new functions into the FUA typology some work needs also to be done through this project on clarifying the feasibility of additional functions (considering methodology and data situation) that can realistically be introduced at a later stage (i.e. under ESPON II.

3. Update of existing typology of FUAs and MEGAs

The information on FUAs plays a major role in the understanding of basic European territorial structures. The acceptance of the delimitation of FUAs as well as ever enlarging information on their individual functionality supports processes in search of territorial potentials and competitive advantages.

What key messages could be conveyed based on the updated typology of FUAs and MEGAs and the corresponding updated European maps?

The work within the project on delimitations of certain FUAs combined with the additional indicators foreseen should lead to a update of the results of project 1.1.1 and a recalculation of the information behind the maps produced so far showing an updated delimitation and classification of FUAs, MEGAs and the individual functions included in the updated typology.

A comparative analysis should reveal the changes between the results of project 1.1.1 and the results of this project.

In order to give the best possible response to the above-quoted grounds of the Terms of Reference, we suggest adopting the following three-step approach:

A Characterizing the structure of FUAs at different levels: updating and measuring the functional specialisation

Not only the ESPON 1.1.1 final report itself, but also, and still more, the Member States and Commission's comments on it, very clearly underline the contradiction that may exist between scales of analysis when characterizing FUAs and working out objectives: *"But if polycentricity is successfully implemented across Europe, regions located within, and in proximity to, the Pentagon will inevitably gain most. At the national and trans-national scales (meso-level), a policy for increased polycentricity and spatial balance at the European level will strengthen the already strongest urban regions. Investment will have to be concentrated in these regions, and as a result, the urban systems of the countries in question may actually then become more monocentric"* (Final Report, Project 1.1.1). Thus characterizing FUAs with more precision also involves reflecting on objectives and scales of analysis. Indeed, the role of the basic pieces of the urban frame varies according to the different levels: a FUA with 50,000 inhabitants and another with 500,000 do not monitor and dynamize their territories in the same way. Therefore, it seems the urban frame could act as a reference to assess the quality of the European space structuration, if not to work out development programmes (involving or not a quest for more polycentrism), at at least 3 levels fitting together:

1 The largest cities, of worldwide or European scope, have to act as nodes of insertion into world networks for European and national economies. When assessing the qualitative positioning of the largest FUAs, one must take account of indicators such as access to air and high-speed trains networks, location of head offices of big international firms, financial polarization, insertion into big international advanced services networks, presence of major international institutions, location of conferences. At the level of such cities, it is essential to solve the quantification of the situation in polycentric megapolitan areas, like the Dutch Metropolis Delta or Rhine-Ruhr in Germany, given that field studies such as those conducted by POLYNET[3] and COMET[4] explicitly show that the different nodes in those areas do not operate as a single node. In that case, the impact of the existence and of the level of the urban frame components has to be assessed from the point of view of the national economic performance, or at least from the point of view of very large urban areas as far as the biggest States are concerned (given that such areas may group NUTS 1 units, it makes no sense here to isolate the Madrid Community or the Ile-de-France from the rest of central Spain or of the Paris Basin).

2 Cities which qualify - or might qualify - as efficient regional metropolises: their strategic functions consist in ensuring the monitoring and polarization of strong macroregional networks and in connecting the latter to the world economic poles, which belong to the previous category. These metropolises have to be assessed not

only in terms of population volume of their FUAs – if not their nodes – (levels around a minimum of 250,000 inhabitants generally seem necessary to deduce significant monitoring effects at such a scale), but also in terms of cultural, academic, etc. potential, as well as air, rail and road accessibility. If some functional specializations may represent real assets at that level, one must keep in mind that monospecializations may weaken some of those cities, and one must take into account that situations of close polycentrism may reflect situations of weakness, esp. in the motor tertiary sector, expressing for example historical conurbation sitations resulting from the industrial revolution.

3 Regional cities, corresponding to FUAs with at least 50,000 inhabitants, and whose function is to ensure a good supply of services at local level on the whole of their territory – provided spatial homogeneity is aimed at. Here we will take advantage of the results of Project 1.4.1 on small and medium-size cities.

We will thus found our methodology on two parallel classifications of FUAs: the first one concerning all FUAs with more than 50,000 inhabitants (corresponding to the spatial monitoring level of regional cities in a Christallerian logic), the second all FUAs with more than 250,000 inhabitants, considering that this is the way to obtain the level of regional metropolises that may actually play a role as regional economic driving forces, and not as mere providers of usual or semi-usual services. The old French notion of "regional capital" is still up to date when revised.

B Defining the levels of polycentrism at different scales

Reference texts at European level present polycentric urban development as *the* means to reach the objectives defined. Given the unambiguous *General objectives* of project 1.4.3 *("The study should be built and expand upon the existing ESPON research framework and objectives within ESDP with regards to balanced, sustainable development and territorial cohesion. This regards in particular the policy orientations on a* ***polycentric development*** *and the work done on Functional Urban Areas (FUA) and Metropolitan Economic Growth Areas (MEGA) by ESPON project 1.1.1")*, and given that many comments made by Member States and Commission relate to this very aspect (*'The study should build on comments made, in particular by Member States and the Commission, related to the typology provided by project 1.1.1* ***on Polycentrism*** *and assess to what extend these comments should give rise to adjustments in the current delimitation of FUAs in the individual Member States'*), it also seems essential to us to consider, firstly, polycentricity assessment as a morphological reality, secondly, polycentricity pertinence from a functional point of view, and, lastly, to check if polycentricity does offer all the virtues it is credited with (increased economic efficiency and spatial equity, greater performance in terms of sustainable development, etc.).

1 Morphological polycentricity assessment

The ESPON 1.1.1 study has established an index to measure polycentricity at national level, based on three normative presuppositions, namely (a) that a linear rank-size distribution reflects a better urban system because free from big cities domination, (b) that a uniform distribution of cities throughout the national territory is more favourable than a distribution in

clusters polarized in some country parts, and (c) that, in a polycentric system, a good accessibility should be similarly available so much for big FUAs as for small ones. Starting from those premises, ESPON 1.1.1 has built a complex indicator made of indexes supposed to account for the three above-mentioned dimensions, namely: the slope of the regression line of the rank-size distribution as well as the primacy rate for both population and GDP, the Gini coefficient of the size of the Thiessen polygon around each FUA, the slope of the regression line between population and accessibility, as well as the Gini coefficient of the accessibility of the FUAs. This methodology provides for each country – independently of its size – a synthetic indicator of its polycentricity.

Several national experts have uttered sharp criticisms on the results produced by the polycentricity index used in ESPON 1.1.1. In our opinion, such criticisms are completely justified and are directly connected with the methodology selected to build the index. To take only one striking example, Ireland is said to enjoy a very high level of polycentricity, despite all proof to the contrary and despite all studies on this question in scientific literature.

Consequently, we propose, on the basis of a similar methodology (see hereafter), to establish a polycentricity index at three different levels:

- The first one at national level, as most of the policies are still defined there and the regional dynamics remain largely determined by that level;
- The second one at MEGA 1 level (or national level by default), which leads to obtaining macro-regions such as, for example, one Germany divided up into 6, Italy and Spain into 2, etc.
- The last one at NUTS 2 level (or at national level by default; if necessary, it will be adjusted as for Belgium, where NUTS2 correspond to the provinces, which makes no sense here) in order to assess polycentrism at a more local level, which corresponds to the territorial monitoring by large regional metropolises, in other words all the MEGAs defined in the ESPON 1.1.1 report (category 1 to 4).

This will notably allow us to characterize more finely every spatial entity considered in a double input table: polycentric areas at regional level in a monocentric context at national level (e.g. Flanders), polycentric areas at regional level in a polycentric context at national level (North Rhine-Westphalia), monocentric areas at regional level in a monocentric context at national level (central France), and monocentric areas at regional level in a polycentric context at national level (Sardinia).

As far as methodology is concerned, we propose calculating our polycentricity index through establishing the cardinal classification of the following variables:

- weight of the leading FUA in the region's total population
- weight of the leading FUA in the total population of the FUAs with more than 250,000 inhabitants;
- weight of the leading FUA in the total population of the FUAs with more than 50,000 inhabitants;
- average differences between the population of a FUA and the population of its immediate follower in a classification of decreasing populations from the largest city to the first FUA immediately under a threshold of 250,000 inhabitants;

- average differences between the population of a FUA and the population of its immediate follower in a classification of decreasing populations from the largest city to the first FUA immediately above a threshold of 50,000 inhabitants;
- variation coefficient of the population of FUAs with more than 250,000 inhabitants;
- variation coefficient of the population of FUAs with more than 50,000 inhabitants;
- sum of distances between cities and their closest neighbours weighted by their population differences plotted to the number of city pairs considered.

2 Assessment of the functional specialization

Next to these exclusively morphological measurements of polycentricity, comprehended in terms of urban population volumes, we will also consider functional polycentricity, which, according to analyses, is much more limited in some countries than morphological polycentricity.

Unfortunately, the poverty of statistics at NUTS 5 level does not allow us to characterize FUAs in a satisfying way from the point of view of their functions (FUAs are made of aggregates of NUTS 5 units). We will therefore be led to show imagination to be able to bring out the best possible measurement from a qualitative point of view, even if this does not go without some approximations.

As a consequence, we propose, on one hand, to take NUTS 3 level, which better matches FUAs outlines (this is however not possible everywhere like in the North of France for example, and it will be necessary to enter into dialogue with the ESPON 3.4.3. team, working on statistical boundary changes). On the other hand, if one cannot characterize with precision, from a functional point of view, the whole of the FUA, one can nevertheless characterize its node by means of qualitative attributes (presence of airports, universities, tourism, etc.).

The table below summarizes the grid of variables selected: seven from ESPON 1.1.1 and those we think possible to add. The latter have been selected to increase the functions diagnosis of FUAs in accordance with the Lisbon strategy, that is to say to strengthen the weight of knowledge economy and advanced services such as: the product value in marketable services (and/or FIRE), weight of R&D and/or patenting, insertion of large cities into international urban networks (Taylor's GaWC[5] index). We also suggest to try to refine the variable used in the ESPON 1.1.1 report for the public sector (see below), in order to be able to carry it into the typology (ESPON 1.1.1 had not been able to carry this variable in its final ranking). Those variables apply either to the whole FUA at NUTS 5 level (or approximated to NUTS 3 level), or to the FUA's node.

This is but a first reflection on the question, produced during the time given to answer this call for tenders, but it can of course be completed or modified by investigating more sources (we think for example of the recent European urban audit, which provides values for 200 to 300 cities) and through a dialogue with the ESPON M.C.

Criteria linked to FUA node	Criteria for the whole of the FUA
Population	Population
Transport a) airports with more than 50 000 passengers b) high-speed trains	
Tourism (number of beds in hotels or similar)	
Product value a) industry (gross value added in manufacturing) b) marketable services (and/or FIRE)	NUTS 3 level Proxy (can be profitably improved thanks to employment statistics compensating for lack of data on added values)
Knowledge: a) number of students attending higher education institutes b) R&D (share of employment in R&D) and/or patents	
Decision making in the private sector a) Distribution of the headquarters of top 500 European firms. b) Taylor's urban index (GaWC), which provides an indicator of city insertion in world networks	
Decision-making in the public sector (administrative status). Starting from the observation that being the capital of a State or of a department is not equal to being a polarizing city, even if important, we think we can refine the variable used in ESPON 1.1.1 by making distinctions according to the weight of local authorities, which means calculating the share of expenses that comes under national and local authorities.	Possible Proxy at NUTS 3 lvel

On that basis we will be able to establish a true functional qualitative typology of FUAs and not a mere ranking on three levels like in ESPON 1.1.1. Moreover, our typology will be much more oriented in the sense of the Lisbon strategy objectives.

C Polycentricity and performances (efficiency, equity, sustainability)

ESPON 1.1.1 did not succeed in drawing clear conclusions on relations between polycentrism degree of FUAs and indicators of economic competitiveness, social equity and sustainable development: "*However, these relationships are not particularly strong (...) Moreover it is difficult to deduce any causal links from them...*" (Final Report, Project 1.1.1). Starting from the results of the research works presented at the La Rochelle conference, we propose to examine them in depth and to recalculate the correlations between the new polycentricity indicator (see below) and economic efficiency, spatial equity and sustainable development indicators, at two of the three predefined levels at least (see above).

It seems absolutely necessary to achieve clear conclusions in this question because European territorial planning policies lend polycentricity a value of efficiency: polycentrism is presented as an objective adorned with all virtues: it is supposed to favour regional development, and, consequently, global development, either through adding up more performing regional developments, or through avoiding agglomeration diseconomies, which

are claimed to affect the largest urban concentrations. At the level of large metropolitan areas, polycentrism is supposed to produce a structuration in secondary centres to counter periurban sprawl dilution. As much at the level of large metropolitan areas as at the level of areas containing closely located cities, polycentrism is supposed to promote complementarities, specializations and networking of cities rather than competition. At superior scales, it is believed a more polycentric national and European structure could simultaneously lead to a more balanced regional development, a decrease in cross-regional disparities, increased competitiveness of European economies, better integration of all the European regions into the global economy, and more sustainable development.

In this part of the study, it will be essential to avoid mixing polycentrism as subject of analysis and political project, and to contribute to show the contradictions that may appear at different scales in this project, as shown by multiple comments on ESPON 1.1.1 report.

1) Polycentricity and economic efficiency

As much in static (at a given date) as in dynamic (growth over one period) terms, we will analyze the correlations between level of polycentricity/monocentrality and level of development, measured through GDP/inhab. level. The conclusions of those analyses can only be drawn in terms of possible statistical relations: these will have to be connected to considerations which border on history and functioning of national urban systems, existence of competition or complementarity between cities, etc. This qualitative interpretation is the only one that can give a sense to statistical interpretations. Also the conclusions will have to be confronted with the major current globalization trends which, we have to admit, benefit the very large services centres at the nodes of the world-economy.

2) Polycentricity and spatial equity

It will also be necessary to analyze the possible statistical links between polycentrism and spatial inequalities. These can be roughly assessed by means of inter-quartile dispersal of the GDPs/inhabitants at NUTS 3 level, although it would be preferable to make rectifications taking account of incomes, unfortunately currently only available at NUTS 2 level (at this point it will be necessary to find proxies on the basis of incomes fiscal statistics), given that FUAs, in other words labour pools, often extend onto several NUTS 3 units. The latter, especially there where they are small – like in Germany, Belgium or the Netherlands, and above all around the largest cities (London, Paris), represent particularly well adapted contexts to measure a GDP/inhabitants, an indicator whose numerator is calculated at the working place and denominator at residence place, which therefore hides completely the social problems in central cities, in opposition to the prosperity of the residents of their suburban peripheries. Inner London's ranking first and Brussels-Capital second of the wealthiest European NUTS 3 units comes close to being pure statistical mystification. As far as the largest FUAs are concerned, rectifications will be proposed.

3) Polycentricity and efficiency in terms of sustainable development

Following a similar approach, we will establish correlations between our polycentricity index at the two levels defined and a set of environmental indicators as far as the few statistical availabilities allow. We naturally think of energy consumption in oil equivalents /GDP), as

well as data from the EEA, but the recent publishing of the urban audit on Europe's environment should help us enlarge the data battery.

Summary of contents of WP 3 and 4

As explained in detail above, we propose to respond to the grounds of the *Terms of Reference* 2 (*Measuring functional Specialisation*) and 3 (*Updating of existing typology of FUAs and MEGAs*) in three steps:

We will first characterize clearly the structure of FUAs at three relevant levels of spatial monitoring: largest cities of worldwide or European scope; regional metropolises structuring FUAs with minimum 250,000 inhabitants, and lastly regional service cities at local level in FUAs with at least 50,000 inhabitants.

Secondly, we will define polycentricity levels on different scales. Given the incoherences in ESPON 1.1.1 report and the criticisms expressed against their polycentricity index, we will build a new polycentricity index on the basis of exclusively morphological variables, an index that will be used on two different scales: at State level (the only level considered in the ESPON 1.1.1 report), but also at the level of macroregions, in order to classify the latter in a double input table. Once this basis is fimly established, we will measure the functional specialization of FUAs through elaborating a true qualitative typology, much more in compliance with the Lisbon strategy.

Lastly, we will study a key question for regional policy and territorial planning, namely the qualitative links, as much from a static as from a dynamic (growth) point of view, between urban polycentricity degree and economic efficiency, spatial equity and sustainable development at both levels.

4. Proposal(s) on future research on the European Urban System

The evidence related to urban areas will play an important role in the development of policies related to urban spaces. In policy terms a major emphasis is put on the role of urban areas as drivers of economic development of regions and larger territories as well as their social, environmental and cultural endowment. In particular, the possibility of urban areas to contribute to the Lisbon objectives is relevant in this respect.

How could a further deepening of the analysis of the European Urban system?

The study should based on the findings concerning data feasibility propose elements of applied research that could met in projects within an ESPON II programme. The potential for an enhanced cooperation among urban areas in clusters (neighbouring areas) and networks (thematic cooperation) should be considered in this respect, based on the findings on the feasibility of including more functional information on FUAs in the future.

Proposals for further deepening the analysis of the urban system should as well address the challenge of a methodology for adding FUAs and MEGAs across borders (such as Copenhagen-Malmö) and for considering larger transnational agglomerations in a European perspective (such as Randstad, Ruhr, Midlands, etc.) as zones for the global integration of Europe.

From the results of this ESPON 1.4.3 project, concrete applied research proposals will be worked out, in order to produce basic discussion elements for the elaboration of the ESPON II programme. Those proposals will aim at providing basic elements allowing to rediscuss the ESDP and, at a more operational and immediate level, to bring out strategic development plans for the different types of urban areas in accordance with the Lisbon goals aimed at making the EU the world's most dynamic and competitive economy. The comprehension of the European urban network at functional level (specializations, firm networks, definition of cooperation-competition-competitiveness areas) will have to be deepened, as will the impact of its structure on economy, social, territorial and environmental cohesion in order to boost sustainable regional development and to increase territorial cohesion through promoting cooperation-complementarity of urban areas. Our reflection will be focused on the following three main questions:

A Analysis of firm networks as a precondition for a correct assessment of polycentrism

ESPON 1.1.1 in its final report clearly distinguishes the two aspects - **morphological** and **functional** - of polycentrism: *"Polycentricity has two complementary aspects. The first relates to morphology, i.e. the distribution of urban areas in a given territory. The second concerns the relations between urban areas, i.e. the networks of flows **and** cooperation"* and puts forward the clear hypothesis that cities morphologically close to each other have more chance to develop functional links: *'The preconditions for polycentricity are best wherre cities are located in proximity to each other (...) At the regional or local scale, polycentricity*

occurs when two or more cities have functions that complement each other and even more so, if the cities co-operate with each other in order to be able to act jointly as a larger city. At this level, policies for polycentricity stimulate the functional division of labour, as well as the flows and the level of co-operation between neighbouring cities'. Meanwhile, ESPON 1.1.1 concludes its study admitting that its analysis of **functional** polycentricity, that is information and cooperation networks between cities, is essentially based upon **morphological** polycentricity criteria: *"The discussion of the potential of polycentricity is based on morphological proximity (...) The potentials for enhancing a polycentric urban tissue identified in this project are related to morphology – i.e. to the proximity and size of cities"* (Executive summary). According to ESPON 1.1.1, this is essentially due to the lack of statistical data:*"A third important precondition for polycentricity is that functional integration and co-operation. However, data on flows and networks is difficult to obtain.* ***It is therefore NOT POSSIBLE to study the degree of integration at the pan-European level****"* (underlined by us, Executive summary).

The hypothesis of overlapping morphological and functional polycentricity seems to be answered negatively by large scale empirical studies on firm networks. Cabus (2005) for instance, who conducted a large survey among all firms in Flanders (thus half of Belgium) has shown that, if firms do operate more and more in networks, those networks do not follow the logic of polycentric urban entities but are much more multiform (distances are generally longer, though varying with firm size and sector concerned).

As a consequence, a comparative analysis of firm networks in Europe is absolutely necessary to understand the spatial logics that play a part at economic level. Such an analysis, relatively easy to conduct and full of lessons, can bring decisive answers to a range of fundamental questions such as: (a) which is the logic in firm establishment?; (b) how do firm networks with suppliers, customers, subcontractors and branches take place?; (c) which is the place and the importance of the different regions and urban centres in those networks?; (d) how do all these data combine according to nature of activity, firm size, location and nature of the link between firms? (e) etc. The results of that analysis should provide an improved basis for European policies in regional economic development, not in a normative and uniform way but respectful of each area's peculiarities and realities.

Lessons from that analysis will also represent a significant contribution to the reflection around the definition of the ESPON II programme and will benefit the whole of the ESPON programme. Indeed, public authorities today no longer give direct support to business in a neokeynesian logic like in the 1970s but tend to boost economic activity with the necessary externalities (see ESPON 3.4.2 project). It is thus crucial for them to know if firm networks logics follow or not urban polycentric networks at morphological level.

To the analysis of the spatial logic of firms should be added a similar analysis on the spatial logic of the other stakeholders: consumers, residents, workers, shops. This would allow public authorities to implement polycentrism in a subtle and judicious way, as much according to the different actors as according types of activity and scale levels.

The study could also be fruitfully completed by the implementation, at European level, of Taylor's methodology (see *Globalization and World Cities* (GaWC) and the POLYNET study results), which would give us information on the insertion of cities in the big urban networks at international and European level. Not only an insertion of the cities but what is from now

on called Mega City Regions (MCRs) in the world urban network with the globalization of economy.

Moreover, we should investigate the hypothesis consisting in examining the possibility that proximity between cities can easily bring about its exact contrary: competition rather than cooperation. Such a hypothesis is largely described in many empirical monographies at regional level – see the harsh competition between Liège, Aachen and Maastricht or between the urban centres making up RandStadt Holland.

B An essential temporal analysis of the evolution of urban economic structures

Still on the basis of the supposed confirmed existence of a functional polycentrism between morphologically close cities, a second explicit postulate in the final report of project 1.1.1 consisted in promoting the cities' structural specialization. Such differentiation was supposed to spare resources by avoiding infrastructure, etc. demultiplication and to favour cooperation between complementary urban entities: *"Rather than competing to build up the same urban functions, the ESDP recommends that cities should co-operate by joining existing assets, in particular assets that are complementary (...) The idea of polycentric development thus runs parallel to the shift in regional policies towards an emphasis on the development of specialised regional competencies, where synergy and strength are sought and developed through regional networks of specialists, suppliers, specialised education and labour markets, much of which is nested in tacit abilities and competencies that are difficult to codify and hence, difficult to reproduce elsewhere"* (Final Report, Project 1.1.1).

Meanwhile, studies on the evolution of urban economic structures show that, although significant differences are still present, they have homogenized from World War 2 to the mid-eighties. For the post-eighties period we will have to assess to which extent the reconcentration of activities in large metropolises goes against this basic trend.

This should be enough to question the idea of a cross-city "specialization-cooperation" couple, which lies at the heart of the morphological-functional polycentrism: *"Functional specialisation is an important dimension of polycentricity as it is these functions that make cities different from each other and produce the flows necessary for economic and political integration"* (Final Report, Project 1.1.1). This element should also be enough to start a necessary in depth reflection on the past and present trends in the localization of economic activities, more particularly knowledge economy and, consequently, whether it is or not justified to speak of spatial concentration or dispersal of this activity through the promotion of urban polycentrism: "...).

The two above-described study proposals should provide the basic material to determine new directions in regional and territorial planning policies. They will permit to improve discussions on the best means to reach the defined political objectives at European level through the promotion of polycentrism vs. monocentrism, cooperation vs. competition between metropolitan areas, etc.

C Polycentrism, growth, competitiveness, spatial equity and sustainable development

Polycentrism is in theory adorned with all virtues: *"It is hoped that a more polycentric urban structure will contribute to a more balanced regional development, to reducing regional disparities, to increasing European competitiveness, to the fuller integration of European regions into global economy, and to sustainable development"* (Final Report, Project 1.1.1) . On the basis of the first results of the 1.4.3 study (Parts 2 and 3: *Polycentricity and performances*), it should be necessary to examine more in depth those relations, so often expressed but not very often confirmed, such as the question if *more competitiveness between cities* combines with *less disparities between them,* and *more polycentric urban structures* with *sustainable development,* or even if *more polycentric urban structures* involve a *better insertion of European regions in globalization*. The analysis of the FUAs' ability to ensure residents, workers and firms accessibility to infrastructures, education, public and private services, networking of their activities and access to worldwide networks nodes, as well as the analysis of urban functions at different levels within FUAs, and the more or less narrow relations between their central nodes and the rest of their territory should bring along elements of answer to those logical, often expressed but too few confirmed, interrelations.

IV Project management

In this part of our tender we will try to describe as clearly as possible the subdivision of the study into different work packages (WPs) according to the Time Chart (TC).

General management (WP1) :
The Lead Partner (LP) will be in charge of WP1 (administrative work) during the 9 months of the project. This includes the management of contracts, financial management and general coordination and internal TPG networking in order to ensure an efficient organization of the work. It is important to note that all teams have experienced work in European consortia and even that 3 teams out of 4 have already worked together.

Theoretical overview of concepts and overall management of the project (WP2) :
WP2 concerns the scientific direction of the ESPON 1.4.3 study.
As all packages strongly require synthesizing of the work, it will be necessary to centralize and synthesize the whole study in order to ensure its coherence. The LP will be in charge of this WP all along the project achievement. The most part of the first month will be dedicated to the finalization of the methodological aspect described above as well as to the preparation of the first workshop to be held on 1 March 2006.

The first Workshop of 1 March will gather the whole team working on this project: LP and the 3 project partners (P1, P2, P3). This workshop will launch the study and will have 3 main purposes: first, to establish a true team spirit and good collective working conditions through mutual understanding and fruitful discussions on the project; secondly, to clarify as much as possible the objectives of the study and the distribution of tasks among PPs. Thirdly, there will be a discussion on the entirety of the methodological aspects of each of the study parts. Special attention will be paid to WP3 in March as many questions concerning WP4 can be dealt with later at mid-June.

Consolidation of the delimitation of FUAs, defining their cores and updating the data (WP3).
This WP will start the day after the first Workshop to end on 14 June the day before the second. Most of WP3 work will be achieved by the end of April, when WP4 (FUAs characterization) starts. WP3 will be carried out by LP, P1 and P2. During WP3 we will have to turn to national experts and dialogue with ESPON MC, to whom we will submit our proposals if problems remain unsolved and/or if some choices are difficult to make in FUAs delimitation.

Measuring of functional specialisation, update of existing typology, assessment and efficiency of FUAs and MEGAs polycentricity (WP4):
WP4 will last from 1 May 2006 to the end of September and will be carried out by the whole of the team, LP and the 3 project partners.
Meanwhile, P3 will start working only as of the second workshop (15-16 June). In this case too we will have to turn to national experts when the TPG does not have expertise to characterize FUAs locally.

The LP will be in charge, during the second half of May, of the **Interim report**, which will contain the conclusions of WP3 (coming to an end), as well as the first steps of WP4, which will have started 2 weeks before.

The second Workshop will be held on 15 and 16 June with the whole of the team (LP and 3 project partners). The workshop will be prepared by the LP in the course of the first half of June. It will be an important meeting, whose objectives will essentially be to draw definitive conclusions from WP3 (which should have ended just before the meeting) and to discuss progress and methodological problems of WP4. Finally, all teams will be invited to react, comment and make proposals about future research on the European urban system, based on a note prepared by the LP.

The Progress report, achieved by the LP during the second half of July, will present the progress of WP4 at mid-course.

Proposals on future research on the European Urban System (WP5) : this WP will be starting on 1 August 2006, just after the Progress Report, and will be achieved by LP and P3. Only two out of the four teams will be working on this question because they have acquired real expertise in the matter. Nevertheless, all partners will be invited to react and bring contributions on that point, not only on the occasion of the second workshop, on the basis of a note presented by the LP and describing the study projects planned, but also during the second half of September, on the basis of WP5 results.

The final Report will be written during the month of October by the LP and one of the project partners (P3). It will be based upon the conclusions of all WPs, which will have been concluded at the end of September.

V Networking with other ESPON projects

Globally, the 1.4.3 project team will have to work in close collaboration with the Monitoring Committee, especially as regards WP3 and WP4. Moreover, in order to be in line with the ESPON philosophy, the ESDP and the Lisbon strategy, the study will have to fall in step with the findings of projects 2.4.2 (Zoom), 3.2 (Scenarios) and 3.3 (Lisbon).

As far as the operational study itself is concerned, project 1.4.3 will have not only the possibility but also the duty, to take in consideration the results of many other ESPON projects (concluded or still in progress), especially:

- Project 1.4.1 (Small and medium-sized cities), for the delimitation of FUA nodes (WP3).
- Project 3.4.3 (administrative units), for the delimitation of FUAs and FUA nodes (WP3).
- Project 2.4.1 (Environment), for indicators related to FUAs and MEGAs characterization and specialization (WP4).
- Project 1.4.2 (Social questions), for possible indicators concerning FUAs and MEGAs characterization and specialization (WP4).
- Project 3.4.1 (Europe in the world) for the insertion of cities into globalization and for air flows as far as FUAs and MEGAs characterization and specialization are concerned(WP4).
- Project 1.4.4 (on the study of flows) as regards FUAs and MEGAs characterization and specialization (WP4).
- A strong cooperation with the ESPON Coordination Unit is generally needed concerning the work on indicators.
- Lastly, Project 2.3.2 (on regional and urban governance), as far as research on polycentrism is concerned (WP5).