ESPON project 1.4.3
Study on Urban Functions

First Interim Report
31 May 2006

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

This basic report exists only in an electronic version.

Table of Contents

Part 1: Reminder of the project programme

The Espon 1.4.3 programme was initially organised in 5 main parts:

1. Assessment of the results of Espon 1.1.1
2. Identification and delimitation of the Functional Urban Areas (FUA) in Europe (29 countries)
3. Measure of the Functional Specialization and updating of the typology of the FUAs
4. Discussion on the Polycentrism issue
5. Proposition for further research (Espon II future programme).

This programme had its kick-off meeting on March 9 2006 and is intended to finish by the end of October 2006. This interim report is to be considered as a progress report, ideas or even results shown here may still evolve before the end of the project.

Part 2: COMMENTS ON ESPON 1.1.1 FINAL REPORT

This is a critical review of the ESPON 1.1.1 final report. It mainly expresses the points of view of the research team (IGEAT, LATTS, IGSO, TSAC), but also includes some of the comments made by the Monitoring Commitee and the Espon national Contact Points. The 1.1.1 report, even though acknowledged by most readers as a step towards further understanding of the European urban system, raises many questions on conceptual and methodological aspects as well as in terms of results and policy recommendations.

Espon 1.1.1 : an unclear scientific position

The ESPON 1.1.1 programme is conceived as an academic study undertaken by a team of European scientists and should therefore apply a coherent "scientific" approach. However, it is sometimes difficult throughout the report to differentiate the descriptive and analytical study from a more normative narrative often based on ESDP and ESPON own objectives. In this context, many hypotheses remain unquestioned in the 1.1.1 report (NORDREGIO et *al*., 2005). For instance, page 3 of the report, it is said:

> "(…), polycentricity is about promoting the balanced and multiscalar types of urban networks that are most beneficial from a social and economic point of view, both for the core areas and for the peripheries."

In this sentence the descriptive value of the concept of polycentricity is shifted – one would say biased – into a rationale of action: polycentricity is depicted here as a potential leverage (to be used by planners and policy-makers) to develop an efficient spatial planning policy ("most beneficial from a social and economic point of view"). Even though this might be a result of the analysis, a scientific approach should not take for granted such assumptions which eventually has incidence on the conceptual framework of the study and on its methodology, where the normative discourses are abusively implemented into unquestioned research hypotheses.

As an example, the morphological polycentricity analysis in chapter 3 frequently abandons the purely descriptive analysis to enter the darker waters of judgmental discourses about what the results should be. The rank-size rule (used in this case to describe the concentration of the population in the upper levels of urban systems a relatively constant relation between size and rank of cities in a given urban context), suddenly becomes a goal to be achieved in order to attain a morphological polycentricity that is implicitly depicted as positive for the EU, following in so an assumption developed for instance in the ESDP.

Here is how a situation of primacy is described in negative terms in Hungary:

> "Budapest, its capital city, for historical reasons is *far too* large for this small country, in fact two-and-half times *too* large" p. 66

Many other examples can be found in the report:

> "Athens and Thessaloniki are *far too large* for the remaining urban system in Greece"
>
> "The 249 areas are *well* distributed across Europe" p. 16
>
> "A uniform distribution of cities across a territory is more appropriate for a polycentric urban system", p. 5

What are the criteria to decide if a country performs poorly or a city is too large or a distribution more appropriate, it is not detailed. What is more, the bias in favour of polycentrism is so important that it is nowhere said the capital would be ‘too’ small in countries in which the primatiality of the largest city is inferior to what the rank-size “law” provides for.

This is all the more puzzling that the necessary critical examination of ESDP's objectives is well achieved at the beginning of chapter 2. It is as if the initial cautions expressed in this first part of the study have been forgotten when undertaking the actual research work (at least in chapter 3 to 5).

Thus the report doesn't seem not to question ESDP's objectives. One can disagree on page 13 with the following sentence about polycentricity:

> "The question is therefore where new functional entities, created trough increased integration and co-operation, may change the European urban hierarchy: where can new nodes emerge, strong enough to counterbalance the Pentagon?" (p. 13)

As Belgian and Polish contact points rightly criticised the main question should have rather been a critical examination of polycentricity as a descriptive tool and as a planning principle in Europe. The commentators (see V. Biot, 2005) insist on :

> "The problem of the "relevance" of polycentrism, not scientifically proven by any "correlation" method (…)" (p. 16)
>
> or
>
> "For Poland, this report has taken for granted the approach of polycentricity selected in the ESDP and uses it as a normative and descriptive concept. So the emphasis is on measuring (polycentrism), not on the evaluation of polycentricity." (p. 19).

Overall, the scientific posture seems to be biased by a pro-polycentrism position where the ESDP/ESPON framework is influencing the analysis and result in applying unquestioned principles, objectives, hypothesis and methods.

The study made for ESPON 1.1.1 actually seems to waver between a scientific analysis of polycentricity and a normative discourse in favour of polycentrism. To keep an objective scientific position, it would have been necessary: 1° to more systematically explicit underlying hypothesis in the analysis; 2° to undertake a critical approach on ESDP's objectives and goals; 3° not to mistake analysis for action, and keep a clearer distinction between the scientific study and ESDP's policy objectives.

Those normative presuppositions also produce some biases in the measurement tools elaborated to study the urban system – what leads to the fact that some key methods and results of the ESPON 1.1.1 report, as we will show, are discutable.

Conceptual issues on polycentricity and functional specialisation

Within the concept of polycentricity, various issues are studied, at different scales, in 1.1.1 report. Scales are sometimes mixed up and so are the concepts, without underlining the links between them.

1. Scale issue

A scale-dependant analysis of polycentricity :

The problem of the *scale* at which polycentricity is studied needs to be clarified. In the ESPON 1.1.1 report, polycentricity is promoted as a continuum, while the structuring role of cities is perceptible at two clearly different scales – defining distinct issues: on one hand, the framing purposes of territories as providers of people services, or the mere execution of production activities from a Christallerian angle; on the other hand, the issue of insertion points in the globalized economy. Polycentricity is even, in some parts of the study, conceived at the *inner* city scale, what constitutes another completely different issue:

> "Polycentricity is also opposed to urban sprawl, in which the structure of secondary centres is diluted in a spatially unstructured continuum" (p.3).

A scale-dependant analysis of functional specialisation:

After measuring some elements of polycentricity in Europe, the 1.1.1 report shifts for some times to another dimension of urban systems with the study of the functional specialisation of its cities. This analytical reorientation of the paper relies on the assumption that differences in specialisation between two cities are the driving forces for their integration into a polycentric system.
However, there is an inconsistency in the use of this argument. The report assumes that polycentricity would result from functional specialisation at meso/micro level but that it is no longer relevant at the macro level (page 3). It is as if distance was reducing the potential complementarities between specialised cities. The scientific literature argues on the contrary that the most important European network of cities links distant global cities that share either functional complementarities or the same specialisation. From the metropolitan archipelago to the global city theories, recent researches argue that Paris, London, Amsterdam, Frankfurt and other major European cities shape a key polycentric economic system. To this little attention is paid in the 1.1.1 report which focuses on local accessibility and spatial proximity.

Actually, various situations have to be distinguished concerning functional specialisation:

- the case of performing small- and medium-sized cities, whose strength lies in their advanced specializations. These cities (or more precisely their firms or institutions) are often inserted into cooperation networks, but with a European if not worldwide dimension, thus not at all proximity networks. Small or medium university cities belong to this category.

- the case of neighbouring small- and medium-sized cities, in which firms actually operate in clusters (for instance, in the Belgian Courtrai area or in the north of Italy in the Brescia area or, in a high tech vein, the Silicon Valley). In the present case, it is not the specialization of cities, but well their insertion into a very specific chain and into proximity networks favouring cross-individual relationships that makes their prosperity;

- the case of polycentric urban frames, often found in old areas of heavy industrialisation or in mining areas, where neighbour cities suffer from the legacy of obsolete structures or their repercussions and from a development gap in their tertiary market sector, especially enterprise services. These cities often have weak links with each other. It is hard to see on which bases they could build up links while they distrust one another in the attraction of aids or investments. Those cities would draw more benefits from developing specialized niches in connection with nearby metropolises and would consequently make up for their lack of high level services, for instance in France, the cities of the Nord-Pas-de-Calais coal basin and Lille, or Charleroi and Brussels in Belgium.

- the case of metropolises: proposals favouring polycentrism presuppose the remetropolisation and globalisation of the economy should lead cities to specialize. In fact, the most performing large metropolises appear to have their dominant structure both diversified and more and more similar (Cabus & Saey, 1997). A similarity can be established between inter-city relationships and the trends in international trade, which decreasingly concerns complementary goods exchanges (Krugman, 1991). This is not only true of the economic structures of those metropolises, but even of the image they wish to give of themselves and of their achievements. Besides, the benchmarking studies conducted by international offices encourage a homogenization of cities' urban policies.

2. Concepts mixing issue

It is said right away that polycentricity has two different dimensions, a morphological one and a functional one. The study covers a very large part to the first dimension, which constitutes the core of the quantitative analysis, and happens to pay less attention to the relational issues. Even though much more difficult to study because of missing data, one needs to stress that the "space of flows" to use Castells terminology quoted in the report in the Chapter 6 is of crucial interest.

Besides, functional polycentricity can be envisaged in two ways:

- In its first sense, this word is used to describe cities and regions which differ from each other as to their specialization in such or such functions, i.e. metropolises in global economy, medium-sized cities in people services, coast or mountain cities in tourism, small cities of rural regions in the industrial development of local productions, etc. In this first definition, functional polycentricity is thus closely linked to the notion of functional specialization, suggesting possible cooperations between complementary cities.
- A second definition of functional polycentricity can start from a more dynamic approach of urban and regional systems. Functional polycentricity is then no longer limited to the study of the cities' economic specializations in such or such function, but corresponds to the *functioning* of the urban system. The emphasis is shifted here from complementarity to exchanges between cities and regions or, statistically speaking, from location quotients to intra- and inter-regional matrixes. Polycentricity is measured in terms of intensity of the relations (exchange of labour, capital, products, services, ideas, etc.) between the spaces considered.

Here's a first confusion between these two phenomena – the specialization and the relations: they are often assimilated as the same thing in Espon 1.1.1 though their relation is never demonstrated nor even analysed. This appears clearly on page 3:

"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".

The study of functional specialisation seems to take for certain the causal link between functional complementarities and potential polycentricity. Yet, there are numerous examples of interactions that result not from distinct functional specialisation but from common specialisation in one or more functions. It is the case with what appears to be the metropolitan system in many developed western countries where the strongest interactions in a given urban system take place between the major agglomerations which in fact share the same economic specialisation. Relations do not come from differences but from identical specialisations in this case. At a larger scale, the London – New York – Tokyo triarchy described by Sassen results from the same concentration of financial services in these three global cities.

Moreover, the 1.1.1 report does not manage to propose a framework explaining how functional specialisation is a tool to describe relational polycentricity. As it is explicitly done with the seven functions depicted in each country in chapter 4. How does a high ranking score in one function or another increase the potential for polycentric integration of a city is unclear. Many studies on city-region networks have stressed the limits of such hierarchical classifications (ranking method). At least it should be complemented with an analysis of "real" economic flows (see P. Taylor, 2003 and its argument on global city networks for instance). In other words, to allocate a value to cities does not inform effective exchanges between them. This is the paradox of the 1.1.1 analysis: it focuses on functional specialisation of cities but fails to indicate functional - that is to say relational – polycentricity.

As one can see, there is also a confusion between "spontaneous" relational polycentricism and institutional cooperation as if the processes were almost equivalent. The indistinct use of both functional integration processes (that result from effective flows) and of co-operation (which is not defined in this case as functional or political) is clear in the following sentence :

"A third important precondition for polycentricity is that of functional integration and co-operation." (p. 17).

As these two dimensions refer to different level of analysis (socio-economic and urban processes on one hand, political and administrative configurations on the other), one solution to limit an undifferentiated use of these complementary but yet distinct dimensions of relational polycentricity would have been to separate them much more strictly in the different parts of the report. In this sense, institutional cooperation should have been kept in the final chapters (7 and 8). Unfortunately, this dimension is often discussed in other chapters.

Such a clearer distinction would have prevented some problems one faces in the understanding of PUSHs areas. In this descriptive analysis of how city-regions works, the potential role of political institutions should not have been used to define inter-urban relations as it is done in this case.

Measures

1. measure of polycentricity

Once the notion of polycentricity has been defined, the study develops a methodology which relies on some unexplained hypothesis that underpins the quality of the analysis.
The study of the European urban system is done in a very empirical way, using standard statistical tools without questioning them. Polycentricity for instance is qualified via different measures among which the size and location indexes are problematic. Demographic size is the primary indicator of polycentricity. However, it refers to a relatively limited understanding of urban "systems". As urban geographers have shown the rank-size analysis is only efficient to qualify the hierarchy of a set of cities but not a *system* of effective relations. Indeed, the use of the rank-size rule is at best only a very indirect indicator of how an urban system might work. It is based on the underlying hypothesis that the geographical distribution of cities follows a hierarchical pattern. In this case, the European urban system is therefore not seen as a network but as a hierarchical arrangement of cities.
This Christaller-like approach is even more obvious when complementing the size index by the location index. The report says:

> "The second prerequisite of a polycentric urban system is that its centres are equally spaced from each other – this prerequisite is derived from the optimal size of the service or market area of centrally provided goods and services. Therefore, a uniform distribution of cities across a territory is more appropriate for a polycentric urban system (…)". (p. 60).

This normative proposal, where a homogeneous distribution of cities is considered "optimal" follows a christallerian rule. This expresses a partly out-dated understanding of contemporary urban systems, especially in regard with the notion of relational polycentricity which demands a network approach rather than the study of an evenly distributed and hierarchical urban structure. In this regard, the 1.1.1 report analysis has been rightly criticised by Contact Points as too static, studying the location of cities (*urban structure*) but missing the interactions between cities (*urban system*). In other words the priority is given to morphological polycentricity (via the analysis of spatial proximity) over relational polycentricity measured in terms of connectivity. Despite the complementary use of a connectivity index at the outset of the analysis (as a third indicator of polycentricity), the study quickly shifts to a narrowed definition of polycentricity:

> "The preconditions for polycentricity are best where cities are located in proximity to each other." (p. 13).

This hypothesis should have been debated more thoroughly as it becomes the key to the rest of the analysis on potential new polycentric developments in Europe. It is indeed what justifies for the authors the use of 45 minutes isochrones to define the PUSHs and PIAs areas. This criterion unfortunately focuses on *local* accessibility rather than on long distance connectivity, most likely leaving aside the important interactions between distant city-regions that constitute the European urban system.

2. Measure of functional specialisation

There is a lack of theoretical clarification on the underlying urban model used to study the functional specialisation in Europe. It seems that the seven functions have been cherry-picked and correspond more to an opportunistic research strategy depending on data availability than on a solid analysis of what cities are. It is symptomatic that the summary report and the chapter 4 give only disarticulated reasons to justify the different functions selected. A basic model of urban functions would have been useful if only to explicit the rationale behind this functional typology.

This might have prevented the use of denominations that are a little imprecise. "Population" is arguably a function of a city but rather a characteristic. One might have preferred the use of the *residential* function term, referring to the fact that a city is a place where people live.

On a more theoretical level, one might regret a lack of detailed analysis of some functions used in the classification as for instance with the "knowledge" function which is not clearly defined. Regarding the fuzziness of the terminology "knowledge", it would have been more explicit to discuss the content or to use a clearer term such as the *creative* function defined in Florida's works (2002) or the *innovation* function (understood in a more restricted way than the creative function as activities dealing with the commoditisation of new knowledge). This semantic debate is not a purely academic argument. It has interesting outcomes in the selection of relevant indicators. The number of students is interesting but is quite limited: number of scientific quotations (informing what could be labelled the "new knowledge production" function), amount of R&D investments (informing the "innovation" function) and the share of creative workers (i.e. the "creative" function) could have further helped understand a complex and probably crucial aspect of modern economies. From our point of view, the idea would be to go past a too high-tech industries related definition of the knowledge function and to broaden the analysis to this ability of cities to engage technological, conceptual, aesthetic and semiotic innovation.

At a more general level, the different "functions" used in the study would have benefited from an initial clarification of the goals and nature of the classification exercise. There is for instance an unclear relation between the nature of the specialisation (quality) and the implicit ranking (quantity) that is proposed for each city. From what one might understand, even though this is unfortunately not made clear in the report, the first dimension informs the quality of a city (administrative, residential, etc.) while the other measures its "attractiveness", i.e. how successful a city is in polarising a function. This results into giving to distinct objectives to this functional specialisation study which may not go together easily. One is strictly descriptive (what is the dominant function(s) of a city?); the other is more evaluative (how good is a city performing in this function?). These are two different exercises that need to be carefully articulated.

This can be illustrated with a detail analysis of "the decision-making power in the public sector" function. We argue that what is described here is not so much a function strictly speaking than a valuation of how a city is successful in a function which could be labelled here the *administrative* function. This administrative function is not specific to European and national capital cities – the ones that have got strong decision-making power in the public sector – but to many other cities. One feels that it is only in a second step of the analysis that the degree of specialisation (low/medium/strong decision-making power) should be considered. This classification can even be further refined by including a spatial reference depending on the scale that is considered. In the French case for instance, administrative cities could be differentiated for instance in four categories: préfectures (NUTS 3 level capital cities) would be *local* administrative cities, préfectures de région (NUTS 2 capital cities) would be *regional* administrative cities, where as Paris would be the *national* administrative city and Strasbourg would be a *European* administrative city. This example shows that observers should differentiate more accurately the nature of the specialisation (the function strictly speaking), its scale and its intensity. One could extend this to most functions. For instance a city specialised in the "production" function (this can be refined for instance into manufacturing and service production) can be either a local, regional, national or European decision-marking city. In this context, the distribution of the headquarters of the top European firms might be an indicator among "productive cities" of a European concentration of decision-making powers. Following the same reasoning, a city with national headquarters would be a productive city with national decision-making powers, and so forth with other regional and local firms.

In conclusion, the functional classification of European cities should distinguish more clearly the *nature* of the specialisation, its *intensity* and its different *scales*, leading to a three dimensional analysis of specialisation.

Axis 1: nature of the specialisation (qualitative)
Axis 2: scale of the specialisation (qualitative)
Axis 3: intensity of the specialisation (quantitative)
This could lead to a comprehensive table of analysis as follows : Axis 1 = columns, Axis 2 = lines, Axis 3 = quantitative values in the table

	Residential function	Industrial function	Innovation function	Administrative function
International/European				
National				
Regional				
Local				

Methodological issues

Our strongest criticisms go to the methodology used in the delimitation of the FUAs and in the measurement of polycentricity.

1. Data availability : the strongest limitation to the study

The 1.1.1 report most important limit comes from the lack of consistent data which can be harmful in terms of results and methodology as shows the following example. If the authors of the report express their intentions to give priority to a European-based study of the urban system:

"the point of departure is that of the European scale" (p. 4)

following in so one of the major objectives given to the ESPON programme, the report is almost entirely based on a very national-centric approach. The study of polycentricity is for example firstly achieved at the national level as the title of chapter 3 indicates. Furthermore, the very definition of the basic geographical building blocks of the study refers to the national level. For instance the FUAs are based on "two thresholds depending on the total number of inhabitants of a *country*". Seemingly the degree of polycentricity is studied within national urban systems. Even though the authors argue that:

"The countries are the best-integrated territorial level in Europe," (p. 5),

this argument is no justification for an analysis that is a European-oriented research project. The object is not to study the most-integrated territorial level (whatever it is) but to focus on the *European* urban system. This has severe consequences in the results. The calculation for instance of Thiessen polygons within national borders exclude all potential transborder polycentricity.

The problem of national-centricity of the study becomes even more dramatic as it is sometimes coupled with poor national data (such as subjective expert "insights"):

"In countries lacking official definitions, the identification of FUAs was based on insights provided by our national experts. The use of national definitions means, however, that the choice of FUAs is not totally comparable across Europe." (p. 4)

This explains partly the problems with some building blocs of the analysis: the Functional Urban Areas

2. Critics on the definition and delineation of the spatial units: FUAs, MEGAs, PIAs and PUSHs

Typical difficulties encountered when trying to delimitate a homogeneous set of functional spatial units in Europe are:

- differences among national definitions and criteria of identification of towns and urbanized areas
- heterogeneity of urban settlement patterns, related to variations in overall population density, urbanization level, historically development settlement forms
- nonuniform availability of spatial data

The lack of common data for the Urban Agglomerations (UAs) and the FUAs partly explains the lack of a single Pan-European definition that is necessary to attain the objective of the study.

> p. 54: "Lacking comprehensive and definitive definitions, this research could only look at various national definitions of UAs".

Commuting data used in this case are available at NUTS 5 level only in 8 countries while national FUAs definitions are available in only 18 countries. Therefore, even though there is theoretically a definition of the FUAs, the final database at the end of the data collecting exercise looks much more like a patchwork of differentiated perimeters than a really standardised spatial study. Quite obviously the authors of the 1.1.1 report must not be blamed for this deficiency which points out our inability to create a pan-European statistical system.

However some minor corrections could have been achieved with the limitation of unnecessary arbitrary decisions:

> "For countries with more than 10 million inhabitants, a FUA is defined as having an urban core of at least 15 000 inhabitants and over 50 000 in total population. For smaller countries, a FUA should have an urban core of at least 15 000 inhabitants and more than 0.5% of the national population, as well as having functions of national or regional importance." (p. 24).

The difference in the definition that depends on total national population size is not explained. It is also not convincing. For example, one can see hardly a reason why the minimum population size for FUAs in Hungary, or the Czech Republic should be 50 000 while in Denmark, or Slovakia – 25 000.
The inclusion of cities under the 20.000 inhabitants threshold:

> "even smaller FUAs are considered if they have a functional role within the national urban system" (p. 64)

is another unjustified decision.

More generally, in the light of the fact that the main goal of the 1.1.1 project was to identify areas of potential urban concentration that could constitute in the future a counterweight to the Pentagon, and hence to analyse urban patterns in Europe at a macro-level, the size limit of 50 000 for a FUA seemed to be an absolute minimum. Inclusion of de facto small towns (as cores of free-standing FUAs) as potential concentration nodes at the European scale has led to a dilution of the analysis and to some paradoxical results, especially in its further steps, when the PUSH and PIA areas were identified. It should be recalled at this point that in the ESPON 1.4.2 project, on *Small and Medium-Sized Towns*, 50 000 inhabitants constitutes the upper size limit for small towns, while medium-sized towns are considered those falling in the 50 000 – 120 000 category.

Such a situation – a choice of FUAs not totally comparable across Europe – was unavoidable. Total comparability of spatial unit would not be a realistic objective. The question remains, however, whether the comparability level actually achieved is satisfactory. This is an important question, as the FUAs comprise the basic units on which most of the further analysis (for example, measurement of polycentricity) was performed.

Some comments of the ex-post evaluations prepared by the EMC and the ECPs relate to the FUA definition, but these observations are fragmentary. A closer inspection of the FUA sets on a country-by-country basis reveals further inconsistencies, as well as errors. The lower size limit for FUAs in several countries – Germany, France, Hungary, Italy, Romania and the United Kingdom – was set at 20 000 inhabitants, in contradiction to the general definition provided. At the some time, population of the smallest FUA identified in Belgium is 70 000 (with all the remaining ones above 100 000), 52 000 in Bulgaria, 51 000 in Spain, 39 000 in Latvia, 60 000 in the Netherlands, 47 000 in Slovenia, and 44 000 in

Poland (with all the remaining FUAs, except one, exceeding 100 000 inhabitants). In the latter group of countries there exists, of course, towns below that size level which could qualify for inclusion as cores of potential FUAs. However, they were not considered as such. In Poland, to use one example, there are 137 towns in the size category of 20 – 50 000 inhabitants, the majority of which are free-standing settlements rather than parts of larger urban agglomerations.

As a consequence of this, differences in the number of FUAs among individual countries can not be rationally explained on the basis of structural characteristics of urban settlement (see Table 1). Indeed, the number of FUAs in the Czech Republic (25) is just one-third of the respective number for Hungary (77), in spite of similar population size and area of the two countries. It is even lower than the respective number for Slovakia – a smaller country, sharing a number of common characteristics with the Czech Republic. In the case of Poland, the number of FUAs identified (48) is comparable to that of Sweden, Portugal and Greece, countries with much smaller total population (the latter two also in the area).

Country	Number of FUAs	Population size of third smaller FUA (in thousand)
Austria	24	22
Belgium	21	141
Bulgaria	31	59
Switzerland	48	22
Czech Republic	25	71
Germany	186	27
Denmark	35	26
Estonia	10	24
Spain	105	52
Finland	35	26
France	211	22
Greece	45	22
Hungary	77	26
Ireland	7	47
Italy	253	23
Lithuania	8	72
Latvia	8	49
Netherlands	39	61
Norway	36	24
Poland	48	105
Portugal	44	22
Romania	59	24
Sweden	47	23
Slovenia	6	77
Slovakia	27	28
United Kingdom	146	21
ESPON Space	1588	

Table 1. Selected data on Functional Urban Areas (FUAs)

The source of these inconsistencies is no doubt a lack of sufficient comparability of the FUA definitions actually used for individual countries. Differences in the selection criteria were simply too large. As a result, the set of 1584 FUAs identified in the project fails to represent a close enough approximation of the European urban network.

Some comments can also be made about the delimitation of the other spatial units used in the Espon 1.1.1 study:

- There are several references to the MEGA selection in the comments on the final report made by the MC and the ECPs. Most of the remarks pertain to individual cities (FUAs) that are missing from the MEGA list but, for some reasons, deserve to be included. The Swiss MC, for instance, points out the case of Basel which was not allocated to the MEGA group owing to the fact that, according to the comment, in the ESPON 1.1.1 the Swiss-French EuroAirport was allocated to the French city of Mulhouse, ignoring its relation to the city of Basel. This indicates one of the problems with the MEGA (and hence the FUA) delineation, i.e. it disregards transboundary areas.
  Some comments also bring out the question of whether important metropolitan centres situated beyond the EU borders should not be considered among the MEGAs. St. Petersburg, for example, "one of the biggest MEGAs in the whole Europe and a very important node of the Baltic Sea Network". This is in fact a part of a bigger issue; another relevant example being that of Istambul.
  A number of doubts, as to the appropriateness of the selection criteria adopted, arise from a closer inspection of the full list of the 76 MEGAs, as well as their allocation among the four categories. An important point has been made by the Belgian CP who questions the major role attached to airport and harbour functions. Indeed, the elevation of Palma de Mallorca, Cork, Turku, Southampton or le Havre to the MEGA status arises doubts, when centres such as Strasbourg, Hannover, Thessaloniki, The Hague, or Liverpool are left behind. The allocation of Palma de Mallorca into a category with cities such as Rotterdam, Budapest and Lisbon is a clear signal that revisions are required in the typological procedures applied. Among minor errors one can mention the ascribing of the city of Turku, in Finland, to north-western Europe (Final Report, p. 13).

- The function of PIA units, in the light of a number of comments, is not clear. Questions pertain to their embededness within national territorial planning systems. The ESPON report seems to consider the PIAs as spaces for reflection, but also for action, in order to re-balance the European urban system. It seems, however, that this objective has not been fulfilled, owing mainly to methodological issues. This is a pity, since a lot of research work was invested into the delineation and analyses of the PUSH and PIA networks.
  First of all, the PUSH and PIA systems reflect all the inconsistencies, primarily the differences among individual countries, in the way the FUA units were identified and delimited.
  Secondly, it was not realistic to assume that all FUA centres, including the smallest ones, can extend their zones of influence over the area situated within the 45 minutes travel time isochrone. If clusters of PUSH and PIA areas were to form magnets for further concentration of economic and demographic potential, they would have to be based upon the network of large cities which offer real attracting power in terms of labour market and the range of specialized services.
  Thirdly, as presented in the report, the pattern of PUSH areas reflects mainly variations in the overall density of urban settlement. Countries with high population densities are almost completely covered by the PUSH and PIA units. This says little about the structure of the urban systems.
  Fourthly, the identification and typology of the PIA areas (276 in total) has produced a number of paradoxical outcomes. As a consequence of the adoption of specific rules, some de-facto middle-sized cities, for example Bielefeld and Verona, emerged as main cores of huge urbanized areas, with the total population of 7.6 million and 6.6 million, respectively. By doing so they could also "advance" within the European urban system, to 12th and 15th rank, among all the major potential urbanized areas (the PIAs) identified.
  Using the case of Poland, one can easily demonstrate that in the elaborate construction of the system of PIA areas the knowledge on urban structure of a given country was totally disregarded, while the results produced have neither scientific nor practical utility.

3. Travel to work : a restrictive approach to polycentricity

Even though this results from a very substantial challenge (i.e. the lack of data), commuting-based analysis is an inadequate indicator to describe relational polycentricity as it focuses only on some types of relations (workers' journeys from home to work) and favours a strong bias towards morphological polycentricity based on spatial proximity. Which the authors of the report acknowledge:

> "One must however keep in mind that spatial proximity is only one aspect of the interaction between cities. Another potentially more important one, is the network aspect. Due to the lack of data, the present project has not endeavoured to present a comprehensive analysis of network interaction between cities. " (p. 53)

If commuting is the less inefficient dataset to define FUAs perimeter, it is very arguable when applied in terms of relational polycentricity as it is does in the PUSHs and PIAs analyses.

> "Our hypothesis is that cities with overlapping travel-to-work-areas have the best potential for developing synergies." (p. 13)

This hypothesis has the merit to be explicitly stated so that the reader knows on which assumption the results are based. However, one is bound to ask why would overlapping travel-to-work areas favour synergies?

> " For each of the FUAs, we have calculated the area that can be reached within 45 minutes by car from the FUA centre. These areas are then approximated to municipal boundaries, as municipalities are potential building blocks in polycentric development strategies." (p. 13)

Here again we find in this explanation of the methodology a confusion between socio-economic processes and political and administrative forces (municipalities as actors of polycentric development strategies). But it goes further as it is based on the belief that proximity leads to polycentricity. Commuting distance is however a very limited tool as the report explains itself:

> "Considering the potential commuter catchment's area as a proxy for each city's influence area is another major hypothesis underpinning the present analysis. Many other types of influence areas exist. For example, the concept of Global integration zones implies that some urban areas have transcontinental influence areas." (p. 121)

4. Criticisms on some detailed indicators

The methodological issues reflect as well some more limited problems encountered throughout the report of which is a brief list.

Size index. The regression plot is calculated on all cities but the major. No explanations are given on the reason why not to include the biggest city.
Location index. The Thiessen polygons methodology does not reflect effective influence of cities.
Connectivity index. Due to lack of data, it is potential connectivity that is measured and not "real" flows (p. 61).
Polycentricity index. Based on selected indicators from the three indexes (size, location and connectivity), this index is a weighted aggregation that refers to no theoretical framework. Therefore, the weight of each indicator seems to be the result of an arbitrary decision which is all the more problematic as the authors admit the final results to be sensitive to changes in the aggregation method. The health warning on the value of the polycentricity index is therefore alarming considering the small correlations observed later in the report between polycentricity and economic, social and environmental data.

GDP/inhabitants. Recent literature shows that the use of GDP/inhabitant is a poor indicator of social inequity and probably even of economic development dynamics in most developed city-regions (Davezies, 2005). Other indicators should be used as proposed by Behrens (2003).

5. Critics on the indicator of polycentricity

The ESPON index uses the size, location and connectivity indexes described above. It is based on three normative assessments:

- a linear rank-size distribution indicates a better urban pattern because not dominated by a single big city
- an uniform pattern of the cities disseminated through the national territory is better than a pattern of urban clusters polarised on certain parts of the national territory
- in a polycentric pattern, accessibility should have to be identically available for small and big FUAs.

The use of Thiessen's rather than Reilly's polygons to measure the more or less strong equidistribution of the territorial servicing by cities means that the equality of the size of these polygons is an objective per se, notwithstanding the pattern of the population on the territory (or that the even distribution of the population on the national territory is an objective per se).

A complex index adds indicators supposed to account for these three dimensions. It characterises each country by a synthetic value, notwithstanding the size of the country. Beyond the normative character assigned to the rank-size law, a logical incoherence appears, as this index takes into account as well the distribution of the population of the FUAs as their GDP, when a scientific analysis should precisely aim at measuring if more or less polycentricity implies more or less equity in the regional distribution of the GDP.

Results

Due to these different limitations (conceptual and methodological), of which the lack of consistent data is the most harmful, some results are suspicious.

It is true with the perimeters studied in the report from FUAs to MEGAs. Some FUAs seem to be missing in some countries (Poland) whereas there are too many of them in other countries (Hungary for instance). MEGAs face the same difficulty. Quite surprisingly in the French case for example, the port of Le Havre qualifies where important city-regions such as Nantes or even Strasbourg (one of the European capital cities) are excluded.

The discutable methodology used to measure polycentricity sometimes leads to results much different from a knowledge, even basic, of national situations and litteratures. This suspicion is also raised by some results which have been largely commented by most European Contact Points. As an example, we can only express our surprise to see that Ireland appears to be among the most polycentric nations in Europe whereas Germany is only in the average (p. 67).

Part 3: Characterization of the Functional Urban Areas

Espon 1.1.1 has produced an exhaustive list of the FUAs for 29 European countries. Globally this list appears to be correct but some errors have been made, according to the criticisms made on the final report by the Espon Contact Points. We don't intend - nor have the mission - to establish a new exhaustive list of the FUAs but we have produced a new methodology to study the morphological areas of the cities. We have thus started to list the European cities on a morphological base by selecting the FUAs (from the Espon 1.1.1 list) with more than 50,000 inhabitants and characterizing them at the NUTS 5 level, using the NUTS 5 database developed by Nordregio and IRPUD for the European commission[1]. From this database we have extracted information like the population and the areas for each NUTS 5 unit and put them on a map of Europe. Creating this list of all the NUTS 5-units contained in each European morphological area will be our main contribution to the study of the European urban network. We are thus now able to produce a map – and all the relative data - of all the selected cities at a European scale, which is interesting because it characterizes precisely the urban areas of each FUAs. It allows further researches on the core cities of the FUAs with all their important functions.
Here's the methodology:

Methodology

First the criteria are built up to make a clear distinction between two main classes of cities :

- *Small*, *medium* and *large* cities which are more to be studied in a Christallerian perspective, they are providing services and the basic infrastructural framework for the territory,
- the *main* cities, at a European metropolitan level, which are the nodes for the insertion in a competitive international economy. From our point of view this last category is the most relevant, for it drives the future of Europe in the Lisbon perspective.

From the EUROPEAN point of view, it appears to be essential to follow the same criteria for every country, whatever their sizes. We are not working in the point of view of NATIONAL territorial planning.

What are *cities*, *morphological urban areas* and *functional urban areas* ?

MORPHOLOGICAL URBAN AREAS

Basically a city is a densely populated node, with a true urban landscape and even better a historical core. Therefore, we have approached those characteristics by considering at first all the municipalities (NUTS 5 level) with more than 650 inhab./km^2. Then all the contiguous municipalities with this threshold of density were added to define central or *morphological urban areas*.

However, in some cases, municipalities have a true urban character but are not reaching the level of 650 inhab./km^2, due for instance to some specificities of the delimitation of the municipality (a large part of the territory is occupied by a lake, or mountains or forests, …). Therefore we have also taken into consideration all the municipalities with more than 20,000 inhabitants.

1 In cooperation with an extensive research consortium, and as part of the DG REGIO Study on Mountain Areas in Europe. This database covered all municipalities of countries with mountain areas. It was then extended to other countries as part of an ESPON project carried out by Nordregio and IRPUD.

In some other cases, very densely populated municipalities are in fact very small isolated entities with only a few thousands inhabitants : therefore, we have not considered municipalities or sets of contiguous municipalities not reaching the 20,000 inhabitants threshold, even if they meet the density criteria.

In some cases, sets of contiguous municipalities, each reaching the 650 inhab./km^2 and/or the 20,000 inhabitants threshold, form a very large area which is in fact structured by different nodes, each with a clear identity, which is the case in some large conurbations. We have then identified different cities, but only when the different nodes are clearly identified as such at the upper levels of the urban hierarchy in the national studies of the urban networks. The limits between these contiguous cities are then based on the limits between their labour pools, if available. If not, we will explain the specific methodologies used in each case.

FUNCTIONAL URBAN AREAS

They are in principle defined on the base of the manpower basin of the morphological urban area.
In fact, the data provided by the ESPON 1.1.1 study don't seem to follow strictly this criteria in many countries, and sometimes truly not. We will discuss that point in each national case.

Here, we will consider two levels, *main cities* on one side, *small*, *medium* and *large cities*, on the other side, according to the above theoretical first paragraph of this chapter.

MAIN CITIES

In this category, we can yet consider two levels, i.e. *Megacities* and *European Metropoles*

MEGACITIES	the population of the *functional urban area* (FUA) is more than 1 million
EUROPEAN METROPOLES	- the population of the FUA is more than 500,000 inhabitants,
	- AND the morphological city at the centre of the FUA occupies an upper level position in the national urban hierarchy (for instance, Regional Metropoles in Germany, in Italy, in France, etc.)

In some cases, we have to consider the situation where different *Megacities* and/or *European Metropoles* are contiguous, or are only separated one from another by other cities (with their own labour pool), or even are bordered by other large, medium or small cities (also with their own individualized manpower basin). In these cases, we have identified POLYMEGACITIES or POLYEUROPEAN METROPOLES. So, we don't have considered as being a Poly two or more large, medium or small cities with contiguous manpower basins.

At the reverse, if medium or small cities don't have individual FUA and are incorporated inside the labour pool of *Megacities*, *European Metropoles* or even large cities, they are not considered as such. The population of these secondary FUAs is included in the population of the main FUA (and even sometimes they could be included in the population of the main morphological area, in case there is a contiguity at the level of 650 inhab./km^2), but they are however called *secondary cores* inside the principal one in a special listing.

For each *Megacity* or *European Metropole*, we will provide population data for the FUA (on the base of ESPON 1.1.1, possibly corrected) and also for the *morphological core* and the *area* of the morphological core. Since few data are available at EUROSTAT at the NUTS 5 level (for instance economic data, including GDP), we have given, if possible, a proxy of the FUA, and sometimes even of its morphological core, at the NUTS 3 level.

OTHER CITIES

In this category, which is more pertinent for the national territorial planning than from the European point of view, we can yet consider three sublevels, i.e. *large*, *medium* and *small* cities.

LARGE CITIES	the population of the FUA is more than 250,000 inhabitants.
MEDIUM CITIES	the population of the FUA is more than 150,000 inhabitants.
SMALL CITIES	the population of the FUA is more than 50,000 inhabitants. We have thus not considered morphological cities that would have more than 20,000 inhabitants but with less than 50,000 in the whole FUA.

As explained above small and medium cities are not individualized if they are only secondary cores inside bigger FUAs, therefore they are added to the global population of *Polymega* or *PolyEuropean Metropoles* if they are inserted between neighbour *Mega*, *European Metropoles* or *large cities*, or only bordering them.

The limit between contiguous *morphological area* of two identified FUAs has been put between the municipalities where the level of density is minimum.

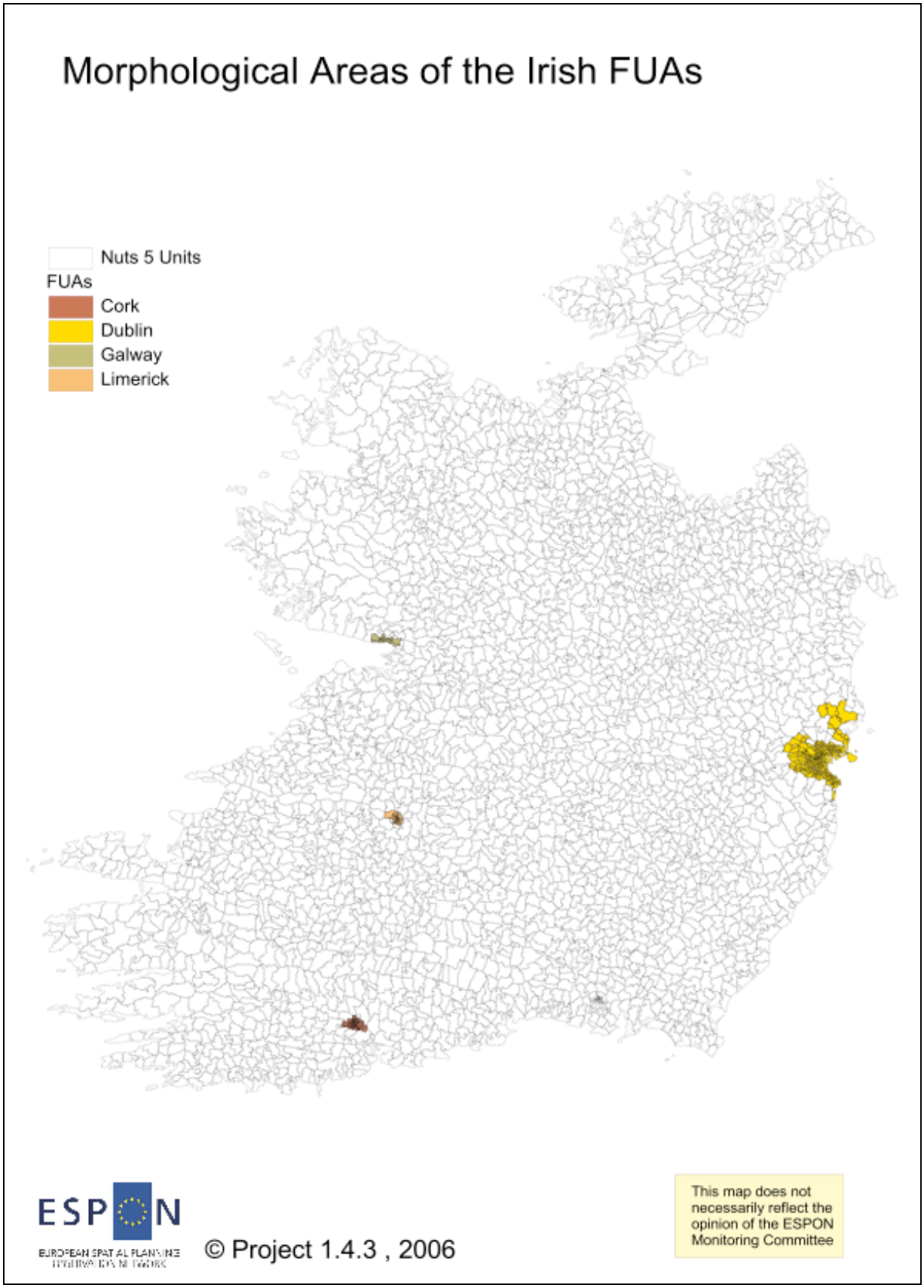
Summary

FUA = morphological area (MA) + labour pool

Criteria for the classification of the FUAs :	population number (minimum 50,000)
Criteria for the morphological area (MA) identification :	density of the NUTS 5 units (> 650 inhab./km^2)
	Population number (> 20,000)
	Contiguity (possible inclusions)
	Identity (possibly FUAs with several MA)

Examples

Next pages show maps of the morphological areas of the FUAs of Ireland and Finland based on a NUTS 5 layout. These maps are shown as examples, they must not be considered as a finished work.


Morphological Areas of the Irish FUAs
Nuts 5 Units
FUAs
Cork
Dublin
Galway
Limerick
ESPON
EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK
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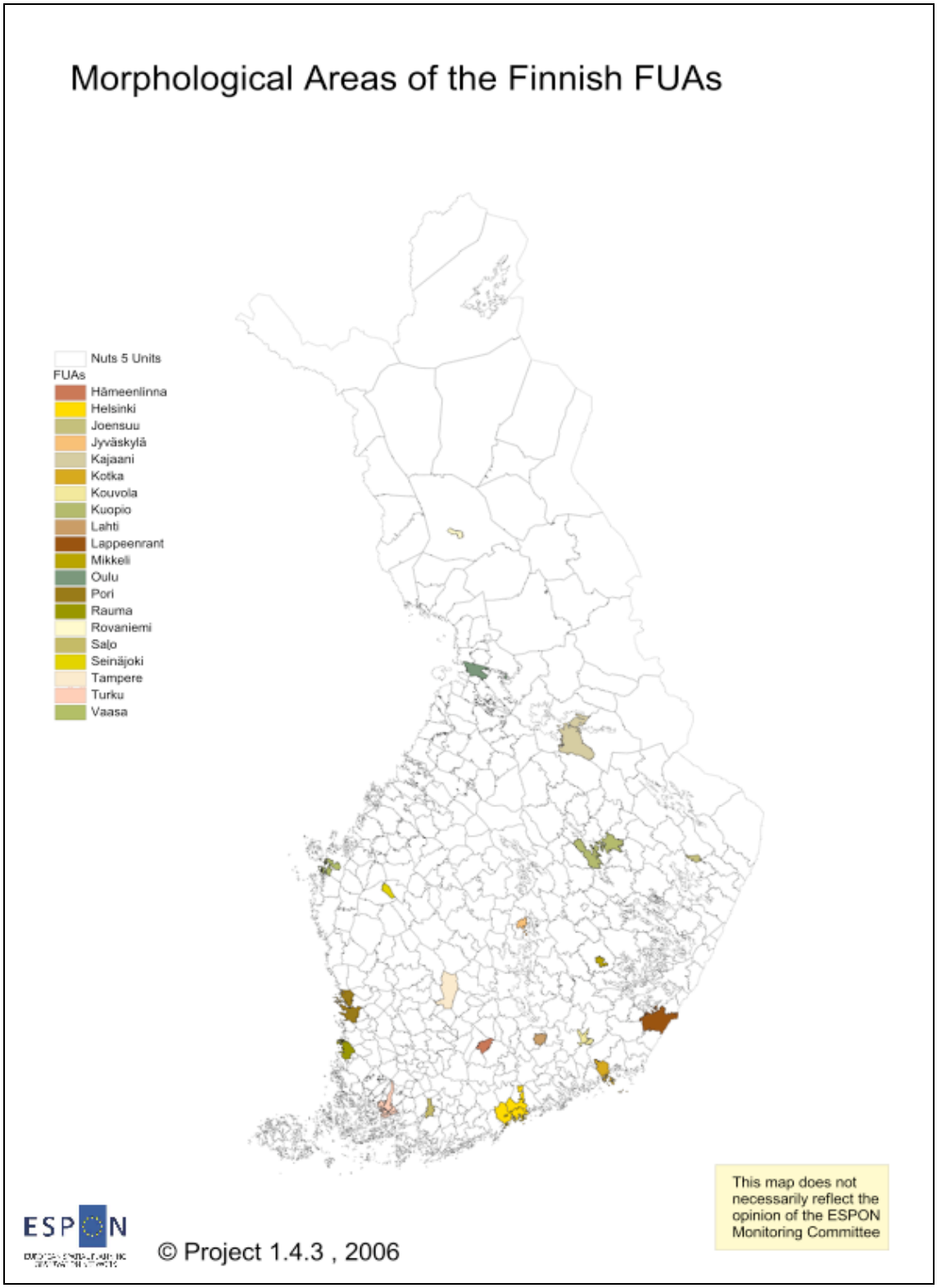
Morphological Areas of the Finnish FUAs
Nuts 5 Units
FUAs
Hämeenlinna
Helsinki
Joensuu
Jyväskylä
Kajaani
Kotka
Kouvola
Kuopio
Lahti
Lappeenrant
Mikkeli
Oulu
Pori
Rauma
Rovaniemi
Salo
Seinäjoki
Tampere
Turku
Vaasa
This map does not necessarily reflect the opinion of the ESPON Monitoring Committee
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Example of the data gathered for each country (here : Finland).

							NUTS 3 Proxy of the FUA						NUTS 3 Proxy of the morphological area					
Category	City	NUTS 3 location	FUA's population	Morphological area's population	Morphological area's superficy	NUTS 5 units of the morphological area	Population	GDP/inhab.	GDP	Area	Population proxy/FUA's population	NUTS 3 units of the proxy	Population	GDP/inhab.	GDP	Area	Population proxy/M.A.'s population	NUTS 3 units of the proxy
Mega	HELSINKI	FI181	1285	1032	2947	a	1298	30966	40181	6767	1,01	FI181	1298	30966	40181	6767	1,26	FI181
LargeCity	TAMPERE	FI192	337	198	686	id. (b)												
LargeCity	TURKU	FI183	365	218	305	c												
MediumCity	OULU	FI1A2	201	123	394	id.												
MediumCity	LAHTI	FI185	162	98	154	id. (b)												
MediumCity	JYVASKYLA	FI193	150	80	137	id. (b)												
SmallCity	KUOPIO	FI132	116	87	1188	id.												
SmallCity	PORI	FI191	108	76	1050	id.												
SmallCity	VAASA	FI195	101	57	397	id.												
SmallCity	KOUVOLA	FI186	92	52	172	id. (d)												
SmallCity	JOENSUU	FI133	90	52	120	id.												
SmallCity	LAPPEENRANTA	FI1A3	83	58	845	id.												
SmallCity	HAMEENLINNA	FI184	82	46	184	id.												
SmallCity	KOTKA	FI186	82	55	947	id.												
SmallCity	RAUMA	FI191	67	37	538	id.												
SmallCity	SEINAJOKI	FI194	63	31	124	id.												
SmallCity	ROVANIEMI	FI1A3	57	35	101	id. (b)												
SmallCity	MIKKELI	FI131	55	33	98	id.												
SmallCity	KAJAANI	FI134	54	36	1361	id.												
SmallCity	SALO	FI183	53	25	147	id.												

Part 4: Measure of the Functional Specialization

The collect of the data is still in progress and it wouldn't make sense to start this part of the project before ending the previous one. Anyway we already have huge amounts of raw data (mainly of economical nature like headquarters location, economic sectors, …) that still need to be processed. Nevertheless we should be able to produce some of the functional specialization indicators, and probably leave the others for which we wouldn't have found proper data as recommendations for future Espon research programme.

Part 5: Discussion on the Polycentrism issue

An index of polycentricity

We have built an index of polycentricity, based on a purely morphological methodology (as approached by the arguable proxies of population data of the FUAs), using the cardinal ranking of the following indicators:

6. weight of the main FUA in the total population of the country or macro-region
7. weight of the main FUA in the total population of the whole set of FUAs with more than 200 000 and more than 50 000 inhabitants
8. average of the differences of population between a FUA and the following one in a decreasing ranking from the most populated FUA to the one immediately beneath the threshold of 200,000 inhabitants and until the threshold of 50 000 inhabitants
9. standard deviation of the population of the set of FUAs with more than 200 000 and with more than 50 000 inhabitants.

The value of each of these seven indicators has been distributed on a scale bounded from 100 (the highest value for the indicator) and 0 (the lowest one). The arithmetic average of these seven indicators gives the cardinal global index. We stress that this exclusively morphological index of polycentrism imperfectly reflects the functional polycentrism, decisional functions appearing to be much more concentrated than the urban populations (C. Vandermotten & *al*., 1999). An apparent morphological polycentricity may conceal a strong functional monocentricity at the level of the location of the command of the economy : this is one of the most significative results of the POLYNET study, which shows how even inside apparently very polycentric urban regions, like Delta Metropolis in the Netherlands and South-East England, the main functions linked to the advanced services sector remain concentrated in the traditional economic cores, like Amsterdam and London (Hall & Pain, 2006). In fact, the functional polycentrism does not exist inside the enlarged metropolitan areas but between their cores, at the European or worldwide level.

Does increased polycentricity bring about advantages?

The question is asked from a point of view of the role cities and regions play in the development of a performing and durable economy, not from the point of view of the provision of services throughout a territory. The question can be put from three points of view:

- does increased polycentricity lead to a better economic efficiency?
- does increased polycentricity lead to more spatial equity?
- does increased polycentricity lead to a more sustainable development?

As regards economic efficiency, a small advantage is detected in favour of the most monocentric countries and macro-regions. This assessment is not only due to the globalisation of the economy, which favours the most accessible and the best integrated cores in the world networks (Sassen, 1991; Veltz, 1996; Taylor, 2003), but also to the fact that a rise in subcontracting, just-in-time, shift work, and advanced services increases the interest of more central locations. But the factors of economic success are so numerous that the statistical correlation between more economic growth and more monocentricity is very weak. Therefore, this small statistical obviousness may by no means be interpreted, in the field of spatial planning and economic development policy, as a wish to promote monocentrism.

From the point of view of spatial equity, it appears of course that there is a small trend toward more homogeneity in the spatial distribution of GDP per inhab. in the most polycentric countries and macro-regions. However, the statistical link is weak in this case too, and quite dependent on statistical divisions which isolate the major core-cities and their peripheries arbitrarily. Moreover, the link disappears when GDPs per inhab. are no longer taken into consideration but the available income by inhab., while taking into account the GDP transfers either through public expenditure and transfer revenues, or through alternating moves and temporary workforce movements (secondary residences, family, business, leisure , week-end or longer duration tourism) (Behrens, 2003; Davezies, 2005).

As regards sustainable development, we have not conducted any study up to now. Meanwhile, it does not seem *a priori* evident that the environmental burden is worse in a more concentrated system than in a more scattered system: the densification and the big size of cities favour for instance public transport to the detriment of individual transport.

In any case, nothing allows us to significantly confirm 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' (ESPON 1.1.1 report) (and*, a fortiori,* to establish causality relationships). It would besides be surprising if there was no contradiction between those different objectives.

Part 6: Proposition for future research

Nothing to declare so far ...

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