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TOWN
Small and medium sized towns in their functional territorial context

Applied Research 2013/1/23

Interim Report | Version 28/01/2013

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

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

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

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

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

This basic report exists only in an electronic version.

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Executive summary

The aim of TOWN research project is threefold:

a. The identification and categorisation of SMSTs in Europe;
b. The analysis of their territorial performances, in terms of socio-economic characteristics and spatial dynamics
c. The development of policy recommendations in relation to typologies and spatial contexts.

At the time of writing the Interim Report the project has reached an intermediate phase, in which we have accomplished the first aim, although it will go through a further iterative revision for the next phase. Moreover, we have established the basis for the implementation of the second and third aims. The executive summary gives a brief overview of the project's current achievements in relation of these aims, which are more thoroughly discussed in the relevant chapters of the Report.

a. Identification of SMSTs in Europe

Our conceptual approach to small towns begins from the definition of SMSTs specified by the project tender, in which SMSTs were explicitly defined as referring to urban settlements with a population ranging from 5.000 and 50.000 inhabitants. As the size range indicates, SMST do not immediately constitute a coherent category or object of study. Furthermore, any precise definition by population size is controversial. Both, upper and bottom size thresholds tend to fluctuate in relation to their various national and regional settlement and local government contexts, especially in the highly diversified European space.

To overcome this problem, the European Commission (DG Regio) and OECD adopted in 2011 a new definition of urban settlements based on population size and density ('high-density population grid cells'). In their first methodological step, the EU territory has been subdivided into grid cells of 1 km^2, each of which has been associated with the population living in that portion of territory. This process offers the possibility to using the density of population as a criterion for the identification of urban clusters by aggregation of contiguous cells across the EU territory - hence overcoming the issue of different national interpretative criteria. In the second step, the clusters of grid cells with a density of more than 1,500 inhabitants per km^2 and with a minimum population of 50.000 inhabitants were kept as 'urban centres' (then specifically validated as such in relation to administrative units).

The TOWN project starts with following this analytical and interpretative approach and thus defines a Small and Medium Sized Town (SMST) as an urban settlement:

- if the multi-cell polygon has a built environment with a density of population of more than 300/m^2 inhabitants; and
- if its total population is between 5.000 and 50.000 inhabitants.

Nevertheless, mainly through the Case study analysis, the research team will investigate to what extent this broad category of settlements, which is defined mainly by a population threshold, can match the two other important criteria identified in the TOWN project, i.e.:

- The distribution of functions, and their role in the regional context;
- The policy aspects of these functions, referring to both the national administrative categorisation and to the specific policy measures within the framework of the hierarchical administrative levels in each country.

Figure A. Typologies of SMST (incl. HDUC and VST)

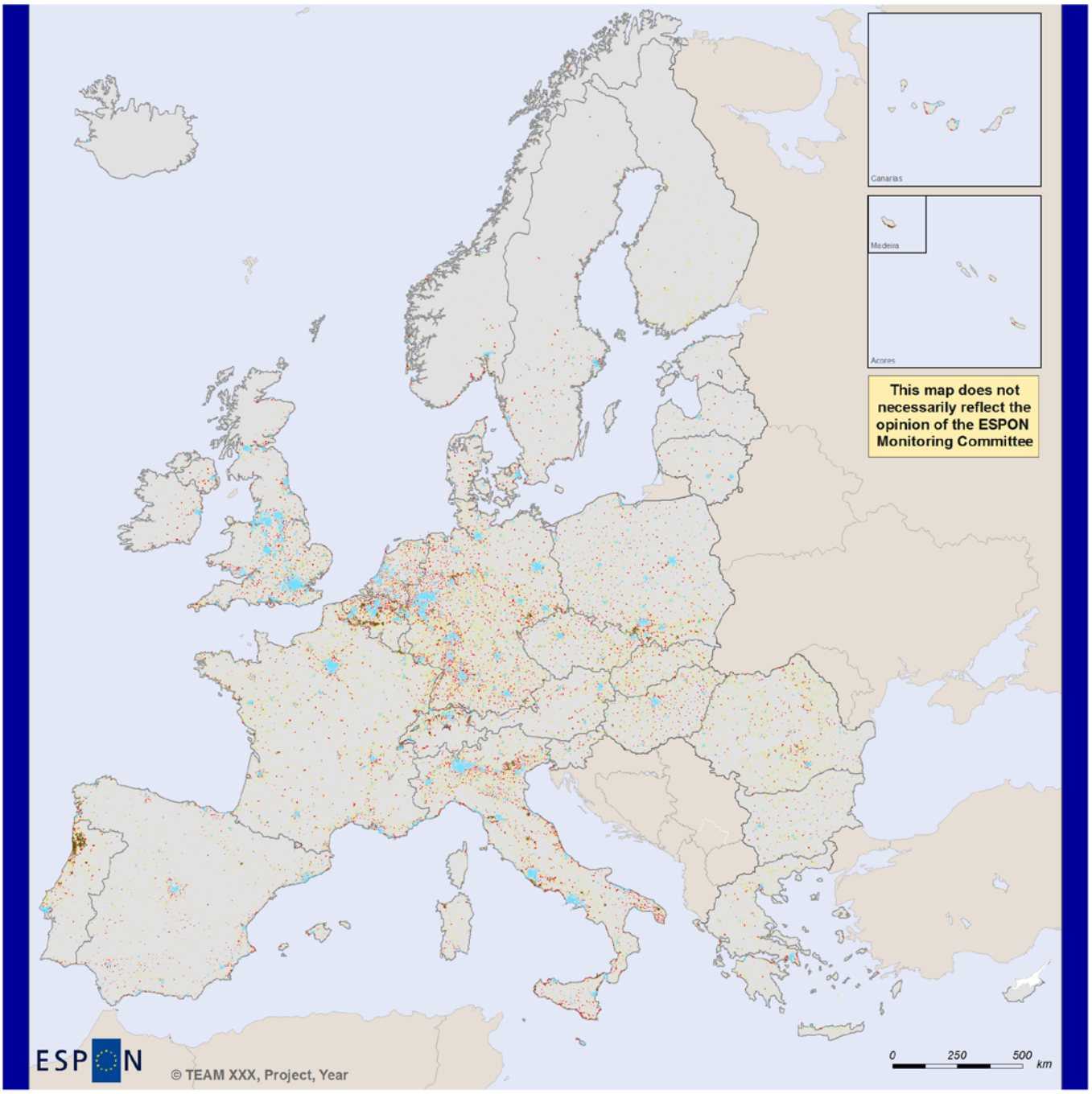


Figure A represents the distribution of SMSTs according to a first classification based on the criteria represented in Table A.

Tabel 1 –Criteria for SMST typologies

		DENSITY (inh. / kmq)		
		< 300	300 < x < 1500	> 1500
POPULATION (inh.)	< 5000	OTHER SETTLEMENTS	VST	VST
	5000 > x > 50000	OTHER SETTLEMENTS	SMST	SMST
	> 50000	OTHER SETTLEMENTS	large SMST	HDUC

The numbers of these typologies are:

- 8,350 urban settlements classified as SMST, of which 8254 “normal” and 96 “large” SMST polygons;
- 846 urban settlements classified as HDUC;
- 70,480 urban settlements classified as VST.

Despite requiring further analysis, some territorial characterisations are already apparent:

- the richness of SMSTs together with extensive urban regions across a space that goes from the south of England throughout the Benelux and the west of Germany to Italy (the ‘Blue Banana’ profile);
- ’clusters’ of SMSTs in the industrial belt of South-Eastern Germany and Poland, Northern Portugal, around and as part of larger urban regions;
- linear conurbations along the whole Western Mediterranean arc from Spain to Italy;
- the relative sparseness of SMSTs in the interior of Spain and France, and southern Sweden;
- The large extension of ‘clouds’ of SMSTs in Eastern Europe .

Moreover, some further elements stand out:

- A certain ‘balance’ in urban systems with a smooth hierarchical structure of urban areas, large SMSTs and normal SMSTs in Italy, Belgium and Germany, as compared to a strongly hierarchical structure in France, Great Britain, Span, and most of south eastern Europe, which appears to have almost eliminated the intermediate “large SMST” level.
- The presence of clusters of large SMSTs in northern Portugal, north-eastern Italy and across northern France and Belgium.

A more sophisticated refinement of the basic SMST typology has also been carried out, as detailed in the Report, adopting intermediate thresholds: 1) population threshold at 25.000 inhabitants which divides small from medium towns; and 2) or an intermediate density threshold of 1.000 inh./kmq which divides low density from high density SMSTs.

b. Analysis of SMST territorial performances

The project faces a crucial challenge in terms of applied research on spatial dynamics. The position and role of SMSTs in territorial development and spatial dynamics in a globalised context has largely been ignored and thus TOWN is dealing with issues that have been under researched in the past. Given this, and the focus of our research, the project is based on the hypothesis that SMSTs have specific territorial roles and spatial trajectories, representing a fundamental feature of the EU territory. This research assumption is based on the perception that SMSTs have their own specific ‘urban’ capital and related territorial

potentials that embed global dynamics in specific spatial contexts in which the economic dynamics are largely underpinned by a complex interplay of internal and external forces. Therefore, SMSTs may exhibit different spatial performances from their context and specific territorial identity. If this is the case, SMSTs could offer opportunities to increase the resilience of territories seeking to contend with global economic trends because they are rooted in local specificities and existing territorial capital.
Hence, the project aims at answering the following questions:

- Are the social, economic and environmental characteristics of SMSTs different from other types of territorial entity (for example cities or regions)?
- How have these social, economic and environmental characteristics of SMSTs changed over the past decade?
- To what degree are variations in social, economic and environmental characteristics between SMSTs within national urban systems more significant than differences in the social, economic and environmental characteristics in SMSTs between national urban systems?

The project has to face the dual challenge of identifying the specificities of SMSTs while at the same time paying due attention to the regional embeddedness of these territorial features. In order to answer the above questions, the project has adopted a specific focus on the territorial role of SMSTs in a multi-scalar perspective, which is applied through the analysis of different levels:

- The singular administrative areas that are concerned with towns, according to their correspondence with the polygons of the identified settlements; it may refer to singular LAU2 or aggregations of them;
- The functional area, based on travel-to-work commuting flows;
- The larger regional statistical units (NUTS2 and 3).

However, this multilevel approach faces some limitations, mainly related to data availability and difficulties in harmonising data at EU level. In this sense, most of the more detailed analyses will be performed at case study level. The TOWN project is constructed upon the concept of triangulated multiple methods of research combining both a pan-European analysis and a case study research strategy that allows the team to deal with a series of data availability and quality issues (Table B).

Tabel 2 - Spatial scale and extent of research activities

Research activity	Territorial extent of research activity				
	EU-wide	Multi-national (case study regions)	Case study work		
			Macro-regional (NUTS1)	Meso-regional	Settlement/ functional region level
Geomatic identification of morphological towns (RA2)	X		X		
Cross-tabulation NUTS analysis (RA3)	X				
European policy review (RAX)	X				
Functional analysis (RA4)				X	
SMST audit (RA3/4)				X	X
Policy analysis/ qualitative assessment (RA4)			X	X	X
SMST typology / regression work (RA3/5)		X		X	

EU-wide perspective

The aim of the EU-wide work is to cross tabulate NUTS3 regions with more/fewer SMSTs with regional typologies exploring some contextual explanations for the location and distribution of SMSTs across the European territory.

Despite all methodological problems and the necessary approximation, relating morphological polygon (of SMSTs) to the NUTS regions in which they are located allows the research team to pose questions such as:

- How do regions with more or less SMSTs compare to other types of regions?
- Are SMSTs more likely to be located in particular regional contexts (such as mountainous, borders, islands or urban-rural)?
- How do regions containing many SMSTs relate to other ESPON regional typologies (such as those generated by EDORA)?

At this stage of the project a synthetic regional typology can be put forward based on the differing proportion of residents living in three 'types' of morphological polygon: high density urban clusters, small to medium sized towns and 'other' forms of urban development.
According to first evidence presented in greater detail elsewhere in the report, it is possible to highlight a clear concentration of regions dominated by SMST (in demographic terms) in the 'traditional' pentagon (centring on the Low Countries and western Germany through Alpine Europe to northern Italy and through the Czech Republic to Hungary. This may start to raise questions about the role of national urban structures in shaping and framing the place of SMSTs.

Case study analysis
However, it is clear that data quality and availability preclude the 'remote' analysis of the all 8,300 SMST morphological units. At the same time LAU2 data is not homogeneous at EU level, and NUTS 3 level is not sufficient to provide meaningful information. Thus the TOWN proposal set out a strategy whereby project resources were concentrated in areas where the project team was most certain of the quality of the data. The aim is to provide in-depth insights into the understanding of the key features that define and characterise SMSTs, their socio-economic performance and nationally and locally specific policies towards and of SMSTs in particular regional contexts.

A combination of qualitative and quantitative analysis should allow us to build a more complex understanding of SMSTs that situates them within a framework of complex relationships of mutual influences of socio-economic performance dynamics, geographic factors, and institutional frameworks. Furthermore, the analysis of SMSTs should not neglect the history of such places and the evolution of these dimensions over the medium and long term (i.e. a form of path dependency).

The case study logic of the TOWN project is that more detailed and validated data will be gathered within the context of wider case study of NUTS1 regions that will allow the research team to respond to these key questions:

- Are the social, economic and environmental characteristics of SMSTs different from other types of territorial entity (for example cities or regions)?
- How have these social, economic and environmental characteristics of SMSTs changed over the past decade?
- To what degree are variations in social, economic and environmental characteristics between SMSTs within national urban systems more significant than differences in

the social, economic and environmental characteristics in SMSTs between national urban systems?

c. Policy recommendations

What we have already documented in the literature overview and policy analysis is that the theoretical and policy fields relevant to SMSTs are dominated by scattered and silo-type analyses and policy approaches. Thus there is no consistent approach to SMSTs at the European level in either theoretical or policy terms. Nevertheless, the project will develop some policy recommendations, bearing in mind that the range of urban settlements covers an extensive variety of territorial contexts and complexity, as well as socio economic characterizations. Bearing this caveat clearing mind, the project will address the issue from a general perspective while at the same time adopting a place-based approach that considers a in-depth knowledge of the territorial context as a sine qua non for the understanding SMSTs.

The data collected in each case study will provide information that will allow us to identify national and sub-national policy approaches (if any) to SMSTs and in tandem with the other analyses carried out as part of the case studies allow us to make a judgement about the 'state' of SMSTs in these areas and how they are changing. This in turn will provide the basis for a pan-European analysis of policy.

The policy recommendations generated by the case studies will need to address several different audiences. First, and most immediately, those in the case study area, it will be necessary to provide them with some guidance on the strengths and weaknesses (opportunities and challenges) in their situation and how this might be addressed. Second, recommendations to the relevant national authorities on SMSTs, for instance this could include the need for an explicit policy on SMSTs (where one is absent). Third, through comparative analysis of the results from all the case studies, draw out wider policy recommendations for the European level on how to support the different types of SMSTs identified in the research, thus suggesting a more variegated approach rather than a 'one-size' fits all approach.

It is also worth bearing in mind that the work can potentially help SMSTs identify other similar SMSTs elsewhere in Europe who they can contact, share experiences with and engage in mutual learning. For instance it may that we suggest the European Commission considering supporting this type of exchange through the Rural Development pillar of Agricultural Policy (in a manner similar to LEADER) or through other aspects of the Structural Funds.

Chapter 1: Conceptualising small and medium-sized towns in their functional and territorial contexts

In this chapter we set out and elaborate the general questions underlying the project before moving on to address some of the definitional and conceptual issues that confront the project and which need to be resolved in order to proceed with our general approach and case study analysis. The intention is to provide an overview of these issues which are then discussed at greater length elsewhere in the report and in the annexes.

1.1: Aims and approaches of the TOWN research project

As already specified in the Inception Report, the aim of TOWN research project is threefold:

- The identification and categorisation of SMSTs in Europe;
- The analysis of their territorial performances, in terms of socio-economic characteristics and spatial dynamics
- The elaboration of possible policy recommendations in relation to typologies and spatial contexts.

At the stage of the writing the Interim Report, the project has reached an intermediate phase, in which we have accomplished the first aim, although it will go through a further iterative revision during the next phase. We have established the basis for the implementation of the second and third aims.

The project faces a crucial challenge in terms of applied research on spatial dynamics. It is based on the hypothesis that SMSTs have specific territorial roles and spatial trajectories, representing a fundamental feature of the EU territory. In this sense, it stands in contrast with previous approaches in which the bigger metropolitan areas were situated at the centre of the research (and political) agenda (McCann, 2004, Bell and Jayne, 2006, 2009). This is not to deny the importance of research on the "higher level" of urban hierarchies, as SMSTs are not insulated from wider social or economic changes. But a selection has to be made, as a large part of the research on large cities does not assist us in thinking about and conceptualising the contemporary functions of SMSTs. This is particularly true of research on urban hierarchies in the late 1990s, where the objective was to define a hierarchy of world cities based on the presence of corporate headquarters of financial services, legal and accounting firms (Beaverstock and Smith, 1999). In reality, the focus on a very small number of activities and actors makes it impossible to say anything about other cities other than pointing out their apparent “weaknesses”, “handicaps”, “lags” (Robinson, 2002; Demazière, Serrano and Vye, 2012).

It is our contention that the role of SMSTs in territorial development and spatial dynamics in the globalised context has been both under researched and underestimated. This is because SMSTs have their own specific ‘urban’ capital and related territorial potentials that embed the wider global dynamics in specific spatial contexts in which the economic dynamics are ”largely underpinned by a complex interplay of internal and external forces” (Courtney and Moseley, 2008, p. 315). Therefore, SMSTs may exhibit different spatial performances compared to their context and specific territorial identity. In a sense they may be ‘relatively

autonomous' actors capable of developing and realising their own potentials either individually or collectively (i.e. through cooperation with other SMSTs). If this is the case, SMSTs could offer opportunities to increase the resilience of territories contending with the impacts of global economic trends because they are rooted in local specificities and existing have their own territorial capital which they can mobilise to achieve their specific objectives. However, we need to avoid falling into an ever bigger trap: the idea that SMSTs are 'free agents' with their own autonomous territorial trajectory, unaffected by any wider 'scale-dependency'. Hence, the project has to face the dual challenge of identifying the specificities of SMSTs while at the same time paying due attention to, and acknowledging, the regional embeddedness of these territorial features.

Accordingly, the project adopts a specific focus on the territorial role of SMSTs in a multi-scalar context. The notion of multiscalarity is applied through the analysis of different levels:

- The singular administrative areas that are concerned with towns, determined by their correspondence with the polygons of identified settlements; it may refer to singular LAU2 or aggregations of them;
- The functional area, based on travel-to-work commuting flows;
- The larger regional statistical units (NUTS2 and 3).

However, this multilevel approach faces limitations, mainly related to data availability and difficulties in harmonising data at EU level. In this sense, most of the more detailed analyses will be performed at case study level, with the nested approach explained in the section 2.2.

Such an approach will allow us to grasp some of the complexity of the territory and the specific role of SMSTs. We expect to find a variety of territorial trends and oppositions, for instance:

- Valorisation vs. impoverishment of resources in terms of territorial capital,
- Spatial isolation vs. integrative processes in spatial dynamics,
- Territorial balance vs. urban concentration (of resources, of services, of population, etc.) in comparison within the wider scale.

What has already been documented from the literature overview and policy analysis (see Annex 5) is that the theoretical and policy fields relevant to SMSTs are dominated by scattered and silo-type policy approaches, as pointed out in section 2.1.2 and 3.3. Thus there is no consistent theoretical or policy approach to SMSTs at the European level. Nevertheless, the project will develop some policy recommendations, bearing in mind that the range of urban settlements covers an extensive variety of territorial contexts and complexity, as well as socio economic characterizations. With this caveat in mind, the project seeks to address the issue from a general perspective while at the same time adopting a place-based approach that considers a deep knowledge of the territorial context as a sine qua non condition for understanding SMSTs.

1.2: Conceptualising urban areas

1.2.1: Built up areas, urban municipalities, and criteria for the urban structures

Our conceptual approach to small towns begins from the definition of SMSTs specified in the tender, in which SMSTs were defined as referring to urban settlements with a population between 5.000 and 50.000 inhabitants. As the size range indicates SMSTs do not immediately constitute a coherent category or object of study. Furthermore, the precise definition by population size is controversial. Both the upper and lower thresholds tend to fluctuate in various national and regional settlement and local government contexts, especially across the highly diversified European space. Hence, SMSTs are perceived as "…an unidentified real object." (Brunet, 1997: 188). It is "real", because in every country, in addition to the capital city and large cities, other urban centres with a wide range of sizes are an important part of the settlement and regional systems. It is also "unidentified" because the size thresholds and key 'urban' functions of the category SMSTs are not unanimously agreed upon within the research community or in national administrative contexts. In order to clarify the ambiguity that surrounds the definition of SMSTs a brief overview of the different conceptualisations and the ways of interpreting the urban dimensions is necessary.

The following overview draws on the ESPON SMESTO project and its overview of the different methodologies and national perspectives and various other literatures we have considered. We identify four key perspectives and discourses related to the definition and conceptualisation of urban places (Table 1):

1) Urban settlement: here a town is defined from a morphological perspective as a compact build up area with certain minimal concentration of population;
2) Urban municipality: here a town is defined as a territorial unit of a local government that contains urban settlement(s);
3) Urban centre: here a town is defined as an urban settlement (or urban municipality) containing a concentration of jobs, services and other functions that serve non-urban settlements (municipalities) in its hinterland; the urban centre acting as an urban core of the urban (functional) region;
4) Urban functional region: here a town is defined as a larger area extending beyond the urban settlement, which contains both, the urban core and its suburban hinterland which together form a socio-spatial system integrated by their daily functional inter-relations.

Table 1. Comparison of different conceptualisations and related criteria.

Terms	Definitions	Distinctive characteristics	Criteria
Urban settlement (morphological definition)	Built up area (area with urban physical characteristics) of a minimum population size	Concentration of buildings (distinction from open spaces) and population (above minimal threshold)	• Compact build-up area • Distance between settlements and buildings • Population • Density of urbanised area
Urban municipality (administrative definition)	Settlement with urban administrative status	Local government with urban administrative duties and responsibilities and territory / boundary containing urban settlements	• Local government • administrative functions • Historical attribution

Urban center / urban core (functional definition)	Urban settlement (municipality) with concentration of jobs, services and other urban functions	Role of centre for region due to concentration of jobs and other urban functions attracting commuters and visitors	• Population • Jobs • Other urban functions • Commuting • Centrality
Urban functional region (functional definition)	Larger area with functional relationship with one or more urban cores	Gravitational area of jobs, services and other functions located in urban core(s)	• Access to jobs and services • Home-work commuting • Home-service commuting

We are fully aware that these general perspectives do not simply resolve the issue of size threshold between SMSTs and non-urban municipalities on the one hand or that between SMSTs and large cities on the other hand. These are tasks that require further scrutiny of these concepts. Rather than seeing these perspectives as alternatives, ESPON TOWN considers them as complimentary approaches.

The definition of urban settlement from a physical, **morphological** point of view has its first fundamental step in the conceptualisation of the distinction between the built-up and open-space areas. In general, an *urban settlement* is considered to be an area in which buildings are not too sparse and contain a concentration of population that creates the sense of an urban agglomeration. From this perspective, two parameters are most commonly used: first, the distance between buildings must be below a given threshold; second, the total population of the built-up area must exceed a certain minimum level.
While the use of these parameters is commonly accepted in official definitions, there are significant differences between thresholds applied in each country (SMESTO, p.58). in terms of the first parameter, the United Nations recommends that for the definition of urban areas 200 m as the maximum distance between houses (Le Gléau et al., 1997), although in European countries it may range from 50 m (UK and Norway) to 250 m in Belgium (SMESTO, p.45). In addition, there may be some different interpretations for areas used for public, commercial and industrial purposes, with the consequence of having more or less fragmented and extensive areas among countries (Le Gléau et al., 1997).
For the second parameter, the continuous built-up area can only be considered as “urban” if its aggregated population exceeds a certain threshold that also varies among different countries (e.g. 200 inhabitants in Belgium and the Nordic Countries), but can also have forms of approximation (e.g. 50 occupied dwellings as threshold adopted in Ireland). At the same time, if the built up area is approximated to administrative or statistical boundaries, the criterion adopted for the identification of the urban settlement is the population density (as for instance in the Netherlands with a threshold of 1.000 inhabitants per kmq).

However, the definition of the urban settlement through its built-up area, and thus using morphological criteria, is different from the **administrative** definition of an *urban municipality* as an administrative entity with (different) functions, rights and duties that can be called town (UK), ville (Fr), stadt (D), mesto (Czech R.), etc. Likewise, the relationship between a built-up area and urban municipality is not consistent across Europe and each country uses a different set of criteria for geographical approximation and administrative attribution.
In terms of spatial matching, several complications may occur. Firstly, urban settlement defined as compact built up area of a certain population size does not have to coincide with a municipal entity despite its size because it is not endowed with a particular administrative status - which is appointed on the basis of non-quantitative criteria. Secondly, a municipality can include open-space areas (e.g. a rural area) and being more extensive, or could contain

several urban settlements. At the same time, an urban settlement can be contained within one municipality but could be also cross two or more of them.
The ESPON SMESTO Project (2006) provided a useful overview of the different national approaches and key criteria that are widely used in the definition of urban areas and their sizes. For instance, with regard to the population size, the Czech Republic and Luxemburg use 2.000 inhabitants as a bottom line, Slovakia 5.000 inhabitants, and Switzerland and Spain 10.000, which shows the rather arbitrary, nationally specific, nature of thresholds based on population size in Europe.
Likewise, the national context matters in terms of territorial characteristics and cultural approaches. In some cases, the status of an urban municipality, town or other administrative terminology is granted by an upper administrative level (State in Poland and Ireland, Lander in Germany) and the decision may be based on an ad hoc decision. For example, in the UK city status has been conferred by the Monarch since 16th century, while in Poland and Germany historical events and political decisions have determined the attribution of town rights/status.

With increasing connectivity between settlements and the formation of urban and regional systems, the identification of cities and towns goes further and uses a **functional** approach in order to understand the role and function of towns as the *urban centres* in the wider territory of an *urban functional region*. Many countries indeed complement the identification of urban municipalities (towns and cities) with functional criteria rooted in the theoretical assumptions of Christaller's "Central Place Theory" (1933), in order to provide a better grasp of the complex structure of urbanised areas. Despite the profound transformations in urban systems towards networks forms (Andersen et al. 2011) this concept remains relevant, especially for SMSTs.

The functional urban region refers to a territorial unit that is spatially integrated by the repetitive daily relations between homes and jobs through commuting to work (Hall and Hay, 1980; Bourne, 1975; van der Laan 1998; OECD, 2002; Antikainen 2005; Karlsson and Olsson, 2006; Sýkora and Mulíček 2009). It is assumed that if the economically active population of one municipality is substantially travelling to another municipality or other municipalities, those entities belong to the same functional area. Functional urban regions consist of two basic functional parts: urban cores and hinterland areas. Usually, municipalities in urban hinterlands, from which a certain percentage of the economically active population travels to the core municipality, are considered to be part of the functional region. The inter-relations of all these municipalities shapes an *urban functional region*. Related to this understanding are concepts such as *travel-to-work area* (Coombes et al. 1982; Robson et al. 2006) and the *local labour market area* (van der Laan and Schalke, 2001), both being based on the commuting patterns of the economically active population travelling daily from one municipality to another.
The functional approach generally divides the territory into areas with specific functional characteristics, usually urban cores and rings (van den Berg at al., 1982; Pumain; 2004). SMESTO indicates three such areas (urban core, inner ring, and outer ring) that together constitute an urban region. Other approaches used in the ESPON framework may employ different terms such as Functional Urban Area (FUA) or Large Urban Zone (LUZ). In some countries, such as France, Belgium and the Netherlands (Eurostat, 1992), the urban regions have an official definition (e.g. *aire urbaine* in France, *région urbaine/Stadsgewest* in Belgium, *agglomération* in Switzerland). While in other countries, the concept of "urban regions" has been developed and applied empirically by research institutes or national agencies without official recognition (for instance Austria, Czech Republic, Germany, Hungary, Ireland, Slovenia, Spain and the United Kingdom).

Overall, the concept of functional urban region, albeit in most cases limited to the working commuting patterns of population, is relevant for the division of the territory into entities that have a meaning for the daily life of inhabitants. The exchanges and relations that take place between the different parts of the urban region delimit the zone of influence of one or more central cores (monocentric vs. polycentric urban area).

1.2.2: Harmonisation of criteria in Europe and contribution of TOWN project

Despite the large variety of criteria and thresholds adopted in Europe, several steps toward a shared identification of urban settlements and the harmonisation of the different interpretations have been made in order to enable comparative studies across Europe. So far these attempts have focussed on the upper part of the list ranking the dimension of the urban settlements, i.e. bigger urban centres. In particular, the European Commission (DG Regio) and OECD adopted in 2011 a new definition of urban settlements based on population size and density ('high-density population grid cells'). First, the EU territory is subdivided into grid cells of 1 km^2, and each of which is associated with the population living in that portion of territory. In this way, the density of population can be used as a criterion for the identification of high density urban clusters by aggregation of contiguous cells in all the EU territory - hence overcoming different national interpretative criteria. In the second step, the clusters of grid cells with a density of more than 1,500 inhabitants per km^2 and with a minimum population of 50.000 inhabitants are identified as 'urban centres' (then specifically validated as such in relation with the administrative units). Following this approach, for 33 urban centres stretching far beyond the city, a 'greater city' level was created to improve international comparability.
Finally, the concept of the *Larger Urban Zone* (LUZ) has been applied, consisting of the commuting zone of cities. Two criteria are used for the approximation of these cities as being a single city: (a) a minimum of 15% of employed persons living in one city that work in another city; (b) all municipalities surrounded by a single functional area are included.
The new EC-OECD definition has identified 828 (greater) cities with an urban centre of at least 50.000 inhabitants in the EU, Switzerland, Croatia, Iceland and Norway, which contain about 40% of the European population. Each city is part of its own commuting zone or of a polycentric commuting zone covering multiple cities. Cities and the commuting zones together (LUZs) account for 60% of the European population, in which several smaller urban centres (below 50.000 inhabitants) are occasionally included.

The TOWN project follows the same analytical and interpretative line and, as specified in the project tender, it focuses on settlements below the threshold of 50.000 inhabitants, including the blurred issue of areas above the threshold but with similar aspects, as explained in the section 2.1.1. and 3.1.
In this approach, as the first morphological step, TOWN defines a Small and Medium Sized Town as an urban settlement:

- if the multi-cell polygon has a built environment with a density of population of more than 300/m^2 inhabitants; and
- if its total population is between 5.000 and 50.000 inhabitants.

Nevertheless, mainly through the case study analysis, we will investigate to what extent this broad category of settlements, which is defined mainly by a population threshold, can reconcile the two other important criteria identified in the TOWN project, i.e.:

- The distribution of functions, and their role in the regional context;

- The policy aspects of these functions, referring to both the national administrative categorisation and to the specific policy measures within the framework of the hierarchical administrative levels in each country.

The project will enhance our capacity to identify territorial differences and spatial typologies, taking into account geographical differences and national administrative traditions. Equally, with its specific focus on these smaller settlements, the project will also contribute to the DG Regio and OECD harmonisation of the urban areas interpretation, hence highlighting the arbitrary nature of the thresholds and some conceptual, spatial and methodological complexities.

1.3: Perspectives on towns: a literature overview

Although largely under-researched, there is a literature relating to SMSTs that has sought to identify the factors associated with the emergence of and the factors behind ,the success (or lack of success) of SMSTs. However it is a literature that does not always explicitly identify SMSTs (such as the literatures relating to 'rural development') and there is usually some ambivalence as to whether the 'real object' under discussion is a morphological, functional or 'policy object' SMST as well as lack of a common concept of 'size' relating to SMSTs. However we can identify three main explanations as to why small towns exist and what underpins their social, economic and environmental performance (for a full overview, see Annex 4 – Socio-economic literature overview). The three, complementary, perspectives we propose are:

1. It is the socio-economic characteristics of SMSTs that make them more or less "successful" in their capacity to create jobs, deliver services, attract new population and to engage in networks. These characteristics are not simply the result of their geographic proximity but flow from the interaction of their inherent value, with wider spatial divisions of labour. The smaller size of the working population often leads to a specialisation in some activities (e.g. manufacturing, tourism), whose fate is ultimately linked to economic and social change at a national or even international level. Among other factors the socio-economic characteristics may clearly be related to both the geographic/topographic position and the framing of policy actors.
2. SMSTs historically emerged as a result of geographic proximity and topographic positioning within spatial networks. Currently, some of them are gradually being transformed by their relationship to a large conurbation. There is a body of research which focus on explanations relating to agglomeration economies and the importance of connectivity and/or of position in urban hierarchies.
3. SMSTs have emerged as objects of interest in spatial development policy. Here the vitality of SMSTs is explained in relation to their institutional settings through which towns are either identified as policy objects or public policies and regulative frameworks in which SMSTs are more, or less, attractive to public and private investment and to movements of population.

This approach allows us to build a more complex understanding of SMSTs that situates them within a framework of complex relationships of mutual influences of socio-economic performance dynamics, geographic factors, and institutional frameworks. Furthermore, the analysis of SMSTs should not neglect the history of such places and the evolution of these dimensions over the medium and long term (i.e. a form of path dependency).

1.3.1: Socio-economic factors

Drawing on the analysis by Hamdouch (1999), the development of SMSTs should not only be understood as a result of their response to global socio-economic dynamics, such as international competition, technological progress, changes in production system, but also within the context of the historical evolution of institutional structures, relations of local actors and strategic choices made in the past. From this position we distinguish **three possible socio-economic profiles** that determine the possibilities for development of SMSTs:

- The first profile is a town with a dominant 'residential economy'. This concept, which was coined by Davezies (2008), is based on the geographic circulation of income (which differs from the geography of production) and of people (commuting workers, elders, tourists, etc.).
- The second profile corresponds to a town with a dominant productive economy. The productive economy in SMSTs is based on the production of goods and services mainly consumed outside the area. This economy is oriented towards activities in agriculture, wholesale trade, manufacturing, research, energy, etc. However, the productive economy in many SMSTs has proved to be fragile, even vulnerable due to competitive pressures, production off-shoring and technological and economic changes (Carrier and Demazière, 2012).
- The third profile of SMSTs is related to the development of activities linked to the knowledge economy which may constitute a long-term opportunity for SMSTs. It provides an opportunity for local actors to (re-)position themselves in the midst of on-going innovation and knowledge processes so as to benefit from them and develop their own potentials. Innovation processes often depend upon a critical mass of knowledge, competences and resources, which requires considerable efforts for the mobilization and training of manpower, acquisition of new knowledge and, above all, close coordination among heterogeneous and geographically dispersed actors (Hamdouch and Depret, 2001; Hamdouch and Depret, 2012).

What the above suggests is that the orientation of SMST economies may be linked to external markets (in case of productive economy or knowledge based economy), or to a greater degree to internal (local) demand (in the case of the residential economy). We can also point to placed-based (endogenous) resources as the potential key drivers of development. In the case of the residential economy, it is the natural and built heritage, and quality of life, whereas in case of the productive economy specialized skills, knowledge and practices are strong assets for export on markets. In both cases, social networks may counterbalance the geographical factors which favour large cities. This point is also significant when knowledge-based activities grow in SMSTs. Finally, the assets of the local economy can provide indications regarding the type of potential activities and of target groups (firms, new entrepreneurs, residents, commuters, tourists, etc.) who may contribute to economic development within a SMST context. In the case of the productive economy, competitiveness is based on human and/or physical capital in relation to external market demand; in the case of the residential economy, the advantage of the SMST lies in the quality of life and amenities; whereas in the knowledge economy it is the vibrant and creative environment, and the connectivity of the SMST to metropolitan areas, and also the quality of life, which may attract the 'creative class' and innovative firms.

Given this we propose a three-level analysis of the dominant economic basis of SMSTs. The first level is the macro-level of the local economy, which consists of three possible profiles: productive local economy, residential local economy and knowledge local economy. These profiles do not exclude one another (SMSTs can build their development pattern through

varied combinations of “ingredients” pertaining to more than one single profile) and their contents and delineations are subject to evolution over time (a SMST is susceptible to change more or less progressively in its dominant profile through specific investments and policies). The second level of the analysis is the meso-level of the local economy that looks at the internal logics among all three profiles in terms of their nature and the degree of specialisation. Finally, the third level is the micro-level of the local economy, where the research analyzes local structural forms, such as networks of local actors, clusters, innovation systems or local production systems.

Given these views, a socio-economic analysis of SMSTs should address the following questions:

- How attractive is a given SMST in demographic terms?
- Which types of population (and which levels of income) does it attract?
- How was the local productive system built (e.g. following Markusen, 1996: Marshallian district, satellite platform, ‘hub and spokes’ district, public-led district)?
- How does international economic change impact on the current development of SMSTs?
- Are there sectors that are more prone to adapt/resist to external change?

1.3.2: Geographic factors

First of all there is a long standing view that the explanation of SMSTs socio-economic performance is closely related to the analysis of spatial proximity and concentration of economic activities (Venables, 2006). However, recent developments suggest that this link is more variable and looser than in the past (Léo and Philippe, 2011). For instance product markets and labour markets may have different forms of spatial proximity. The product market is likely to be scale-open, so reductions in transport costs will increase market access for firms. Meanwhile, the labour market operates within a narrower area, so if travel times are too long access is reduced. Moreover, some sectors of economic activity require closer proximity of firms to consumers than others. Thus some skill-intensive parts of a sector may require greater proximity (e.g. clustering, networking) while others, which are less skill-intensive, can be relocated to lower cost operating locations.

A second geographic factor can be seen in Christaller’s theory of Central Places that highlighted a relation between the demographic size of a city and functions gathered in it and services, thus forming levels of a functional spatial hierarchy. In effect cities greater in size have more enlarged urban functions compared to SMSTs. On the other hand, the functions of some SMSTs depend on proximity to other more important cities that might limit their influence on the territory (Taulelle, 2010).

Berry (1964) argued that cities evolve in relationship with other cities which together form an urban system. From this perspective, some SMSTs may benefit from proximity to larger cities, through land availability or complementary economic activities. Nevertheless, Léo et al. (2012) argue for the existence of an opposite negative logic whereby a metropolis may block the development of the SMST due to the effects of spatial competition for the provision of commercial activities and services (Léo et al., 2012).

A third geographic factor suggests that the economic fate of SMSTs is often linked to how the region they belong to performs in terms of production, competitiveness and demography (Lacour, 2010).

The final geographic factor is that of agglomeration and dispersion of activities whereby firms benefit from close proximity to other firms, people, capital, goods and services

(Marshall, 1920), and from economies of urbanization which stem the agglomeration of a diversity of economic activities within a city (Jacobs, 1969).

Given these views, a geographic analysis of SMSTs should address the following questions:

- How does the urban hierarchy affect the development of SMSTs?
- What is the nature of relation between SMSTs and their hinterland?
- How do the functions performed by a SMST change over time?
- What is the performance, in economic and demographic term, of macro-regions hosting SMSTs? Do the tendencies observed in a given SMST confirm the macro-regional orientation, or do they contradict it?
- Do the economies of location give an advantage to some SMSTs?
- What is the networking capacity of SMST and what shared strategies are already implemented?

1.3.3: Institutional Settings

Freeman and Perez (1988) argue that different economic stages in different eras require different sets of supporting institutions. On this basis it can be hypothesized that 'successful territories' [SMSTs] are those with institutions already in place when they are needed, or which manage to build new institutions quickly and effectively.
The institutional situation in each country is not only a context variable, but also an important explanation of why and how cities – and specifically SMSTs – are debated and promoted. The ESPON research devoted to secondary tier cities and territorial development in Europe shows that reforms concerning the public sphere of cities (competencies, accountability, capacities to develop projects with private partners, etc.) have some common tendencies, but national situations may differ, regarding, particularly the number of levels of government and the degree of devolution (ESPON SGPTD, 2012). Three results of this study are relevant to our discussion of the influence of institutions on the performance of SMSTs. First, de-concentration of investment and decentralization of decision-making and resources leads to higher performing second tier cities. Second, the performance of non-capital cities is significantly affected by national government policies - implicit or explicit, direct and indirect. And it is argued that countries whose governments pay more attention to the territorial and urban impacts of those policies will have higher performing cities than those who do not. Thirdly, local factors - especially leadership - matter. What is also significant for us is that the study argues that the economic performance of cities will increasingly depend upon their strategic capacity to manage their constraints and maximize their local assets if they are to be successful.

Regarding local policies, Pecqueur (1989), Stöhr (1990) and Magnaghi (2003) have shown their significance for the socio-economic development of territories, especially those that are far from (and not easily connected to) large cities. The importance of the local mobilisation of a broad array of actors is also a lesson to be learnt from the many local policy initiatives which were launched across Europe, to try to overcome the disadvantage of SMSTs in terms of their accessibility, quality of life and job creation (Stöhr, 1990; Demazière and Wilson, 1996). The horizontal integration of local initiatives across administrative boundaries also matters. In recent years, more and more policies in the European context attempt to target economic efficiency and competitiveness through stronger networking and cooperation between towns and cities belonging to the same region (ESPON FOCI, 2010). Nevertheless, there are retarding factors at the micro-level of many European

countries such as heterogeneity of competences, limits of competencies, inadequacy of administrative boundaries in relation to the issues on the ground, limitations in financial resources of the respective administrative levels of the partnership, competition and mistrust between partners, absence of mechanisms and instruments to set aside local interests for the greater regional good, lack of coherence, etc. Thus, there is a common challenge of coordination concerning the implementation of policies originating at higher levels of governance, and horizontal coherence between organizations at the local level (ESPON FOCI, 2010).

Institutional dynamics, as related to the territorial development of SMSTs, also need to be understood in terms of innovation and knowledge processes. Hamdouch and Moulaert (2006) identify three components in this process. The first component is the institutional framework that characterizes the socio-economic system of a territory (patterns of behaviour, legal framework, power structures, etc.). The second component is the local agents with their strategies and modes of interaction (coordination, cooperation, rivalry, etc.). The third one is the nature and orientation of policies and regulations (fields of application, spatial levels of implementation, etc.). All three components are closely inter-connected. Institutions shape the orientation and the content of public policies and regulations which, in turn, influence strategies and coordination modes within innovation and knowledge processes (Hamdouch and Moulaert, 2006). This means that innovation and knowledge processes offer a continuous flow of opportunities to influence the system and to initiate new forms of coordination in SMSTs.

The literature suggests that economic progress needs corresponding and flexible institutional settings that can create a facilitative environment and quickly respond to global changes. In other words, patterns of behaviour, legal frameworks, power structures, local agents and their modes of interaction, and policies and regulations orientations structure institutional dynamics that have an influence on the socio-economic development of territories. The literature highlights the importance of decentralization processes and the power given to local authorities, local development policies and their correspondence to the regional and national ones, as well as the institutional dynamics that shape systems of innovation and systems of education and research.
Given these views, a socio-economic analysis of SMSTs should address the following questions:

- How do European, national and regional policies influence the development of SMSTs?
- Is the situation of SMSTs debated at the European, national and regional level?
- What local policies are best suited and how do they encourage or discourage local development?
- What institutions are crucial for the economic development of SMSTs?
- Regarding local economic policies taking place in SMSTs, what is their rationale?
- Under which circumstances do local actors get involved in innovation and knowledge systems?

Chapter 2: Methodological approaches to researching SMSTs

Much of the methodology of the TOWN project involves making SMSTs visible through a mix of work with secondary data as well as through the collection of qualitative assessments of SMSTs across Europe. The complete methodology was outlined in the inception report from April 2012. In this section the proposed methodology will be summarised and updated where necessary.

The TOWN project is constructed upon the concept of triangulated multiple methods of research combining both a pan-European analysis and a case study research strategy that allows the team to deal with a series of data availability and quality issues. This chapter will describe the methodological approach of the project as a whole with particular reference to the research work that has been carried out in the period up to this interim report. Table 2 outlines seven principal data gathering and analytical activities against the spatial extent of the work that either has been undertaken in the period up to the interim report or that will be undertaken up to the draft final report (December 2013). This chapter will outline and justify the methodological approaches that have been chosen.

Table 2. Spatial scale and extent of research activities

Research activity	Territorial extent of research activity				
	EU-wide	Multi-national (all case study regions)	Case study work		
			Macro-regional (NUTS1)	Meso-regional	Settlement/ functional region level
Geomatic identification of morphological towns (RA2)	X		X		
Cross-tabulation NUTS analysis (RA3)	X				
European policy review (RAX)	X				
Functional analysis (RA4)				X	
SMST audit (RA3/4)				X	X
Policy analysis/ qualitative assessment (RA4)			X	X	X
SMST typology and regression work (RA3/5)		X		X	

2.1: Pan-European research component

There are two components of work that are intended to cover the complete European Union territory. The aim of the pan-Union work is to:

- To identify all morphological towns meeting the population thresholds; and,
- To be able to cross tabulate NUTS3 regions with more/fewer SMSTs with regional typologies exploring some contextual explanations for the location and distribution of SMSTs across the Union territory.

This section will outline the research methods the research team has deployed to achieve these objectives.

2.1.1: Geomatic identification of 'morphological' towns

The geomatic identification of SMSTs is one of the core activities of the TOWN project. It is the means by which the research team will identify SMSTs meeting some basic population density and population threshold characteristics across the Union territory. As anticipated in chapter 1, the basic geomatic method used to identify SMSTs follows the procedure implemented by DG Regio (DG Regio, 2011), which uses as a spatial base unit the grid cells of 1 kmq and the associated population and density data as the criteria for the identification of high density urban clusters by agglomeration of contiguous cells. Nearly 2.000.000 cells are included, covering all population settlements across the EU.
Elaborating population data and density of inhabitants in contiguous cells, three "degrees of urbanization" have been identified by DG Regio:

- High-density clusters (or city centres): contiguous grid cells of 1 kmq with a population density of at least 1,500 inhabitants per km2 and a minimum population of 50.000.
- Urban clusters: clusters of contiguous grid cells of 1 kmq with a density of at least 300 inhabitants per km2 and a minimum population of 5.000.
- Rural grid cells: grid cells outside urban clusters

In this project, we identify SMSTs with DG Regio's "urban clusters", in a similar way that OECD (using the same database), has classified urban areas (OECD, 2012). SMST have been therefore identified with the following procedure:

a. selection of contiguous cells of at least 300 inh./kmq and creation of polygons by aggregations
b. from those polygons, cells with at least 5.000 inhabitants have been retained
c. from the resulting selection, high-density clusters have been removed.

The procedure may be modified through additional geomatic manipulations:

- contiguity at diagonal level could be considered; in this case, a larger number of grid cells could fall within SMST and so larger SMST could be created
- empty gaps inside the polygons could be filled; they may identify empty spaces which nevertheless represent element of urban continuity (a lake, a large park, etc.), and including them in the SMST polygons that surround them would seem appropriate, but from a merely geo-statistical point of view it is better at this stage to leave them out.

For the moment, our database of SMST does not involve these procedures, but they may be considered at a later stage of the project implementation.
Thus, our first basic typology classifies SMST as polygons with one of the following characteristics:

a. Polygons with a total density (average density of all cells included) between 300 and 1500 inh./kmq and a population between 5.000 and 50.000 inhabitants;
b. Polygons with a total density of more than 1,500 inh./kmq but a total population of less than 50.000
c. Polygons with a total population of more than 50.000 but a total density of less than 1,500 inh./kmq.

By elimination, we can also identify non-SMST urban areas. We thus include in our basic classification of urban settlements or **TOWN Typology 1**:

- those settlements that are characterised by a population density superior to 300 inh. per square km but a populating lower than 5.000 and therefore insufficient to be considered SMST, hence classified as "Very Small Towns" (VST);
- those settlements that are too large and dense to be considered SMST and are therefore named, following the DEGURBA methodology, "High Density Urban Clusters" (HDUC).

The rest of the territory is defined, by exclusion, as "other settlement types" and includes unpopulated areas, sprawling urbanisations, or settlements that are too sparsely populated to even be considered as Very Small Towns. Table 3 illustrates these typologies, with nomenclatures and colours corresponding to the maps that will be introduced below.

Table 3. Basic urban settlements typology

		DENSITY (inh. / kmq)		
		< 300	> 300 and < 1500	> 1500
POPULATION (inh.)	< 5000	OTHER SETTLEMENTS	**VST** (very small town)	**VST** (very small town)
	> 5000 and < 50000	OTHER SETTLEMENTS	SMST	SMST
	> 50000	OTHER SETTLEMENTS	SMST	**HDUC** (high-density urban clusters)

The findings of this research activity and the diversification of the different typologies are presented in chapter 3.

2.1.2: Pan European analysis of SMSTs

The TOWN proposal outlined a research strategy for describing both individual SMSTs (as either morphological or functional towns) and for deriving indicators at either NUTS level 2 or 3 that might indicate the presence (or non-presence of SMSTs). This work was defined as RA3. In the first instance this was a research activity that built upon the morphological polygons established in activity RA2 (described in section 2.1.1).

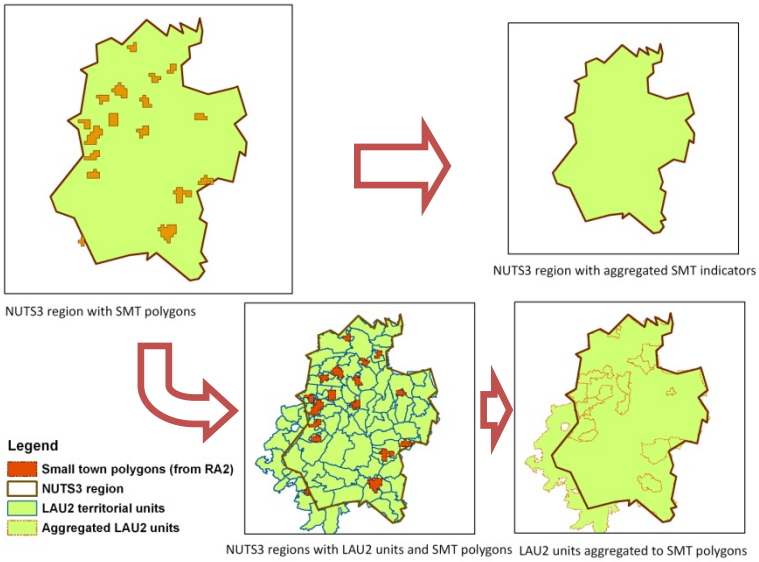
In the TOWN proposal the project team offered to do two things under the heading of RA3:

- Cross tabulate indicators based on the presence or non-presence of SMSTs in NUTS3 regions with a basket of indicators relating to the social, economic and environmental characteristics of those regions (including regional typologies from other ESPON projects);
- Construct a data base of the characteristics of SMSTs – the extent of territorial coverage (of the EU) would be dependent on the quality of secondary data-bases made available from the ESPON team. However in essence this work would involve the creation of SMST statistics based on associating small area data (small local

authority units or LAU2 units) with the morphological (and later the functional) SMST polygons.

These parallel conceptual processes of data creation are illustrated in Figure 1. Whereas Figure 1 deals with the conceptualisation of aggregating data to the morphological polygons, the method can equally be applied to creating aggregate data for functional areas relating to SMSTs once functional analysis has been completed (see Section 2.2.1).

Figure 1: Generating data relating to morphological SMSTs



The aim of relating morphological polygon characteristics (of SMSTs) to the NUTS regions in which they are located allows the research team to pose questions such as:

- How do regions with more or less SMSTs compare to other types of regions?
- Are SMSTs more likely to be located in particular regional contexts (such as mountainous, borders, islands or urban-rural)?
- How do regions that contain many SMSTs relate to other ESPON regional typologies (such as those generated by EDORA)?

The process of aggregating indicators based on the SMT polygon exercise is mechanically simple. However it does need to take into consideration an underlying hypothesis that current NUTS3 regions are not useful regional contexts for our SMSTs. This will be a hypothesis that will be tested through the functional analysis carried out in the case studies (see Section 2.2.2).

The aim of identifying the social, economic and environmental characteristics of SMSTs (either as morphological or functional areas) is intended to answer the following questions:

- Are the social, economic and environmental characteristics of SMSTs different from other types of territorial entity (for example cities or regions)?
- How have these social, economic and environmental characteristics of SMSTs changed over the past decade?
- To what degree are variations in social, economic and environmental characteristics between SMSTs within national urban systems more significant than differences in

the social, economic and environmental characteristics in SMSTs between national urban systems?

Making visible our SMSTs is more problematic however in relation to creating settlement level data from the initial basis of data collected at small local authority area level (LAU2) across Europe. The principal problems of small area data when used in studying issues across national statistical boundaries relate to:

- The territorial basis for aggregating social and economic statistics. Small area data across Europe is not collected at a standardised geography but tends to be collected by member states at the scale of local government units. Local government territories are defined on the basis of the needs of local government in member-states. The needs of statistical analysts (for stable unchanging geographies and long time series data) are also not pertinent in the definition of local government areas. Consequently local government areas change frequently (meeting the need of delivering local government but being extremely problematic for understanding areal changes over time).
- The scope of effective data harmonisation. Data is problematic if it is not generated at the same time (for cross sectional analysis) or is compiled using different definitions of variables. For the most part there are common definitions across a range of demographic, social and economic concepts, albeit that these definitions rest upon administrative processes that might vary between countries (for example in relation to establishing citizenship).
- Changes in the ways that statistical agencies collect data about their populations. Increasingly the collection of Census statistics by a decennial exercise of form-filling in being replaced across Europe by administrative registers. Whereas this is deemed to be cost effective, this change is likely to introduce changes in the ways socio-economic facts are generated (being linked more closely to administrative processes).

Furthermore, even if the data management of changing boundaries, changing codes and differing data definitions can be dealt with, the exercise has to face up to the problem of whether the scale of territorial unit 'matches' that of the SMSTs. If local authority units are significantly larger than our SMSTs, the research team is faced with the issue of how to assign values to a part of the area without necessarily knowing how the SMST relates to the wider local authority area. However if the local authority units are generally smaller than the SMSTs we are interested in, the research team would be in a position of 'aggregating up' local authority units to the SMSTs of interest.

For the 15 member states of the Union (prior to January 2004) Table 4 illustrates the potential of local authority units to be useful in identifying the characteristics of SMSTs (based on a simple size criterion) based on the SIRE database. Of the 15 member-states, nine have local government units that are likely to be aggregated up to create SMST statistical units, two (Finland and the UK) have a reasonable potential for aggregation whilst four member-states are problematic (local government units tend to be between 10 and 50.000 inhabitants). Thus the question is: how feasible it is to generate EU wide settlement characteristics based on a geomatic process (of associating LAU2 units to morphological polygons)? Based on the SIRE database it is already likely to be difficult in relation to the 12 member-states that joined since January 2004.

Table 4. Population size of LAU2 units for member-states identified in SIRE database

Nation-state	Year of data	Number of LAU2 (NUTS5) units in SIRE database with CODAGG code					% LAU2 units with under 5000 inhabitants
		under 5000 inhabitants	5-9,999 inhabitants	10-49,999 inhabitants	over 50.000 inhabitants	total	
Austria (AT)	2001	2142	144	65	8	2359	91%
Belgium (BE)	2001	89	166	307	27	589	15%
Germany (DE)	2001	11059	1288	1348	192	13887	80%
Denmark (DK)	2001	18	117	124	17	276	7%
Spain (ES)	2001	6948	510	531	119	8108	86%
Finland (FI)	2001	230	113	91	14	448	51%
France (FR)	2000	34809	971	788	111	36679	95%
Greece (EL)	2001	5877	104	108	41	6130	96%
Ireland (IE)	2002	3327	90	23	0	3440	97%
Italy (IT)	2001	5836	1153	974	138	8101	72%
Luxembourg (LU)	2001	97	14	6	1	118	82%
Netherlands (NL)	2001	15	80	348	61	504	3%
Portugal (PT)	2001	3797	227	212	5	4241	90%
Sweden (SE)	2001	12	60	175	42	289	4%
United Kingdom (UK)	2001	6147	3012	1482	0	10641	58%

Source: derived from SIRE database

2.1.3: Pan European policy analysis of spatial development policies underpinning SMSTs

As pointed out in the TOWN Working Paper on *Small and Medium Sized Towns (SMSTs) and European Policies* (see Annex 5), produced as part of RA1, the last two decades have witnessed an increasing policy focus on the role of cities and regions at global, European, national and sub-national levels. In terms of thinking within the European Union (EU) regions, including city-regions/metropolitan regions, are seen as playing a key role in Europe's development and competitiveness. Cities are seen as central to achieving the aims of the Lisbon-Göteborg Strategy (see CEC, 2005 and 2009) and wider policies on cohesion (e.g. CEC, 2006) and more recently to Europe 2020. However, the focus has overwhelmingly been on larger cities and capitals while the roles and functions of SMSTs have rarely figured in these debates. More recently there has been growing recognition, although not necessarily an increased understanding, of their significance. There is undoubtedly more awareness of SMSTs significance for rural areas, in terms of preserving people's well-being/quality of life, as (local) service centres, countering migration to urban areas and rural depopulation and as part of regional economies and thus their overall role in achieving "…balanced regional development, cohesion and sustainability of the European territory." (CEC 2011, p4).

While this is to be welcomed it has not been accompanied by the development at European level of a range of policies specifically directed at SMSTs. In terms of our project there are no clear 'policy messages' from the European level, thinking on the issue of SMSTs remains

underdeveloped and fragmented. It is thus important to identify relevant national and sub-national policies through the case studies and use them to try and construct (in a deductive sense) the wider policy implications for the European level in association with current thinking on spatial/territorial development associated with Cohesion Policy and RDP.

A number of approaches/methodologies have been developed associated with Cohesion Policy and RDP that are applicable to SMSTs, and indeed, would appear to constitute an implicit 'policy approach'. For instance in the LEADER initiative developed as part of RDP seven key elements are identified that in combination constitute the LEADER approach (CEC, 2006):

1. Area-based local development Strategies
2. Bottom elaboration and implementation of strategies
3. Local public-private partnerships, know as Local Action Groups (LAGs)
4. Integrated and multi-sector actions
5. Innovation
6. Cooperation
7. Networking

These elements are broadly similar to the methodology advocated by the European Commission for urban policies under the general rubric of an integrated approach necessary for sustainable urban development (see CEC, 2009). Moreover, the Barca Report (2009) has further elaborated this approach in relation to Cohesion Policy more generally under the 'place-based development approach' that seeks to address the problems of areas, not defined on a simple administrative basis, but in relation to 'meaningful places of intervention'.

A place-based development policy thus refers to:

- a long-term development strategy whose objective is to reduce persistent *inefficiency;*
- (under utilisation of the full potential) and *inequality* (share of people below a given standard of well-being and/or extent of interpersonal disparities) in specific *places,*
- through the production of bundles of *integrated,* place-tailored *public goods and services*, designed and implemented by eliciting and aggregating *local preferences and knowledge* through *participatory political institutions*, and by establishing linkages with other places; and
- promoted from outside the place by a system of *multilevel governance* where grants, subject to *conditionalities* on both objectives and institutions, are transferred from higher to lower levels of government. (Barca Report, 2009, p5)

The above requires that we consider the implications of European, national, regional and local policies in combination that impact, both directly and indirectly, on SMTSs. Thus while RDP and Cohesion Policies may have 'direct' impacts on SMSTs other policies (e.g. on transport, services of general interest, energy, economic and industrial policy) will have indirect implications. The implications of this is that any policies developed specifically in relation to SMSTs at European, national, regional and local levels need to consider the combined implications of these wider policies and seek to assess their impacts in a holistic manner. While more local strategies should seek to find ways to take into account and combine these different policies into a clearly articulated strategy.

The data collected in each case study will thus provide information that will allow us to identify national and sub-national policy approaches (if any) to SMSTs and in tandem with the other analyses carried out as part of the case studies allow us to make a judgement

about the 'state' of SMSTs in these areas and how they are changing. This in turn will provide the basis for a pan-European analysis of policy.

2.2: Case study work

The principal strategy for organising the work of TOWN is through the strategy of the regional case studies. It is clear from the feasibility work undertaken in the period and described in Section 2.1, that data quality and availability preclude the 'remote' analysis of all the 8,300 SMST morphological units identified in RA2. Thus the TOWN proposal set out a strategy whereby project resources were concentrated in areas where the project team was most certain of the quality of the data and sufficient coverage of different regional typologies. Within the project schedule of TOWN the case study work is covered by work package RA4.
RA4 focuses on case studies of SMSTs in particular European regions, their aim is to provide in-depth insights into the understanding of the key features that define and characterise SMSTs, their socio-economic performance and nationally and locally specific policies towards and of SMSTs in particular regional contexts. The tasks of this research activity are:

- identify SMSTs and thus correct and validate the outputs of pan-European geomatic morphological analysis, delimit SMSTs urban regions (spheres of influence) and detect types of SMSTs territorial arrangements;
- describe key characteristics of SMSTs and analyze their socio-economic (including demographic) position and performance;
- analyse the impact of EU, national and sub-national policies on SMSTs and own development policies and practices of SMSTs and offer policy recommendations.

However, the project is aware of the substantial differences between SMSTs in terms of their size, function and roles in particular settlement and regional contexts. In particular, the project understands that the performance of SMSTs depends upon:

- differing functional roles (manufacturing, tourism, agriculture, service provisions, etc)
- types of spatial organisation of settlements (autonomous towns, networked SMSTs, agglomerated settlements within metropolitan area/urban regions);
- regional types (urbanised, rural, island, mountain areas, coastal, etc.) and macro-regional / national characteristics;
- types of local government systems and national policies towards SMSTs (the degree of local autonomy within their national/regional systems of governance, the capacity to address and tackle local development problems, national and regional government policies affecting SMSTs).

Considering these differences, the case studies have been selected with the aim of covering a large variety of contexts and characteristics (see section 2.2.4), in order to provide additional contributions to the understanding of the pan-EU analysis conducted in other TOWN research activities. The verification and validation of conceptual understanding of SMSTs and their performance and qualitative and quantitative analyses of a sample of SMSTs in their specific regional contexts will then offer important insights to SMSTs in Europe as a whole.

In order to fulfil the research project expectations, a protocol of analysis has been prepared. The key units of the case study analysis cannot be only 'SMSTs', but also their immediate 'functional areas' and the regional contexts (as settlement systems within NUTS2/3 regions) in which SMSTs are located. The project applies the notion of the territorial 'nested' case study in order to address the issues related to SMSTs at three 'key' territorial levels (macro, meso and micro level) with research tasks attributed to each level (table 5).
The first level concerns the selection of NUTS 1 regions in order to assure an appropriate coverage of SMSTs (at least 10%) across Europe and a mix of national urban systems (in smaller member-states and sub-national regional urban systems in larger member-states).

Table 5. Case study nested structure

MACRO LEVEL (NUTS0 and NUTS1)
1. National context (or regional context when appropriate): • Definition of SMSTs according to national administration and/or in national professional discourses; position of SMSTs in national urban and regional systems; • Review of national literature about SMST supplements the general review from RA1; • Overview of national/sub-national policies towards SMSTs; 2. Verification of the geomatic identification of SMSTs (NUTS1) • Verification of the morphological polygon provided by the geomatic analysis (RA2); • Identification of SMSTs (administrative criterion); 3. Identification of NUTS 3 regions for detail analyses
MESO LEVEL (NUTS2 or NUTS 3 regions within the NUTS1 area)
1. Functional analysis: • Identification of SMSTs with local centre criterion. • Definition of urban region areas (local labour area, daily urban system) • Commuting patterns 2. Analysis of any discrepancies between morphological, functional and administrative dimensions; 3. Exploration of the economic, social and environmental characteristics and performance of SMSTs 4. Regional governance and strategic planning: implications for SMSTs
MICRO LEVEL (Individual SMSTs and their groups within NUTS3 regions)
1. Exploration of the role of SMSTs according to the aims of EU 2020 (in terms of regional competitiveness / smart growth, providing social cohesion in different regional contexts and in achieving sustainable development). 2. Local development policies of SMSTs and effects of EU, national and regional policies on their development 3. Identification of strategic and innovative policies and practices underpinning the development trajectories of SMSTs that can then form the basis for policy recommendations to policy communities at different levels (local to European) and for SMSTs in similar contexts.

The second level provides an appropriate coverage of the ESPON territorial typologies (in a simplified form around rurality, urban-ness and issues related to being close to borders, being mountainous or coastal) and types of territorial arrangements of SMSTs (autonomous, networked, and agglomerated). Finally, the third level focuses on (groups of) SMSTs and their territorial performance.

The case study analysis will use a combination of quantitative and qualitative techniques ranging from literature and documents review through data analysis and GIS presentation to interviews with stakeholders and their interpretation. It will be essential to explore and interpret the complex territorial relations that characterise the SMSTs. Moreover, the case

study team will be expected to reflect on the outcomes of analyses from the other work packages using local knowledge. Over and above the work of reporting and interpretation, the case study team will build good relations with stakeholder agencies and bodies whose interest lies in the local development of SMSTs in their case study area.

Moreover, the case study work continues to have an important role in validating and extending the geomatic identification of SMST morphological polygons and the capacity of the research team to meaningfully link territorial data (at small area scale) to these morphological polygons. Thus the case study teams will:

1) validate the correct morphology SMSTs / HDUC polygons. This means they will have to check that the delimitation of SMSTs and HDUC effected on purely geomatic grounds matches to an acceptable degree the actual extension of urban settlements with given characteristics in terms of population size and density.
2) Possibly also validate the information provided in terms of typology membership and identification of SMST "high density cores".
3) append "names" and/or other national/regional codes to them either the name of the dominant LAU or whatever lieu-dit in common use).
4) feed back the verification to the team in charge of RA2, so that they can 1) revise the methodology of construction of SMSTs polygons accordingly, and 2) append "names" and meaningful "codes" to the automatically generated code system that keys the database.
5) validate the data linkages with the administrative NUTS3 / LAU levels, correcting the estimated percentages of population living in SMSTs and HDUC for each relevant NUTS3/LAU2 territory in the meso study area.

2.2.1: Functional analysis of SMSTs

The aims of the functional analysis are:

- the identification of large cities and SMSTs using the concept of urban centres;
- the identification of large cities and SMSTs urban regions (local labour area, daily urban system), using core-hinterland analysis;
- the distinction between lower and upper tiers of urban hierarchy, i.e. between SMSTs and large cities using functional analysis of relations between urban centres;
- the analysis of the intensity and directionality of flows among identified SMSTs and their urban regions and identification of SMSTs territorial arrangements (autonomous, networked, agglomerated).

From the functional-spatial perspective cities and towns are understood as centres which possess centrality functions that serve wider territories. Cities and towns thus qualitatively differ from settlements which do not possess centrality functions, which are not centres. Centres are highly differentiated according to the strength and significance of their centrality functions and hence their territorial / regional influence. Hence, it is important to distinguish between large metropolises, medium and small towns according to the particular degree of centrality which ranks a city/town within urban hierarchy.

The basic spatial unit of functional analysis is LAU2. However the spatial resolution can be modified in countries with large LAU2, using smaller spatial units, depending on data availability. Of course there will be a mismatch between the LAU2 and the polygon of the settlements, and the case studies will assess the differences among the two references.

The functional analysis, as indicated in Table 6, is based on:

- travel-to-work data (job commuting data);
- data on population and economically active population in LAU2 (or other spatial analytical units).

Table 6. Case study data for functional analysis for LAU2 units and time period 1991-2001-2011 (or as close as possible)

Data theme	Description of the data required
Population	Population number
Labour market	Number of jobs
Commuting	LAU2-LAU2 matrix of commuting patterns within NUTS1 region (If it is not possible to supply a LAU2-LAU2 matrix in either year, can you supply a measure of labour market self containment for SMSTs, i.e. what % of resident workers living in the SMST/LAU2 unit also work within the LAU2 area.)

We first identify those settlements that play the role of job centres and then delimit their micro-regions and functional urban regions. The job centres are selected from municipalities (and other types of LAU2) using two criteria (1) size: threshold value of minimum job size (minimal number of jobs); (2) functionality: job center is the main commuting destination from at least one another LAU2 (this criteria may be in some instances modified in countries with large LAU2, based on local knowledge).

Job centre is defined as LAU2 (or smaller spatial unit corresponding to town settlements) with at least 1000 jobs (this may vary in specific national contexts), which is, at the same time, the main commuting destination for at least one other LAU2 (settlement). The process of identification / selection of LAU2, that are centres, includes three analytical steps:

- calculation of number of jobs in each LAU2 - no. of jobs = no. of economically active employed population – outgoing job commuters + ingoing job commuters;
- directional assignment of the highest outgoing flow from each LAU2 (= identification of destinations of the maximal flows);
- intersection of two working datasets and final delimitation of urban centres (they include all size categories of centers, not only SMST)

Czech example: Based on 2001 data 493 of 6258 Czech municipalities fulfilled the criterion of a minimum 1000 jobs; at the same time 645 municipalities were classified as destinations for maximal commuting flow from another municipality. The intersection of these two datasets resulted in a set of 367 job centres with 1000 and more jobs that were, at the same time, the major commuting destination for at least one other municipality.

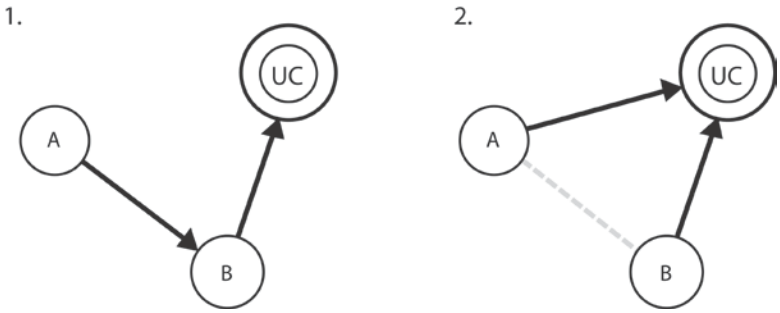
Not every job centre is strong enough to form its own micro-region. Therefore, the analysis continues with the delimitation of micro-regions and their respective urban centres. The micro-regions are delimited integrating the settlements to the centers according to direction of major flows from each LAU2. Each settlement is assigned just only to one centre/functional region.

Regionalization process in three subsequent stages:

- delimitation of “proto-micro-regions”;
- setting up the minimal threshold value for proto-micro-regions population size, dissolving proto-micro-regions with population below the threshold;

- territorial consolidation of proto-micro-regions, final delimitation of micro-regions.

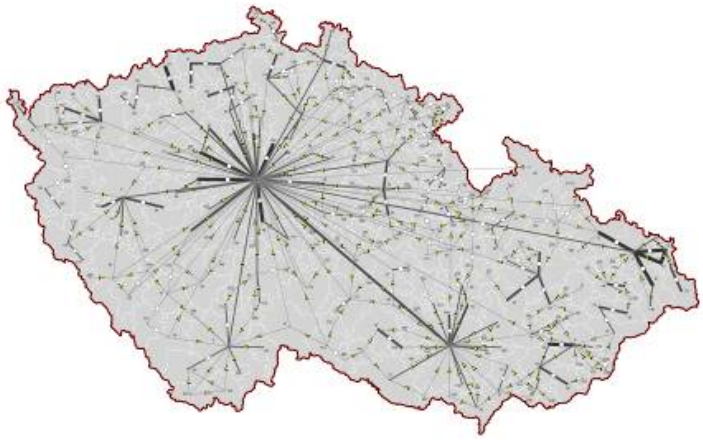
Figure 2. Assignment of LAU2 to urban centres



Having the set of urban centres, LAU2 are linked to the centres via the criterion of the strongest commuting-to-work flow. If the largest flow from LAU2 is not directed to one of the identified urban centres, the LAU2 is linked to a job centre indirectly. If the main commuting destination B of LAU2 A is not an urban centre, then LAU2 A is linked to the urban centre UC that is the main commuting destination for municipality B (see Fig. 2). This approach results in proto-micro-regions (PMRs) delimitation.

Czech example: There were 352 proto-micro-regions delimited. You may notice that the number of PMRs is different from the number of urban centres. The reason is that commuting hinterlands of some urban centres consisted of municipalities which were at the same time urban centres for other municipalities (fig. 3).

Figure 3. Significant flows between job centers in Czech Republic (2001)

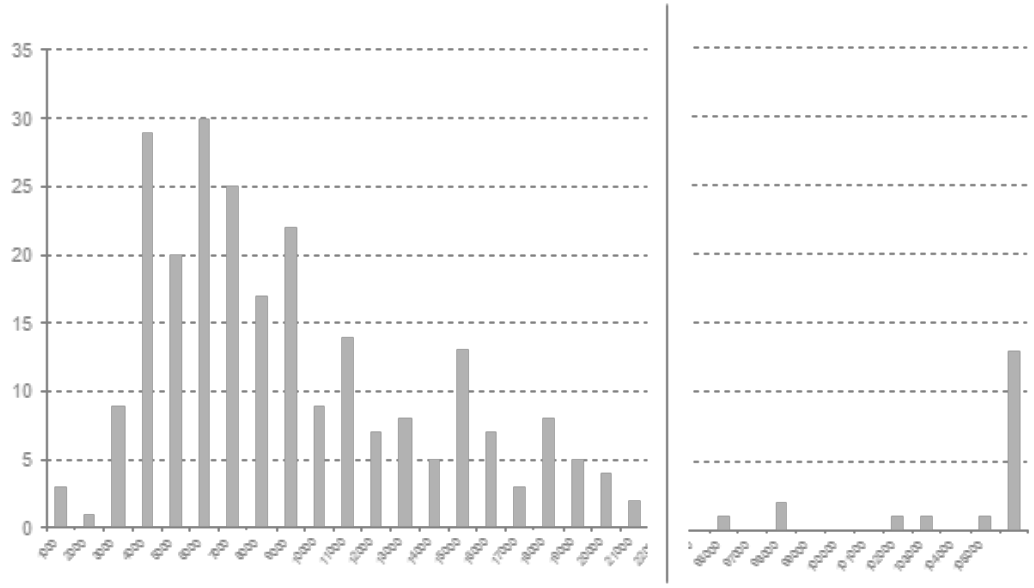


Proto-micro-regions should be treated as a preliminary representation of the micro-regional pattern. However, final micro-regions should fulfill the criteria of minimal population size and territorial integrity. It is advised that teams use frequency analysis (histogram) to find a threshold value applicable in the case-study region.

Applying the defined minimal population to the set of PMRs means that some proto-micro-regions fall under the line and have to be dissolved and spread over other proto-micro-regions. When attaching the dissolved PMR municipalities to the larger PMRs, several aspects should be taken into account, such as commuting directionality of their original job centre or other significant commuting flows of municipalities.

Czech example: The threshold value of 6 000 inhabitants was employed in the Czech case as derived from frequency analysis (see Fig. 2). Minimal population size criterion of 6 000 inhabitants was fulfilled by 260 PMRs. The rest (92 PMRs) was dissolved.

Figure 3. Distribution of PMRs frequencies according to their population size



As the territories of PMRs are often spatially fragmented they have to be consolidated into spatially continuous territories. This operation should be executed over the map project of PMRs. Particular LAU2 will have to be re-assigned to other centres (regardless to the direction of their maximum outgoing flow) to ensure continuous and not fragmented territories of the final micro-regions.

The final map and dataset of modified proto-micro-regions represents the result, i.e. the set of LAU2 assigned to territorially coherent micro-regions. Each of the micro-regions is organized around its urban centre which can now be called a micro-regional centre (MRC). Micro-regional centres represent the urban nodes with certain levels of job centrality; their centrality is reflected in the size of respective micro-regions.

Czech example: Territorial consolidation of 260 PMRs over 6000 inhabitants did not affect their number. As a result, 260 final micro-regions were delimited for 2001 covering the whole territory of the Czech Republic.

Job centers include municipalities of various size/centrality, both SMSTs as well as large cities. Therefore, we have to differentiate between SMSTs and large cities. We analyze commuting between job centers to identify hierarchical levels and thus the functional importance of centres which in combination with other characteristics help us to distinguish between SMSTs and large cities.

Finally, we perform an analysis of the intensity and directionality of flows among identified SMSTs and their urban regions with the aim to identify SMSTs territorial arrangements. The basic types of territorial arrangements are: (1) autonomous (isolated, self-standing) SMSTs (usually in peripheral rural regions), (2) agglomerated SMSTs that are integral parts of polynucleated metropolitan areas and conurbations dominated by large cities/major metropolises, (3) polycentric networks of SMSTs.

2.2.2: Audit of small and medium sized towns

The aim of the TOWN project is to make visible where feasible the characteristics of these SMSTs using secondary data sets in terms of the characteristics of their morphological and functional spaces. It is worth outlining some of the key issues related to the reliance on secondary data-sets when studying multiple national statistical jurisdictions. In being able to describe characteristics of SMSTs, the project will be able to explore questions such as are the socio-economic profiles of SMSTs different from their micro functional region, from larger cities or from the wider regions in which they are located. A second aspect of this work is that it allows us to outline to what degree the socio-economic profiles of SMSTs might have changed over the past decade.
Based on analysis of existing data sets (outlined in Chapters 3 and 4) it is unlikely that existing pan EU databases will either be able to: cover all EU member-states or cover the factors explaining SMSTs success outlined in Chapter 1. Thus the case study logic of the TOWN project is that more detailed and validated data will be gathered within the context of the wider case study NUTS1 regions that will allow the research team to respond to these key questions (first outlined in Section 2.1.2):

- Are the social, economic and environmental characteristics of SMSTs different from other types of territorial entity (for example cities or regions)?
- How have these social, economic and environmental characteristics of SMSTs changed over the past decade?
- To what degree are variations in social, economic and environmental characteristics between SMSTs within national urban systems more significant than differences in the social, economic and environmental characteristics in SMSTs between national urban systems?

As outlined in Section 2.1.2, SMSTs do not necessarily exist as statistical objects in secondary data-sets. Section 2.1.2 outlined a method by which secondary areal data gathered as the small area scale of small local authority units (LAU2) in member-states related to our morphological polygons identified by geomatic analysis (see Figure 1). It is worth noting, however, that this method can equally be deployed to identify territorial statistics for our functional micro-regions (see Section 2.2.2 for an outline of how these are to be identified).

Chapter 1 identified three broad sets of explanatory factors behind the well-being of SMSTs: factors relating to the socio-economic profile; to connectivity and agglomeration (geographic factors) and to factors relating to institutional framing. As outlined in the TOWN proposal the SMST audit will restrict itself to those factors that can reliably be constructed through the use of secondary data-sets. Complicated and often intangible characteristics such as the ‘culture of innovation’ or ‘attitudes to forms of economic growth’ cannot be captured in this way. Thus the general culture of development in SMSTs can only be captured through the qualitative assessment of individual settlements (see policy analysis and qualitative assessment in Section 2.2.3).

In developing a SMST audit that can be plausibly and meaningfully gathered as secondary data for morphological and functional SMSTs we will focus on the three principal foci of chapter 1:

- Indicators that describe the socio-economic factors that underpin the relative success of SMSTs (the socio-economic factors);

- Indicators that relate to the networked (or agglomerated) position of SMSTs in their functional contexts (the geographic factors); and
- Indicators that describe the institutional framing of SMSTs (the institutional factors).

The principal socio-economic characteristics of places (in general) relate to the profile of the resident population (who lives in a place), the functioning of labour markets (both in terms of labour demand as jobs and labour supply as resident economically active population) and the physical fabric of a place (relating to its housing stock). These are characteristics that can be related both to stocks (the number of residents) and to flows (such as migration or commuting flows). Some flows can be inferred from 'stock' data: for example the number of foreign born residents gives an indication of the number of 'lifetime' migrants in a location (a long term net flow) based on the 'stock' of foreign born residents.

The issue of connectivity and functionality can be established through secondary data, although the SMST audit here will build on the functional analysis work (see Section 2.2.2). The functional analysis work will establish the geographies of micro-regions building on the concept of the 'employment centre' (a functional or service role of many SMSTs) and the commuting flows between small area units in and around LAU2 geographies. However following the recommendations of the ESPON SEGI project (2012) the research team will explore the degree to which the presence of 'business units' (or employers) relating to different areas of the service sector are present in our SMSTs.

Table 7. Data sought from case study teams for 2001 and 2011

Broad framework	Data theme	Description of the data required
Socio-economic	Demographic data	Population: by age and gender Number of births and deaths Annual migration (shorter term migrant flows) Foreign born population (lifetime migrants)
	Labour market	Economically active population and unemployed by sex Economically active population by educational attainment Number of jobs by economic sectors (NACE) Commuting flows in/out of area
	Housing stock	Number of dwellings and a number of secondary and vacant dwellings
Policy/ networked	Municipal budget	Local Government resources (municipal budget) Administrative title (and any associated competence) of 'town' within member-state's local government system
Networked	Services (presence of)	Employment centre (see also Section 2.2.2) Schools (secondary and primary) Health care facilities (primary and secondary) University and other tertiary education facilities Banks/financial services Retail services (number/type of shops)

Finally, institutional factors are difficult to capture through small area secondary data. Much of this will be captured through the policy analysis and qualitative assessment work of the case studies (see Section 2.2.3). However discussions between the research teams quickly established that most local government systems retain a 'town' status for certain municipal authorities, a status that historically has been associated with enhanced areas of competence (the right to hold livestock markets for example). Also it is possible to establish

municipal budgets as a measure of the capacity of municipal authorities 'to act' at the scale of SMSTs.

Overall the set of 'raw' data sought from the case study teams is outlined in Table 7 across the three broad areas of socio-economic, institutional and networked (geographic) indicators.
In terms of structuring this work, the variables available within the SIRE data-base are insufficient to cover this range of indicators. The case study teams will both assess data availability and gather available data (on the basis of Table 7). The data will be supplied as an excel spreadsheet to the TPG. The evaluation of their availability, the gathering of alternative and/or additional data will be discussed and agreed with the Steering Group of the TOWN project.

2.2.3: Policy analysis

The aim of this part is to identify the relevant national, regional and local policies that directly impacts on SMSTs (obviously this will depend upon the particular governmental structure and the level of autonomy each level has) as well as other (sectoral) policies that have an impact on SMSTs (Table 8). This will be necessary to provide an understanding of how SMSTs are viewed within policy discourses and their functions/roles understood both within the wider context and in terms of their more specific characteristics (e.g. as local service providers, transport hubs, in the local labour market). It will be also be necessary to take into account European policies (related to the Structural Funds where areas are eligible for them) and how they are articulated with the various national and sub-national policies.
Case study teams should seek to identify:

- The impacts of EU, national, regional and local policies
- Local strategies and their impacts
- Examples of 'good practice' that can form the basis of policy recommendations

Table 8

Policy thematic	Explicit SMST focus	Implicit/tacit SMST focus
Policy aims/Objectives		
Evidence of diagnosis/identification		
Policy levers		
Programme/resource allocation		
Evidence of policy impact		
Governance arrangements		

Developing out of the different perspectives this section will generate some of the first policy recommendations based on the evidence assembled in the other activities.

The policy recommendations generated by the case studies will need to address several different audiences. First and most immediately, those in the case study area, it will be necessary to provide them with some guidance on the strengths and weaknesses (opportunities and challenges) in their situation and how this might be addressed. Second, recommendations to the relevant national authorities on SMSTs, for instance this could include the need for an explicit policy on SMSTs (where one is absent). Third, through comparative analysis of the results from all the case studies, draw out wider policy

recommendations for the European level on how to support the different types of SMSTs identified in the research, thus suggesting a more variegated approach rather than a 'one-size' fits all approach.

It is also worth bearing in mind that the work can potentially help SMSTs identify other similar SMSTs elsewhere in Europe who they can contact, share experiences with and engage in mutual learning. For instance it may that we suggest the European Commission considering supporting this type of exchange through the Rural Development pillar of Agricultural Policy (in a manner similar to LEADER) or through other aspects of the Structural Funds.

The principal role of the case study team will be to gather data in the form of:

- Identification and analysis of key policy documents relating to plans and strategies relating to spatial planning, economic development, environmental enhancement and community development at national, regional and SMST level.
- Identification and overview of key policy instruments and resources dedicated to the policy theme.

The analysis will be conducted combining the following techniques:

- Collecting and reading key policy documents
- Interviews/meetings/focus groups (face to face or telephone) amongst policy makers, policy officers and business community who are working on plans and strategies relating to spatial planning, economic development, environmental enhancement and community development at national, regional and SMST level. Data analysis of the key pieces of evidence (documents, interview transcripts/notes) in order to develop evidence-based responses to the case study themes indicated above.

To this we would add, as identified in the conceptual framework (section 1.2), the socio-economic nature of the SMST in terms of:

- Residential economy
- Productive economy
- Knowledge economy

Of course we need to bear in mind that in any concrete situation the relevant SMST will be a combination of these three 'ideal types'.

It is important to take into account all of these dimensions if we are to clarify the perceived and actual role(s) of each SMST by identifying their purpose, qualities, services, nature of the local economy, gain an understanding of their wider region and their position within and relationship with the wider region. Moreover, we need to ascertain if they work with other neighbouring towns and engage with them in co-operative/complimentary ways and whether or not there are policy frameworks, at national or sub-national level, that encourage this type of working.

There are a number of underlying policy issues to that the case studies will need to focus on in particular the capacity of policy-makers operating at the level of SMSTs to mobilise resources appropriately which depends upon:

- The degree of agency at the local level
- The territorial scale of the local government unit related to the scale of functional SMSTs
- The relational/functional context of the SMST

In addition we identify the following questions that will help structure policy analysis in the case studies and provide the basis for later comparative analysis that can generate for general (i.e. relevant to the European level) policy recommendations:

- Is there a national approach to SMSTs – does this take the form of a strategy?
- Are the implications of (national) sectoral policies for SMSTs taken into account?
- At the regional level are there regional policies on SMSTs?
- Is there an evidence base available?
- Which, if any, EU policies are utilised and how?
- What degree of latitude is there for SMSTs to work together both within a region and nationally (and cross-border/internationally)?
- What types of SMSTs exist in the case study region and what are their roles/functions?
- Are SMSTs in the case study areas working together?
- Do the SMSTs have either a local or sub-regional approach?
- Are there appropriate governance and decision-making arrangements in place?
- How is the private sector involved?
- Is civil society involved?

2.2.4: Selecting the case study regions

As outlined in the overview the project depends upon the case study based research. In order to ensure that the case study work is complementary and comparable across the different case study localities it has been important to ensure that case study selection allows the project team overall to meet the project objectives with regards to:

- The validation of the geomatic and socio-economic analysis
- The exploration of the policy analysis and the qualitative assessment of the state of SMSTs across the Union both in terms of the SMSTs themselves (as either functional or morphological places) but also in terms of how regional policy makers frame spatial development within SMSTs (taking into consideration the differing territorial structures of sub-national governance across Europe).

Table 9. Case study regions

State	First level Potential NUTS1 case	n. of NUTS3	Second Level Potential NUTS 2 -3	n. of NUTS3
In-house case studies				
Belgium	Flanders (BE2)	22	Flanders	22
United Kingdom	Wales (UKL)	12	Wales	12
Spain	East (ES5)	10	Catalonia	4
Czech Republic	Czech Republic (CZ0)	14	Northern regions	6
France	Parisian basin (FR2)	22	Centre	6
Subcontracted case studies				
Italy	North West (ITC)	25	Piemonte	8
Sweden	North Sweden (SE3)	7	North Sweden	7
Cyprus	Cyprus (CY0)	1	Cyprus	1
Slovenia	Slovenia (SI0)	12	Slovenia	12
Poland	Central Region (PL1)	11	Central Region (PL1)	11

The case study regions (Table 9) have been selected not only considering an appropriate coverage of the EU territory, but also according to the following criteria:

- the government structure of the member-state (federal/unitary/decentralised);
- the size of member-state (smaller/larger) and of the local government units within member states (larger/smaller LAU2 units);
- coverage of ESPON typologies relating to NUTS3 measures of urban-ness/rurality, border areas, mountains and coastal areas;
- the spatial patterns of the SMSTs and the socio-economic characterization of the regional context.

Table 10-11 summarises the settlement characteristics for 9 case study areas (the case of Cyprus is missing from this analysis as the DEGURBA grid data do no cover the Republic of Cyprus – it will be added in a later stage).

Table 10. Main settlement characteristics of case study regions (SMT and HDUC)

NUTS1 case	Population (2006)	Area sq.km (2006)	n. of NUTS3	% population living in SMST (based on corrected estimation)	% area occupied by SMST	n. of NUTS3 regions with SMST as prevailing population settlement	% population living in HDUC (based on corrected estimation)	% area occupied by HDUC	n. of NUTS3 regions with HDUC as prevailing population settlement
Flanders (BE2)	6,098.000	13,569.5	22	38.0%	16.0%	11	41.4%	13.0%	10
Wales (UKL)	2,966,400	20,817.7	12	26.2%	2.6%	2	49.9%	3.6%	7
East (ES5)	12,711.000	60,456.8	10	20.7%	2.0%	3	63.4%	2.5%	6
Czech Republic (CZ0)	10,269,100	78,820.0	14	27.7%	2.5%	7	31.4%	1.7%	4
Parisian basin (FR2)	10,658,099	146,689.6	22	20.2%	1.0%	1	20.6%	0.5%	5
North West (ITC)	15,585,440	57,978.0	25	20.5%	3.9%	10	58.9%	6.1%	12
North Sweden (SE3)	1,705,200	313,436.5	7	33.7%	0.2%	2	11.1%	0.03%	0
Cyprus (CY0)	772,500	9,368.0	1	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
Slovenia (SI0)	1,705,200	313,436.5	12	27.3%	0.1%	2	26.5%	0.1%	2
Central Region (PL1)	7,736,600	53,803.7	11	14.7%	1.2%	0	49.0%	2.1%	5

In terms of population shares by settlement, we identify SMST as the prevailing settlement form in:

- 3 NUTS3 regions within the case study of Eastern Spain (ES512 Girona; ES522 Castellon; ES533 Menorca);
- 11 regions in Flanders (BE213 Arr. Turnhout; BE221 Arr. Hasselt; BE222 Arr. Maaseik; BE233 Arr. Eeklo; BE234 Arr. Gent; BE235 Arr. Oudenaarde; BE236 Arr. Sint-Niklaas; BE252 Arr. Diksmuide; BE253 Arr. Ieper; BE242 Arr. Leuven; BE258 Arr. Veurne);
- 10 regions in the Italian North West (ITC12 Vercelli; ITC14 Verbano-Cusio-Ossola; ITC15 Novara; ITC16 Cuneo; ITC18 Alessandria; ITC32 Savona; ITC44 Sondrio; ITC47 Brescia; ITC49 Lodi; ITC4A Cremona)
- 2 regions in Slovenia (SI015 Zasavska; SI024 Obalno- kraška)

- 7 regions in the Czech Republic (CZ020 Středočeský kraj; CZ041 Karlovarský kraj; CZ051 Liberecký kraj; CZ052 Královéhradecký kraj; CZ063 Kraj Vysočina; CZ071 Olomoucký kraj; CZ072 Zlínský kraj);
- 2 regions in Wales (UKL13 Conwy and Denbighshire; UKL14 South West Wales);
- 1 region in the Parisian basic (FR211 Ardennes);
- 2 regions in North Sweden (SE321 Västernorrlands län; SE332 Norrbottens län);
- None in the Central Region of Poland, and there are no SMST data for Cyprus (not included in the DEGURBA database).

Table 11. Main settlement characteristics of case study regions (VST and other settlements)

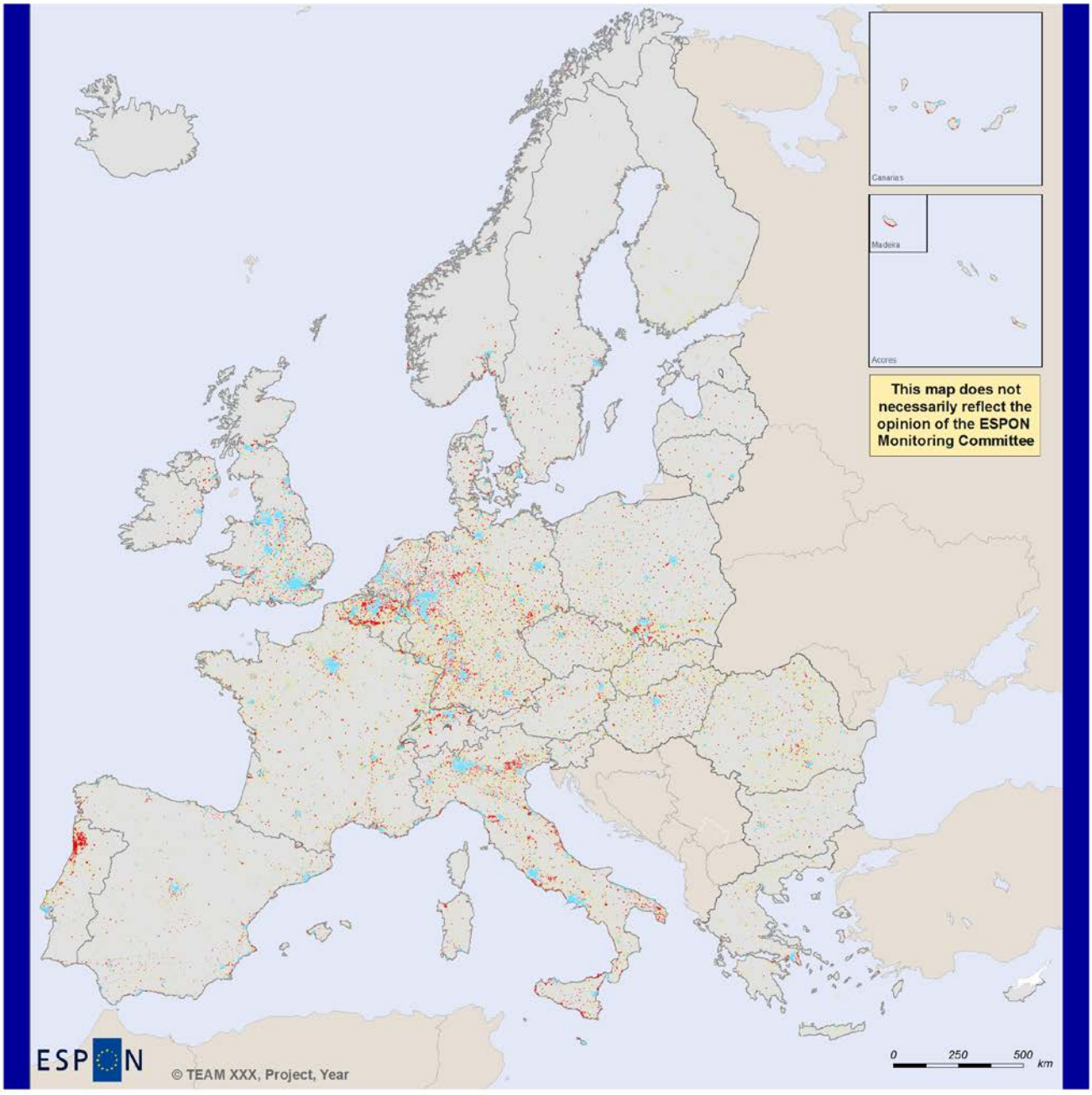
NUTS1 case	% population living in VST (based on corrected estimation)	% area occupied by VST	n. of NUTS3 regions with VST as prevailing population settlement	% population living in OTHER SETTLEMENTS (based on corrected estimation)	% area occupied by OTHER SETTLEMENTS	n. of NUTS3 regions with OTHER SETTLEMENTS as prevailing population settlement
Flanders (BE2)	9.1%	6.4%	1	11.5%	64.6%	0
Wales (UKL)	9.7%	2.0%	2	14.2%	91.8%	1
East (ES5)	9.3%	2.4%	1	6.7%	93.1%	0
Czech Republic (CZ0)	20.4%	4.4%	0	20.5%	91.5%	3
Parisian basin (FR2)	22.4%	2.6%	1	36.7%	95.9%	15
North West (ITC)	11.7%	4.4%	2	8.9%	85.5%	1
North Sweden (SE3)	17.1%	0.2%	0	38.0%	99.7%	5
Cyprus (CY0)	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
Slovenia (SI0)	17.1%	0.2%	0	29.1%	99.6%	8
Central Region (PL1)	7.7%	1.9%	0	28.6%	94.7%	6

In the Annex 3 to this document, we have included the classification of urban areas in case study maps according to the different typologies identified in RA2 – morphological analysis. Moreover, Annex 2 substantiates the decision of changing the region focus in the Polish case study.

Chapter 3: Early findings

3.1: Identifying morphological town polygons

Figure 4. Basic SMST polygons in Europe (TOWN Typology 1)



The application of the procedure described in section 2.1.1. has yielded:

- **8,350** urban settlements classified as **SMST**;
- **846** urban settlements classified as **HDUC**;
- **70,480** urban settlements classified as **VST**.

In Figure 4, SMST are mapped out as red polygons, together with the HDUC in light blue. At first glance, SMST can barely be distinguished within the wider scale of the ESPON space. However, a number of phenomena are already visible:

- the richness of SMST together with extensive urban regions in a sector that stretches from the south of England throughout the Benelux countries and the west of Germany to Italy (the 'Blue Banana' profile);
- 'clusters' of SMSTs in the industrial belt of South-Eastern Germany and Poland, Northern Portugal, around and as part of larger urban regions;
- linear conurbations along the whole western Mediterranean arc from Spain to Italy;
- relative sparseness of SMSTs in the interior of Spain and France, and southern Sweden;
- The large extension of 'clouds' of SMSTs in the eastern countries.

Figure 5 illustrates the distribution of population across SMST by population classes. The distribution is highly skewed towards small population sizes (with a median value of 9,395.5 inhabitants); the first half of SMST, ordered by size only, contain 23% of the total population in SMST, while the top 5% contain 22% of the population. Having "cut" population size minimums at 5.000 inhabitants, we note that there exist SMST of more than 250.000 inhabitants, thus the size of a large city, though not having a sufficient population density to be considered as such.

Figure 5. Populations of SMST polygons by population classes

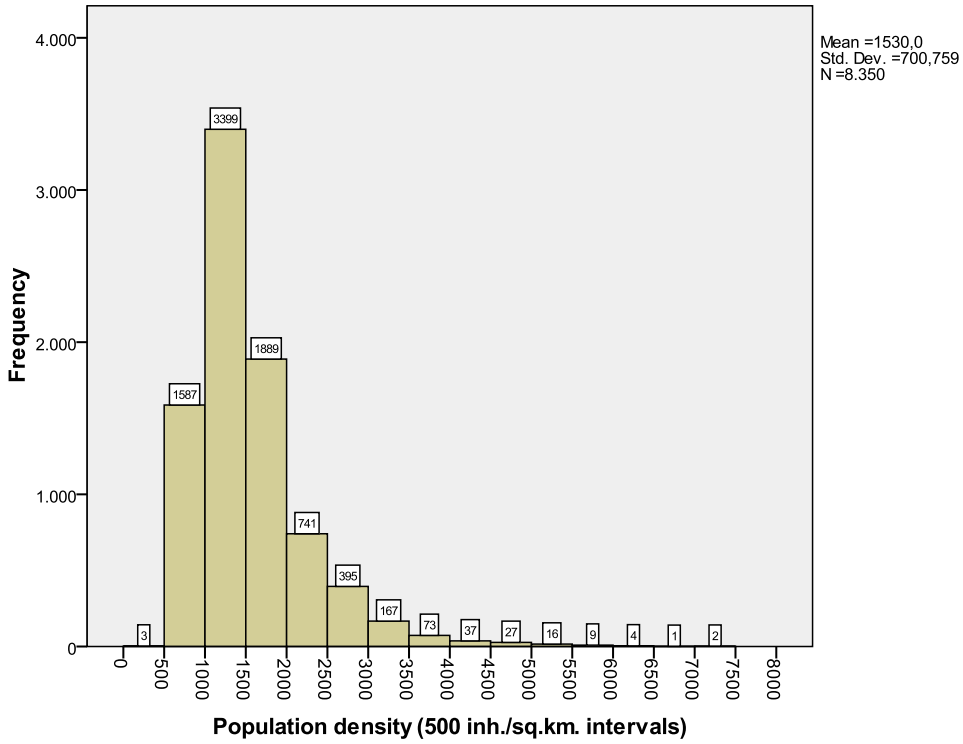


Figure 6 illustrates the distribution of SMSTs by density classes. This distribution is slightly less skewed than that of population. We note that in spite of having a minimum of 300 inh./kmq as a defining factor for SMST, none of our polygons has a density value less than 463.2 inh./kmq (see below a discussion of this result), while the maximum value is 14,804.5 inh./kmq, a "metropolitan" class of urban density (though population size is not the binding constraint for SMST). Overall, the top 5% SMSTs in order of density have densities that are superior to 2,865.3 inh./kmq.

Finally, Figure 7 cross-plots populations and population densities of the SMSTs. The peculiar "wind fan" structure of the figure is determined by the discrete (and limited) number of pixels in each polygon, producing discontinuities in the distributions of density-population couplets.

Figure 6. Populations of SMST polygons by density classes

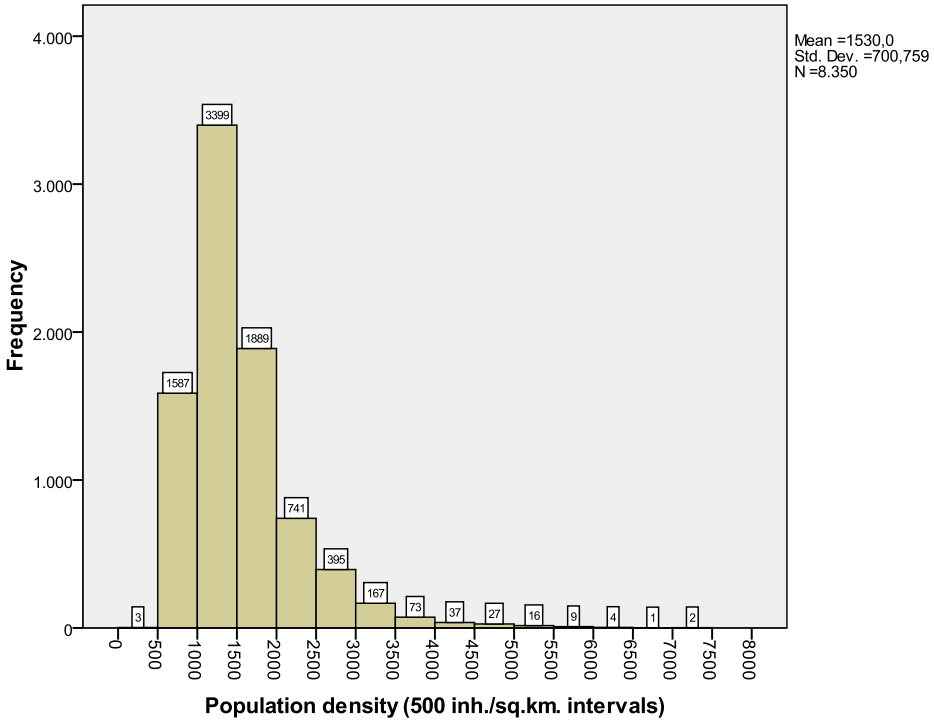
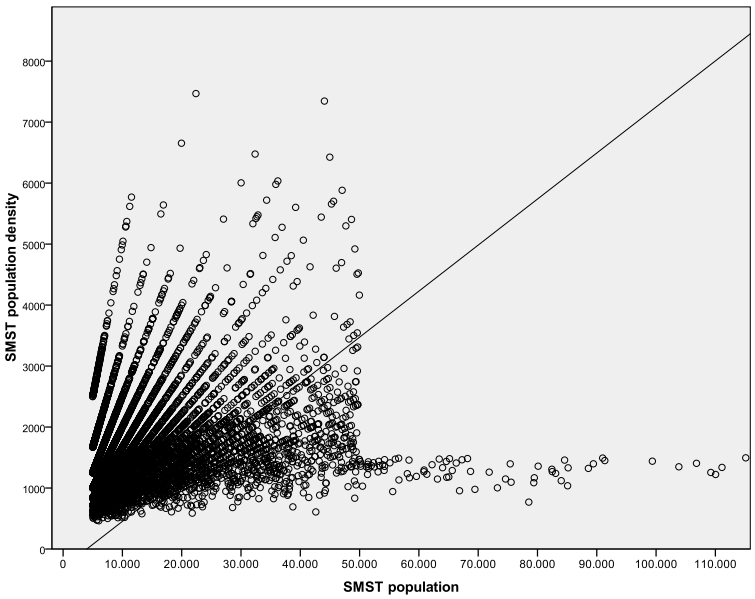


Figure 7. Cross-plot of populations and population densities of basic SMST polygons



It must be noted that this simplified method of obtaining a delimitation and classification of urban settlements, involving a sequence of elaborations on the original raster database, is not without problems. We can point to three orders of problems.

First, the method employed to create SMST polygons aggregates contiguous grid cells that are *all* greater than 300 inh./kmq, producing aggregate SMST densities that are in general well above the 300 inh./kmq threshold (see Figure 7). A more sophisticated method that generates clusters of contiguous grid cells whose *aggregate* density is greater than the 300 inh./kmq threshold would return different results and would also include in urban areas lower density grid cells. However, its application would be technically complex and subject to a certain degree of discretion in the delimitation of the resulting polygons. Moreover, it would be inconsistent with the method adopted by DG Regio and OECD, making our respective approaches incomparable.

Second, an opposite problem arises from the construction of HDUC polygons "by elimination" from the set of polygons created that are to be considered SMST; that is, after generating polygons by aggregation of contiguous grid cells whose density is greater than the 300 inh./kmq threshold, we have "taken out" and named HDUC those polygons whose density is greater than 1500 ing./kmq and whose population is above 50.000. The method used is substantially different from the one that identifies SMST: in fact, if HDUC were build by aggregation of contiguous cells that were *all* superior to 1,500 inh./kmq, as in the DEGURBA document, some "fringe" areas whose overall density is likely to be lower than 1,500 inh./kmq would have been left out (maybe resulting as SMST or VST "attached" to HDUC). This means that our approach "over-represents" HDUC – there are parts of HDUC polygons which have the characteristics of SMST in terms of their density and population dimensions. From the functional point of view (that we are privileging in our approach, because the main focus of this project is on the "role" of SMST, which is addressed primarily through a functional analysis at urban system level – and not on the shape or role of HDUC, as in the DEGURBA study) separating these areas would make little sense because they indicate a sort of "functional continuity" that should be taken into account. Yet from a purely morphological perspective it does create problems in specific contexts of high urban sprawl and dense urbanisations according to a 'ribbon development', problems which may be partly amended in successive stages of verification and correction of the geo-database in case study regions.

For further clarity, we include in Fig. 8 and 9 two examples from the Flanders case study, whereby we reproduce the urban settlement polygons and compare it with their 'underlying' structure of grid cells when they are classified by their individual density. This method allows us to distinguish, within one polygon, the existence of a 'core' (and even of high-density nuclei) and a 'fringe'. In the Annex we have included other examples of metropolitan areas from our set of case studies that are characterised by a problematic morphology, in order to identify core areas, high-density nuclei and fringes.
Thus, in Figure 8 we have mapped the resulting settlement structure in the urban area of Ghent, a city of approx. 250.000 inhabitants and whose density (at municipal level) is of 1,600 inh./kmq, which would therefore classify it as a HDUC; yet, because of the aggregation method employed, the polygon that includes it sprawls to surrounding areas resulting in a large SMST polygon of 382,425 inhabitants and a density of 1,401 inh./kmq, thus qualifying as a SMST (map on the left side) in spite of the existence of a higher density "core" – as can be seen from the map on the right side.

Figure 8. Urban agglomeration of Ghent, Belgium. (left): SMST and HDUC polygons**; (right):** grid cells of 1 km^2, classified in three density ranges

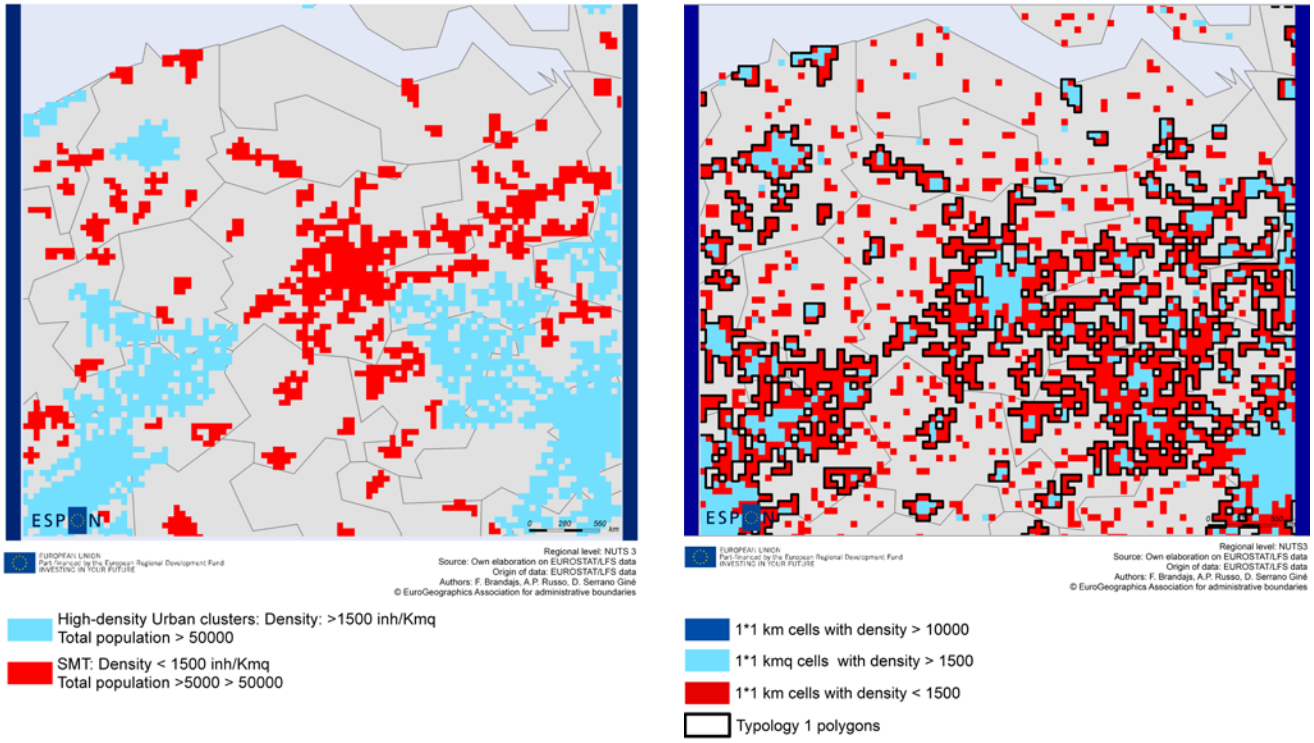
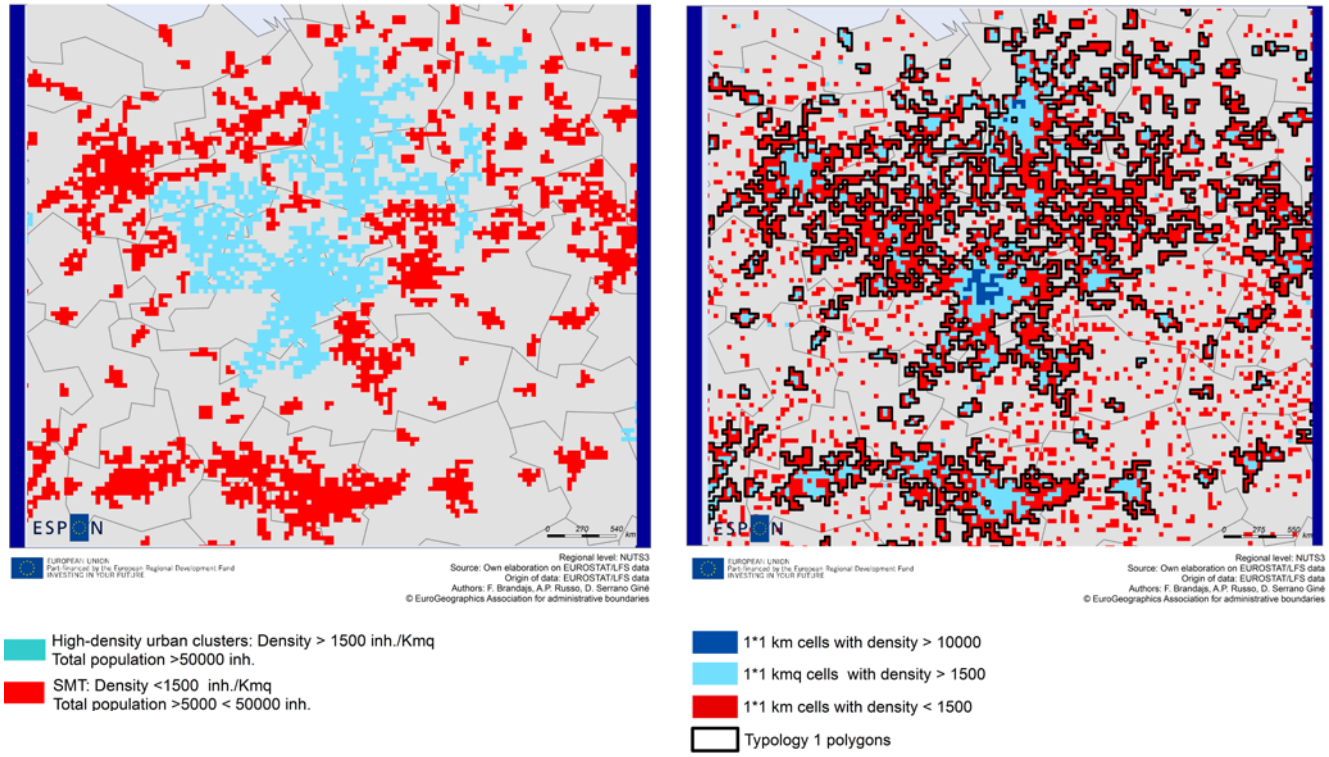


Figure 9. Urban agglomeration of Brussels, Belgium. (left): SMST and HDUC polygons**; (right):** grid cells of 1 km2, classified in three density ranges



Conversely, the maps in Figure 9 illustrate the situation of the HDUC polygon of Brussels, a HDUC of 1,84 M inhabitants with a global density of 2,225 inh./kmq characterised by a sprawling lower-density 'ribbon development' into surrounding areas, especially into the

Flanders territory in the north-west (left side); in the map on the right we can again see that the 'high density core' would exclude the larger parts of these ribbons.

Third, the 1x1 km dimension for the original raster database on which the construction of this geo-database is based is relatively 'rough' – small discontinuities in the urban fabric could be significant in the process of 'isolating' urban settlements for the analysis also at distances that are far inferior to 1 km. In fact, our polygons could be compared to the work recently conducted by the M4D project in the creation of a geodatabase of Urban Morphological Zones or UMZ (Guerois et al., 2012) which elaborated Corine based urban cover grids at a much finer definition of 200m grid cells. In later stages of the project, we will use the information generated by M4D to revise and correct our work of construction of polygons. Moreover, it must be noted that the population estimation method at grid cell level in DEGURBA has a certain degree of inaccuracy which may yield problematic definitions of SMST populations especially in the case of sprawling low-density suburban areas, again calling for verification and correction.

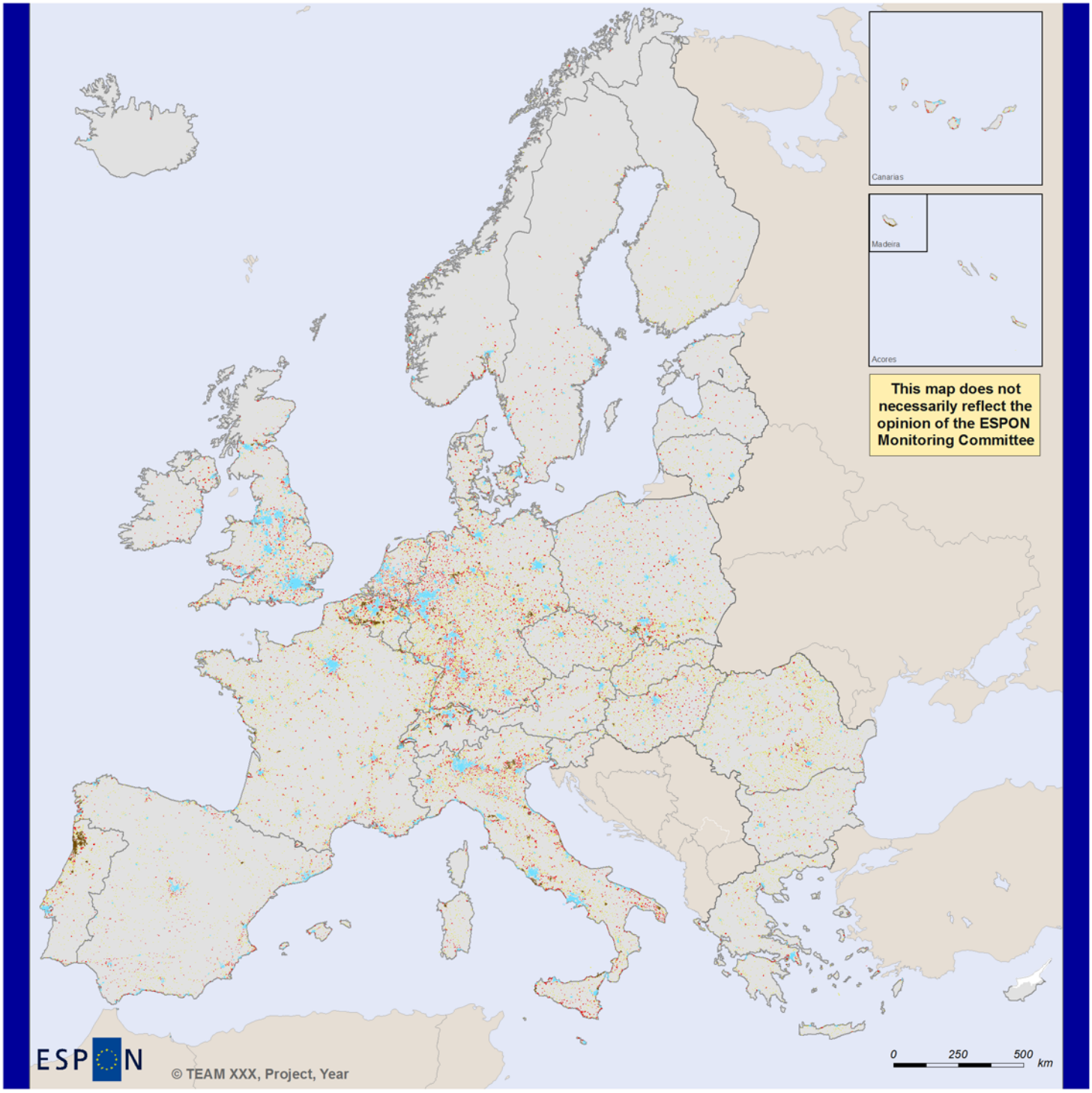
3.2.1: Typologies of SMST

Basic SMST polygons, as well as the other urban settlements obtained through the DEGURBA methodology (HDUC and Very Small Towns), may then be further classified, considering different values of population and density of inhabitants, always within the values indicated for urban clusters. Indeed, it should be noted that the basic typology also includes among SMST urban area that have more than 50.000 inhabitants. As the tender specification for this project explicitly mention a population range for urban areas between 5.000 and 50.000 inhabitants as the identifier of small and medium towns, a first enhancement oriented at a better understanding of population settlements introduces the subcategory of "large SMST" for those SMST that have more than 50.000 inhabitants, though having a total population density below the 1,500 inh./kmq threshold of large urban areas (see Table 12).

Table 12. Modified SMST typology including large SMST.

		DENSITY (inh. / kmq)		
		< 300	> 300 and < 1500	> 1500
POPULATION (inh.)	< 5000	OTHER SETTLEMENTS	VST	VST
	> 5000 and < 50000	OTHER SETTLEMENTS	SMST	SMST
	> 50000	OTHER SETTLEMENTS	large SMST	HDUC

Figure 10. TOWN typology 2 of SMST (incl. HDUC and VST)



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Origin of data: EUROSTAT/LFS data
Authors: F. Brandajs, A.P. Russo, D. Serrano Giné
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High-density urban clusters: Density > 1500 inh./Kmq
Total population >50000 inh.
Large SMT: Density <1500 inh./Kmq
Total population >50000 inh.
SMT: Density <1500 inh./Kmq
Total population >5000 < 50000 inh.
Very Small Towns: Density > 300 inh./Kmq
Total population < 5000

This typology (**TOWN Typology 2**) subdivides SMST into a class of 8254 "normal" and 96 "large" SMST polygons across Europe. The latter correspond to a number of sprawling medium-density regions across Europe.

In Figure 10 we have mapped this modified basic typology, also including "high density urban clusters" as identified by DG Regio and VST. With respect to Figure 10, we now have a better visual perspective of spatial relations between different cities by "degree of urbanisation". Some further elements that stand out:

- A certain balance within urban systems with a smooth hierarchical structure of high density clusters, large SMSTs and normal SMSTs in Italy, Belgium, Germany, as compared to a strongly hierarchical structure in France, Great Britain, Span, and most south eastern Europe, which almost eliminated the intermediate "large SMST" level.
- The presence of clusters of large SMST in northern Portugal and north-eastern Italy.

A more sophisticated refinement of the basic SMST typology subdivides them further also including "small SMST" as SMST with a population below 25.000 (**TOWN Typology 3**). As a result (See Table 13), we now include among SMST:

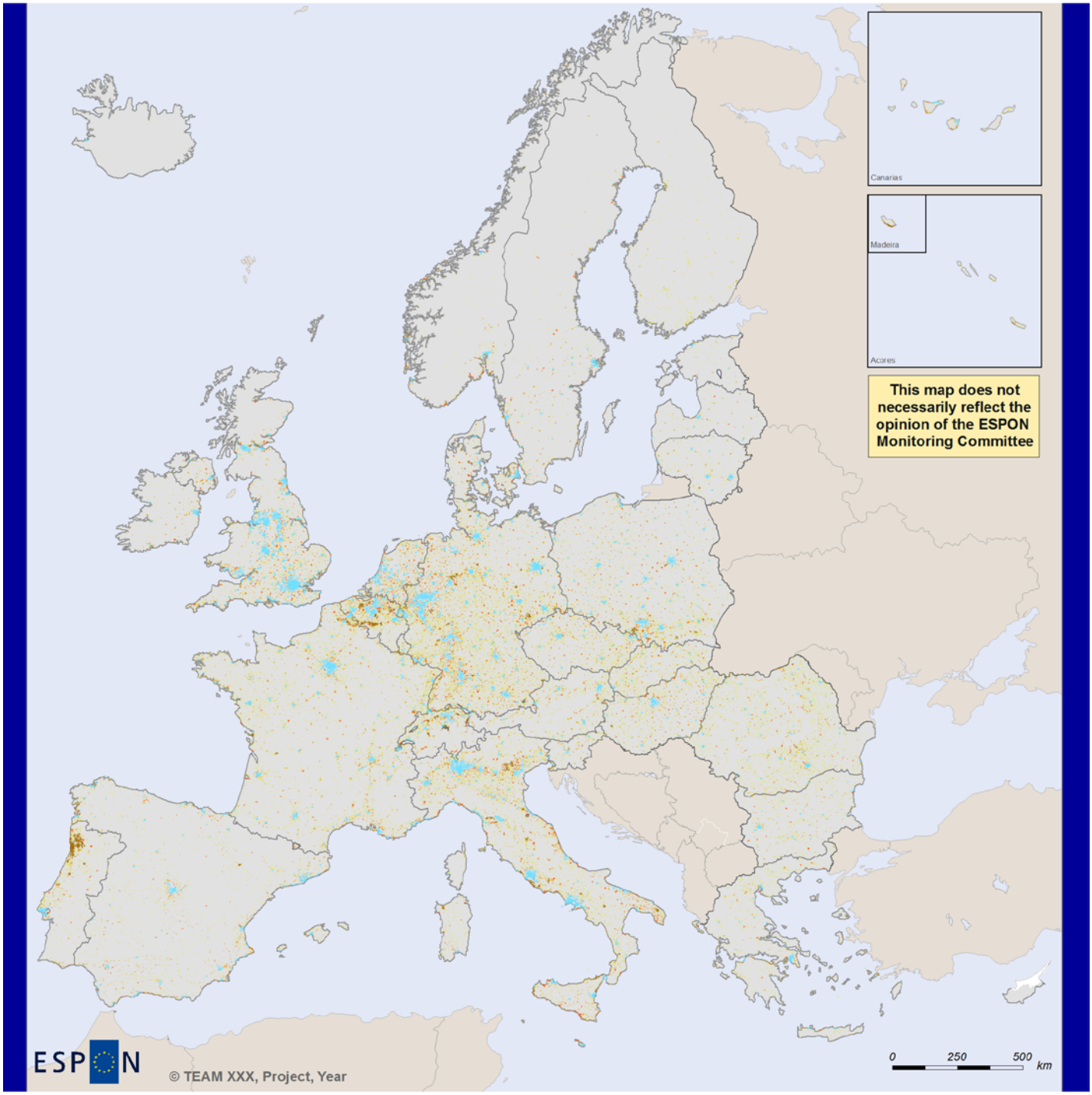
a. **7,301 small SMST**, with a population density of more than 300 inh./kmq and a population of less than 25.000;
b. **953 medium SMST**, with a population density of more than 300 inh./kmq and a population between 25.000 and 50.000,
c. **96 large SMST** as before, with a population density of more than 300 inh./kmq (but smaller than 1,500 inh./kmq) and a population of more than 50.000.

Table 13. TOWN typology 3 based on 3 population thresholds

		DENSITY (inh. / kmq)		
		< 300	> 300 and < 1500	> 1500
POPULATION (inh.)	< 5000	OTHER SETTLEMENTS	VST	VST
	> 5000 and < 25000	OTHER SETTLEMENTS	small SMST	small SMST
	> 25000 < 50000	OTHER SETTLEMENTS	medium SMST	medium SMST
	> 50000	OTHER SETTLEMENTS	large SMST	HDUC

The correspondent classification is mapped out in Figure 11, while Figure 12 cross-plots the values of population and density of the three SMST classes so obtained. In Figures 1.A-E in the Annex 3, for a better visualisation of these results, we map SMST classes so obtained as well as high density clusters in five NUTS 1 areas chosen among the case studies in our project.

Figure 11. TOWN Typology of urban regions based on 3 population thresholds (TOWN typology 3)



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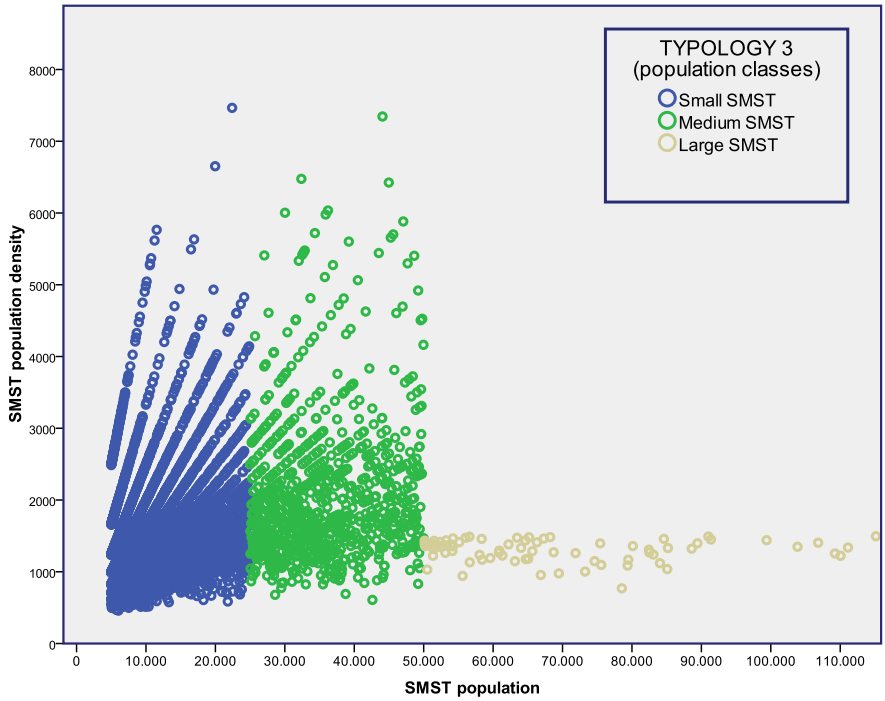
High-density urban clusters: Density > 1500 inh./Kmq
Total population >50000 inh.
Large SMT: Density >300 <1500 inh./Kmq
Total population >50000 inh.
Medium SMT: Density >300 inh./Kmq
Total population >25000 <50000 inh.
Small SMT: Density >300 inh./Kmq
Total population >5000 <25000 inh.
Very Small Towns: Density > 300 inh./Kmq
Total population < 5000

Figure 12. Cross-plot of populations and densities of SMST in TOWN typology 3



A fourth typology of SMST, or **TOWN Typology 4** (Table 14) introduces an intermediate density threshold of 1.000 inh./kmq and identifies:

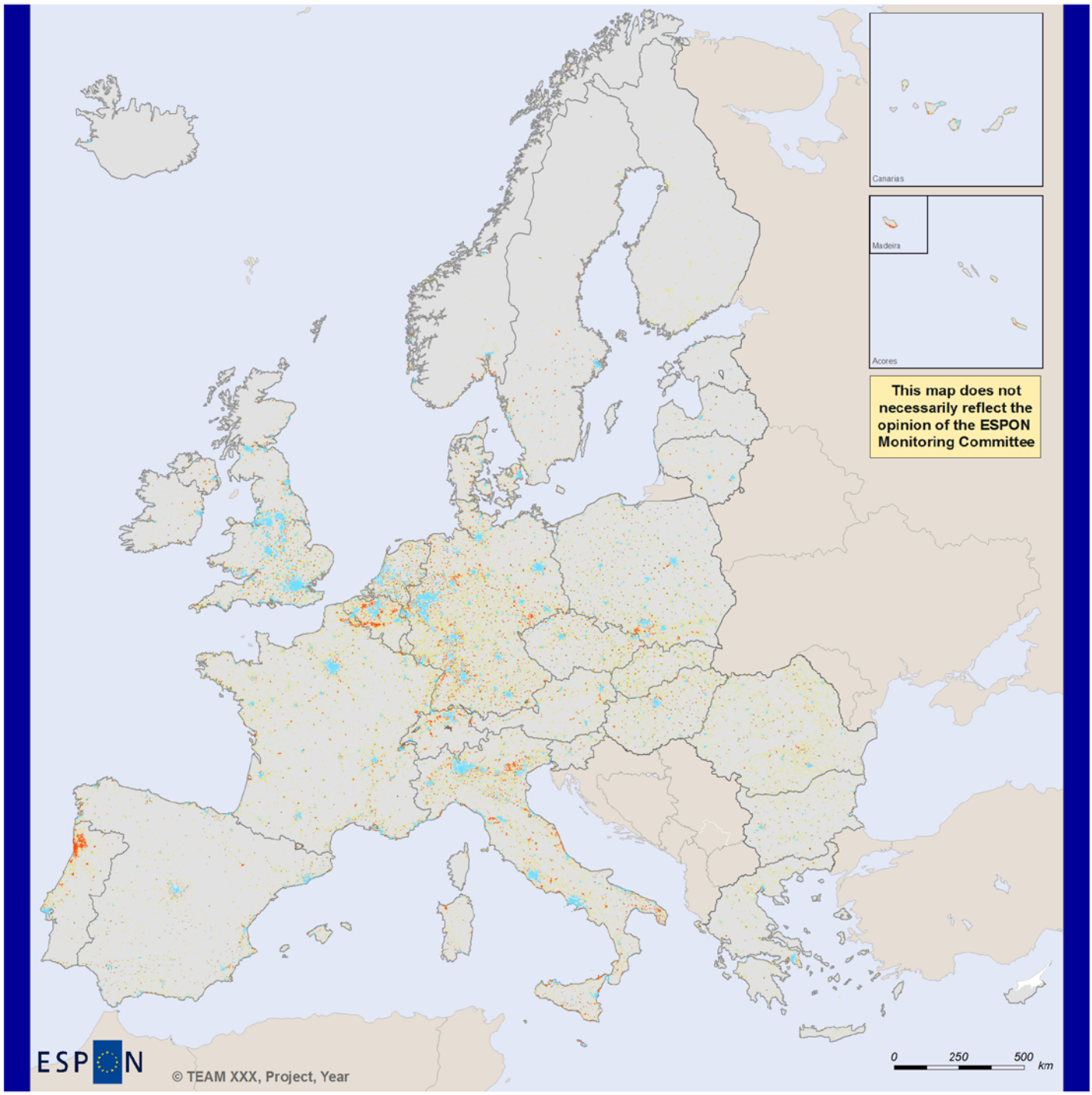
a. **1,590 low-density SMST**, with a population of more than 5.000 and a population density between 300 and 1.000 inh./kmq;
b. **3,399 medium-density SMST,** with a population of more than 5.000 and a population density between 1.000 and 1,500 inh./kmq;
c. **3,361 high-density SMST**, with a population of more than 5.000 (and less than 50.000) and a population density of more than 1,500 inh./kmq.

Table 14. Typology of urban regions based on 3 density thresholds (TOWN Typology 4)

		DENSITY (inh. / kmq)			
		< 300	> 300 and < 1000	> 1000 and < 1500	> 1500
POPULATION (inh.)	< 5000	OTHER SETTLEMENTS	VST	VST	VST
	> 5000 and < 50000	OTHER SETTLEMENTS	low density SMST	medium density SMST	high density SMST
	> 50000	OTHER SETTLEMENTS	low density SMST	medium density SMST	HDUC

The correspondent classification is mapped out in Figure 12, while Figure 13 cross-plots the values of population and density of the three SMST classes so obtained. Maps zooming in case study regions according to this typology are provided in Figures 2.A-E in the Annex 3.

Figure 12. - Typology of urban regions based on 3 density thresholds (TOWN typology 4)



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High-density urban clusters: Density > 1500 inh./Kmq
Total population >50000 inh.

High density SMT: Density >1500 inh./Kmq
Total population >5000 and <50000 inh.

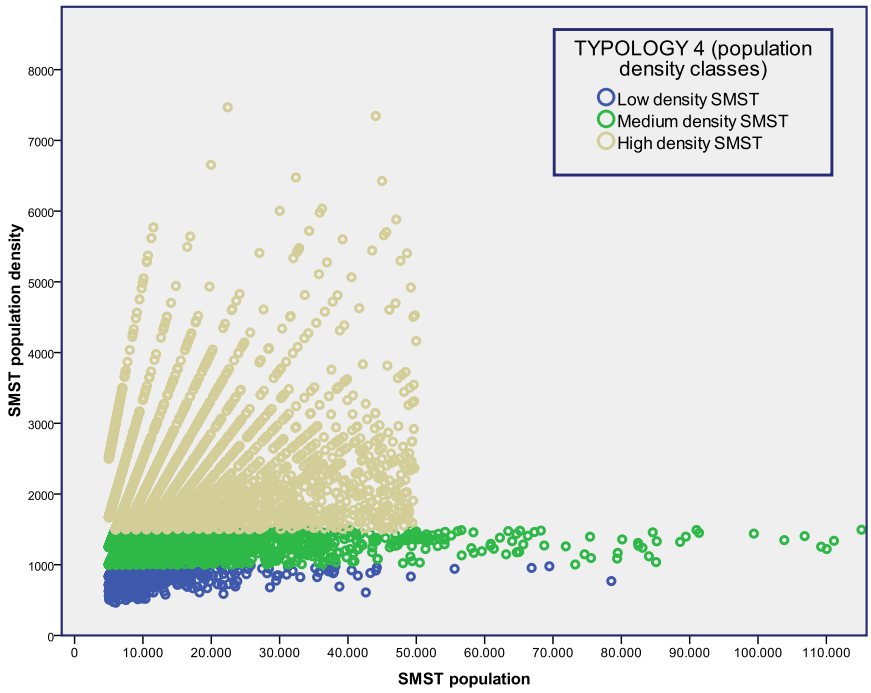
Medium density SMT: Density >1000 and <1500 inh/Kmq
Total population >5000 inh.

Low density SMT: Density <1000 inh./kmq
Total population >5000 inh.

Very Small Towns: Density > 300 inh./Kmq
Total population < 5000

In this map, the majority of SMST in most countries belong to the higher density class, coinciding with traditional market towns and secondary poles in metropolitan regions, but we can also see the presence of low-density SMST clusters around large metropolitan areas like Paris, Athens or Rome, and more diffused medium-density SMST networks in industrial areas in the Flanders, Northeast Italy, and Southern Poland, as well as on Italian coasts and along the main communication arteries in the European core.

Figure 13. Cross-plot of populations and densities of SMST in TOWN typology 4



3.2: Overlapping the SMST and the NUTS3 geography

Having identified our morphological polygons (representing the contiguous residential built up areas of SMSTs) the project team has explored the degree to which sensible indicators can be generated and analysed at NUTS3 level. The reasons for doing such an analysis are twofold:

- Firstly analysing the geomatic characteristics of our morphological SMST at NUTS3 level allows the team to check population estimates (based on geomatic aggregation) at a territorial level where population characteristics are already known. This might be thought of as checking the calculations for systematic errors.
- Secondly compiling measures of SMST significance at NUTS3 level allows the team to consider (with care) the influence of broader contextual factors (through existing ESPON regional typologies and indicators constructed at NUTS3 level) on the existence of small and medium-sized towns. This arises because of the relative wealth of data available at NUTS3 level.

The use of a NUTS3 based geography for this work is problematic on three counts:

1. The NUTS3 geographies have recently changed (in 2010) leaving around 10% of NUTS3 units that have been changed relative to the 2006 NUTS3 geography (and thus data assigned to the different units are not comparable);
2. The variability of NUTS3 unit size between different member-states makes them problematic for cross-national comparison if any 'size effect' bias is not taken into account within the areal statistics; and,
3. The dissonance between a NUTS3 geography based on arbitrarily drawn administrative boundaries (by the national statistic agencies of member-states) and the functional geographies (such as labour market areas) that the analysis purports to analyse. This generates the possibility of concealing the phenomena we are interested in analysing.

In member-states where we can make the comparison local labour market areas are between half and a tenth the size of functional local labour market areas (depending on both the national context and the method used for identifying the functional area.

3.2.1: Checking polygons characteristics at NUTS3 level

The geography of small to medium sized (morphological) polygons does not map neatly onto NUTS3 regions. We have discussed some of the problematic aspects of the NUTS3 region above. Specifically our SMST polygons do not always nest within a single NUTS3 region. However from a GIS point of view this issue will become more problematic as the TPG attempts to link the LAU2 (municipal) data-set to our polygons. The implications of this mismatch are that:

- It is difficult to infer SMST attributes from NUTS3 characteristics. The NUTS3 geography is relatively data-rich whereas data relating to SMSTs is not always easily visible.
- It is problematic to aggregate SMST data derived from the polygons to the NUTS3 level (given the lack of easy 'nesting'). This arises both from the geographic facts on the ground where morphological settlements do not respect administrative boundaries (even national ones) but also because the grid squares from which our polygons are derived do not respect administrative boundaries.

However despite the problematic relationship, the TPG still felt that there was value in aggregating polygons data at NUTS 3 level in order to test and fine tune a methodology that will later be extended to the LAU2 (municipal) level.

The two principal means of aggregating SMST data at the level of their NUTS3 regions centres on firstly the proportion of a regional population that is estimated as living within our small to medium-sized towns (polygons) and secondly the regional proportion of the area taken up by the SMST polygons.

In Section 3.2.2 we will also use an indicator based on the number of SMST centroids that are located within a NUTS3 polygon as an indicator of 'how many' towns are present. These processes of aggregation involved a very complex process of estimation which is subject to an inevitable margin of error. In some cases the resulting value of the indicators values have been "rounded up" but in a very few cases the values are clearly wrong and we cannot for the moment detect exactly the origin of the error so we leave them as "no data".

Figure 14. Share of regional population living in SMST

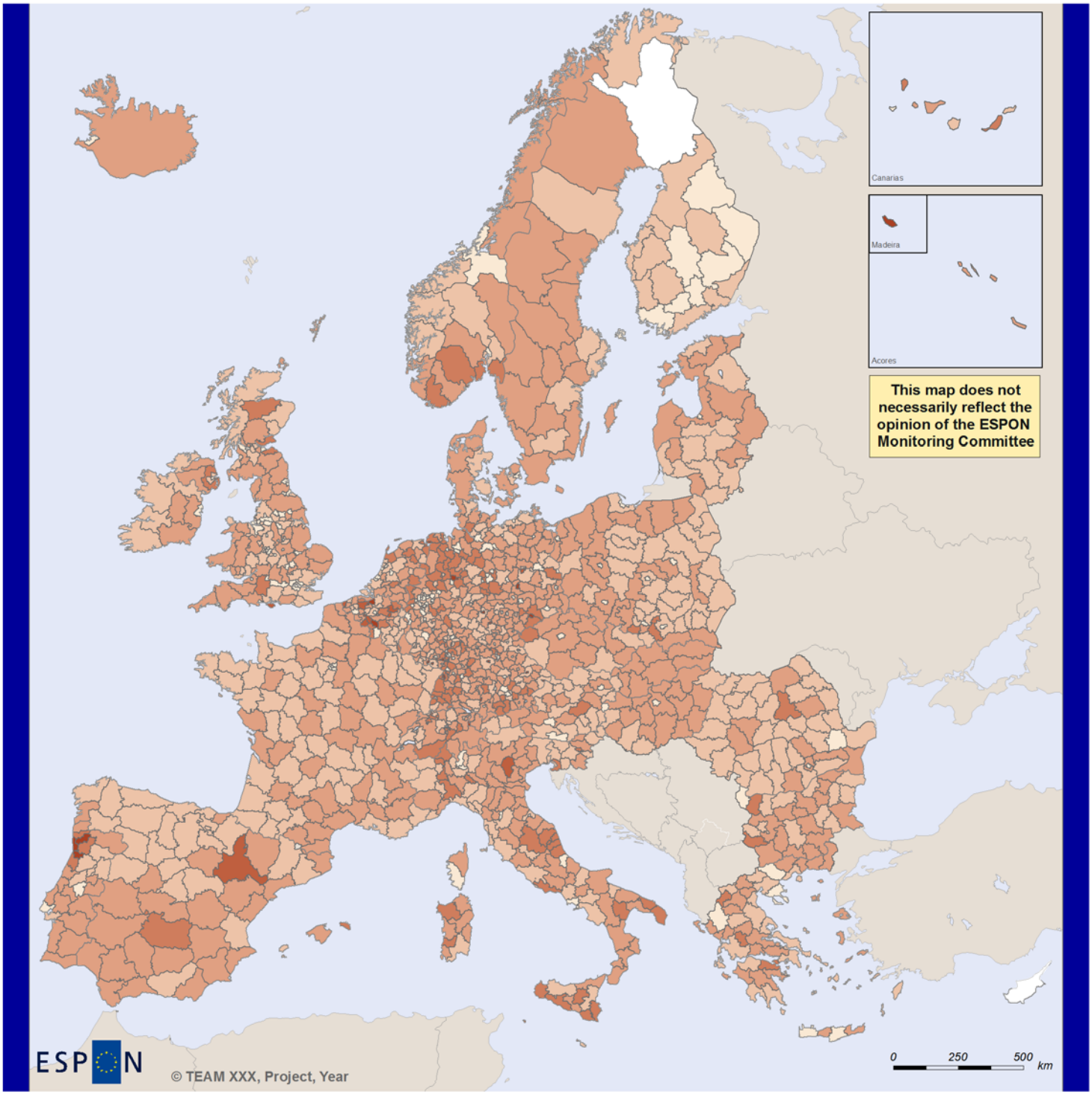
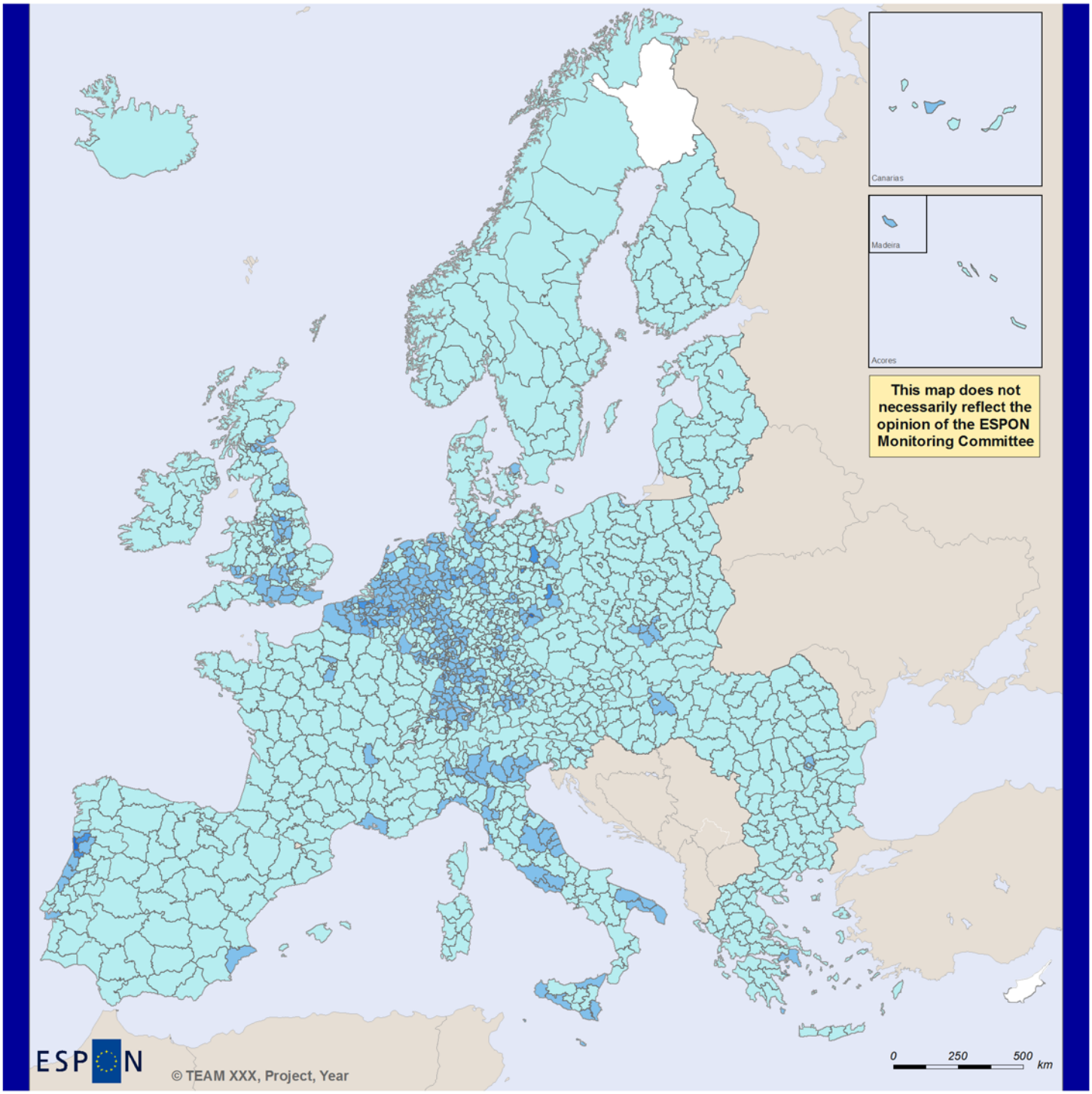


Figure 15. Share of regional cover occupied by SMST



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Regional level: NUTS 3
Source: Own elaboration on EUROSTAT/LFS data
Origin of data: EUROSTAT/LFS data
Authors: F. Brandajs, A.P. Russo, D. Serrano Giné
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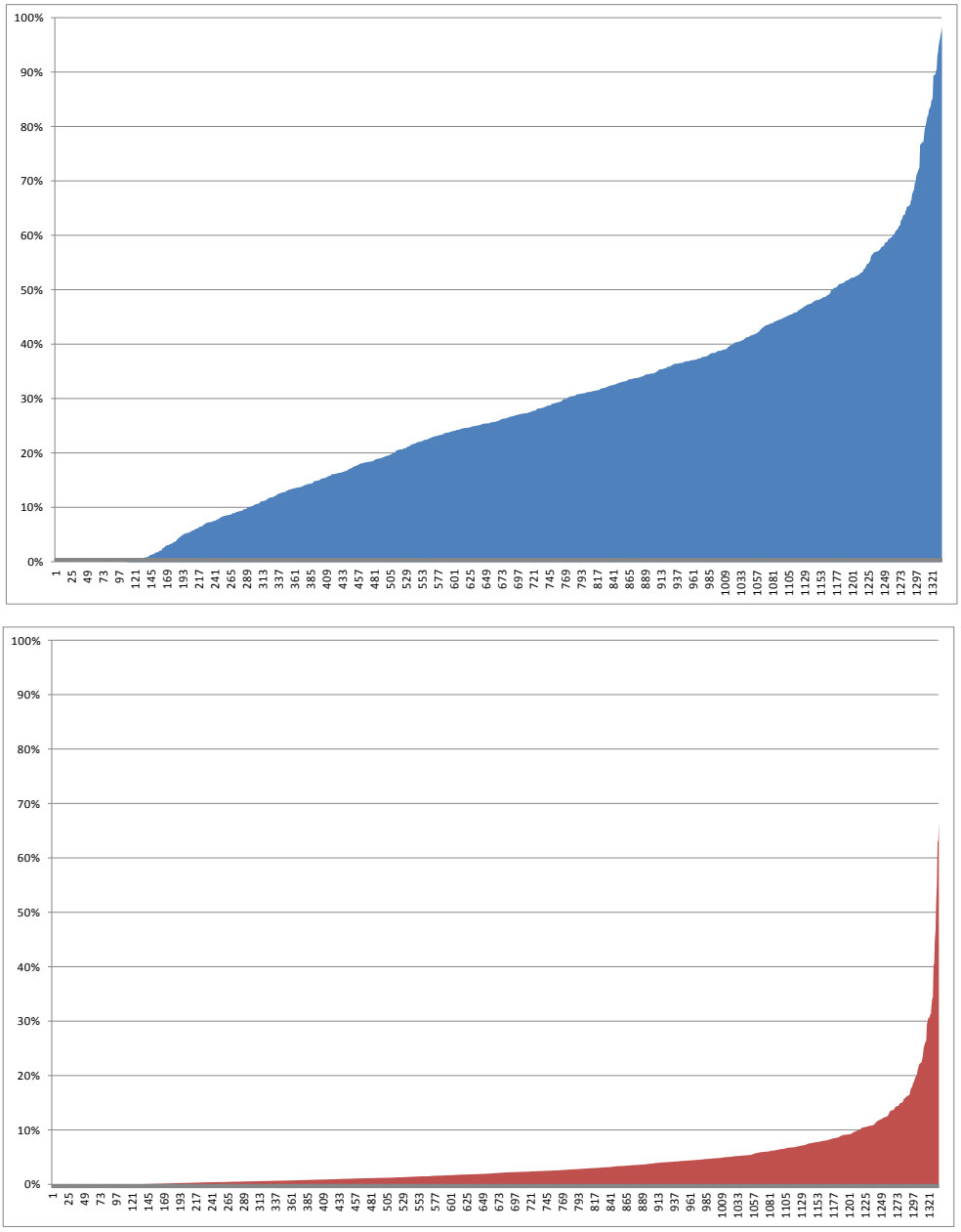
Area occupied by SMSTs/area NUTS3

- <5%
- <25% >5%
- <50% >25%
- <75% >50%
- <80% >75%
- >80%
- NO DATA

Figures 14 and 15 are based on our estimates of the proportion of NUTS3 population living in SMSTs (Figure 14) and on the proportion of the regional area occupied by SMSTs (Figure 15). Both indicators are sensitive to the NUTS3 unit size (the same size SMST is more visible in a smaller NUTS3 region than a larger one) and given that NUTS3 areas vary markedly between member-states it is not perhaps surprising that there is a marked 'country effect' on the these indicators. We estimate that around 10% of the variance for the proportion of population and about 24% of the variance for the proportion of area can be accounted for by nature of the country alone (before considering NUTS3 level factors).

Figure 16. (a) (above): distribution of percentage of NUTS3 population living in SMST; (b) (below): distribution of percentage of surface of NUTS3 population occupied by SMST



Countries with a tendency to have a smaller than average proportion of inhabitants living in SMSTs, are the United Kingdom, France, Finland and Romania. However countries such as

Germany, Belgium, Portugal and Italy have a tendency for higher than average proportions of SMST residents within NUTS3 regions. Figure 16b indicates the distribution of NUTS3 regions against this particular indicator. The distribution suggests a reasonable spread of this indicator across Europe.

Mapping the proportion of SMSTs by physical area produces the map in Figure 15 and the distribution of proportions evidenced in Figure 16b. The distribution of regional area proportions is far more concentrated. Figure 15 indicates that there are strong concentrations of SMSTs by area in southern England, Belgium and the Netherlands, western Germany and Italy. This is a concentration of places within the heart of the Union's territory.

At this stage of the project these insights can be drawn into a synthetic regional typology based on the differing proportion of residents living in three 'types' of morphological polygon: high density urban clusters, small to medium sized towns and 'other' forms of urban development. For this exercise we have chosen to focus on the proportion of population because the distribution of this indicator makes it a more useful one by which to divide up the space of ESPON space.

Figure 17 plots NUTS3 regions on a scatter plot using the proportion of population living in HDUC on the x-axis against the proportion of NUTS3 population living in a SMST. The plot distinguishes all data points in relation their membership of the four categories: SMST dominated, HDUC dominated, VST dominated and 'other settlement' dominated. We have simply used the criterion of assigning a region to the 'type' of settlement that constitutes the single largest proportion. Figure 15 shows how the regions come to be clustered in relation to the proportionally dominant form of settlement (as measured by grid characteristics).

Figure 17: Proportion of population in polygons types

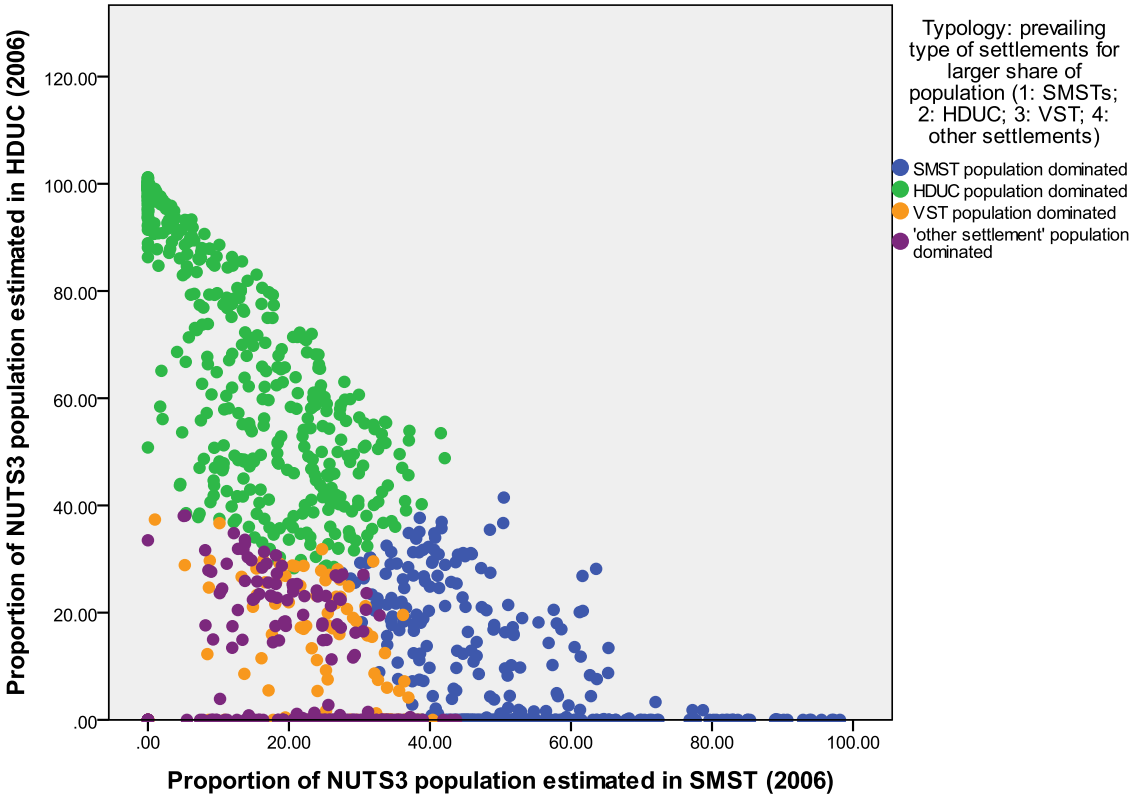


Table 15 reveals that on average regions dominated by SMST polygons will have on average around 51% of their population living in SMST (morphological) polygons. This category of

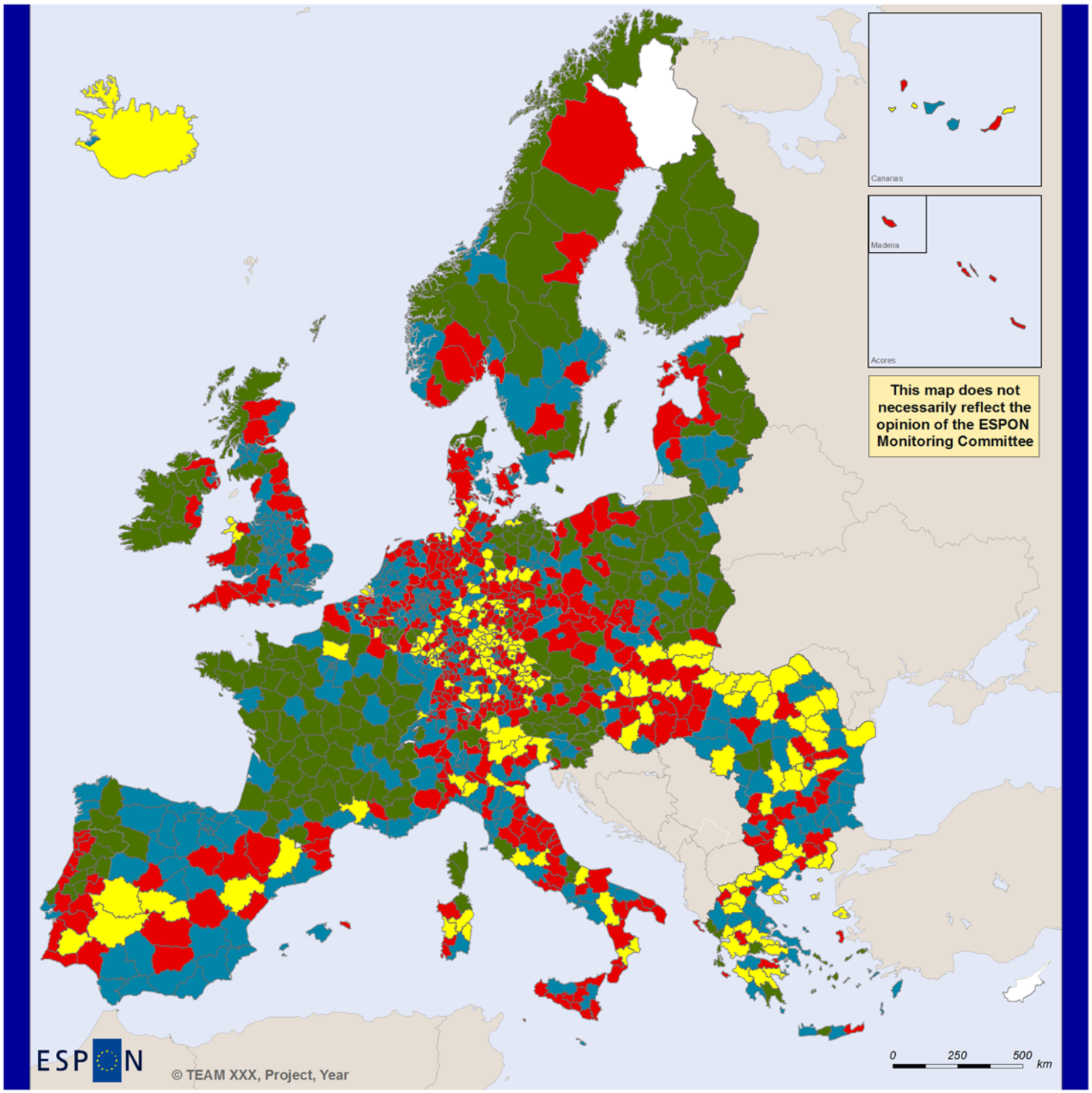
region accounted for around a third to a quarter of regions in the data-set (346 out of 1161) and numerically is the second most important type of region in this typology. Overall around 27% of the EU population lives in a SMST polygon. SMST polygons also account for a large proportion of the population in other types of region such that on average about 25% of the population in regions dominated by very small town polygons will live in SMST polygons. This basic typology then raises the issue of whether the role for SMSTs changes depending on the dominant form of settlement pattern in which they are located. Are SMSTs more important in regions where they form a greater proportion of the population? Do they play an important network focus in regions that are dominated by very small towns?

Tabel 35. Population in settlement polygon types per NUTS3 region.

Typology: prevailing type of settlements for larger share of population (1: SMSTs; 2: HDUC; 3: VST; 4: other settlements		Proportion of NUTS3 population (per 100 residents) living in:			
		SMST polygons	HDUC polygons	VST polygons	Other types of settlement polygons
SMST dominated region	Mean	50.6790	7.7703	21.7708	18.9885
	N	346	379	346	346
HDUC dominated region	Mean	12.4128	69.4045	8.9601	8.7816
	N	468	452	460	454
VST dominated region	Mean	25.2056	8.1312	42.3287	22.4817
	N	137	158	135	135
'other settlement' dominated region	Mean	22.3094	7.5650	22.1271	46.3847
	N	210	237	205	205
All regions	Mean	27.1165	30.5003	19.1141	20.2638
	N	1161	1226	1146	1140

The typology generated by these different proportions of population per regional population is mapped out in Figure 18. This spatial view of regions categorised by the proportion of population living in the different types of polygon shows that there may be significant variation in relation to territorial blocks across the Union area. Albeit that regions dominated (in demographic terms) by small towns are spread across Europe, there is also a clear concentration of such regions in the 'traditional' pentagon (centring on the Benelux) and western Germany through Alpine Europe to northern Italy) and through the Czech Republic to Hungary. This starts to raise questions on the role of national urban structures in shaping and framing the place of SMSTs. What are the particular ways in which SMSTs are framed in countries like Belgium (one of our case studies) and to what degree does this permit SMSTs to flourish?

Figure 18. Prevailing type of settlements in terms of population shares in NUTS3 regions



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Origin of data: EUROSTAT/LFS data
Authors: F. Brandajs, A.P. Russo, D. Serrano Giné
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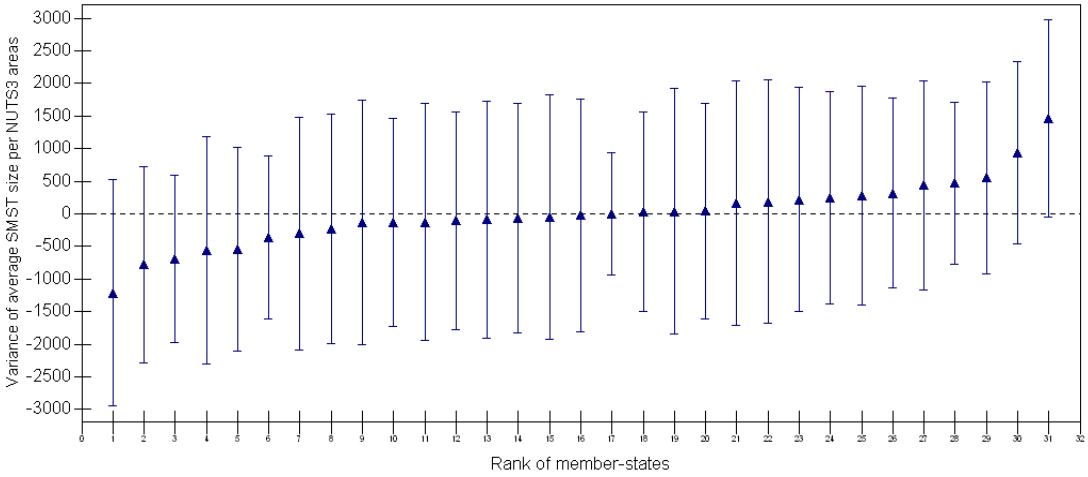
Typology: prevailing type of settlements for larger share of population

- 1: SMSTs
- 2: HDUC
- 3: VST
- other settlements
- NO DATA

3.2.2: Cross-typology analysis of the regional contexts for SMST

The aim of this analysis is to explore the impact of the NUTS3 regional context on the presence of SMSTs across the European Union area. We know that 'size matters' in that the larger the NUTS3 unit, the higher the number of SMST polygons and the smaller the proportion of SMST populations (as a percentage of regional population – see Section 3.2.1). However we need to consider the degree to which the presence of small and medium-sized towns correlates with the regional (NUTS3-based) typologies generated by earlier ESPON work. This allows the TPG team to consider whether the distribution of small and medium-sized towns may be associated with a range of contextual variables (operationalised in these typologies).

Figure 19. Variance of average SMST size (within NUTS3 regions) by country



The team has used the indicator of average population size of small to medium-sized town as an initial indicator of SMST health. Figure 19 plots the variance of average SMST size per NUTS3 region clustering the analysis by member state. The Figure reveals that the average SMST size does not vary significantly between member states as the bar of the standard error of the variance for all countries crosses the dashed horizontal line that marks the average population size for a small to medium-sized town across 31 countries in this data-set. Finland marks the extreme left of the plot where our SMST polygons are (on average) relatively small in comparison to the European average whilst the bar to the extreme right represents Belgium indicating that the average size of SMSTs in Belgium are relatively large in comparison with the European average.

Creating a regression model the research team has been able to explore the degree to which the average size of small (morphological) town is associated with the range of contextual typologies developed by ESPON relating to the environmental character of regions (mountainous, coastal, islands) and of the developmental character of regions (border, the urban-rural characteristics and whether the region is de-industrialising). With the exception of the urban-rural typology none of these characteristics appear to have any influence or association with the average size of small to medium-sized towns in NUTS3 regions. However there does appear to be a significant association between average SMST size and the urban-rural character of the region such that SMSTs appear to be larger in predominantly urban NUTS3 regions than in NUTS3 regions that are not predominantly urban. It is not possible however to distinguish average SMST size between remote rural, accessible rural (rural close to a large city) and intermediate regions suggesting that it is

other factors that might distinguish between the average size of SMSTs in 'non-urban' regions.

In terms of urban structure it might be supposed that average SMST size within any given NUTS3 region is likely to be influenced by the number of other SMSTs in the region and the proportion of the region's population that is included within major agglomerations (the high density urban clusters identified in Section 3.1). These are variables that can be added to the model based on the work of the geomatic team (RA2).

This model can be developed further through the use of indicators put together as part of the EDORA project (EDORA, 2011). Reviewing the data base put together by the EDORA team three indicators in particular have been retained in the regression analysis (as being statistically significant). These variables are the GDP per capita (purchase power parity) 2006, the number of bed spaces per head of (regional) population and access to natural areas.

Table 16 outlines three models built from a simple model with no explanatory variables (model 1) that gives the average of the average SMST size is 14,875 inhabitants across 1193 NUTS3 regions. Model 2 gives the coefficients once dummy variable have been included for the DG Regio urban-rural categorisation (with predominantly urban areas as the reference category. Thus the average aggregated mean population size for SMSTs in remote predominantly rural regions (for example) is around 1250 fewer inhabitants than for predominantly urban regions (where they average 15,745 inhabitants).

Table 15. Regression models on average SMST size (within NUTS3 regions).

	Model 1		Model 2		Model 3	
	β_i	s.e.	β_i	s.e.	β_i	s.e.
intercept (β_0)	14875	353	15745	527*	22286	1246*
Predominantly urban region as reference category						
Intermediate region, close to a city			-1360	645*	-4527	745*
Intermediate region, remote			1815	1877	-1230	2035
Predominantly rural region, close to a city			-2248	676*	-7081	911*
Predominantly rural region, remote			-1248	819*	-5646	1083*
Number of SMSTs per NUTS3 region					-111	38*
Proportion of NUTS3 population in HDUC					-107	11*
Access to natural areas, 2008 (EDORA indicator)					-9.4	4.3*
Number of tourist beds per capita 2006-08 (EDORA indicator)					-6.195	2.348*
GDP per capita PPP, 2006 (EDORA indicator)					0.077	0.028*
-2*loglikelihood:	25834.51		24680.96		21642.93	
Units: number of NUTS3 regions	1193		1188		1051	

Note: (*) indicates statistical significance at least 0.05

Model 2 brings in the additional factors relating to the urban structure of the region and the three EDORA indicators. Combing these variables the average SMST size within a region gets smaller when there are many other SMSTs and when the proportion of regional (NUTS3) inhabitants living in high density urban clusters (HDUC or large cities) is higher. Equally the average SMST size declines as regions have greater access to 'natural areas' and as the number of tourist beds per capita increase. This would suggest SMSTs in tourist areas (rural regions dominated by the demand for its consumption in EDORA terms) and in particular in tourist areas relying on access to the natural environment. Finally the data suggests that SMSTs get larger (on average) in wealthier areas marked by higher GDP per regional inhabitant (measured as purchasing power parity). This last observation would suggest that SMSTs are performing better (in relation to population numbers) in regions where economic value (as GDP) is accumulating (in EDORA terms).

Indicators relating to accessibility (multi-modal), GDP growth, regional population size and net migration did not appear to be statistically associated with average SMST size (within regions). Until such time as we can construct a database on the characteristics of individual towns (rather than only knowing aggregate characteristics across NUTS3 regions) we are unable to explore the importance of context further on small to medium sized towns.

However these initial findings point to some interesting relationships with the broader urban-rural context of such towns as well as the potential relationship with tourism (as either source of income or constraint on indigenous population growth) and wealth (do wealthy people make SMSTs prosperous or do they migrate to places that are already prosperous?). This then is the subject matter for the case study work.

To conclude, some early observations and questions that can be further explored in the case study work relating to SMSTs across Europe can be drawn from the EU-wide analysis so far:

- Some countries seem to have tight concentrations of SMSTs (the Low Countries down to northern Italy) whilst others (France, Baltic countries) do not. To what degree do national policy frameworks of spatial and thematic policy frame the development of SMSTs? Are the differences between SMSTs influenced to a greater degree by 'within country/region' differences or 'between country/region' differences?
- The average size of SMSTs (morphologically speaking) are bigger in predominantly urban regions that in remote rural regions. Do the functional roles of SMSTs change in different urban-rural contexts (such as between rural remote contexts versus predominantly urban ones)?
- The proportion of the population living in SMSTs is still large in regions that are dominated by other forms of morphological settlement (such as very small towns or 'other' types of settlement). Does the functional role of SMSTs change in these different settlement contexts?
- The average size of SMSTs get bigger in regions with higher levels of GDP per capita but smaller in regions with a higher impact of tourism. What are the factors underpinning the socio-economic performance of small towns (and their regional contexts)?

3.3: Policy analysis

To date our work has largely been at the European level and out findings relate to this level (for a detailed overview, see the working paper in Annex 5). However, as the case studies develop we will produce more detailed policy results as highlighted in 2.1.3.

As we noted in the TOWN bid the issues affecting SMSTs span several policy domains, indeed they do not really 'fit comfortably' into any of these, particularly when the focus is on SMSTs (i.e. populations between 5.000 and 50.000) as is the case with our project. In the working paper it was pointed out that SMSTs broadly fit into two European policy domains:

- Regional Development - Territorial/Spatial Development
- Rural Development

However, SMSTs are rarely the specific objects of analysis or policy in either of these policy domains. Moreover, although we identified these two policy domains in which to consider SMSTs separately in fact there is considerable overlap between them with regard to how SMSTs are viewed, although their role(s) are seen in rather different ways and the policies in each policy domain take somewhat different forms. This 'separation' has important implications for the coordination and integration of policies and this applies not just to the two policy domains identified but also to a wide range of other policies that have, direct and indirect, implications for SMSTs (e.g. services of general interest, transport, energy, economic and industrial policy). Any policy approach to SMSTs has to take into account the complex array of policies and influences that impact upon and influence SMSTs.

The dominant policy narrative appears to be one in which the traditional 'urban-rural dichotomy' remains dominant and "…is primarily structured around settlement hierarchies and accessibility/remoteness from centres of population, with distance from urban centres the defining asset/handicap." (EDORA, 2011, p23). But as the EDORA team point out this is not the only way to understand the situation, they ask "…is the most important interaction *between the local and global*, or at least between local places and places elsewhere…" (ibid, p23) structured by local territorial capital. In fact they conclude that both forms of interaction are important if we are to understand how different places perform. This combined approach may offer a better way to understand the different situations and roles/functions of SMSTs in their contexts and thus a basis on which to develop an overarching policy framework that can support them. However, this requires a fundamental break with the dominant approach of current rural development policy which still largely remains anchored in its agricultural history. It also requires a more thorough going integration in horizontal and vertical policy terms of a wide range of European Policies as well as the development of integrative forms of governance/governing.

At the normative level Rural Development Policy appears to share many of the concerns that are central to Cohesion Policy, but due to processes of 'institutional inertia' (one might even talk of 'policy path dependency') in this policy arena this has mainly remained at the level of rhetoric and largely subservient to more traditional interests of the local agricultural economy/actors and local/regional authorities. Within EU Rural Development Policy there has, to date, only been passing acknowledgement of the role that SMSTs can play (e.g. CEC, 1988, the Cork Declaration), while other policy areas (such as territorial/spatial development and regional policy) have not seriously taken them into account with the focus largely remaining on larger places.

More generally while documents such as the ESDP (1999) and City of Tomorrow (CEC, 2011) have acknowledged the role of SMSTs this has still to permeate the relevant policy communities to any significant extent. While there has been a recent recognition of the role that might be played by 'secondary growth poles' in the more balanced distribution of economic activity across the European space this does not, as yet, appear to have taken into account the roles that the SMSTs we are considering can play within a complex web of regional and European settlement patterns, population distribution and transport networks and flows of capital and people. Overall as Smith and Courtney (2009, p23) note "The role of small towns is currently undervalued throughout Europe and this represents an important policy gap". It is this 'policy gap' that needs to be seriously addressed and filled in, and not merely in relation to Cohesion/Territorial Development Policy and Rural Development Policy but also in relation to how a whole range of policies impact on SMSTs and their future.

Nor do we make the assumption that at national level there will be a 'policy' directed at SMSTs, this is something to be discovered through the case studies. However, we suspect that the situation at national level will resemble that discovered by a review of small towns in Scotland carried out by the Scottish Small Towns Task Group (2007) which noted:

> In discussions with Scottish Executive officials it is evident that responsibility for policies relating to small towns are spread across a number of departments and that there is no one portfolio or section that has responsibility for small towns. (ibid, p44)

With regard to small towns the report highlighted the existence of a 'policy vacuum' which reinforced "…their isolation from political support and resource allocation." (ibid, p45). This judgement would also seem to apply to the European level. Nevertheless, we do not assume that this is the case in all European countries and the case studies will help to cast light on the situation.

Broadly speaking there are two ways in which to address the current issues and future development of an SMST: a demand-led approach and a supply-led approach. A demand-led approach would identify deficiencies and address them through a variety of means to develop local assets (e.g. development of local human and social capital through investment in education); this is largely based on endogenous factors. While a supply-led approach would identify gaps and, for instance, seek to fill them by attracting investment from external sources (e.g. other governmental sources and/or business); this is largely based on exogenous factors. It is important to bear in mind that any strategy is likely to be a combination of these two approaches and the exact balance between will depend upon the SMSTs strategy, the available resources and the position of the SMST. It will thus be important to identify the particular 'policy bundles' deployed in each case to achieve a strategy.

Chapter 4: further proceeding towards the Draft Final Report

The phase of work from the interim to the draft final report will build on the evidence relating to the state of SMSTs across Europe both in relation to the 'performance' of SMSTs (as either functional or morphological places) as well as in relation to the policy responses to the needs and aspirations of SMST communities. To a great degree the design of the project relies on data gathering through the multi-level nested case studies in order to find evidence for the state of SMST across the ESPON space.

The work at the level of the Union will focus on:

- An analysis of Commission policies (spatial and thematic) that impact on SMST plus a review of the ten national contexts in which our case studies are located;
- Completion and analysis of small town audit database (variance analysis and multi-level regression analysis); and,
- Typology building based on SMST (morphological and functional level) characteristics.

It is through these activities that the TPG will continue to explore the early findings outlined in Section 3.

Table 17: indicators and variables for SMSTs by spatial extent of analysis

	Spatial extent of analysis	
	SMSTs in 15 member states plus Slovenia, Czech Republic and Cyprus	SMSTs in 10 case study regions (including Slovenia, Czech Republic and Cyprus)
Demographic	Population by age for a base-year (1999-2002)	Population by age for a base-year (1999-2002) and one subsequent year (one in period 2005-2011) Deaths and births by year (measured or modelled) from base-year to subsequent year of measurement
Migration	% foreign citizen population for base-year	% foreign population (lifetime migration rate) and annual migration rate for base-year Annualised net migration rate between base-year and subsequent time period.
Labour market	Economic activity rate (by age) and labour market self-containment rate for base-year	Economic activity rate, employment rate, unemployment rate and labour self containment rate for base-year Employment (workplace estimate) by sector for base-year
Housing	Housing: secondary home and vacancy rate for base-year	Housing characteristics for base-year including vacancy rates and second home ownership
Education		Educational qualifications amongst resident population for base-year
Functional role		Employment by service sector, site for local government, role in functional labour (commuting) area and identification as administrative 'town'

Having reviewed the SIRE dataset and having surveyed partner research teams across the ten case study areas, Table 17 outlines the key indicators that will be constructed for a wider population of SMSTs in the member-states prior to January 2004 accounting for around 75%

of SMSTs identified based on data from the SIRE database. The first column indicates the indicators that can be derived from the available SIRE data (based on Census records). The second column indicates the richer set of indicators that are derivable based on the data that each of the research teams can make available. With the exception of the demographic variables these indicators are generally only available for one base year period (one of 1999, 2001 or 2002) since small area data from the 2011 Census exercises will not be available during the lifetime of this project.

These indicators as town-level variables can be mixed with context-wide variables (NUTS3 based or country based) to explore the relationship between the variables using either changes in population or the annualised migration rates as dependent variables combined with both NUTS3 level and country level variables in an exercise of multi-level regression modelling. This will allow the team to explore the relationships between the different independent variables and the population size (as a basic measure of small town health).
Whereas, the data set is not as wide ranging as some that have been used for typology building (see for example Shepherd 2009), this limited palette of indicators will be able to classify some basic characteristics of SMSTs. More nuanced assessments of SMST performance will be gained through interview work in 20-40 SMSTs in the case study work. Typology building will be part of RA5.

This basic data work will form one of the inputs to the International Workshop for policy makers to be held in Leuven in November 2013.

In the meantime, the first part of the year (January – June 2013) will be dedicated to the implementation of the case study analysis. In order to guarantee a coherent development of the 10 case studies, three documents have been made available to the 10 Case study teams:

- a case study protocol;
- guidelines for validation geomatic analysis;
- guidelines for functional analysis.

These documents will be revised after the feedback from the case study teams and their application, and they will form the main part of the methodological handbook that will be submitted together with the Final Draft Report (December 2013).

The preliminary outcomes of the case study will be discussed in a dedicated workshop in June 2013, hosted by the University of Tours as part of the Third TPG meeting. The final outcomes of the case study will be formalised in a Case study handbook and will be submitted together with the Final Draft Report (December 2013).

Annexes

Annex 1: references

Annex 2 - Justification for changing case study region in Poland

Annex 3: Town typology in case study regions

Annex 4: socio-economic literature overview

Annex 5: Small and Medium Sized Towns (SMSTs) and European Policies

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