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METROBORDER

Cross-border Polycentric Metropolitan regions

Targeted Analysis 2013/2/3

Interim Report



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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.

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1 Executive Summary

The Metroborder project addresses cross-border metropolitan polycentric regions (CBMRs). The aim of the project is to map and to better understand the structures and the functioning of this type of spatial pattern. The project adopts a twofold perspective, addressing both the European level and the case study level (Upper Rhine, Greater Region). Furthermore, the aim is to support strategy building in order to improve the performance of the cross-border polycentric metropolitan regions.

On the European level, 11 CBRMs are analysed. The selection of these regions is based on previous studies of the ESPON programme (esp. ESPON 1.4.3). The ongoing work on the territorial definition of CBMRs – based on the functional urban areas (FUAs) – turns out to be challenging, for reasons of data availability as for the complexity of the regions involved.

In order to analyse the functional integration within these regions (work package 1), four indicators have been implemented by now. Firstly, the development of cross-border commuting between 2000 and 2006 shows tremendous differences in dynamic and quantity, ranging from just a few thousand commuters daily in Wien-Bratislava or København-Malmö to approx. 130,000 in the Luxembourg region. Despite the obvious differences, most regions show an increasing number of commuters as well as an asymmetric pattern, i.e. we mostly see a clear pole of attraction.

Secondly, the comparison of cross-border transportation lines within the 11 regions shows a less clear picture: We can compare spatial pattern, speed and frequency of the different transport systems that are very diverse. However, given the very different contexts, a direct comparison has to be seen very cautiously.

Thirdly, the population density and growth in the 11 regions is elaborated and compared by an index of demographic convergence, showing that some regions tend to converge while others diverge in demographic terms. The role of borders, thus, cannot simply be generalised.

Fourthly, the development of the citizenship on each sides of the border shows regions of very differing patterns that can mostly be explained by (the absence of) language barriers and differentials in the real estate and labour markets. The overall trend shows an increasing asymmetry in most cases.

The fifth indicator foreseen in the framework of this analysis, the regional GDP, will be developed as one of the next steps.

Similarly, the global positioning of the CBMRs in a globalising world is still to be completed. The analysis will be based on different indicators also implemented in further ESPON research projects and will develop synergies in this respect.

In parallel, the institutional integration of the 11 regions has been compared and – again – shows a complex picture. A variety of indicators illustrates the diversity of cross-border cooperation, including the juridical form, thematic scope, the stakeholders involved, historical context etc. A visualised overview compares institutional levels involved and the geographical scope of the cooperation perimeter. The latter aspect is visualised in form of institutional maps for each region.

In the remaining months of the Metroborder project, the envisaged analysis of functional integration will be completed. The focus will be on the synthesis of the collected results and on the revision with regard to policy options and strategy building.

Work package 2 deals with two Case studies – the Greater Region and the Upper Rhine. In both regions, the spatial pattern of the metropolitan economy shows a strong concentration on the poles of Luxembourg resp. Basel. Employment at head-office tends to be more concentrated and of less cross-border character than the labour market and the residence of the employees. The next steps have to ensure the comparability between both case studies.

Ongoing surveys in exemplary sectors will highlight the cross-border dimension of the economy (automotive industry in the Greater Region, life sciences in the Upper Rhine).

The institutional integration in both case study regions is illustrated by means of institutional mappings. The multi-level complexity gets very obvious, as well as the different understanding of spatial perimeters.

The key methodology of this work package is a Delphi Study, conducted currently in both regions. Linking the governance analysis and the strategy building, the Delphi study aims to develop strategic options in each case study region in order to foster the potentials of being a CBMR. This so called 'policy' or 'strategic' Delphi allows detecting, developing, aggregating and assessing future development paths of the CBMR.

About 300 experts in each region have been asked to participate in this email-based survey. The first questionnaire has been sent in both regions; a second questionnaire will use the results of the first round. The interim

results of the first survey show that – in both regions – the lacking strategy is seen as a major deficit. At the same time, the intermediate results are promising with regard to the objective of developing appropriate policy options.

The zoom into governance patterns focussing secondary poles and centres within the Upper Rhine region is currently analysing the strategies toward the primary pole. Different types of interaction as well as the strategy types of territorial authorities have been developed.

The feasibility study of emergency services has developed the methodological challenges of a multi scalar approach while reflecting the shortest path problem, location-allocation problem and potential accessibility.

Conducting a full analysis of the Greater Region's internal weaknesses and strengths appears as a promising but complex challenge. In a next step, the applicability with regard to the Upper Rhine region will be assessed.

The strategy building (WP 3) will start after submission of this interim report. Using the tools of SWOT analysis and scenario building, the objective will be to develop concrete policy options. This phase will be highly interactive by frequent involvement of the stakeholders. The present development of the Delphi Study (response rate, significant results) seems to be promising with regard to the definition of future strategies.

Dissemination activities (WP 4) have regularly taken place and will further be conducted.

2 Framework

2.1 Objective

The Metroborder project addresses Cross-Border Metropolitan Polycentric Regions (CBMRs). The aim of the project is to map and to better understand the structures and the functioning of this type of spatial pattern. The aim is to provide an analysis of the main challenges the CBMRs face both internally and externally. In dealing with these questions, the project will adopt a twofold perspective, addressing both the European level and the case study level (Upper Rhine, Greater Region). Furthermore, the aim is to support strategy building in order to improve the performance of the cross-border polycentric metropolitan regions.

The starting point of the project is that borders and border regions have changed dynamically during the last decades. Their functions of separation have partly – and geographically in differing degrees – turned into the function of interface or even catalyst for cross-border interaction; border regions have partly changed from peripheries to so called “laboratories” of Europe (e.g. Van Houtum 2000, Paasi 2005, Leimgruber 2005, Newman 2006). The Metroborder project will address both sides of the coin.

As foreseen in the Metroborder Agenda, work package 1 (European level) has been the main focus of the research work over the first year and takes, thus, a large part of the Interim Report. Work package 2 (case study level) is in full activity, work package 3 (strategy building) will start after the submission of this report; dissemination (WP 4) is carried out throughout the whole project period.

2.2 Metroborder as a Targeted Analysis

The Metroborder project is a so called Targeted Analyses of the ESPON programme (Priority 2). The general idea is to make use of existing ESPON results in order to respond to questions that stakeholders have formulated.

The striking advantage of this concept is that the research can profit from the existing data, the established methodology, and the well functioning network of experts. At the same time, this approach can be a challenge as the existing ESPON knowledge does not allow a simple ‘zoom-in’ in order to have maps and results answering the stakeholders’ requests, but that the existing data sets have to be complemented by national or regional data and by – to a certain extent – new data collected by the researchers. For the Metroborder

project, the challenge is considerable: Firstly, cross-border data are generally rare as the cross statistical and political competencies and as flow-data are in general hard to collect. Secondly, the ESPON programme has not yet conducted a 'normal' research project purely on cross-border issues. The starting points within the ESPON programme are numerous, but considerable data shortages remain with regard to the cross-border situation. In order to deal with these data problems, several data sources beyond the ESPON data have been used, especially existing studies from the researchers involved in the project as well as the collection of new data.

Within the ESPON Priority 2, the Metroborder Project belongs to the so called type of action "Knowledge support to experimental and innovative actions". This implies particularly the case study approach, the consideration of multiple territorial scales, and the interactive process with the stakeholders supporting concrete political action. As foreseen in the Metroborder agenda, so far the activities have mainly focussed on the analytical work. However, numerous meetings with stakeholders have taken place (cp. chapter 6). The first online survey of the Delphi Study has been launched, and this interactive research tool has proven to be strongly helpful with regard to the development of political visions.

2.3 Conceptual Challenges

The Metroborder project brings together several complex geographical conceptions: Especially the notions of *polycentrism* and *metropolisation* are broadly debated, but also the question how to describe *cross-border regions* is not trivial.

As pointed out, the Metroborder project is a so called *Targeted Analysis* in the framework of the ESPON programme and, thus, the purely scientific and conceptual debate is not the main focus. However, in order to develop the research design, the crucial understandings have to be highlighted.

Starting with **polycentricity**, where the debate within and beyond the ESPON programme is vast (cp. ESPON 2006/1.1.1; Waterhout 2002). In very simple words, polycentricism means the existence of more than one spatial pole. Polycentrism can be understood in more morphological or functional ways, in more analytical or normative ways etc., and large parts of the debate on polycentrism are linked to the question of scale. Within the ESPON framework, the analytical understanding has mainly referred to four scales (for the most recent overview see ESPON FOCI Interim Report Annex p. 165 ff.): Polycentric structures can be analysed on the European (macro level),

the interregional (meso level), intra-regional (micro) and intra-urban scale. Also with regard to the cross-border issue and CBMRs in particular, all levels of polycentrism are relevant. However, the Metroborder project has to link these scales – just one example: Analysing metropolitan qualities within the ESPON framework means to refer to the so called MUA and FUA-methodology that mostly refers to intra-regional scale; governance patterns on cross-border problems, however, tend to be institutionalised on an interregional level. Some of these 'scale jumps' within Metroborder are due to restraints on political frameworks or on the data availability. The Metroborder project is well aware of the sometimes surprising shifts and is permanently reflecting on this dimension. In general, however, we focus on the intra-regional scale of polycentrism as it was implicitly addressed within the Metroborder project specifications.

Similarly, the notion of **metropolisation** can be debated and questioned extensively. In general, the focus is the importance of territories in a globalising world, thus, on a supranational level (cp. e.g. Krätke 2007). This might concern numerous dimensions like the economy, politics, culture etc; hubs, gateway and centres of innovation and communication are analysed. Metroborder does not develop an own approach of metropolitan functions but refers closely to the existing ESPON framework, promoting a clear economic perspective and focus on indicators of the labour market (esp. ESPON projects 1.1.1 and 1.4.3). In that context, the morphological and the functional urban areas (MUAs, FUAs) are of crucial importance.

Functional integration of cross-border polycentric metropolitan areas is mainly expected in contiguous Functional Urban Areas whose core has a clear cross-border dimension. The institutional and political setting is considered separately, with the ambition to bring these perspectives together in a next step.

3 General Analysis (WP 1)

The main objective of this work package is to examine the functional and institutional dimension of integration in cross-border metropolitan regions at the European level. The WP develops a research framework that will be relevant for the whole project. This common reference framework will be applied and mapped for the whole ESPON space, including the case study regions, and interpreted with regard to the European level.

As far as functional integration is concerned, the WP starts by identifying the selected cross-border metropolitan regions and develops several indicators dedicated to apprehend the process of integration in a cross-border environment.

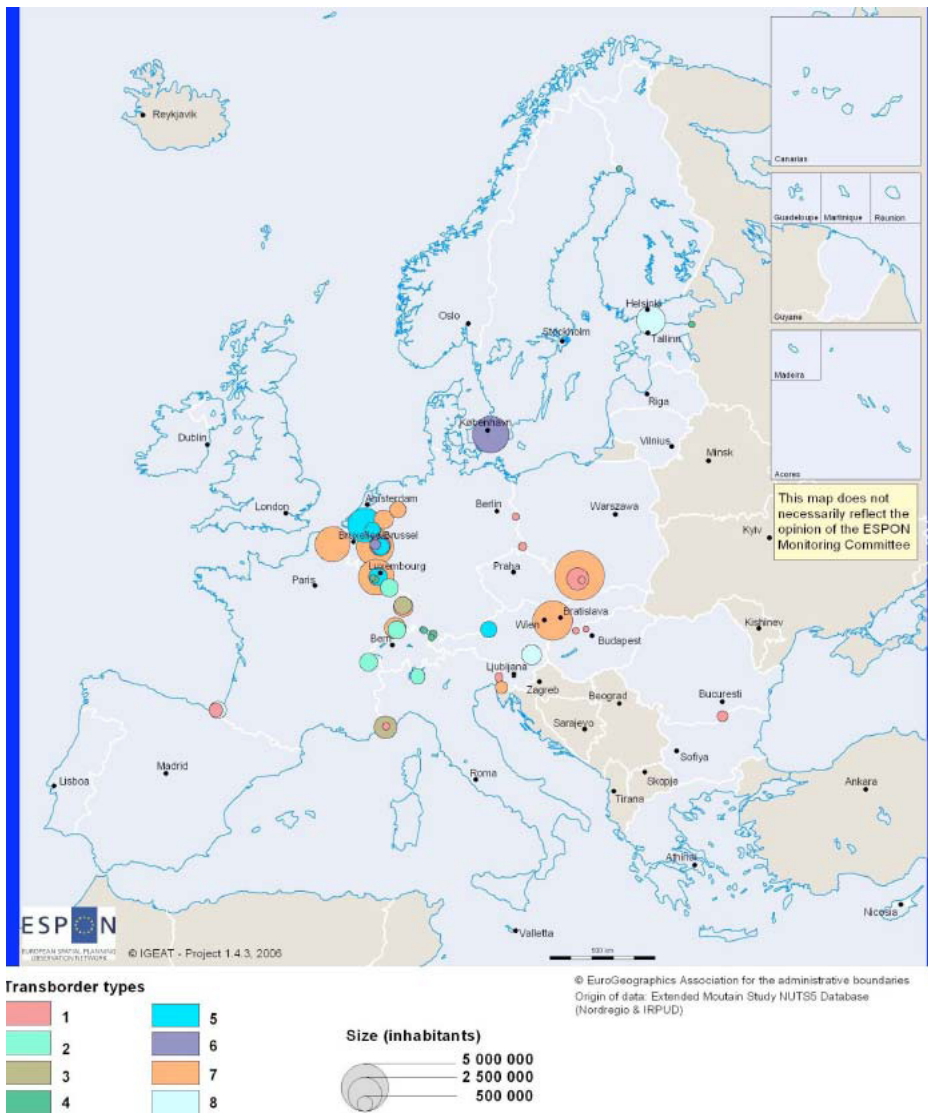
As far as institutional integration is concerned, the WP also aims to develop a research framework for governance. For obvious reasons, in depth and in situ studies on governance in the comprehensive sense are hardly possible for the whole ESPON space. Thus, formal institutionalisation of cooperation within CBMR has to be considered as indicator and as outcome of governance processes.

3.1 Functional Integration on European Level (WP 1.1)

The starting point for WP 1 is the work of several ESPON projects on metropolitan functions, polycentricism and cross-border territories, notably ESPON 1.1.1 on European polycentric development (2005) and 1.4.3 on urban functions (2007). ESPON 1.1.1 provided a first list of Functional Urban Areas (FUAs) for 27 European countries. This result has been further developed with up-to-date data by ESPON 1.4.3, and also enhanced with more detailed information about Morphological Urban Areas (MUAs) and hence with functional information for the FUAs, considering the FUAs as the labour pools of the MUAs, with some focus on cross-border regions (see Map 1). According mainly to distance criteria, the FUAs were also grouped in polystructures, among which the bigger ones are essentially the Metropolitan Areas.

Combining metropolitan functions and polycentric cross-border situations is, in the first instance, a challenge of data availability and comparability on an appropriate scale. Thus, going beyond the existing perspective means to

develop indicators on a sound data basis. In concrete terms, the first part of the project has been dedicated to the development of several indicators.



Map 1 Transborder types according to ESPON study on urban functions. Source: ESPON (2007)

The term “spatial integration” has led to multiple definitions, particularly in the context of studies on European integration (Anderson & Wever 2003, Brenner 2004, Dabinett & Richardson 2005, Hansen & Serin 2007). The spatial integration process is fundamentally based on the existence of interactions between areas separated by a boundary. These interactions are not limited to the economic sphere, but concern also other flows or

transactions (cultural, political relations, migration, etc.). The existence of interactions does not necessarily mean that the territories converge. Some relationships can be highly asymmetric and be fed by strong differentials. It is therefore necessary to complete the analysis by considering the possible convergence of the territories. Cross-border relations are not necessarily based on shared motivations. The need or the desire of actors to cooperate is therefore an essential aspect of the integration process. As a consequence, in this study, we define cross-border integration as a process of increasing interactions between different types of actors located on both sides of the border and we pay particular attention to what extent this comes along with convergence.

This definition allows us to consider the two main dimensions of integration: firstly, cross-border integration refers to the existence of *interactions* between territories and is based on flow analysis and barrier effects; secondly, cross-border integration also refers to the *convergence* of spatial characteristics and is based on homogeneity analysis and discontinuities. Interactions and convergence can be studied according to different domains, including demography, economy, transports, and policies. Table 1 lists the indicators reflecting cross-border integration according to this analytical framework. As far as interactions are concerned, the project studied the intensity of cross-border commuting, the frequency of cross-border public transportation lines, as well as the structure of cross-border cooperation. As far as convergence is concerned, the analysis is based on the demographic average annual growth, the evolution of the residents' citizenship, the evolution of the regional Gross Domestic Product (GDP).

Domains	Interactions	Convergence
Demography		Population average annual growth Residents' citizenship
Economy	Cross-border commuters	Regional GDP
Transports	Frequency and average speed of cross-border transportation lines	

Table 1 Indicators of cross-border integration in Metroborder WP1

3.1.1 A pyramidal approach for identifying CBMRs

The starting point for the identification of CBMRs is the ESPON Project 1.3.4 (2006) that identified 28 cross-border regions of which – within that project – 15 have been identified as being metropolitan. Taking into account the additional criteria of polycentricity, the number of research areas has to be reduced to 11 regions (see Fig. 1): the threshold is to have at least 10 percents of the population living on either side of the border. For example, the cross-border dimension was not strong enough in the cases of Milano and Tillburg-Eindhoven as more than 95% of the population of the cross-border area lives in one country. With regard to all other criteria, the selection procedure adopts the approach of ESPON 1.4.3. (Arnhem-Nijmegen and Twente-Nordhorn do not show a clear metropolitan dimension as evidenced by ESPON 2007: 1.4.3).

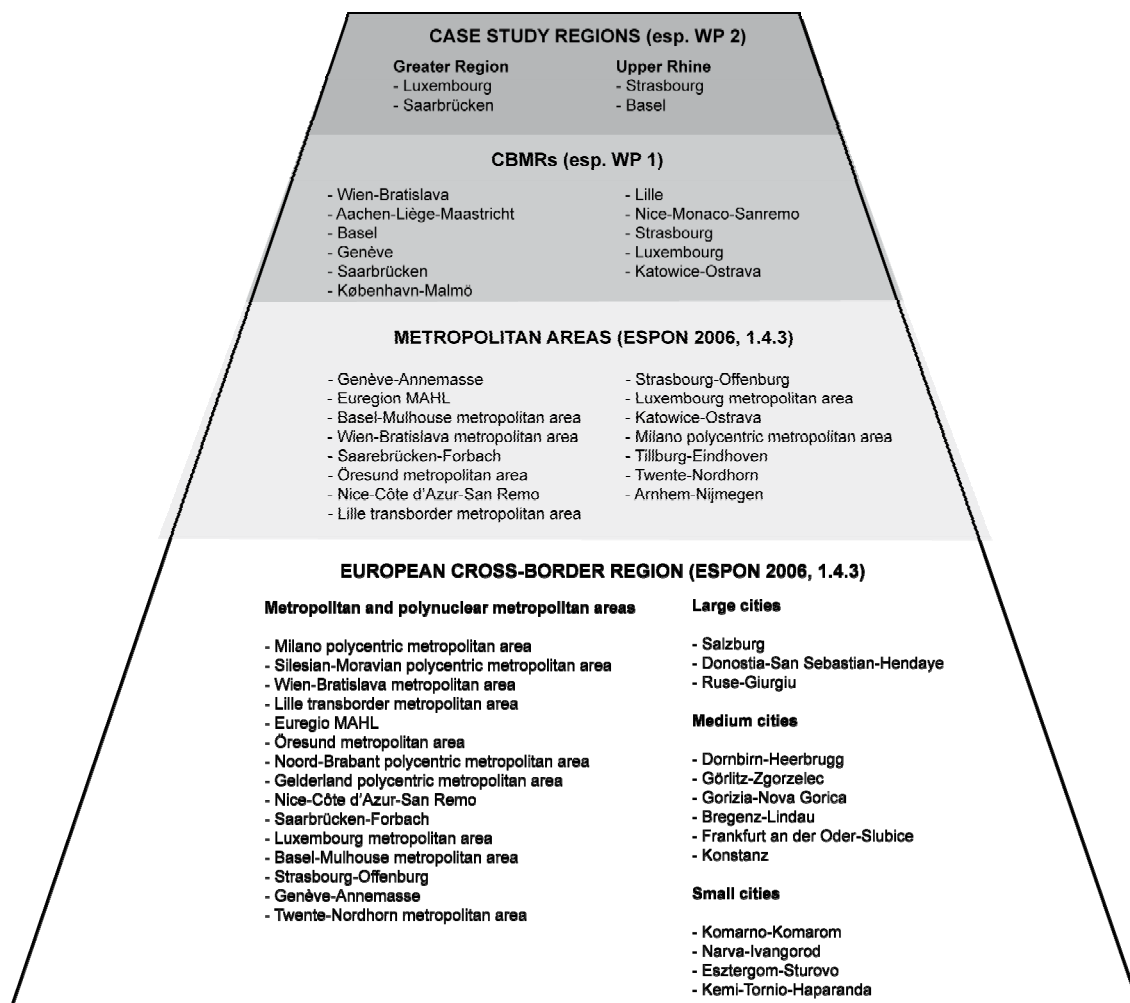


Fig. 1 Pyramidal approach to Cross-Border Metropolitan Regions (CBMRs). Source: European cross-border regions and Metropolitan Areas according to ESPON 1.4.3 (2007).

Four of these areas will then be deeply analysed within the framework of the case study regions Upper Rhine and Greater Region: Strasbourg and Basel on one side, and Luxembourg and Saarbrücken on the other side. The logic of the pyramidal approach is to deepen the analysis for the cross-border polycentric metropolitan areas where the characteristics provided by the Metroborder Project specifications are given comprehensively.



ESPON
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Regional level: NUTS 1
 Source: Metroborder, 2010
 Origin of data: Metroborder, 2010
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Map 2 Location of the 11 CBMRs selected for WP 1

The spelling of the CBMRs relies on the respective domestic language. The name of the cross-border metropolitan area refers to the largest city in terms

of demographic size and not to any cross-border institutional cooperation area (e.g. MAHHL) or any geographical feature (e.g. Öresund). More than one city is only referred to if the population size is comparable (e.g. Wien-Bratislava).

3.1.2 Identifying CBMRs on the basis of MUAs and FUAs

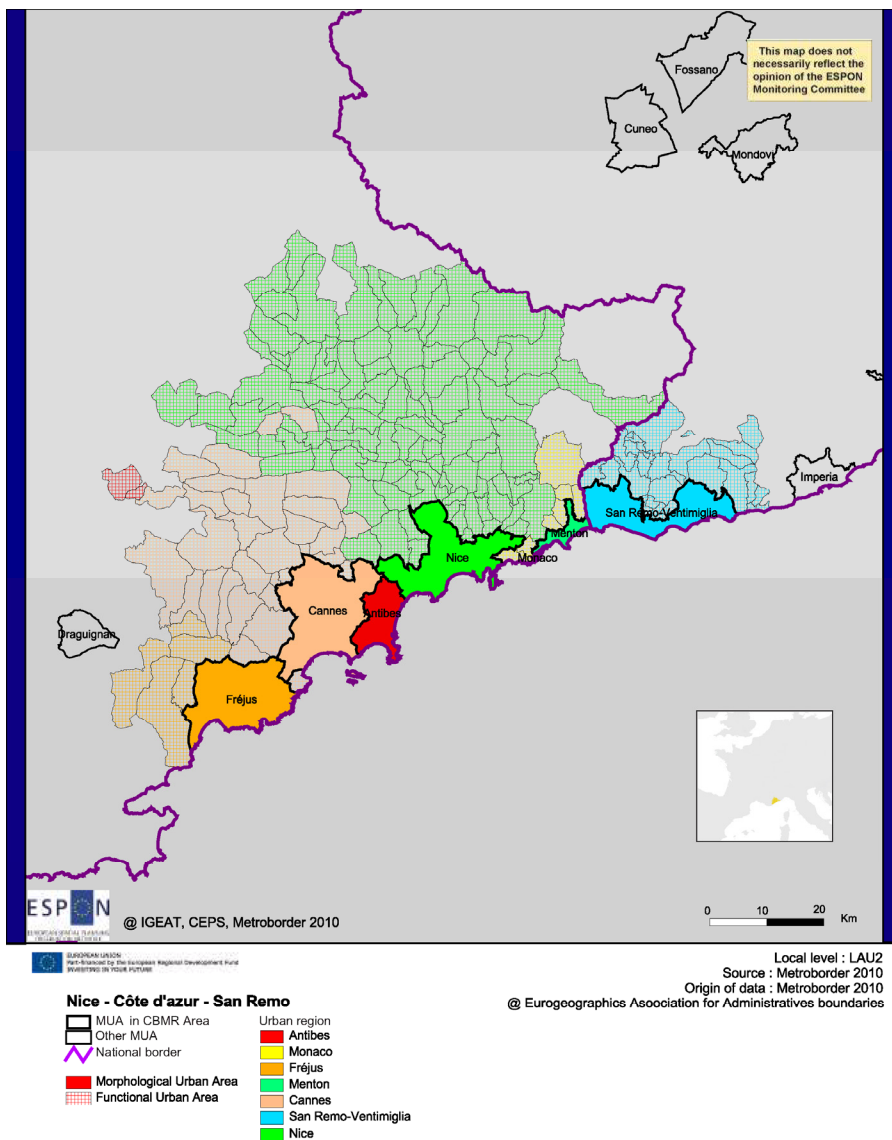
The analysis of cross-border metropolitan regions is based on two spatial concepts: Morphological Urban Areas (MUAs) and Functional Urban Areas (FUAs). According to ESPON (2007), MUAs are defined as agglomerated sets of Local Administrative Units 2 (LAU's) – previously called NUTS 5 – that have a population density higher than 650 inhabitants per km² (for more details about these definitions see ESPON 1.4.3 final report).

Identifying the relevant Morphological Urban Areas (MUAs) and Functional Urban Areas (FUAs) in a cross-border context is a critical issue. It is an even more delicate issue to define the areas that constitute the CBMRs, bringing together a series of MUAs and FUAs. The Metroborder project works on a general definition that fits all contexts of the 11 cases. The objective is a procedure of identification that considers the different dimensions of the CBMR concept – the cross-border dimension and a certain polycentric and, at the same time, metropolitan character. On the basis of two examples, we illustrate the general approach and the problems still to be solved (see below, Map 3 and Map 4).

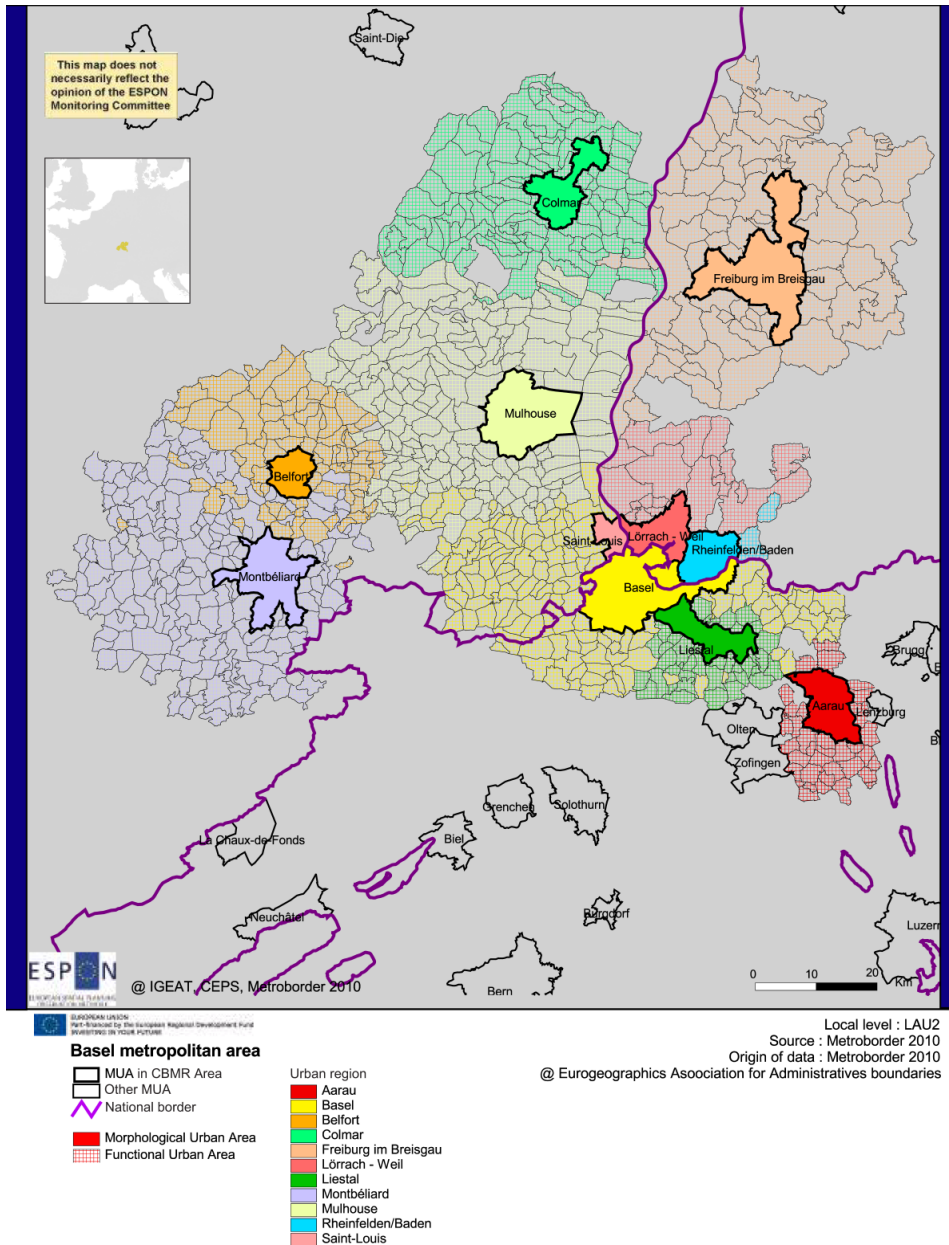
- Starting point is the cross-border FUA selected by ESPON 1.4.3 and the 10%-threshold of the population on either side of the border, as explained above. In our case, the Basel FUA resp. Nice FUA are the starting points, i.e. the FUAs of the respective metropolitan core. In bipolar CBMRs (e.g. Wien-Bratislava) we start with the larger domestic FUA.
- Then we add all FUAs that at least touch (or overlap) the primordial FUA. Then we also add those FUAs that at least touch the ones already added and so on. This approach is due to a polycentric understanding that addresses the regional level of polycentrism and not restricted to the inter-urban perspective. However, in order to keep the criterion of a metropolitan potential, FUAs are only included when they have a minimum population of 50,000 within the respective MUA (and, thus, we do not refer to the threshold 20,000 defining MUAs in general in the ESPON programme). The example of Nice shows that the established area fits quite well to what generally is considered as part

of this cross-border system. In the case of Basel, the inclusion of Belfort and Montbéliard might be questioned. Different approaches, considering distance, travel-time and other criteria have not yet turned out as appropriate. These aspects remain work in progress.

- Adjacent FUAs are not embraced if the respective MUA has a higher population than the cross-border MUA that was the starting point of the selection process – this criterion safeguards the level of polycentricism as well as the cross-border character: Following this rule, Zürich is not part of the Basel CBMR, Köln not considered to be part of Aachen-Liège-Maastricht CBMR, etc.



Map 3 Approaching Nice CBMR on the basis on MUAs and FUAs



Map 4 Approaching Basel CBMR on the basis of MUAs and FUAs

3.1.3 Demographic positioning of cross-border MUAs and FUAs

The mapping of the CBMRs is still work in progress. However, the positioning of the central MUAs and FUAs involved shows the diversity of the regions. The morphological urban areas within the 11 CBMRs are quite diverse in terms of demographic size (see Fig. 2), ranging from 130,000 (Luxembourg) to 2.5 million (Katowice-Ostrava) inhabitants in 2006 (see Annex to WP1.1). As to the morphological areas, functional areas are very diverse in terms of

population size, ranging from 800,000 (Genève) to 4 million inhabitants (Katowice-Ostrava) in 2006 (see Annex to WP 1.1). Comparing the demographic size of morphological and functional urban areas in 2001 and 2006 already shows different profiles (cp. Fig. 2).

In the case of Genève, Lille, Nice-Monaco-Sanremo or Strasbourg, the difference between the population of the two spatial units is small (less than 400,000 inhabitants in 2006) whereas in Wien-Bratislava, Katowice-Ostrava, København-Malmö and Luxembourg, the difference between the two appears to be extremely large (more than 800,000 inhabitants in 2006). From this point of view, Luxembourg has an exceptional situation: its functional area is more than 7 times bigger than the morphological area.

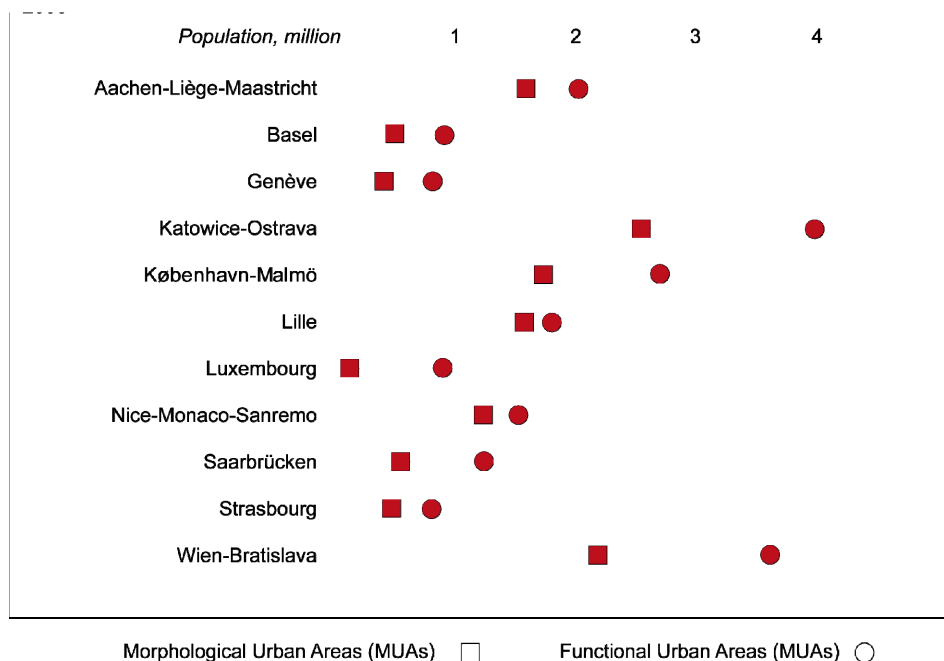


Fig. 2 Comparing the population of Morphological and Functional Urban Areas (Source: See Annex to WP 1.1)

As Fig. 3 indicates, the evolution of the average annual population growth of Morphological and Functional Urban Areas is usually converging: Basel, Saarbrücken and Katowice-Ostrava are declining in demographic terms whereas Genève, Luxembourg, and Nice-Monaco-Sanremo have been growing very fast between 2001 and 2006.

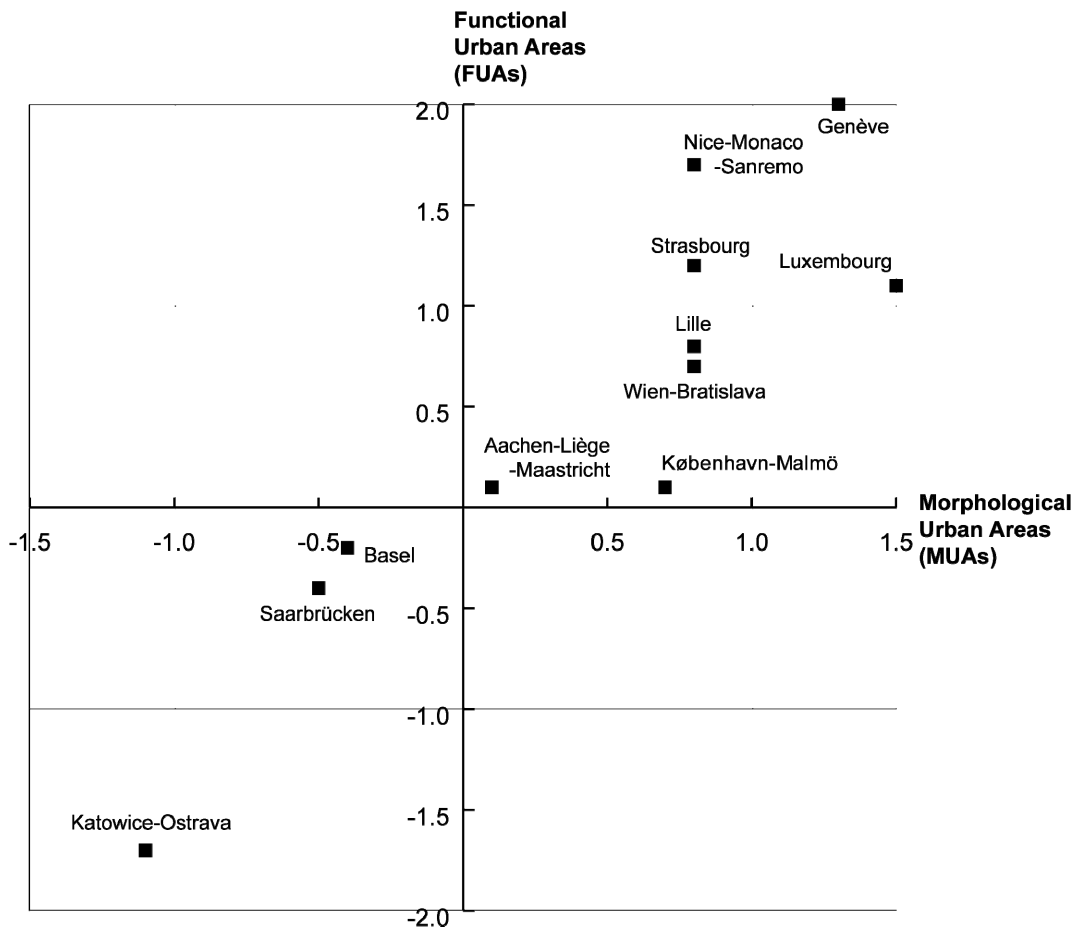


Fig. 3 Comparing the average annual growth of Morphological and Functional Urban Areas (between 2001 and 2006, in %, source see Annex to WP 1.1)

3.1.4 Cross-border interactions analysis

3.1.5 Indicator 1 - Cross-border commuting (2000/2006)

The aim of the cross-border commuting indicator is threefold: to measure the intensity of home-work-flows that cross the borders in 2000 and 2006; to investigate the number of cross-border commuters in each country (asymmetry) at both points of time; and to study the evolution of the number of commuters between 2000 and 2006.

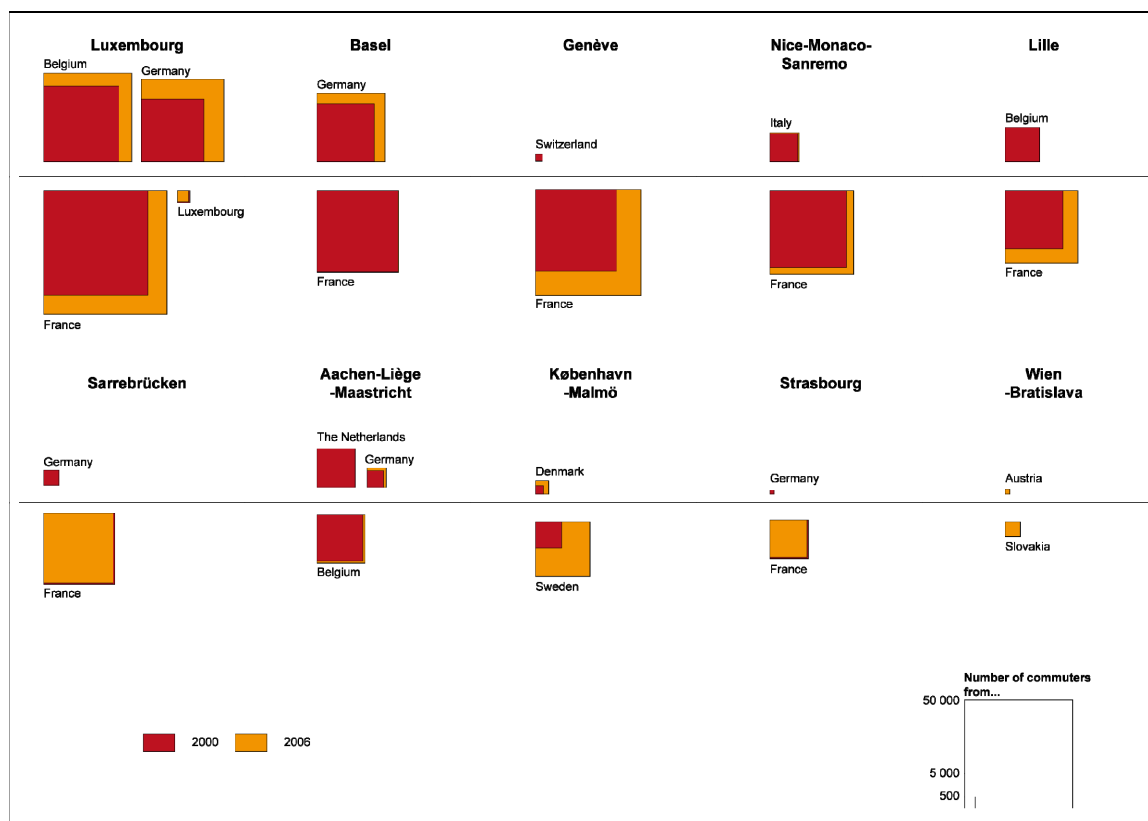


Fig. 4 Cross-border commuters in metropolitan areas, 2000 and 2006. (Sources and Spatial Units: see Annex Table 15)

The different CBMRs show very different commuting intensities depending on the different size, average annual growth and distribution by country of origin considered. From a demographic perspective, Fig. 4 shows clearly that several patterns can be observed as far as the number of cross-border work is concerned, depending on the intensity of the phenomenon. With more than 127,000 cross-border workers in 2006, the Luxembourg metropolitan area is undoubtedly the border area where this phenomenon is the most developed, followed at some distance by Basel (49,000), Genève (47,500), Nice-Monaco-Sanremo (34,000) and Lille (27,500). Saarbrücken (21,500),

Aachen-Liège-Maastricht (17,500) and København-Malmö (13,500) have a lower number of cross-border workers, while Strasbourg (6,000) and Wien-Bratislava (1,000) are numerically much less affected by the phenomenon. No information is available on Katowice-Ostrava.

As Table 2 indicates, most of the cross-border metropolitan areas concerned by this study experienced a positive annual growth of cross-border employees between 2000 and 2006, with the exception of Saarbrücken (-0.8%) and Strasbourg (-1.2%). The highest average annual growth can be observed in København-Malmö (+26.5%), which can be explained by the opening of the Öresund Bridge in 2000. In Genève (+9.0%), Luxembourg (+6.4%) and Lille (+5.9%) also, the number of cross-border workers is growing rapidly and is at least twice as high as in the other metropolitan areas. As a consequence, the ranking of metropolitan areas conducted on the basis of the absolute number of cross-border workers has experienced some changes from 2000 to 2006. These changes have mostly benefited Genève, Lille and København-Malmö.

In most cases, the distribution of cross-border workers by country of origin is extremely asymmetric. This is particularly true for the metropolitan areas of Luxembourg, Basel, Genève, Nice, Saarbrücken, København-Malmö and Strasbourg, where over 90% of the flows are moving from one country to the other. Two exceptions are worth being noted: in Lille and Aachen-Liège-Maastricht, the distribution among countries is more balanced, reflecting the Flemish dynamic growth of urban centres in the first case and a polycentric urban structure in the second case.

This must be seen against the backdrop, that between 1999/2000 and 2006/2007, the number of cross-border workers has experienced strong growth from 490,000 to 660,000 in the EU15/EFTA which is home to 95% of the cross-border employees (European Parliament 1997). Flows to Switzerland, Luxembourg, Austria and the Netherlands are increasing (fuelled primarily by France, Germany and Belgium), while flows to Germany declined. In the 1990s, Switzerland, Germany, and Luxembourg were the first cross-border destinations for commuters. In 2006, though, Luxembourg (127,533) has clearly distanced Germany (86,334) in terms of daily cross-border workers. The European Union (2009) now mentions that around 664,000 cross-border workers could be identified in the EU15/EFTA and 114,000 in the EU10+2, which means a total of 778,500 cross-border workers in the EU27/EFTA (2006-2007). Our results suggest that at least 345,000 of them (44%) are located in one of our 11 cross-border metropolitan regions.

Table 2 provides a ranking of border regions from a purely bilateral perspective, according to the number of cross-border commuters in 2000 and 2006. In 2006, the border between Luxembourg and France was by far the busiest border region among the 11 cases and can be considered as the busiest border in Europe with 64,540 daily cross-border commuters. Among the top five borders, three are characterized by flows going to Luxembourg. Figures related to the borders between France and Switzerland in Genève and Basel, and between France and Monaco in Nice-Sanremo-Monaco are also extremely high. The results confirm previous regional studies indicating that, in Europe, France is mostly emitting cross-border workers whereas Luxembourg, Switzerland and Monaco are mostly receiving these workers in Europe (EU 2009). Interestingly, these results also suggest that the presence of a knowledge-intensive economy driven by an international financial centre (Luxembourg, Genève, Monaco) and/or high-tech activities (Basel) is a crucial factor explaining the intensity of cross-border employment in Europe.

	From	To	2000	2006
1 Luxembourg	France	Luxembourg	46,500	64,540
2 Genève	France	Switzerland	28,198	47,349
3 Luxembourg	Belgium	Luxembourg	24,300	33,021
4 Nice-Sanremo-Monaco	France	Monaco	24,958	30,060
5 Luxembourg	Germany	Luxembourg	16,500	28,982
6 Basel	France	Switzerland	28,329	28,450
7 Lille	France	Belgium	14,500	22,500
8 Saarbrücken	France	Germany	21,700	20,623
9 Basel	Germany	Switzerland	14,236	19,822
10 København-Malmö	Sweden	Denmark	3,016	12,744

Table 2 The 10 busiest borders, 2000 and 2006

Sources and Spatial Units: see Table 15. NB: Only borders with more than 10,000 daily cross-border commuters in 2006 are represented.

3.1.6 Indicator 2 - Cross-border transportation lines

All the existing connections and their frequencies of public transport between major cities of the CBMRs have been taken into account in order to implement this indicator – either by rail, by bus, or even by boat (for Wien-Bratislava, along the Danube). The total number of connections in both directions of traffic has been counted, during a working day over a 24 hours period.

Fig. 5 illustrates the organisational structure of public transport networks between major urban centres of the different metropolitan areas. Cross-border connections within morphological urban areas are not represented. The links between the centres which are considered appear to be proportional to the number of daily connections.

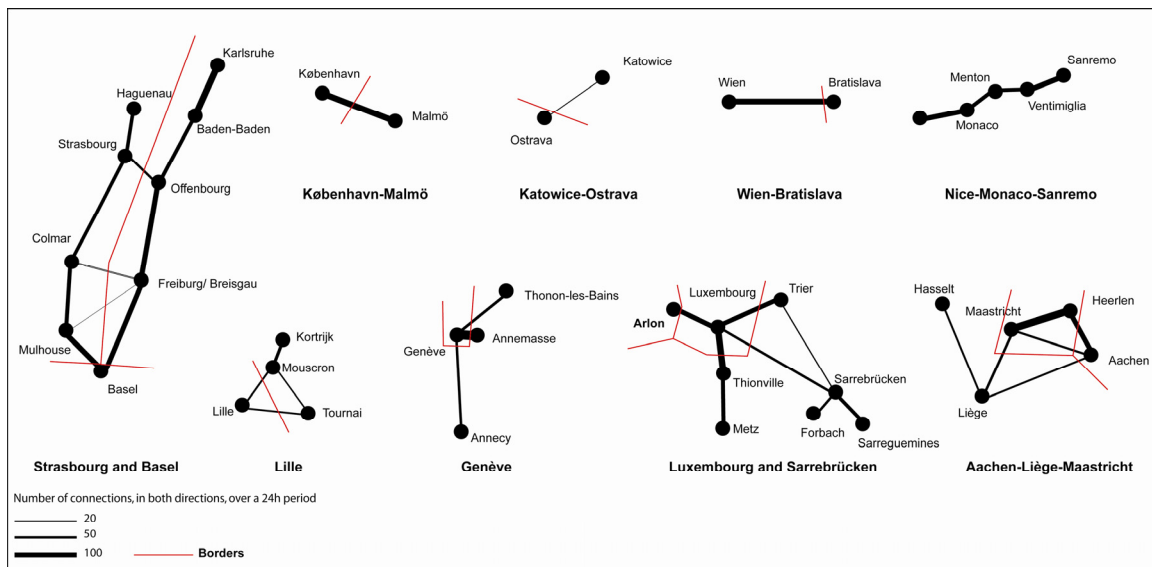


Fig. 5 Structure of cross-border public transport networks – number of connections. For sources and for the geographical context, see Fig. 19

These graphs show clearly the hubs within the different cross-border metropolitan areas. In the example of the Upper Rhine, Basel plays a key role, because railway lines in Alsace and Baden-Wurttemberg are north-south oriented. From a public transportation perspective, Basel constitutes a node of interconnection between these networks. Further north, in the case of Strasbourg, the city of Offenbourg also articulates the Alsatian railway lines with the Karlsruhe-Basel line.

The example of Luxembourg shows important frequencies, mainly oriented toward Luxembourg City, which is the main centre for the labour market. This important number of daily connections is an answer given to the huge flows of commuters coming from Lorraine, Wallonia, Rheinland-Pfalz and Saarland every day. In the example of Aachen-Liège-Maastricht, the figures show a relatively poor integration. Liège is the main hub between on the one hand the Belgian cities and on the other hand the Dutch and German cities within this area of cooperation.

It is important to note that the different situations cannot easily be compared, as far as each case-study is specific and embedded in a single context. Nevertheless, some fundamental differences in the architectures of the public transport networks of the different case studies can be observed: Connections with foreign cities are very numerous in the regional employment centres of Luxembourg and Basel whereas there is still no direct linkage between the Polish and the Czech national railway systems in the example of Katowice-Ostrava.

Comparative analysis

The linkage frequency index is a composite index delivered for all studies regions, which takes into account all connections between the different cities, weighted by the number of cities that are considered. The estimated speed of the public transport lines between main urban centres is calculated by dividing the air-distance by the time that is required to link the different urban centres (Table 3).

Values for transport within the urban agglomeration are presented separately, in order to differentiate intra-urban and inter-urban speeds. Only the urban centres of more than 20,000 people have been taken into consideration in the analysis.

Again, given the diversity of the situations, we cannot simply compare between the different values. For example, the weak results that are obtained for the case of Genève can be explained by the fact that only the cities of Genève, Thonon-les-Bains and Annecy were considered, whereas most of the cross-border flows are contained in Genève's morphological agglomeration, in which Annemasse is included. The results show that the situation seems particularly favourable in the case studies of Luxembourg, Basel, Wien-Bratislava and København-Malmö. In these examples, connexions are numerous and efficient between the main urban centres. However, these results have to be cautiously interpreted, due to huge differences between the demographic weights of the cities that were taken

into consideration for the production of this indicator. Needs are not the same, in terms of frequencies and seating capacities between for example Strasbourg and the small city of Offenburg in Baden-Wurttemberg on the one hand, and, on the other hand, both capital cities of Wien and Bratislava.

	Theoretical Average Speed	Speed Rank	Linkage frequency index	Frequency Rank	Cities considered	Ranking according to the intensity of CB links inside the MUA
København-Malmö	48.0	6	122	1	København-Malmö	N/A
Wien-Bratislava	63.7	3	117	2	Wien-Bratislava	N/A
Luxembourg	69.1	1	100	3	Luxembourg, Metz, Thionville, Trier, Arlon	N/A
Basel	67.5	2	81	4	Basel, Fribourg, Mulhouse, Colmar	2
Nice-Monaco-Sanremo	39.7	9	73	5	Nice, Monaco, Sanremo, Vintimiglia, Menton	N/A
Aachen-Liège-Maastricht	38.7	10	61	6	Hasselt, Aachen, Maastricht, Liège, Heerlen	N/A
Saarbrücken	53.9	5	61	7	Saarbrücken, Forbach, Sarreguemines	N/A
Genève	34.4	11	55	8	Genève, Thonon-les-Bains, Annecy	1
Strasbourg	44.2	8	49	9	Strasbourg, Offenburg, Baden-Baden, Freiburg/Breisgau	3
Lille	57.8	4	31	10	Lille, Kortrijk, Tournai, Mouscron	4
Katowice-Ostrava	45.0	7	18	11	Katowice, Ostrava	N/A

Table 3 Speed and number of public transport connections between the major centres in the different case-studies, 2009

Sources: see Fig. 19

3.1.7 Cross-border convergence analysis

3.1.8 Indicator 3 - Population density and growth

This section's main objective is to highlight the effect that may have national boundaries on population dynamics in a metropolitan context. The indicator measures a) the density of population in 2006 and b) the average annual demographic growth between 1980 and 2006 of all municipalities located in the 11 cross-border metropolitan regions.

The findings demonstrate that border regions show very heterogeneous demographic profiles in Europe. Like any other European metropolitan regions, cross-border metropolitan regions are characterised by an intense spatial dynamic of employment and population. The spatial pattern, however, shows specific forms in borders contexts. Even if European integration has significantly promoted the opening of borders and fostered trade between nations, certain demographic differentials can still be observed within the metropolitan areas considered by this study.

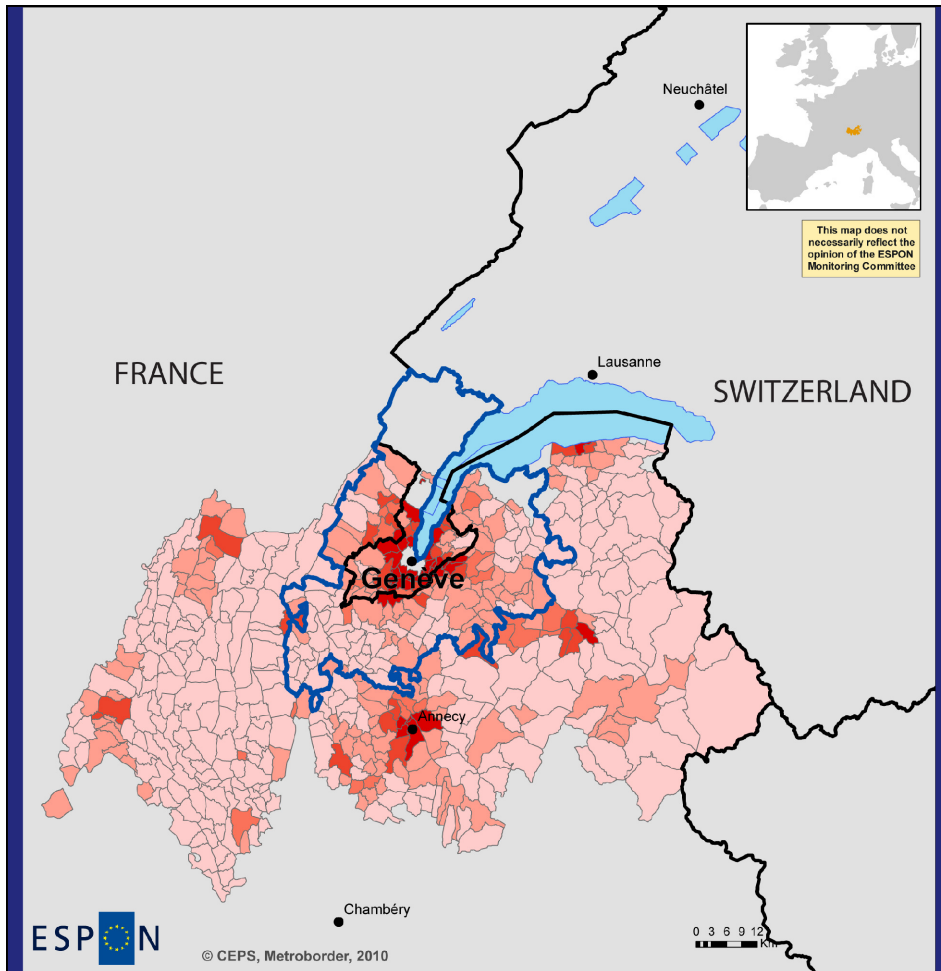
Density of population

The calculation of population density (number of inhabitants per square kilometer in 2006) shows the population patterns within border areas. Map 5 shows the example of Genève Region (for more examples, see Annex, chapter 7.2.4).

Like Genève, several border cities (Lille, Nice-Monaco-Sanremo, and Katowice-Ostrava) show similarities in demographic terms: the conurbation of Genève was extended towards the border and now encompasses the urban area of Annemasse; the metropolitan area of Lille is a very dense cross-border polycentric conurbation because of its industrial history; similarly the urban and industrial Silesian region which is one of the most important industrial areas in Europe; while in the case of Nice, the coast is urbanised and forms a urban cross-border continuum (from Cannes to Sanremo). Given these results, the boundaries in these cross-border regions do not introduce significant demographic variations between the municipalities of the countries; there is no strong differentiation of density of population on both sides of the border.

On the other hand, in some cases (Wien-Bratislava, Aachen-Liège-Maastricht), differences in densities appear on both sides of the borders. For example, the adjacent cross-border municipality of Aachen has lower population densities. In this case, the border creates a break. For Wien-

Bratislava, the location of the two capitals in comparison with the state border (spatial proximity for Bratislava and distance for Wien) produces differences in demographic terms. Here the densities are not the same on both sides of the border. København-Malmö is a special case because of the presence of the sea that physically separates the two main cities. In these circumstances it is difficult to assess differences in densities.



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Local level: NUTS 5
Source: Metroborder, 2010
Origin of data: Metroborder, 2010
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FUAs Perimeter

Density (inhab./km²)

- 0 - 100
- 101 - 300
- 301 - 500
- 501 - 1000
- 1001 - 8000

Map 5 Population density in the Genève region

Average annual growth rates

The indicator of average annual growth (AAGR) measures the demographic evolution from 1981 to 2006. This indicator allows a comparison of the population growth dynamics in the different regions although demographic data are not available for the same date for all cases.

Fig. 6 shows that in many cases the demographic evolution has followed a similar growth on both sides of the border (particularly in Basel, Genève, Lille, København-Malmö and Strasbourg).

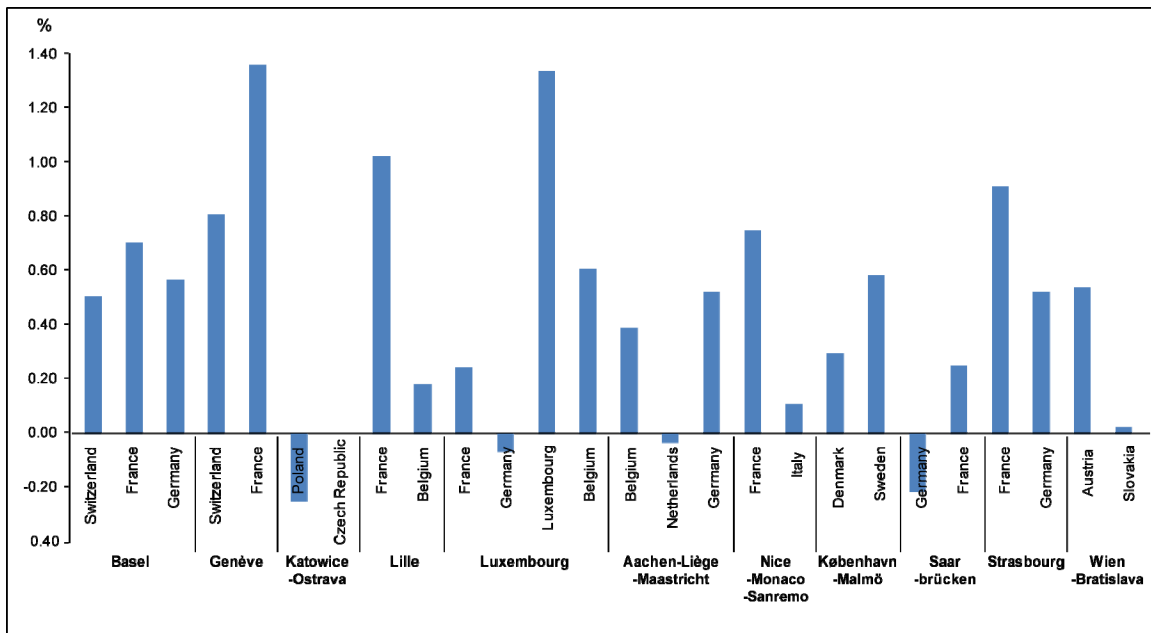
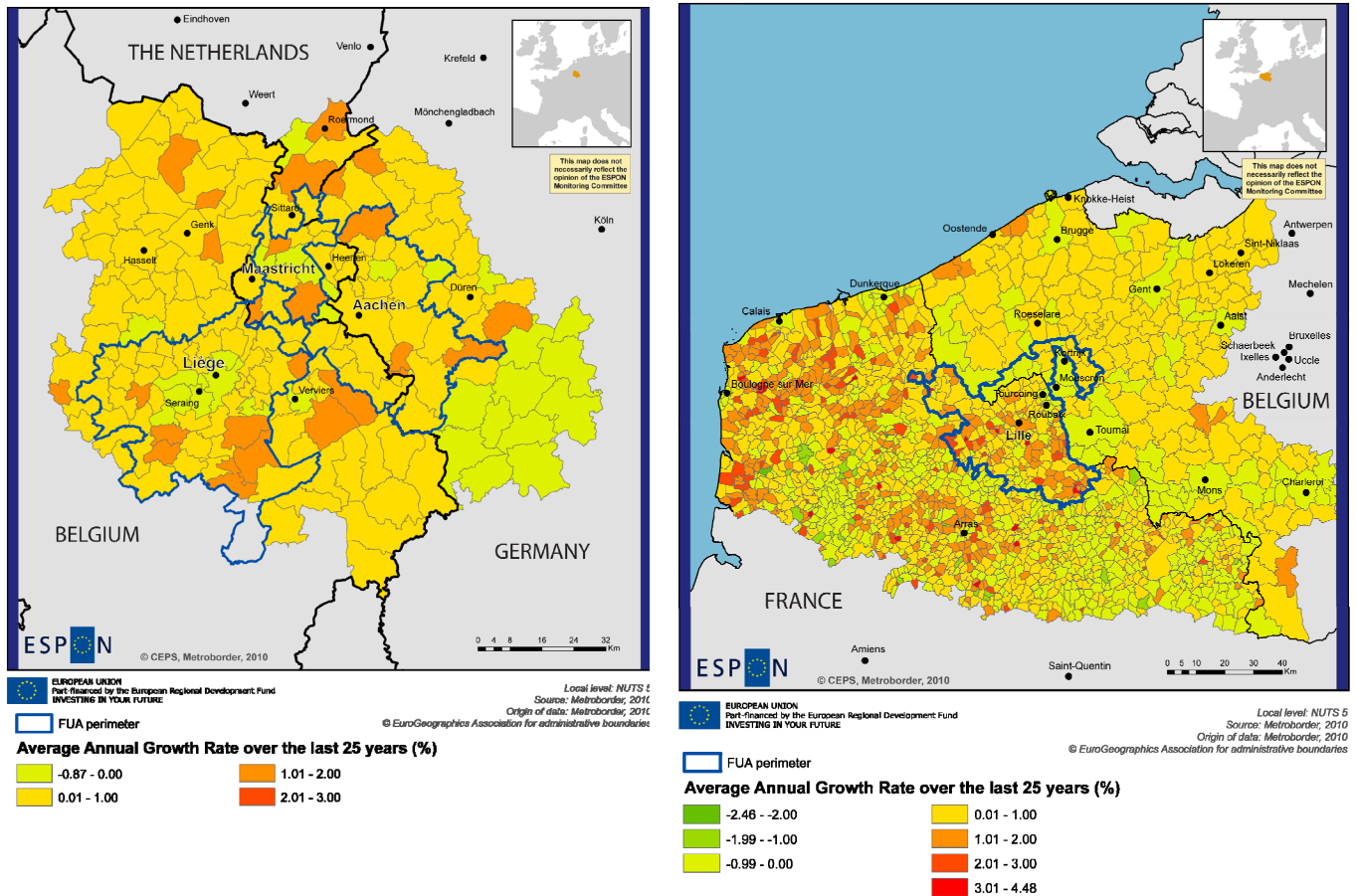


Fig. 6 Average annual growth rate over the last 15 years
Sources: National Statistics Offices

However, in the cross-border areas of Genève, Lille and København-Malmö, the population development shows different dynamics on both sides of the border. In Lille, for example, the growth rate of the French side is 1.0% per year while it is only of 0.2% per year on the Belgian side. In these cross-border metropolises, we note thus a demographic convergence on both sides of the borders. In the others cases, like Nice-Monaco-Sanremo, Katowice-Ostrava, and Saarbrücken, the demographic trends are not the same of both sides of borders. There are strong differences: the average annual growth rates are antagonist. For the cases of Wien-Bratislava and Aachen-Liège-Maastricht (see Map 6), trends vary according to the time scale considered. Over a period of 25 years, the annual growth rates are quite similar, while

over a period of 15 years, the growth of the population is radically different, even opposite (for example, Dutch municipalities lost population).



Map 6 Average annual growth rate – the examples of Aachen-Liège-Maastricht and Lille

The recent changes show a discrepancy in the demographic evolution of the contiguous border areas that might be considered as a border effect. In the case of the urban area of Bratislava, the opening of national borders in 1990 causes a particular development. The case of Luxembourg is more complex because of the number of borders, but also due to the size of the studied area (for details and a cartographic illustration of the case study region see Map 23).

Index of demographic convergence of border territories

In order to assess the overall trend, an index of demographic convergence of border territories has been calculated on the basis of a ratio between the densities of both sides of a dyad (common border between two states).

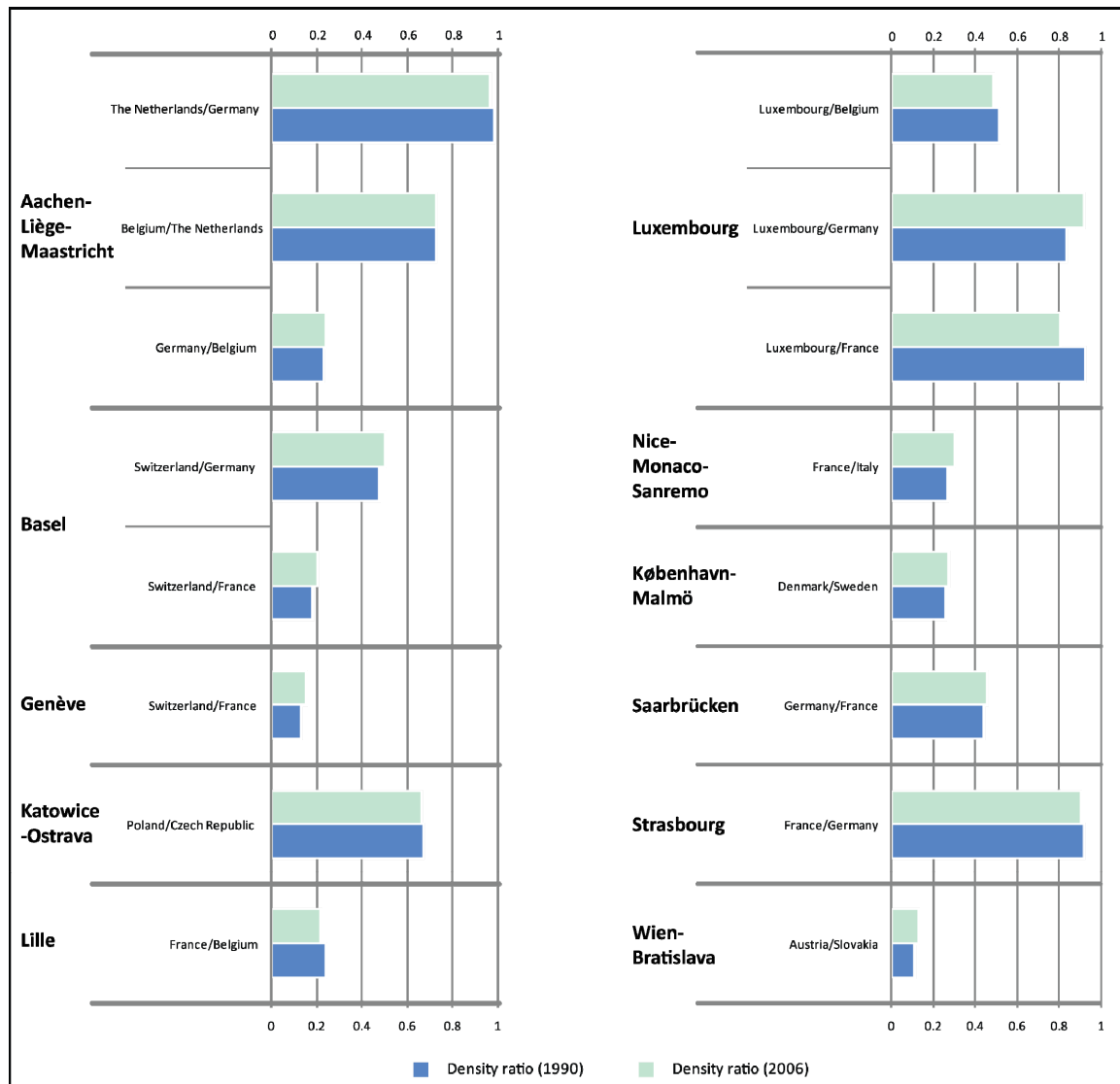


Fig. 7 Index of demographic convergence of border territories

For this, a cross-border zone was defined as an area of 20 km radius around a town adjacent to the border (either the main agglomeration as Basel or Strasbourg, or a town located between two major MUAs). For this area, the densities were calculated. The index thus reflects the degree of resemblance between the border areas in terms of density of population, dyad by dyad. The index has to be interpreted as follows: when the value is close to zero, huge differences exist between both sides of the border; when the value

approaches one, the two spaces show similar densities. This index therefore allows knowing whether contiguous territories are similar or not from a demographic perspective.

Fig. 7 shows three types of development: firstly, those border territories showing a certain demographic convergence (index > 0.7, e.g. the Strasbourg case or Aachen-Liège-Maastricht); secondly, the border territories where the demographic trend is different on both sides of the border (index < 0.3, e.g. Genève or Lille); and, thirdly, those border territories where the index indicates a medium convergence (index 0.3 - 0.7, e.g. Saarbrücken, Katowice-Ostrava).

In cases with more than one boundary, the index of convergence varies according to dyads (example of Basel, Luxembourg and Aachen-Liège-Maastricht). Moreover, it is interesting to note that the same demographic dynamics on both sides of the border do not necessarily correspond to a demographic convergence (Lille, Genève and København-Malmö). Finally, this index shows three cross-border territories being convergent in a demographic perspective: Strasbourg, Luxembourg (borders with France and Germany) and Aachen-Liège-Maastricht (Belgium border and the Netherlands, the border between Germany and the Netherlands). In all other cases, the index reveals rather disparities in demographic terms on both sides of borders.

3.1.9 Indicator 4 – Citizenship (2000-2006)

The cross-border nature of a metropolitan region can be approached through the residential attractiveness, which sometimes extends beyond national borders. This attractiveness is influenced by key elements such as the dynamism of the labour market or the living standard, but it is however hampered by other factors such as cultural or linguistic discontinuities.

This indicator measures the proportion of residents who have the citizenship of the country located on the other side of the border in each part of the CBMR. Firstly, the figures are given for year 2000 (Fig. 8); secondly, the evolution between 2000 and 2005 (resp. 2006) is represented (Fig. 9).

The underlying spatial units correspond to similar administrative territories in terms of size (e.g. *Cantons* in Luxembourg, *Arrondissements* in France, *Kreise* in Germany, groups of municipalities in Denmark, Sweden, etc...).

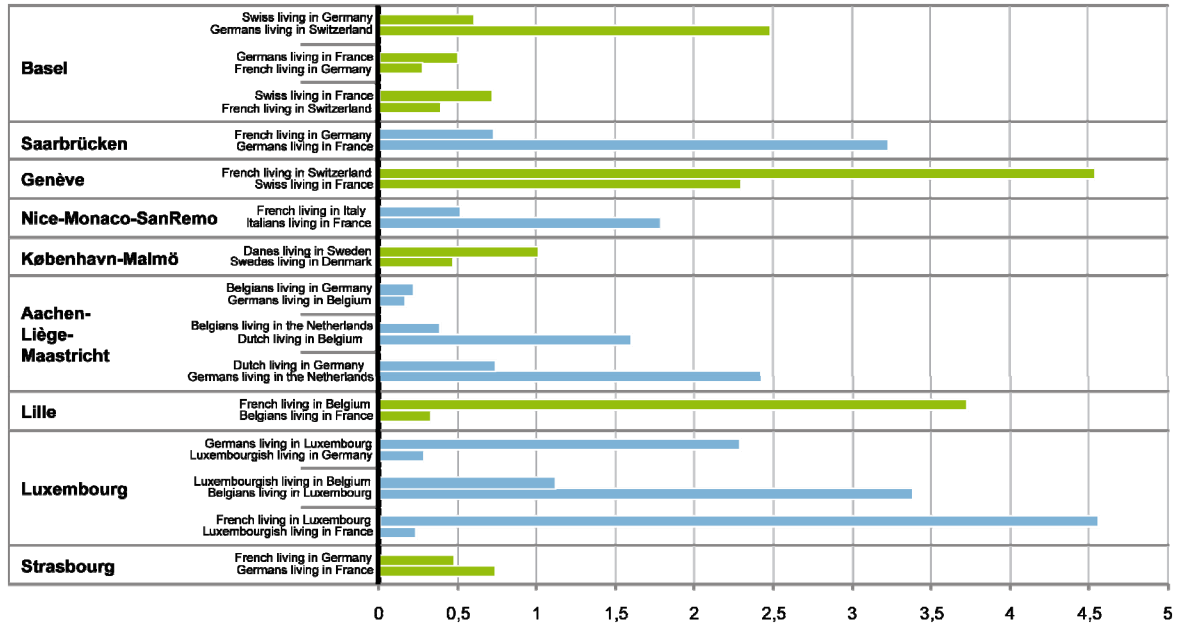


Fig. 8 Citizenship portion in the different parts of the cross-border metropolitan regions (in %)

Sources: Luxembourg: STATEC, Statistisches Landesamt Rheinland-Pfalz, Statistisches Landesamt Saarland, IGEAT, Insee. Basel: OFS, Statistisches Amt des Kantons Basel-Landschaft, Basel-Stadt Statistik, Statistisches Landesamt Baden-Württemberg, Insee. Genève: OFS, Office cantonal de la statistique du canton de Genève, Statistiques Vaud, Insee. Nice-Monaco-Sanremo: Insee, Istat. Lille: Insee, IGEAT. Saarbrücken: Statistisches Landesamt Saarland, Insee. Aachen-Liège-Maastricht: Statistisches Landesamt Nordrhein-Westfalen, IGEAT, Statistics Netherlands. København-Malmö: Ørestat databank, Statistics Denmark, Statistics Sweden. Strasbourg: Insee, Statistisches Landesamt Baden-Württemberg.

Fig. 8 shows several types of regions: Firstly, there are relatively homogeneous configurations in which the proportions of foreigners coming from the neighboring countries are similar from one country to another (e.g. Strasbourg, Aachen-Liège-Maastricht). These configurations do not suggest strong differentials to improve the attractiveness of one side of a cross-border metropolis (e.g. attractive housing price level). In the other cases that are more numerous, we see asymmetries reflecting the existence of differentials.

Secondly, some cases show a significant share of foreigners and, thus, highlight the attractiveness of some border cities like Genève or Luxembourg. In both examples, there is no real language barrier, and this facilitates the decision to live abroad. In the German-speaking city of Basel, the most important foreign resident community is the German one, whereas there are more cross-border commuters coming from France. This illustrates the importance of linguistic barriers toward residential dynamic. In the case

of Lille, we can notice that the Belgian part of the cross-border metropolis is much more attractive for foreign residents.

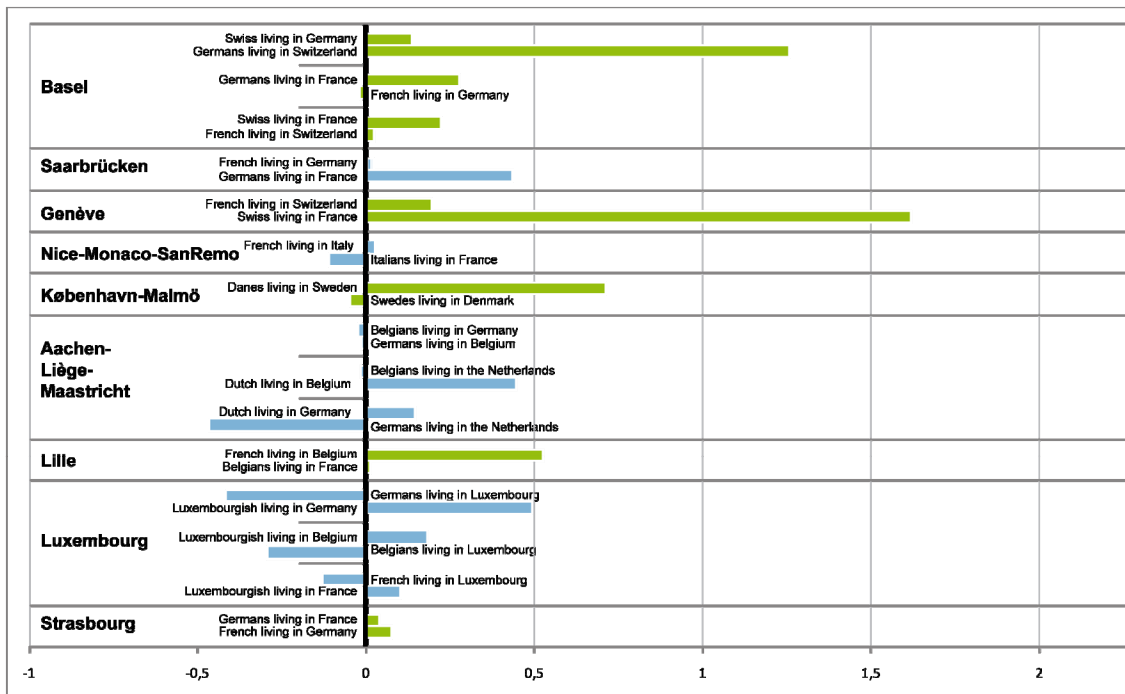


Fig. 9 Evolution of the relative weight of foreign residents in the total population of the border region 2000-2005/06 (in %) Sources: see Fig. 8

Fig. 9 shows the development of the portion of foreign residents from 2000 to 2005/6. This indicator shows that the trend does not correspond to a dynamic of convergence at all. The growth dynamics of the foreigners coming from the other side of the border in the population of a core-metropolis is often asymmetric. This can be explained by the fact that the border underlines differentials that individuals seek to exploit. People can choose to live in a border area where the real estate prices are low, while working on the other side, where the working conditions are better (Genève, Luxembourg, Basel).

3.1.10 Indicator 5 - Regional GDP (next step)

As mentioned above, the spatial distribution of regional GDP is considered being another reliable indicator to identify converging or diverging tendencies in cross-border areas. It will be elaborated on within the next steps.

3.1.11 European and global positioning (next step)

The positioning of the CBMRs on the European and global map is of particular importance. Metroborder aims to conduct this positioning by means of different indicators (Fortune 500, GaWC etc.) and has to make use of the ongoing work within the ESPON programme, especially the FOCI project. The FOCI project has already delivered preliminary results on the question of regional competitiveness and will soon deliver more elaborated results. These will be of high interest for the cross-border question, too (see FOCI Interim Report Annex Chapter 3). As soon as the FOCI project advances with regard to these questions, Metroborder will make use of the data and adopt them for the CBMRs.

3.2 Institutional Integration (WP 1.2)

3.2.1 Conceptual and methodological framework

In order to identify the key factors in the dynamics of institutional integration in metropolitan contexts, various explanatory frameworks can be mobilised (cp. Lefèvre 2004).

Firstly, the public political and institutional structures have to be considered on various scales: urban, regional, national, inter- and supranational level. Metroborder aims to consider them all but focuses in particular on the regional, national and international level. Within the Metroborder project, cooperations that are purely local or that are just based on a small sized project cannot be considered systematically.

Secondly, the relationships between the private and public sectors are considered. According to the prevailing political culture, the place of civil society and economic protagonists vary widely in the modes of cross-border metropolitan cooperation. A priori, the opening up of systems for actors constitutes a stimulating factor since private initiatives are likely to favour actions undertaken by public entities (Jouve and Lefèvre 2003).

Thirdly, the historical dimension is also taken into consideration. Institutional integration is a process that is part of the duration and history of relationships between actors and often intervenes in the current and future types of cooperation. In this way, the capitalisation of exchanges and experiences over time can be used as a foundation for the emergence of a 'culture of cooperation' (Lefèvre 2004) characterised by speeches, practices

and common images. In addition, the dynamics of cross-border metropolitan integration are part of a wider context dictated by the evolution of legal frameworks and financial incentives, both on the level of interstate agreements and at the European level.

Several indicators have been developed with regard to the institutional integration of the 11 CBMRs. The cross-border institutional integration will be analysed by considering the legal regulation within the multilevel context. Legal regulations, budget, and further formalised institutionalisations are at the same time basis and outcome of cross-border cooperation.

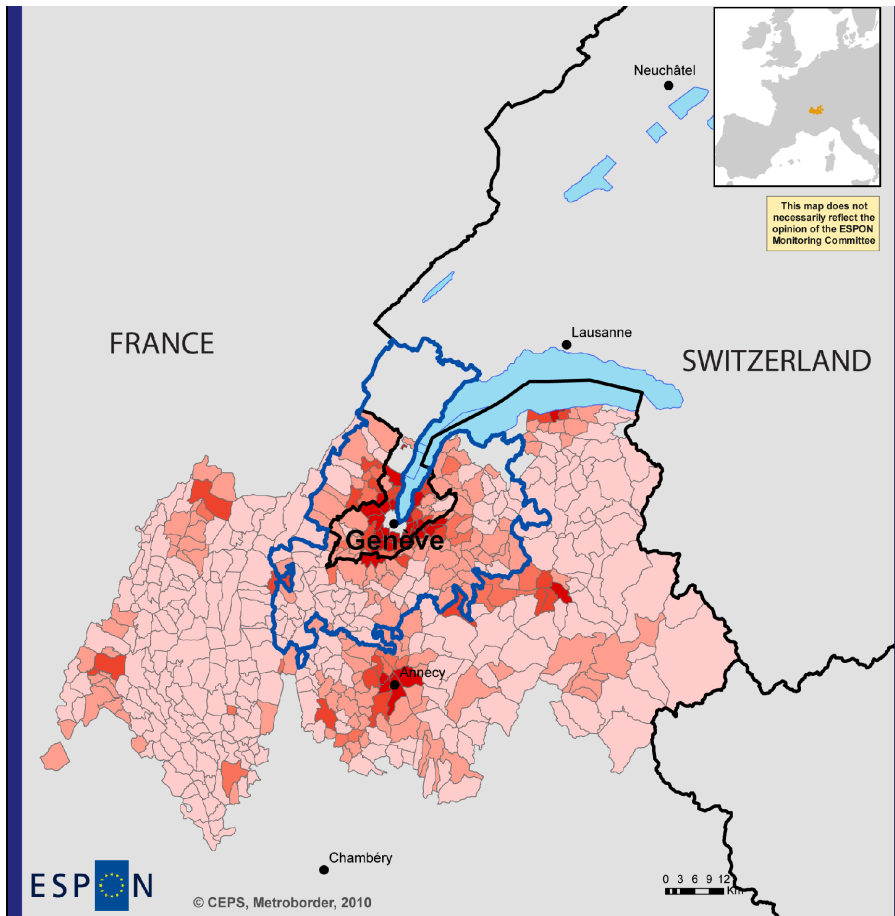
In addition, ongoing cross-border cooperation has been analysed with regard to the advancement and the historical depth of the institutionalisation. Further indicators are the thematic orientation of the cooperation, the geographic scope and structure and the actors involved. The analysis starts with the mapping of the perimeters of institutional cooperation on the regional level.

3.2.2 Institutional mapping

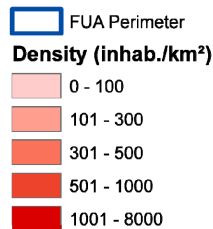
The multiplication of cross-border cooperation institutions in European border regions is linked to the promotion of legal tools, at first on national level and later enforced by the EU and the provision of financial resources that aim at formalising cross-border projects (INTERREG) (Scott 2002).

Amongst the eleven cross-border metropolitan regions examined in this report, nine have established structures of cross-border cooperation with a certain metropolitan ambition. Despite some cross-border cooperation activities, the regions of Katowice-Ostrava and Nice-Monaco-Sanremo have not set up any institutional structure in that respect so far.

The mapping of the cooperation refers to the official perimeter of the cross-border institution or, if a perimeter is not defined, shows the territory of all institutions involved as well as a certain number of city networks (see the example of Aachen-Liège-Maastricht in Map 7 and all institutional mappings in the annex, Map 24 - Map 29).



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Source: Metroborder, 2010
Origin of data: Metroborder, 2010
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Map 7 Aachen – Liège – Maastricht: perimeters of institutional cooperation

3.2.3 Comparing the different institutionalisations

3.2.4 Legal status

A comparison of cross-border cooperation shows a variety of configurations related to the nature of institutional structures put in place, the thematic of the cross-border cooperation, the scalar arrangements of these governance initiatives, their geographic structure and the type of actors and organisations involved (see Table 4).

	Name of the cross-border cooperation structure	Status of the CBC structure	Organisation of Technical Staff	Area of cooperation (km ²)	Date of establishment of the actual cooperation structure	Date of the first institutional cooperation on cross-border area
Aachen-Liège-Maastricht	Euregio Meuse-Rhin	Charter	Coordination between regional teams	12882	1976	1976 (Euregio Meuse-Rhin)
	MAHHL	Association	Working Groups	-	1991	
Basel	Trinationaler Eurodistrict Basel	Association	Integrated Team	1989	1994 (ATB), 2007 (ETB)	1963 (Regio Basiliensis)
	metrobasel	Association	Working Groups	2606	2008	
	Regio TriRhena	Association	-	8700	1995	
	Commission Intergouvernementale franco-germano-suisse	-	Working Groups	21518	1975	
	Conseil Rhénan	-	Working Groups	21518	1997	
	Oberrheinkonferenz	Intergovernmental Commission	Working Groups	21518	1991	
	Regio Basiliensis	Association & Swiss intercantonal coordination office	Integrated Team	-	1963 (Association), 1970 (Intercantonal coordination office)	
Genève	Projet d'Agglomération franco-valdo-genevois	Charter	Integrated Team	1900	1997 (Charter), 2004 (Projet d'agglomération)	1974 (Comité régional franco-genevois)
	Conseil du Léman	Consultative Institution	Commissions	18868	1987	
	Comité Régional Franco-Genevois	Consultative Institution	Working Groups	47192	1974	
Katowice-Ostrava	No Structure	-	-	-	-	-
København-Malmö	Oresund Committee	Association	Integrated Team	20869	1993	1964 (Öresundskommitten)
Lille	Eurométropole Lille-Kortrijk-Tournai	EGTC	Integrated Team	3533	1991 (Copit), 2008 (EGCT)	1960 (Regional Economic Liaison Committee), 1970 (Franco-Belgian Commission for the development of border regions)
Luxembourg	QuattroPole	Consultative Institution	Working Groups	-	2000	1971 (Regional Commission Saar-Lor-Lux-Trier)
	LELA +	Charter	Working Groups	-	2007	
	Euregio SarLorLux +	Association	Working Groups	36700	1988	
	Greater Region	Charter (Creation EGCT in discussion)	Working Groups	65401	1995 (1st Summit of the Greater Region)	

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Nice-Monaco-Sanremo	No Structure	-	-	-	-	-
Saarbrücken	Eurodistrict Saarmoselle	Association (Creation EGCT in discussion)	Integrated Team	1460	1991 (Association Zukunft SaarMoselle Avenir)	1971 (Regional Commission Saar-Lor-Lux-Trier/West Palatinat)
	QuattroPole	Consultative Institution	Working Groups	-	2000	
	Greater Region	Charter (Creation EGCT in discussion)	Working Groups	65401	1995 (1st Summit of the Greater Region)	
Strasbourg	Eurodistrict Strasbourg-Ortenau	Association (Creation EGTC in 02/2010)	Integrated Team (forthcoming)	2176	2005	2003 (Joint Declaration Franco-German), but institutionalised relationships at the municipal level since 1975
	Conférence du Rhin supérieur	Intergovernmental Commission	Working Groups	21518	1991	
Wien-Bratislava	Centrope	Charter	Subcontracting	48000	2004	2000 (Jordes)

Table 4 General characteristics of institutional cross-border cooperations

Sources: Bundesamt für Bauwesen und Raumordnung (2009) and Metroborder.

Note: city networks are not represented

The cooperation structures show a wide variety of legal status, reflecting strong differences in the type of organisation and the level of institutionalisation. Cross-border cooperation groupings can simply rely on an informal structure like a charter or a convention between partners. This is notably the case for the *Projet d'Agglomération franco-valdo-genevois* or *Centrope*. The cooperation can also be based on a non-profit association of national (or regional) right like the Eurodistricts in Basel, Saarbrücken and Strasbourg or the *Öresund Committee*. In recent years, the convention of Karlsruhe (1996) was of particular importance for the contracting countries France, Switzerland, Germany, and Luxembourg, as it allowed the creation of local groupings of territorial authorities. Finally, cross-border institutions can become European Groupings of Territorial Cooperation (EGTC), which is an entity with legal personality. In different cross-border metropolitan regions like Luxembourg and Saarbrücken, the creation of an EGTC is in preparation. But so far, only Lille, and recently Strasbourg, have implemented this legal tool.

The legal status of the organizations determines, to some extent, the form and role of cross-border governance structures. It can sometimes be advantageous for local and regional actors to cooperate on a low level of institutionalisation. Territorial observation, strategic territorial vision, project coordination or communication and lobbying can be undertaken within an informal structure; large projects, however, often need a more formalised

organisation (MOT 2006). For more details on these aspects see Annex, chapter 7.3.2.

3.2.5 Thematic of cooperation

On a broad perspective, town and regional planning, economic development, tourism, culture, training and employment constitute the most common domains covered. Although some CBMRs suffer from shortage of affordable housing or residential land, these issues are seldom integrated in the cross-border cooperation (only the Eurodistrict Trinational of Basel and the Projet d'Agglomération franco-valdo-genevois are considering this thematic). Last but not least, the organisation of big events that are able to foster the international attractiveness of the metropolitan region has been undertaken or supported by a few cross-border groupings. The most relevant examples are Luxembourg and the Greater Region, European Capital of Culture in 2007, and IBA Basel 2020, an international architecture exhibition supported by ETB. Of course, within each domain, the level of involvement by the cooperation structure may differ considerably. As far as town and regional planning is concerned, the most advanced territorial diagnosis and strategic planning have been conducted at the level of cross-border agglomerations, some of them like Basel, Genève, and Strasbourg being in the process of implementing urban development or public transportation projects. The existence of an integrated technical team constitutes an advantage for such activities. For other territorial groupings, forward thinking in urban and regional development is conducted but implementation of concrete projects on the ground has not yet occurred.

3.2.6 Geographic scope

Within the structures of cooperation, three spatial scales can be distinguished:

- (1) Firstly, there are cooperation groupings that are calibrated on cross-border conurbations and their nearby economic space. This is notably the case for Eurodistricts (Basel, Lille, Saarbrücken, and Strasbourg) and agglomeration projects (Genève). The size of these cooperation groupings varies between 1,500 and 3,500 km². In most cases, these initiatives were launched during the 1990s.
- (2) The second category of structures of cooperation typically comprises "Euroregions" defined in a broad sense (Perkmann 2003). Their geographical size ranges between 10,000 and 20,000 km². This scale of cooperation is

notably at play in the region of Aachen-Liège-Maastricht, in the Öresund region, the Lemane region and in the Upper Rhine region. Either these structures represent regional cross-border cooperation groupings that come in to support other initiatives implemented at a more limited spatial scale or they form the main structure of cooperation (like the Öresund Committee or the Euregio Maas-Rhine). Generally, these structures of cooperation are older than the first ones, most of them having been formed in the years 1960-1970.

(3) The last category of cooperation groupings is much wider as it includes institutional structures that put together several regions, thus forming large areas that extend over 40,000 km². Among our case studies, only Centropé, the Comité régional franco-genevois (CRFG) and the Greater Region fit this category. It is worthwhile to note that this difference in scale does not involve different institutional settings or other cooperation thematic.

3.2.7 Type of actors

Finally, cross-border cooperation initiatives vary also depending on the type of actors involved (public, private, from civil society...) and, for public organisations, their institutional level. Among the cooperation groupings driven by public actors, one can distinguish two kinds of institutions. Firstly, some structures bring together local actors (municipalities and districts) and/or regional actors (regions, provinces, cantons, and *Länder*). In principle, these cooperation groupings benefit from a certain degree of autonomy vis-à-vis central states. Secondly, some structures involve representatives of central or federal governments. In some cases as in Genève, Lille and København-Malmö, the main structure of cooperation includes actors from the three institutional levels (although for the Öresund Committee the states are only involved as observers). The presence of national players in the cross-border cooperation groupings is linked to the institutional settings at place in the different countries, especially the structure of the state (central or federal) and the level of decentralisation. In any case, the participation of central states seems twofold: It can mean be advantageous for the implementation of cross-border cooperation, particularly with regard to the legal competence of central governments or the political leadership of a national actor (e.g. Lille with Pierre Mauroy) and, on the other hand, it may inhibit cooperation between local and regional authorities who sometimes distrust the central government.

As far as non public actors are concerned, their role varies from being the initiators of alternative private organisations (like metrobasel in Basel or the

network Twin City Wien-Bratislava) to being associated with some instances of institutional cross-border cooperation (e.g. the Economic and Social Council of the Greater Region).

As the ESPON Project on Governance (2006/2.3.2) has already shown, there is quite a bias on public actors; the participation of civil society and stakeholders is less developed.

3.2.8 Multi-scalar and multi-level governance assemblages

Fig. 10 illustrates the multiplicity and diversity of institutional configurations within the studied areas. The x-axis represents their geographical scale and the y-axis the institutional levels of public bodies involved. The analytical distinction between geographical scales and institutional levels seems relevant as cooperation at local scale does not necessarily involve only local actors and cooperation at regional scale is not restricted to regional or national authorities. In fact, there is a decoupling of the two parameters, making tangled governance assemblages both (institutionally) multi-level and (geographically) multi-scalar. After having synthesised the institutional cooperation setting in each CBMR, this analysis seeks to identify common trends and structures.

In order to ensure comparability on European level, both axes have to simplify highly complex aspects:

Firstly, the institutional level refers to the domestic political hierarchy. Numerous particularities have to be simplified (e.g. French *Préfecture*, absence of regional level in Luxembourg etc.). The notion of symmetric / asymmetric patterns addresses the hierarchic level and must not be misunderstood in normative. Asymmetric configurations can be optimal if they bring together the needed competences; and symmetric configurations can bring together partners that do not possess the same institutional powers.

Secondly, the geographic scope refers, again, to the territory that is result of the summed up perimeters of the institutions involved. This does not necessarily mean that the political ambition of the cooperation is focused on this territory.

For reflections on possible political consequences from different scale and level configurations, see Annex, chapter 7.3.3.

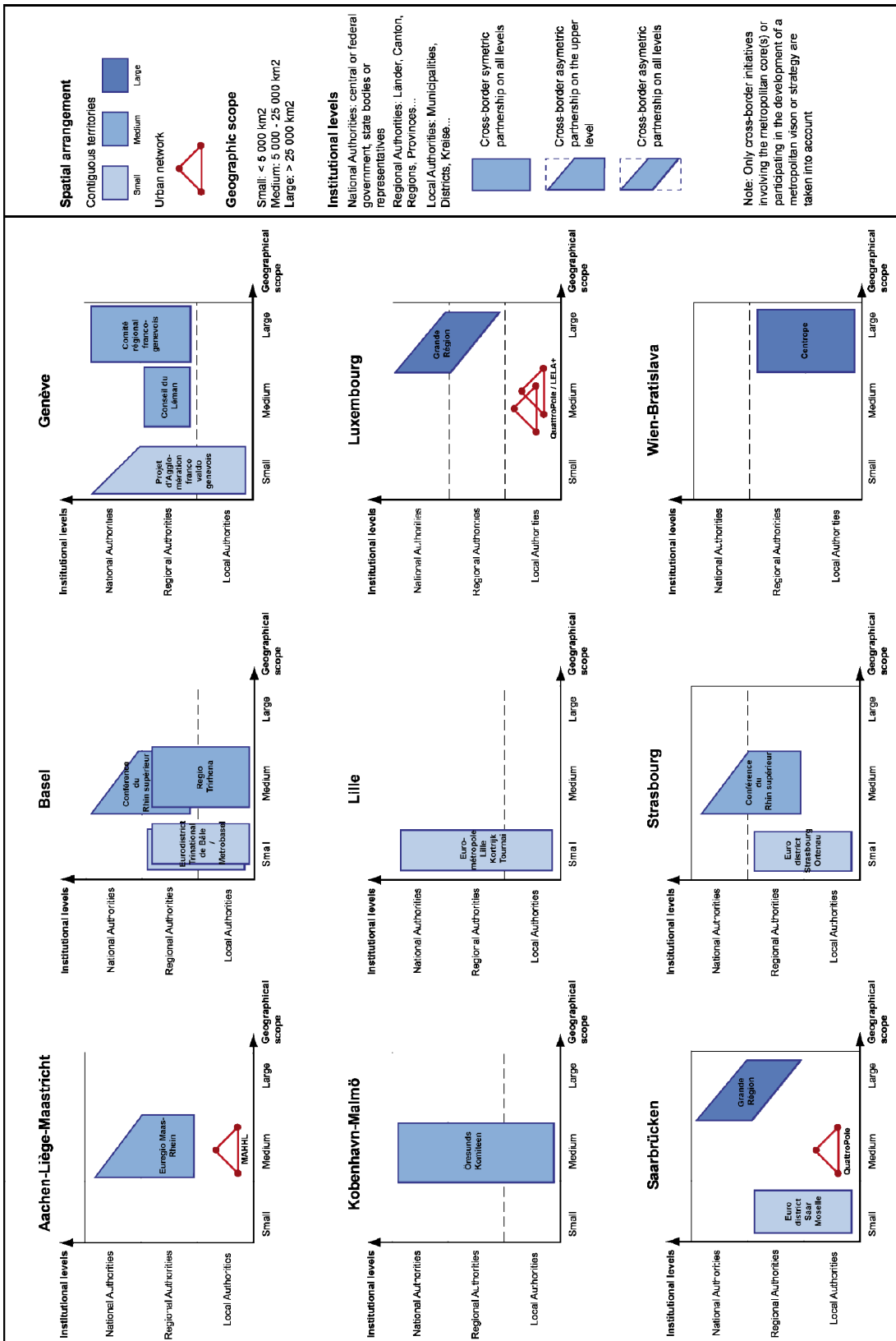


Fig. 10 Institutional mapping of cross-border cooperation groupings
 Sources: MOT 2006, websites of cooperation structures

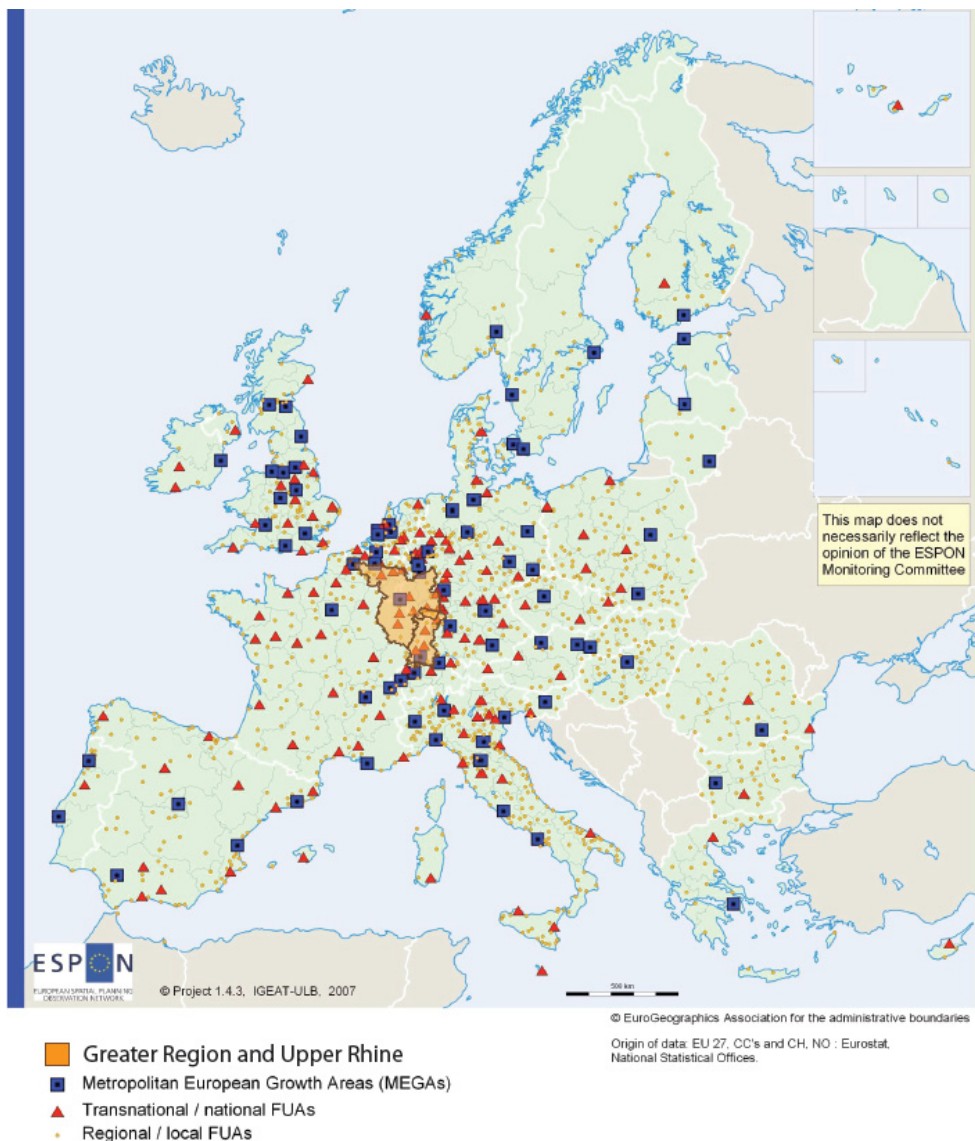
3.3 Next steps

For the coming period of the Metroborder project, several steps have to be taken:

- Elaboration of CBMR definition from the perspective of functional integration, taking into account the existing ESPON concepts (FUA, MUA, PIA, PUSH etc.) as well as the analyses of the different Metroborder indicators.
- Analysing regional GDP
- Summary analysis of functional integration
- The outward positioning of the CBMRs has to be elaborated in order to position them on the European and global level.
- The results of the functional integration study will be more closely connected to the analysis of the institutional integration, taking into account in particular the different perimeters of integration (cp. Le Galès 2002; Savitch & Vogel 2000)

4 The Case Studies (WP 2)

Work package 2 addresses the Greater Region and Upper Rhine region as case studies. The aim is to go into more detail with regard to the functional and the institutional integration. The analyses of the functional integration will be based on different domestic data sources; the analysis of the institutional set-up will mainly be based on a Delphi study that is currently conducted in both regions. Approaching the two case study regions from the ESPON perspective starts with the following picture (Map 8) :



Map 8 The institutional perimeters of the Greater Region and the Upper Rhine and their European positioning – modified map from ESPON 1.4.3

Both cooperation territories are close to the major European metropolises, but they are not comprising first category MEGAS. However, Luxembourg and Basel are two poles with a remarkable global positioning due to a certain specialisation (cp. ESPON 1.4.3 and 1.1.1). On the intraregional level, both regions are highly polycentric, having a dense structure of secondary centres.

4.1 Functional Integration Greater Region (WP2.1GR)

4.1.1 Methodology

The Greater Region is a vast and highly heterogeneous area in terms of economic activities (e-BIRD 2005). Because of the importance of its financial intermediation activities and the existence of European institutions, Luxembourg is highly atypical within this area. Despite its small demographic size, Luxembourg is considered as an international economic and political centre (Rozenblat & Cicille 2003) and belongs to the group of European cities with “*a relatively strong evidence of world city formation*” (Taylor 2000: 15). None of the other French, German or Belgian regions are engaged in an equivalent process of economic growth as so much oriented towards the knowledge economy. This specificity explains why the analysis of high-tech and knowledge-intensive services is primarily conducted in Luxembourg in this following study. The focus on Luxembourg and its neighbouring areas does not mean that only this area is interesting from an economic point of view. Similarly, the attention paid to knowledge-intensive services does not mean that only these activities are worth being analysed. However, Luxembourg provides an interesting case study in the sense that activities considered here are predominantly metropolitan and exert considerable influence at the regional level. There is no doubt that they are crucial for the economic development of the whole Greater Region.

On the basis of the work of the OECD (2006) and Eurostat (2006) on the knowledge economy, this study has a double purpose. From a sectoral point of view, the aim is to propose a classification of economic activities seen as representative of the knowledge economy adapted to the specific characteristics of Luxembourg, and to discuss the sectoral development of the jobs linked to these activities between 1994 and 2008. This analysis highlights the major trends affecting the economic profile of the Luxembourg metropolitan area, and confirms the growing importance of knowledge-intensive activities. Then, from the geographical point of view, the

classification allows the mapping of jobs characteristic for the knowledge economy (using the site of the head office or of the actual workplace, according to the geographical unit considered) and thus to identify the focal points of the metropolitan economy in space.

The analysis of employment linked to the knowledge economy is conducted primarily on the basis of the data provided by the Luxembourg General Inspection of Social Security (IGSS). In contrast to the data from the population census which concerned only residents, the IGSS data have the advantage of taking into account both employees resident in Luxembourg and those who cross the border daily (including their co-insured), which is advantageous given that 41.5% of jobs were held by cross-border workers in 2008 (STATEC, 2009). The data used thus relate to all those in active employment covered by social insurance provided by the state of Luxembourg on 31st March of each of the years for which data are provided (1994, 1996, 1999, 2002, 2005, 2008) (for methodological details see Annex 7.4).

4.1.2 Interim results: The knowledge economy in Luxembourg

The temporal and spatial development of high-technology and knowledge-intensive employment in Luxembourg is analysed from two perspectives. Firstly, a sectoral analysis is made of the development of the number of high-technology and knowledge-intensive jobs from 1994 to 2008 at the national level. Secondly, an analysis of the spatial distribution of people employed in Luxembourg is carried out on the basis of the location of the head office of the enterprise.

Growth of high-technology and knowledge-intensive jobs

Between 1994 and 2008, the average annual growth in high-technology and knowledge-intensive jobs was particularly significant in Luxembourg (+5.5%) and was markedly higher than that in other sectors of activity (+3.1%). Over this period, the number of jobs linked to the knowledge economy rose from 61,675 to 129,697, while other jobs rose from 147,709 to 227,522 (Table 5). These figures show that the high-technology and knowledge-intensive jobs represent a growing portion of the total employment within Luxembourg, rising from 29.2% in 1994 to 36.2% in 2008.

Categories	1994	1996	1999	2002	2005	2008	Average annual growth 1994-2008 (%)
High-tech and knowledge- intensive jobs	61,675	66,768	79,421	98,621	107,424	129,697	5.5
Other jobs	147,709	153,779	172,180	193,015	207,867	227,522	3.1
Unknown NACE code	16,85	4,619	1,633	1,049	440	795	/
Total	211,069	225,166	253,234	292,685	315,731	358,014	3.8

Table 5 Persons in employment by category of employment, 1994-2008
Source: IGSS. Authors' calculations.

Analysis of the development of high-technology and knowledge-intensive employment by sector of activity allows the more precise identification of the activities which act as driving forces within the Luxembourg economy (Table 6). In absolute terms, these are the financial KIS (40,856), national and international bodies (20,603) and market KIS (28,310) which included the largest number of jobs in 2008. These three sectors represent on their own 69.2% of total employment linked to the knowledge economy. The high-tech KIS (+14.4%) and market KIS (+9.2%) sectors saw the highest levels of average annual growth over the period in question, which is explained by the fact that these sectors accompanied the development of the financial centre. However, not all the high-technology and knowledge-intensive sectors can be considered as key activities of the Luxembourg economy. In absolute terms, the weakness of the high-tech manufacturing industries, which represent only 0.6% of jobs linked to the knowledge economy, can be mentioned. The rate of growth measured between 1994 and 2008 for other KIS (+4.3%) – including higher education, healthcare and culture – showed weaker growth than the more dynamic sectors of Luxembourg's knowledge economy.

The examination of the sectoral distribution of jobs linked to the knowledge economy and their development gives rise to an uneven economic profile for the Luxembourg metropolis. Its strong points include finance and high added-value services which accompany the development of financial activities. This strong economic specialisation has a reverse side, which is marked by under-representation of employment relating to higher education

and culture. These findings provide a reminder that Luxembourg presented a highly atypical sectoral profile in comparison to the EU 15 average. Indeed, the portion represented by financial services (29.4%) and services to enterprises (33.8%) is significantly more important than in Europe, while a deficit can be seen in the areas of medium-tech industry (1.8%) and higher education, culture and healthcare (20.5%), which represent just half of the average proportion across the EU 15 (Brinkley and Lee, 2008). These characteristics result from this economic model adopted by Luxembourg over the past decades, which heavily favoured the development of a highly specialised financial industry (Pieretti et al. 2007; Walther & Schulz 2009) and invested only very late in the field of education and scientific research, with the exception of certain manufacturing companies which have provided long-established research centres.

High-tech and knowledge-intensive sectors							Average annual growth
	1994	1996	1999	2002	2005	2008	1994-2008 (%)
High-tech manufacturing industry	394	387	425	522	683	835	5.5
High-tech KIS	1,930	2,912	4,688	7,310	7,655	12,702	14.4
Market KIS	8,257	9,045	12,548	17,920	20,603	28,310	9.2
Financial KIS	20,633	22,479	26,390	33,415	33,835	40,856	5.0
Other KIS	6,085	6,471	7,302	8,462	9,579	10,987	4.3
National and international bodies	13,503	14,254	16,426	18,406	20,706	20,603	3.1
Independent intellectual workers	3,073	3,420	3,942	4,886	5,563	6,404	5.4
International civil servants ¹	7,800	7,800	7,700	7,700	8,800	9 000	1.0
Total	61,675	66,768	79,421	98,621	107,424	129,697	5.5

Table 6 Jobs linked to the knowledge economy, 1994-2005
Source: IGSS except when indicated otherwise. Authors' calculations.

¹According to STATEC.

Distribution of activities by location of head office of enterprises

Employment linked to the knowledge economy by location of head office of enterprises is very unevenly distributed across the country. As shown in

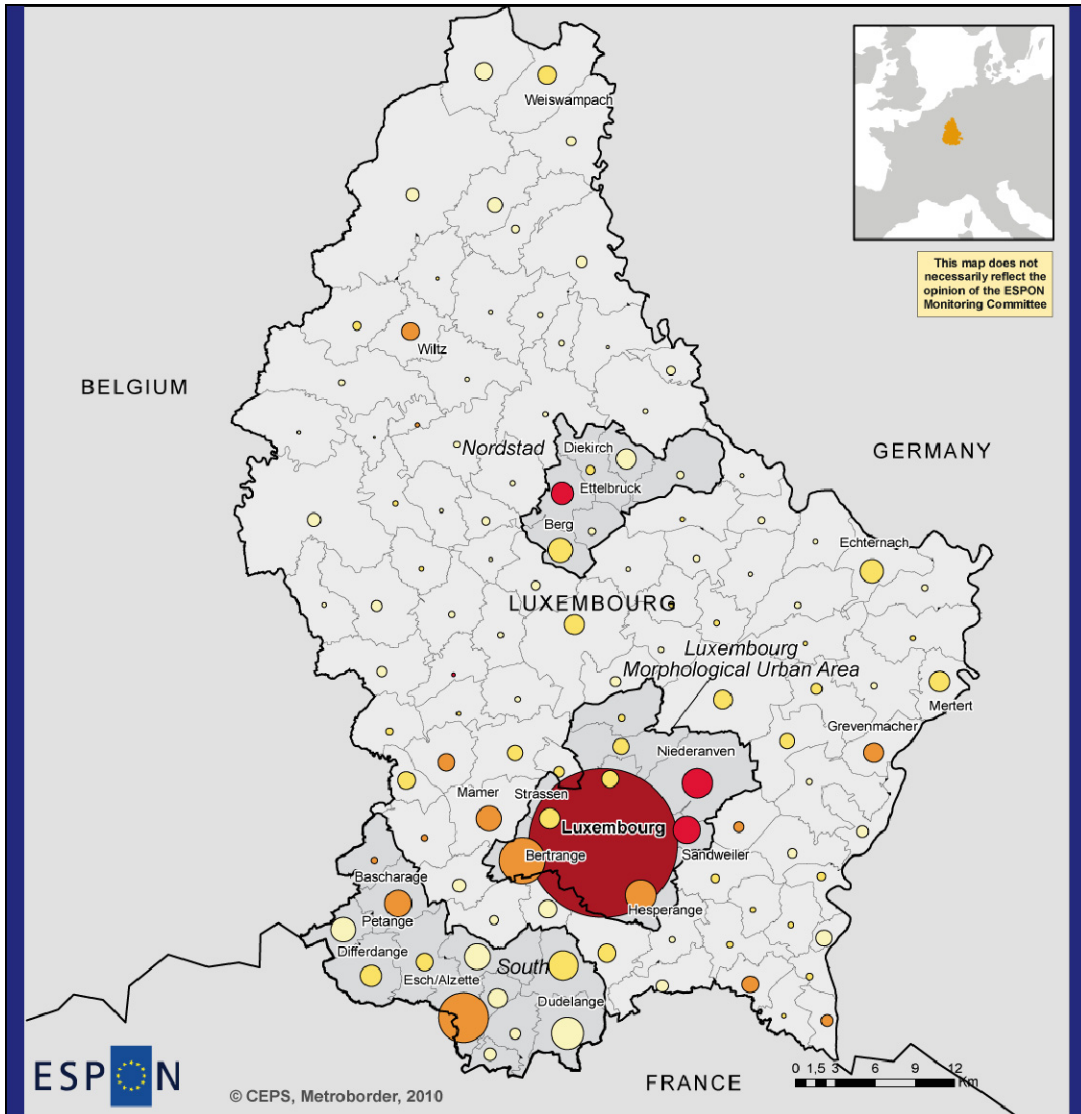
Table 7, 82.5% of this employment is located with the Luxembourg Urban Area, 7.6% within the South Region and only 2.0% within Nordstad in 2008. At the municipality level, Luxembourg City alone has almost 85,600 jobs linked to the knowledge economy, while Esch-sur-Alzette is home to just 4,725 (equivalent to 73.2% and 4.0% respectively). It should be noted that the number of high-technology and knowledge-intensive jobs grew significantly in the South Region between 2005 and 2008. This is to be explained primarily by the establishment of back office financial services (+1433 jobs) at Esch-Belval which increased the financial KIS categories and, to a lesser extent, by the relocation of a public research centre previously located in the capital (+148 jobs).

Urban areas	High-tech						National and int. bodies	Total	Proportion (%)
	High-tech manufacturing industry	High-tech KIS	Market KIS	Financial KIS	Other KIS				
Luxembourg Urban Area	270	8,371	22,447	37,955	6,873	20,585	96,501	82.5	
<i>Luxembourg City</i>	<i>95</i>	<i>6,149</i>	<i>19,042</i>	<i>33,297</i>	<i>6,432</i>	<i>20,584</i>	<i>85,599</i>	<i>73.2</i>	
South Region	30	1,885	2,493	2,135	2,373	12	8,928	7.6	
<i>Esch-sur-Alzette</i>	<i>1</i>	<i>433</i>	<i>933</i>	<i>1,482</i>	<i>1,864</i>	<i>12</i>	<i>4,725</i>	<i>4.0</i>	
Nordstad	5	730	268	58	1,264	0	2,325	2.0	
Other urban areas	531	1,764	4,395	795	1,725	6	9,216	7.9	

Table 7 Employment linked to the knowledge economy by urban units, 2008

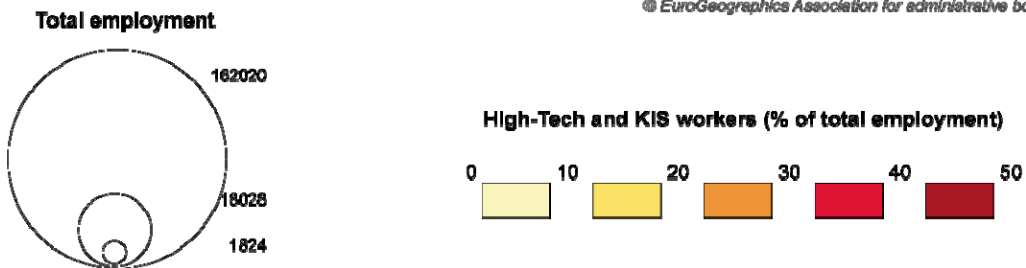
Source: IGSS. Authors' calculations.

However, the number of jobs linked to market KIS and other KIS fell over the period in question in the South Region. In the country's other urban units, the level of employment linked to the knowledge economy is essentially linked to the high-technology KIS (+800 jobs), which results from the establishment of IT service companies in the peripheral zones of activity well served by motorways.



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Local level: NUTS 5
Source: Metroborder, 2010
Origin of data: Metroborder, 2010
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Map 9 Employment by location of head office of enterprises and proportion of high-technology and knowledge-intensive employment, 2008
Sources: IGSS.

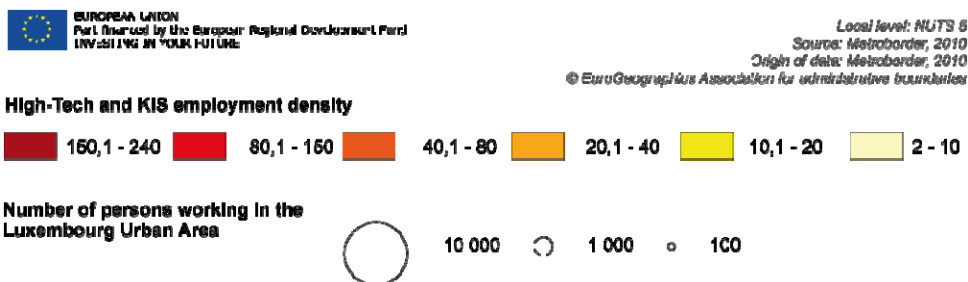
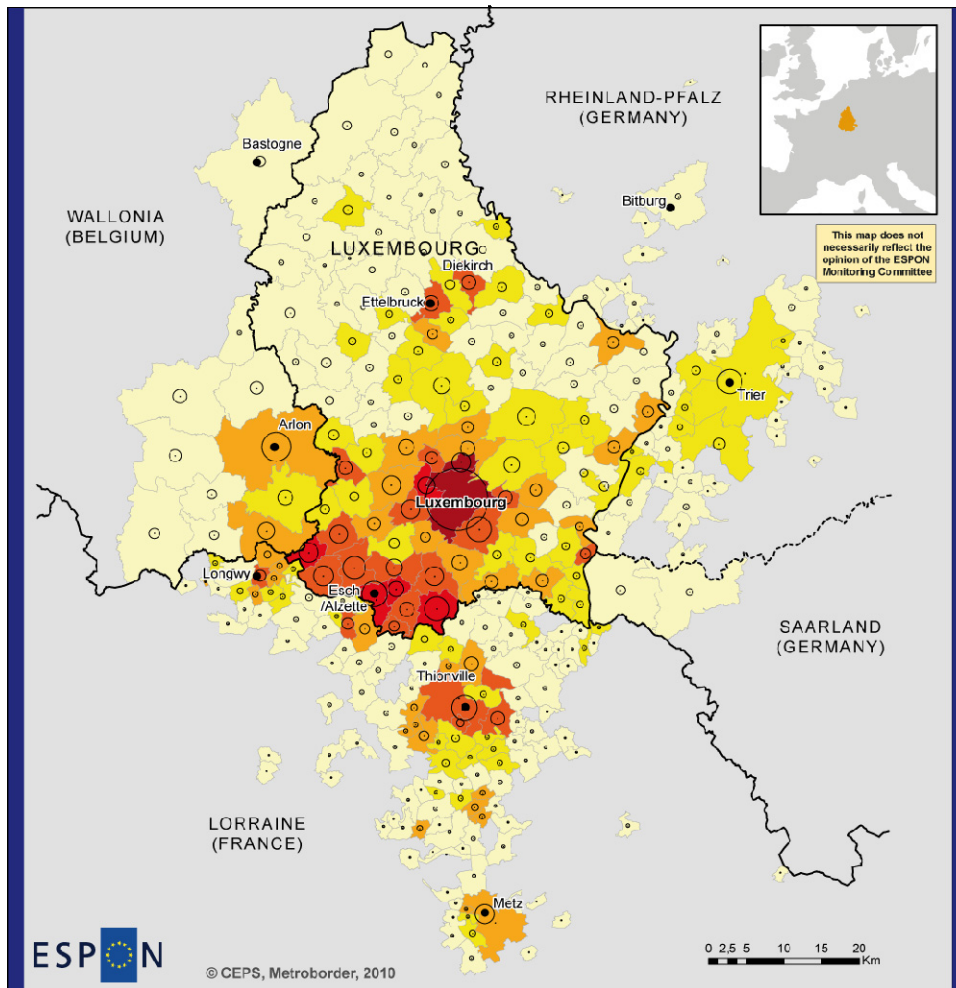
The polarisation of the metropolitan economy within the capital is linked above all to the very heavy concentration of national and international bodies (99.9% of all such jobs are located in Luxembourg City), financial KIS (81.3%) and, to a lesser extent, of market KIS (64.3%), three sectors of activity which represent the majority of employment linked to the knowledge economy within Luxembourg's urban units. The dominance of Luxembourg City within the metropolitan economy of the country has traditionally been reflected by a higher proportion of employment linked to the knowledge economy within the total number of jobs (48.1%) than elsewhere in the country (Map 9). Leaving to one side the capital, the municipalities which display a relatively high rate of knowledge-intensive employment are principally located within the Luxembourg agglomeration (in particular Niederanven, Sandweiler, Hesperange, Bertrange and Strassen), with the notable exception of Ettelbruck, which owes its score to the presence of a major hospital facility. In the South Region, 16.5% of jobs are linked to the knowledge economy, with higher figures for the areas of Esch-sur-Alzette (26.9%) and Bascharage (22.9%).

Place of residence of high-tech and KIS workers employed in Luxembourg

The analysis of employment by the place of residence carried out on the cross-border metropolitan area of Luxembourg City shows that the distribution of the high-tech and KIS employees' residences follows a multipolar pattern. This pattern is very different from the polarised distribution observed at the workplace. This peculiarity is explained by the fact that people are typically less concentrated than employment. Map 10 presents both the absolute number of employed persons in high-tech and KIS sectors, and the density of these jobs across municipalities.

This distribution generally follows the hierarchy of urban centres: the absolute concentrations are the highest observed in Luxembourg City (12,155) in the peripheral centres of Arlon (2,654), Thionville (2,079) and Esch-sur-Alzette (2,043) on the one hand and in the middle-size centres of Trier (1,917) and Metz (1,199). An important border effect can be identified between municipalities in southern Luxembourg where high-tech and KIS employment density is high and in many French municipalities located close to the border in North Lorraine. No such border effect can be observed elsewhere in the metropolitan area: a remarkable continuity can be observed between Luxembourg City and the hinterland of Arlon, and between the capital of Luxembourg and Trier. At a local level, high-tech and KIS workers are well represented in the residential suburbs of Luxembourg City (Hesperange, Walferdange and Bertrange).

The densities of metropolitan areas are very unevenly distributed within the metropolitan area. They are highest in the Luxembourg Urban Area (Luxembourg City, Walferdange) and in some municipalities from southern Luxembourg (Esch-sur-Alzette, Pétange). Border municipalities are characterised by low values, with the exception of Longwy, Villerupt and the Thionville Urban Area.



Map 10 Place of residence of high-tech and KIS workers employed in Luxembourg and number of persons working in the Luxembourg MUA, 2005

Source: IGSS.

Note: only the municipalities with a density higher than 2 jobs per km² and a number of employed persons higher than 10 are represented

3.2.1.4. Conclusion

The analysis of metropolitan employment at the place of residence allows giving a first picture of the functional Luxembourg cross-border metropolitan area. This metropolitan area is mainly shaped by the internal urban structure and large communications networks. High-tech and KIS workers are mainly located in the Luxembourg urban centres and suburban municipalities and in urban centres located in neighbouring France (Thionville, Metz), Belgium (Arlon) and Germany (Trier). Despite its industrial past, the South Region in Luxembourg is seen as a major residential area for those categories of workers (13,000) after the City of Luxembourg (19,800), illustrating a form of functional interdependence between the economic centre of the metropolis and its urbanised surrounding.

The significant difference observed between the location of high-tech and KIS employees by location of head offices or by location of residence is due to a high daily commuter level. Road accessibility, the preference for suburban housing, the cost of housing and increased cross-border work has led to an extension of the Luxembourg cross-border metropolitan residential area. The latter – including medium sized (e.g. Thionville, Arlon) and larger cities (e.g. Metz, Trier) in the neighbouring countries – gives this cross-border metropolitan region a clear polycentric notion. This is undoubtedly the case at the intraregional level (i.e. Luxembourg's FUA). Further research on potential overlapping with FUAs of the neighbouring urban centres might also provide evidence as to the interregional level of metropolitan polycentricity.

4.1.3 Zoom-in automotive sector

4.1.4 Methodological Framework

Within the Greater Region, the cross-border functional integration is studied more in depth using the example of one particular economic sector. The aim is in particular to better understand the cross-border dimension of the economy. The envisaged selection of the automotive industry has been

reflected, taking into account several concerns. Nevertheless, the automotive sector has proved to be the best fitting example for the following reasons:

- All Greater Region countries acknowledge the relevance of the automotive industry and try to foster it by means of cluster initiatives etc. Moreover, this *Leit-Industrie* has been an important pillar in all involved countries supporting the structural change in the last decades which can be characterised as a uniting, transboundary development (cp. Dörrenbächer & Schulz 2002, 2005, 2006). As a consequence, the automotive industry consists nowadays of various types of enterprises: Besides the actual vehicle producers usually referred to as original equipment manufacturers (OEM), an ever growing number of – especially 1st tier – supporting industries has an increasing relevance (cp. VDA 2004). These suppliers belong to the fields of R&D, electro-technology and high quality service providers which are all characterised as metropolitan functions.
- As the automotive industry consists of diverse branches and both small and medium sized enterprises as well as large entities, it dominates the industrial sector within the Greater Region (see tab. and map below, cp. Ministère d'Etat du Grand-Duché Luxembourg 2009: 20f.). This relevance is stressed by the figures of employment.
- The politically induced cluster initiatives in all parts of the Greater Region serve as a source of information. No other economic sector provides such a comprehensive open-access database. Given the limited resources for this zoom-in study, a comprehensive data collection is unfeasible.

Two types of data can be used: Firstly - as the ESPON database does not provide any data for the given case study - existing data are compiled (from cluster initiatives etc.), giving information on original equipment manufacturers as well as 1st, 2nd and 3rd tier suppliers.

Secondly, from November 2009 to January 2010 a questionnaire has been developed and sent to all companies to inventory the structure of the automotive industry and the cross-border relations of the companies. The questionnaire covers the following aspects:

- the fields of cooperation (production, R&D, networking etc.) and location of partners,
- the intensity, the character and the challenges of a cross-border cooperation within the Greater Region (communication patterns, linguistic barriers etc.),
- the employment structure (number of persons employed, geographical origin of the employees) and
- the organisational structure of the companies (headquarters vs. branch plant, degree of independence etc.).

4.1.5 Interim results and next steps

The inventory of the automotive industry by analysing the open-access databases first of all provides higher numbers of employees within the automotive sector than frequently found in official statistics: More than 650 companies with about 160,000 persons employed belong to one of the cluster initiatives (Table 8). These figures are far more diverse and larger than usually communicated.

Region	Persons employed
Lorraine	35,000
Luxembourg	10,000
Rhineland-Pal.	50,000
Saarland	49,000
Wallonia	15,500

Table 8 Persons employed in the automotive industry (OEMs and supplying industry, without truck production).

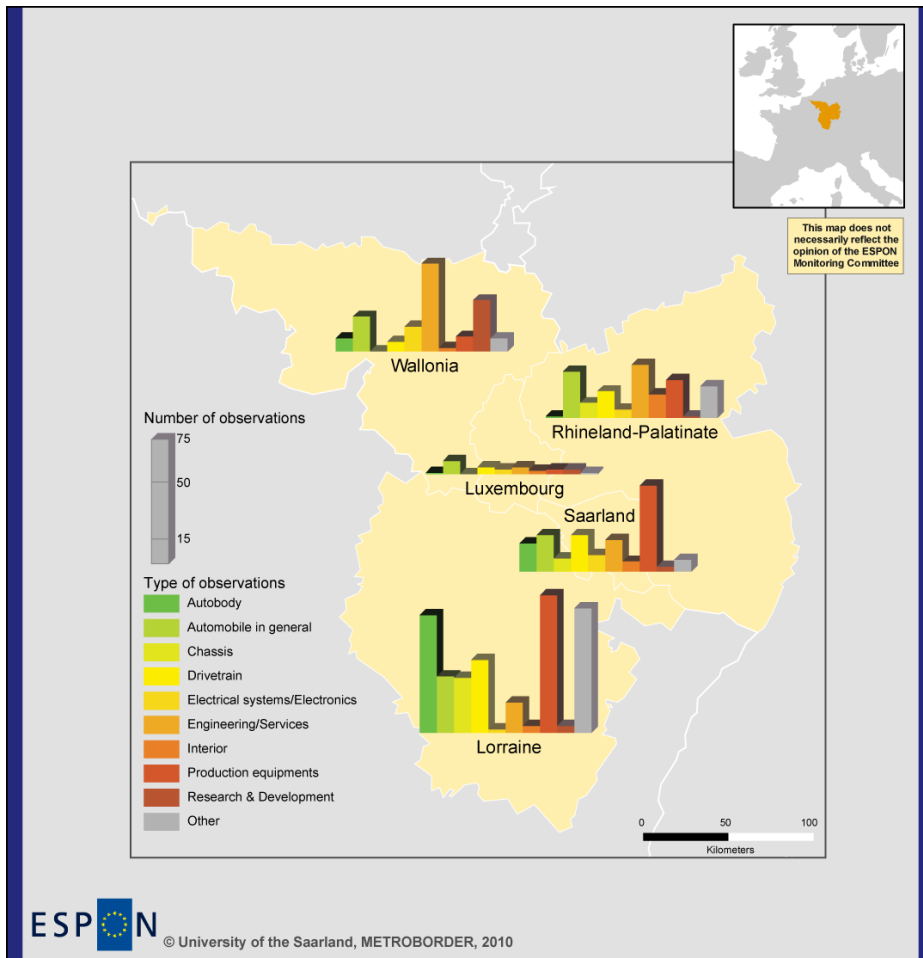
Sources: autoessor, ILEA, Zulieferinitiative Rheinland-Pfalz, automotive.saarland, Cluster Auto-Mobilité de Wallonie

The available data allow differentiating business activities within the supply industry and their spatial patterns (see Map 11).

Recent developments of the automotive technology and the market dynamics have obviously led to a significant shift in the structure of the automotive industry, as about one third of the companies are working in the fields of high quality services, electro-technology or R&D. First indications of the ongoing survey show that cross-border cooperation is taking place in these "new" domains as well as in the "traditional" fields as drive train technology, chassis etc.

The next steps of this zoom-in study will especially focus on the cross-border dimension of this economic sector. As flow-data – especially across-borders – are not available, this aspect will be addressed by the analysis of the survey currently carried out. The interpretation will be supported by several qualitative interviews. The analysis will mainly focus on an assessment of the cross-border integration and on the identification of challenges for an intensive cooperation within the Greater Region.

In parallel, the institutionalised forms of cross-border cooperation within the automotive sector will be examined more closely and will be mapped.



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Local level: Nuts 1
Source: ESPON MAP Tool, 2006
Origin of data: autoessor, ILEA, Zulieferinitiative Rheinland-Pfalz,
automotive.saarland, Cluster Auto-Mobilité de Wallonie
© EuroGeographics Association for administrative boundaries

Map 11 Fields of business activities of suppliers in the automotive industry (number of firms without OEMs, without truck production).

4.1.6 Functional Integration Upper Rhine (WP 2.1UR)

4.1.7 Methodology

The analysis of the functional integration of the Upper Rhine region cannot directly adopt the methodology developed for the Greater Region case study as the structure of the available data is very different. The approach used for the Upper Rhine maps different indicators and discusses the functional integration. The guiding questions are:

- How can the cross-border integration be described, be spatially differentiated and be explained?

- To which extent do economic sectors (and their enterprises) concentrate on specific parts of agglomeration?
- Is the polycentric structure enforcing or diminishing? Is the urban hierarchy steepening or flattening?

The indicators analysed focus on demographic aspects, the allocation of economic activities and on the labour market. As for the Greater Region, the 'metropolitan employment' is of particular interest. This differentiation between 'normal' and 'metropolitan' jobs seems to be easily comprehensible but is difficult to undertake as different national census practices have to be brought together. It is obvious that banking and business service industries count as metropolitan jobs although they comprise less qualified subaltern qualifications. On the other hand, medical services normally are grouped to "social services" (which are not particularly metropolitan) although they comprehend also the top level research units. In order to address this dilemma, the sectors of life sciences, business service industry and machine industry are taken as indicators for knowledge intensive sectors.

The territorial starting point is the perimeter of the Upper Rhine Conference and takes additionally into account some additional urban poles as they seem to be important in order to explain the overall picture.

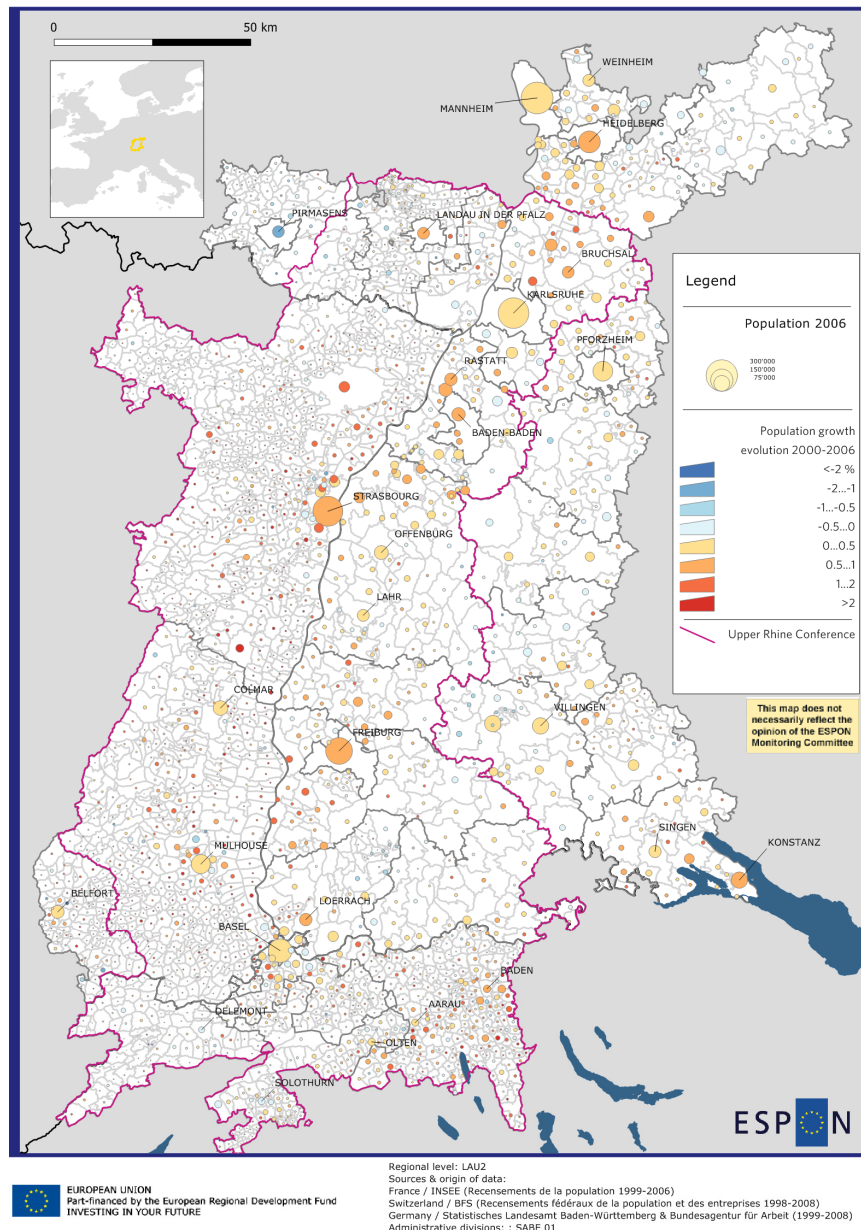
The analysis of the Upper Rhine region is conducted on the municipality level and has to cope with the respective restrictions (recent census data, high level of data protection, flow data is rare etc.). Cross-border data are especially hard to gain, even more for cross-border commuting. The last counting was conducted in 2002 in the framework of the regular documentation of the residence places of cross-border commuters by the Federal Office for Migration. Comparable job data exist only for 1999/2000. Therefore a complete matrix with home municipality, working municipality number of employment, number of commuters and commuting rate only exists for the year 2000 (PERLIK & SCHULER, 2004). It is only available for the Swiss border region (Basel-Mulhouse-Freiburg).

The cross-border countings in the years after 1999/2000 give only information about the relation residence place to country of employment – these data are helpful for the comparison on European level as conducted in WP 1.1, but they do not serve the case study approach. The cartographic representation for the commuter matrix from 2000 will be edited for the (draft) final report (cp. Dessemontet et al 2005; Perlik & Schuler 2007: 54).

4.1.8 Interim Results

Population

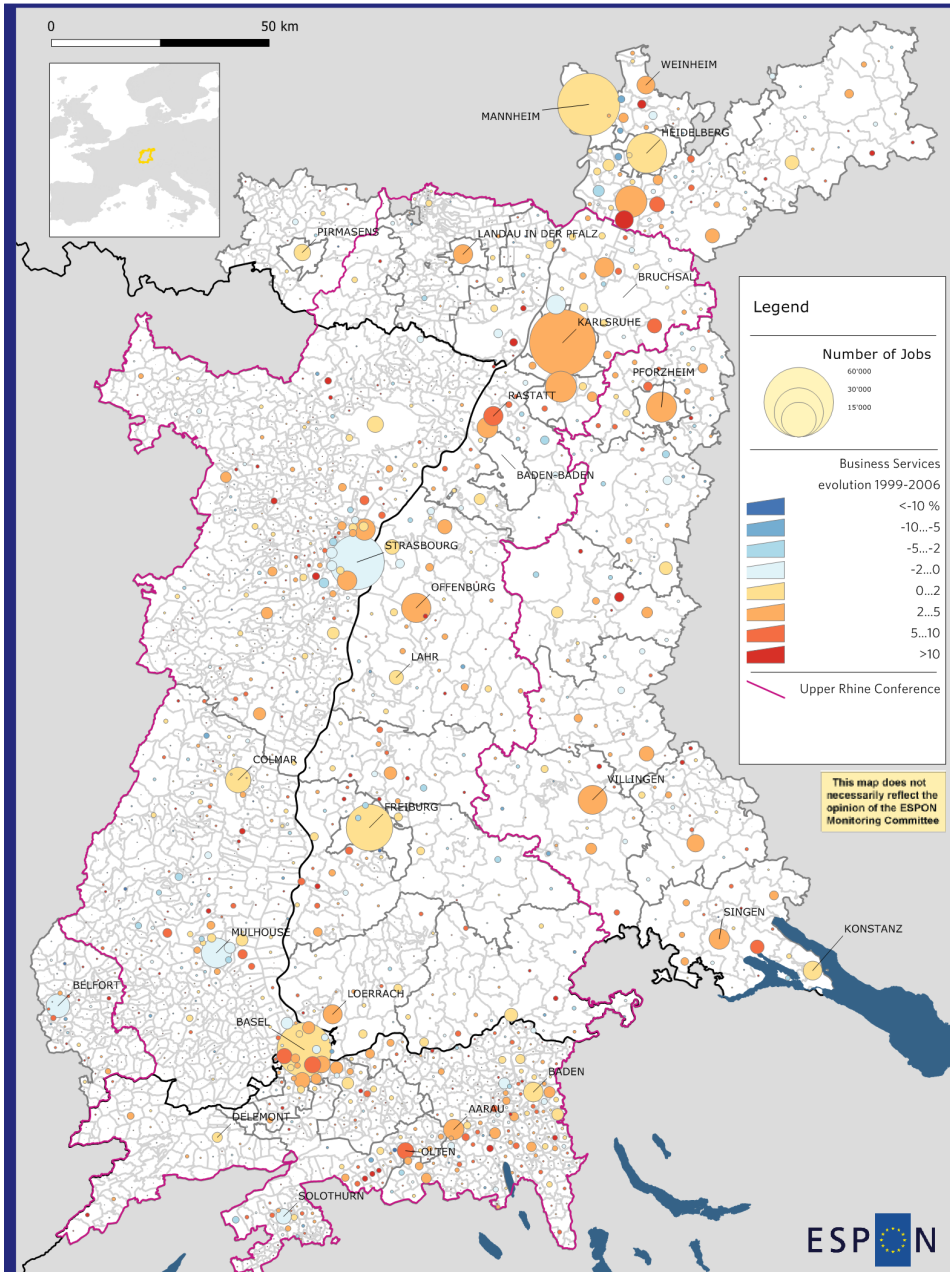
Map 12 shows the development of population in the Upper Rhine region between 2000 and 2006. In the years after 2000 especially the municipalities on the French side of the Basel-Mulhouse-Freiburg region have substantially increased. If we compare this with the period before (see Annex Map 30), the difference is obvious: At that time, mainly suburban municipalities grew, strengthening the agglomerations of Karlsruhe, Strasbourg and Basel in their national context.



Map 12 Evolution of population in the Upper Rhine region 2000-2006

(Metropolitan) Employment – a) Business service industries

Jobs in business services industries which comprehend (among others) financial services, insurances, informatics and other consulting services are the typical metropolitan jobs. Nevertheless, the aggregation of a whole spectrum of SMEs and freelancers, leads to a dispersed spectrum of these jobs in the whole area.



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Regional level: LAU2
Sources & origin of data:
France / INSEE (Recensements de la population 1999-2006)
Switzerland / BFS (Recensements fédéraux de la population et des entreprises 1998-2008)
Germany / Statistisches Landesamt Baden-Württemberg & Bundesagentur für Arbeit (1999-2008)
Administrative divisions: : SABA 01

Map 13 Business services Upper Rhine in the Upper Rhine region

The map reflects the structural economic changes due to vertical disintegration, resulting in an overall growth of out-sourced services linked to manufacturing industries. Therefore even in the peripheral areas a considerable growth of jobs can be observed, albeit starting from a low base level. It is not astonishing that the dominant core cities of the investigated region – Karlsruhe, Freiburg, Basel and Mannheim – hold the main part of jobs and show a light or even disproportional growth. The disproportional growth of Karlsruhe remarkable as it developed from a high level of nearly 60,000 jobs.

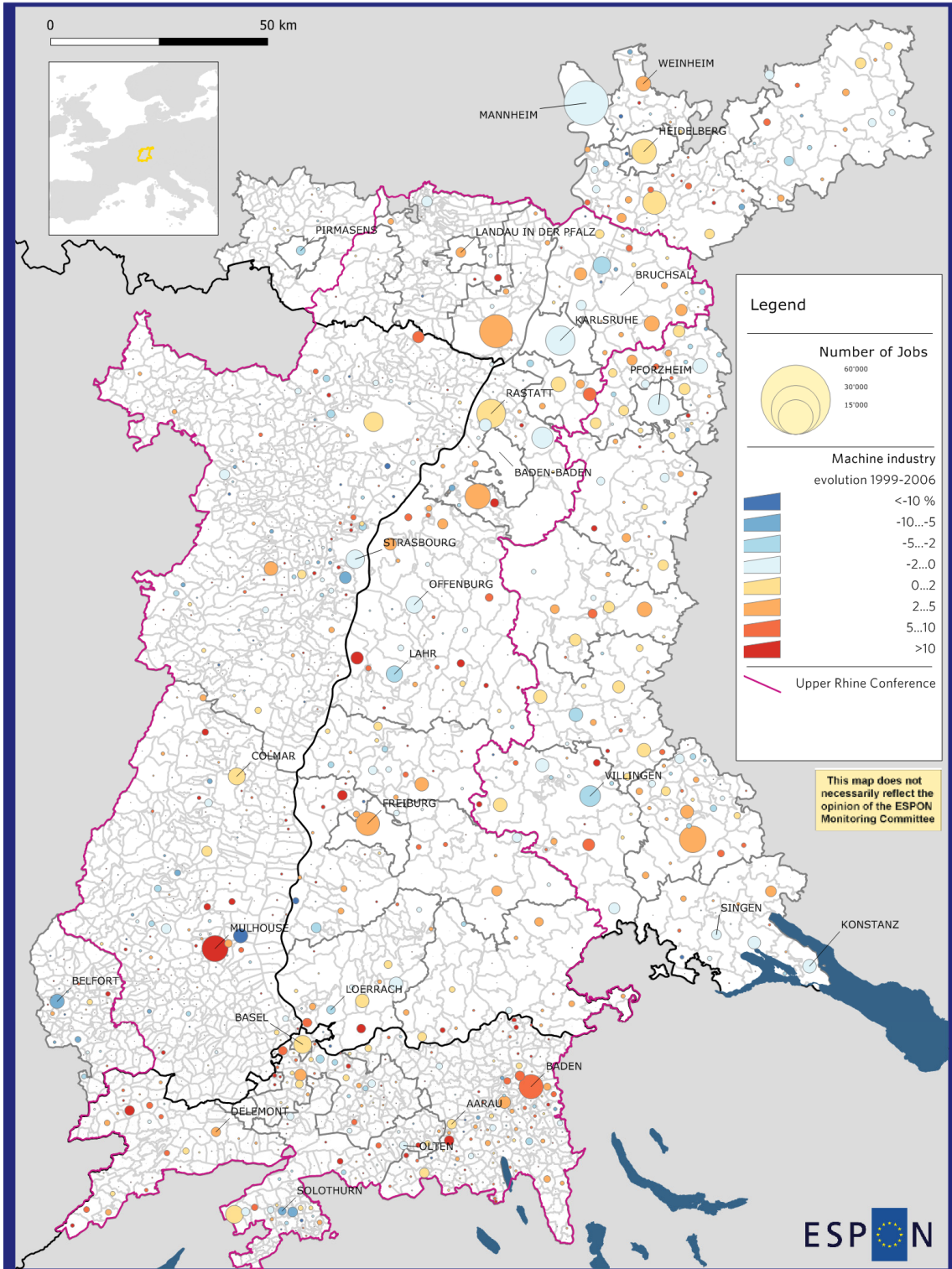
Beside the general growth in the peripheries on the small scale and in the metropolises we see a considerable sub- and peri-urban growth of service business industries in the Mannheim-Heidelberg area and in the tri-national Basel region (but only on the Swiss and German side).

In France, however, the bigger cities lost jobs in business service industries which may be partly compensated by a light growth in the sub-urban municipalities. This counts for Strasbourg and Mulhouse. In Belfort the loss has not been compensated. Only Colmar has a light growth.

The pattern gives indications about the strength of the respective agglomerations or metropolitan areas. However, the growth rates and the decline rates cannot directly be linked to specific cross-border explanations. Even in the case of Basel and Lörrach, the growth does not necessarily refer to a special form of cross-border collaboration. But the observable augmentation patterns show a high dynamic in the case of Karlsruhe (disproportional growth), Mannheim-Heidelberg-Weinheim (disproportional growth in the whole region) and Basel (disproportional in the suburban parts). The corridor between Basel and Zürich (cantons of Solothurn and Aargau) show a remarkable proportional and disproportional growth of jobs in business service industries (up from a mean base level) can be seen. Compared to this, Freiburg has only a light growth and only restricted to its core.

b) Machine industry

For the machine industry, job growth can only be observed in the core towns Basel, Mulhouse and Freiburg, complemented by the growth of the suburban parts on the Swiss territory. It is remarkable to see an above average growth also in the canton of Jura which has only 70,000 inhabitants and belongs to the metropolitan periphery. The industrial profile (precision tools, micro technologies) seems to be sound. At the French side it is only the automotive location of Mulhouse (Peugeot) which grows considerably.




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Regional level: LAU2
 Sources & origin of data:
 France / INSEE (Recensements de la population 1999-2006)
 Switzerland / BFS (Recensements fédéraux de la population et des entreprises 1998-2008)
 Germany / Statistisches Landesamt Baden-Württemberg & Bundesagentur für Arbeit (1999-2008)
 Administrative divisions: : SABE 01

Map 14 Machine industry in the Upper Rhine region

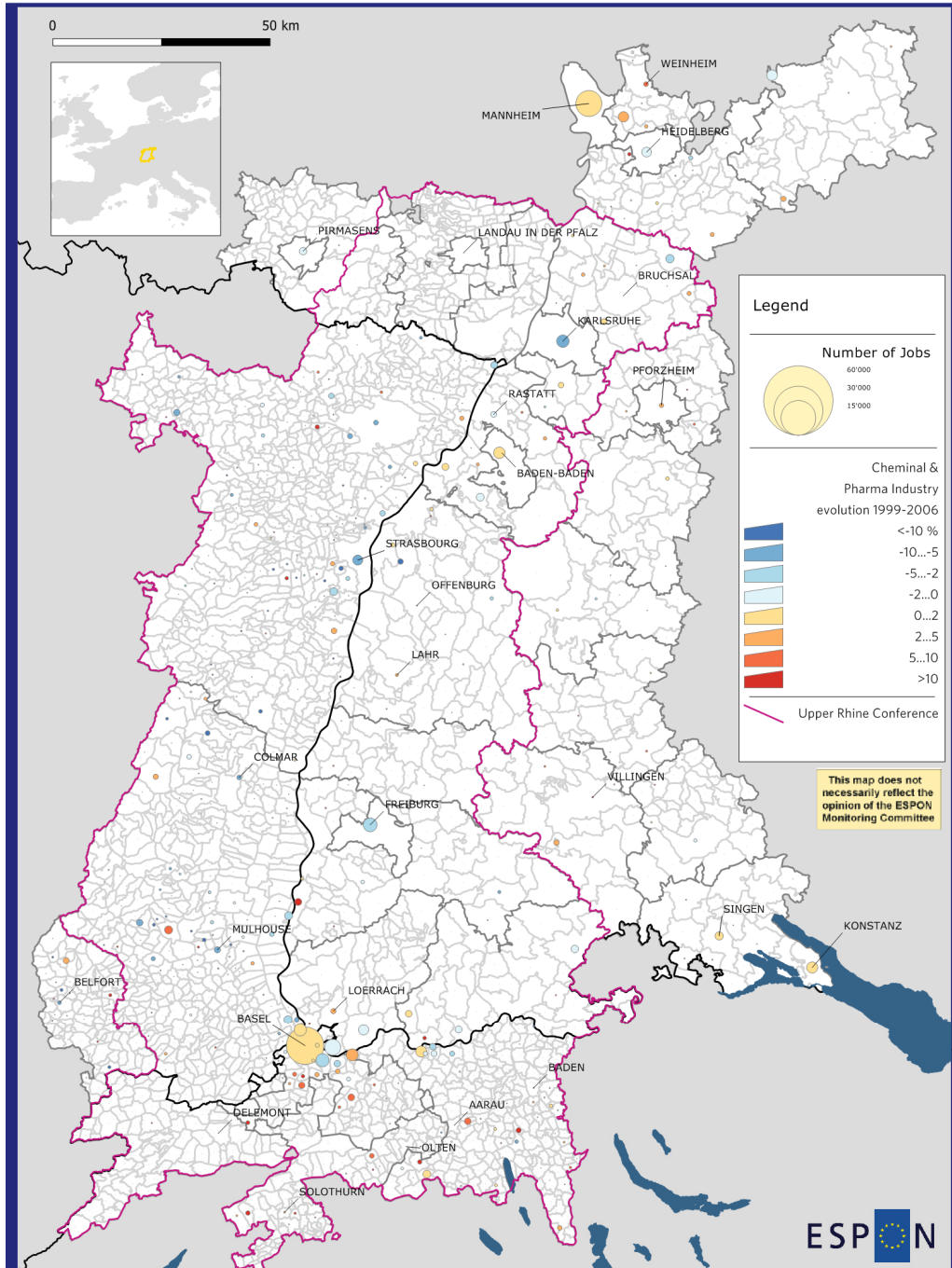
In the north of the investigated area again the Baden-Baden/Rastatt area shows growing at least partly due to the automotive sector (Mercedes Benz). In contrast to this, the city of Karlsruhe sees further tertiarisation while losing jobs in industry. The location of Wörth, another Mercedes-Benz site, is still growing, employing many cross-border commuters from France. In the Mannheim area the same picture is valid; the surrounding towns and municipalities denote growth while there is a decline in Mannheim which remains nevertheless the biggest centre of manufacturing industry in the investigated Upper Rhine region.

4.1.9 Zoom-in life sciences

The analysis of the life sciences industry is based on the interpretation of existing data, partly presented here, and on a postal survey that is currently conducted.

In the second half of the last century there was a differentiation between bulk chemistry and specialties; the latter included pharmaceutical products. Swiss chemistry was leading in this transformation processes and concentrated earlier than other chemical production clusters on pharmaceutical products. In the 1990s the technological trajectory generated the differentiation between chemistry and life science industry which is based on the evolution of biochemical and biotechnical processes. On the level of enterprises this technological development was underpinned by the mergers between CIBA and Geigy in 1970 and again 1996 between CIBA-Geigy and Sandoz to Novartis. In the following years the traditional chemical branch came into decline; enterprises were sold or relocated. The strength of the Basel region is based on the new life science industry which has its economic headquarters in Basel as well as their European headquarters. The Basel location comprises all top level functions (research and development, launching production, administration). The staff is recruited globally and is highly qualified. In the last years a lot of spin-offs have been created based in the suburban municipalities of the Basel metropolitan region, mainly on the Swiss territory of the tri-national metropolitan region. As the staff of the life sciences sector comprehends to high degree researchers, academic personal and leading management personal, we can (for the case of the Upper Rhine region) consider the life sciences sector as being 'metropolitan'. Unfortunately, the national statistics do not reflect the new differentiation of chemistry and life sciences. Due to data protection one has to take this aggregation to maintain the possibility for an overall picture on LAU2 level for

all tri-national municipalities. This restrictions are tolerable, as we know the locations of remaining chemical production (Pratteln, Muttenz, Grenzach-Wyhlen), so that we may interpret the distribution of jobs and its development during the time (Map 15).



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Regional level: LAU2
Sources & origin of data:
France / INSEE (Recensements de la population 1999-2006)
Switzerland / BFS (Recensements fédéraux de la population et des entreprises 1998-2008)
Germany / Statistisches Landesamt Baden-Württemberg & Bundesagentur für Arbeit (1999-2008)
Administrative divisions: : SABE 01

Map 15 Chemical industry in the Upper Rhine region 1999-2006

The map shows that the growth of jobs in the life sciences is clearly concentrated on the Swiss territory, mainly on the sites of Basel (canton of Basel Stadt) and Allschwil (canton of Basel Landschaft), Kaiseraugst and Eiken (canton of Argovie). Also in the south of Basel (canton of Basel-Landschaft) there are small sites with high growth in the last 10 years. They are mainly start-ups and spin-offs in the biotechnological sector. The declining locations are Pratteln (Basel), Grenzach-Wyhlen (DE) and the adjacent French sites. These are all centers of traditional chemistry although the enterprises produce specialties (vitamins, dyes and pigments etc.).

The city of Freiburg loses considerable parts of its few life science and chemical jobs. The Strasbourg/Offenburg agglomeration counts high in the French pharmaceutical cluster but also loses jobs considerably during the investigated period. In contrary to this, the Baden-Baden/Rastatt region augments slightly its jobs in this sector (from a moderate base level).

Karlsruhe has no particular reputation for a chemical/pharmaceutical cluster. In the investigated period it loses a substantial part of its existing jobs in this sector. In contrary to this, the location of Mannheim (which is not part of the Upper-Rhine conference perimeter) gains jobs in this sector and is an important location. This is due to the historical site of Boehringer Mannheim which belongs to Hoffmann-La Roche since 1997 (Roche diagnostics) and contributes to its growth.

Conclusion: repartition of jobs in the Upper Rhine cross-border region

The number, development and distribution of the different economic sectors show that metropolitan regions host several clusters of manufacturing and service industries. The maps show that economic functions tend to concentrate at certain places. These places are still predefined by the national regulations which create the specific trajectories of investment and disinvestment.

The functional integration by the labour market has been proven by several studies in the past (Gallusser 1975; Diener et al. 2005, Schneider-Sliwa 2004). The spatial pattern shows also that the jobs may have specific locations within a certain metropolitan region. In the case of Basel-Mulhouse-Freiburg the life sciences are based in Basel and the adjacent municipalities on the Swiss side. Machine building, tools and microtechnologies are concentrated in the surroundings, especially at the Swiss side and there predominantly in the canton of Jura. The automotive sector is restricted to the French side; some suppliers on the German side are not only linked with Peugeot but work also for other car factories. The core towns are equipped with public/social services and personal services. The core towns stand in the

center of tertiarisation. The urban hierarchies get steeper by hosting the commercial services which are in constant growth. The growth concentrates also on the adjacent suburban towns but fails to appear on the French side. In contrary to this, there is a constant population growth in the small adjacent municipalities on the French side. But also in this economic segment are the Swiss and German parts stronger. Especially Freiburg and its Western and Southern environs (Kaiserstuhl, Rhine valley) grow stronger than the rest of the tri-national region.

The spatial pattern developed in this work package as well as the expert interviews conducted so far draw a picture which is characterised by a certain complementarity of functions according the different countries: metropolitan jobs in Basel city and the near Swiss suburban municipalities (e.g. Allschwil), residences in France where building zones and frame conditions for dwelling are more favourable and space is abundant and leisure/consumption as hiking, shopping, gastronomy in Germany (Black Forest, Markgräfler Land). Commuting data show that the labour market is since long time tri-national with a strong focus on the Swiss side as working place. Further research has to show if the cross-border integration is rather integration by 'reputation' or a full economic integration. This notion of reputation refers to the findings of GLÜCKLER (2007) for the ITC-sector in the Rhine-Main metropolitan region which he describes as a "locus of business opportunity". The ongoing works will deepen these aspects of cross-border functional integration.

4.1.10 Next Steps

The analysis of the functional integration will focus on further elaborating the approach already started. In doing so, the link with the Greater Region approach will be fostered in order to allow a better comparability.

The zoom-in study of the life sciences industry will be enriched by the postal survey that is currently going on. The design of the survey is very much in parallel to the survey of the automotive industry within the Greater Region and aims to allow a comparison.

4.2 Governance in the Greater region and Upper Rhine (WP 2.2/2.3)

4.2.1 Objectives and methodology

The objective of the case study approach of this work package is twofold and aims to

- zoom-in and better understand the institutional setting in both the Greater Region and the Upper Rhine region.
- prepare the phase of strategy building by already involving the political actors intensively.

The research is based on various sources. The analysis of respective political documents and numerous expert interviews have been the basis for the preparation of the *Delphi study*, the crucial methodology of this work package. The analysis starts with an *institutional mapping* in both case study regions.

4.2.2 Institutional Mapping

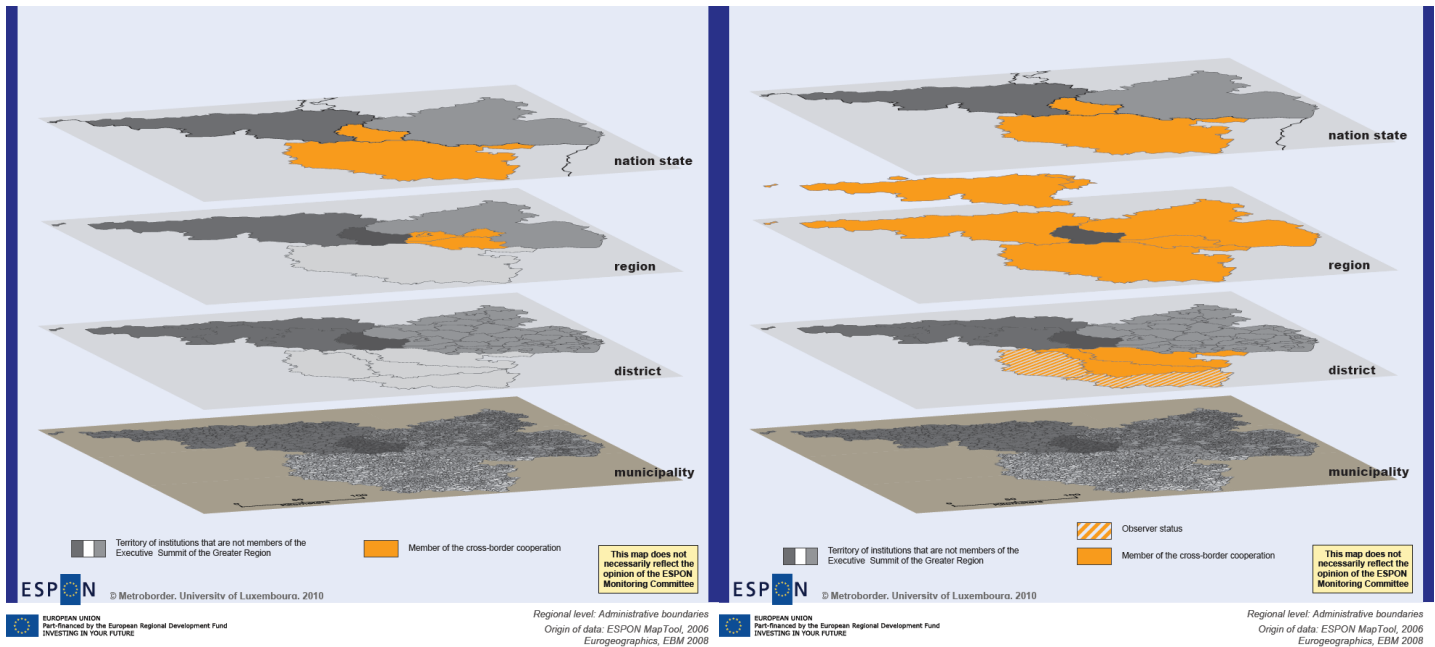
This work package uses *institutional mapping* as a method in order to reflect on the multi-level dimension, the historicity, the political perimeter and on the territoriality of cross-border institutions and, in that, deepens the mapping approach already applied in WP 1.2 (chapter 3.2.2).

In general, institutional mapping simply aims to *visualise* the institutions that are involved in a certain matter in order to facilitate the analysis (Aligica Dragos 2006). The notion of 'institutional mapping' can be meant as a metaphor as – e.g. in sociological contexts – the mapping of actors might be conducted without any spatial focus. In the context of territorial research, however, the territorial question is crucial. When mapping institutions, this automatically raises the question *where* (i.e. for which territory) the institutions have a democratic legitimation to do *what*.

As WP 1.2 has shown (see chapter 3.2.2), the territories of cross-border cooperation (mostly) consist of sub-national entities that are cooperating across national borders. The size and form of these perimeters sometimes are a little surprising. This might also be said for both case study regions – the longish form of the Upper Rhine conference and the size of the Greater Region) are frequently addressed within the public debate.

In the framework of this interim report not all results can be presented. The whole outcome has been the basis for the Delphi survey design. However, some examples shall be illustrated.

Within the Greater Region, cross-border cooperation takes place on several levels in different institutionalisations. Amongst these, the so called *Summit of the Executives of the Greater Region* is an essential institutional framework (Map 16). Mapping this framework and comparing it with its 'roots' of 1971 gives the following picture:



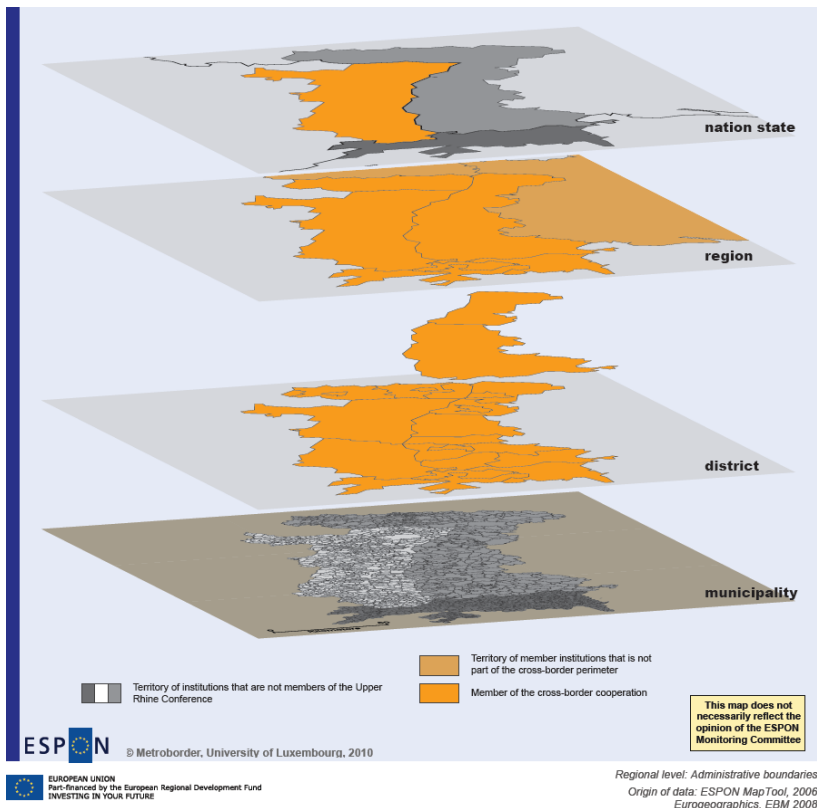
Map 16 Institutional Mapping of the Greater Region: “Commission Régionale Saar-Lor-Lux-Trêve/Ouest -Palatinat” (1971) and the “Sommet des Exécutifs” (today)

These institutional maps show that this cross-border cooperation has involved more and more actors and by that has widened its territorial scope. From a multi-level governance perspective, the regional level has been established as the essential arena. On the district level, the French *Départements* have been added. The visualisation gives the impression that the political idea has somehow “triggered down” and spread.

The territoriality of political mandates is especially complex in cross-border contexts: On the Belgium side, the two linguistic regions *Communauté française* and *Deutschsprachige Gemeinschaft* are included as well as the *Region Wallone* – the latter congruent with the first ones. However, the Brussels Region is also part of the *Communauté française*.... – already these

aspects demonstrate the complexity of the institutional cooperation (without elaborating on the German federalism, the French centralism or the particularities of the small state Luxembourg).

The maps do not show the horizontal and vertical fragmentation of the competences in certain policies. The responsibility for the same matter can be at different levels on different sides of the border. The visualisation of this kind of “multi-level mismatch” is work in progress.



Map 17 Institutional Mapping Upper Rhine Conference (since 2000)

The institutional map of the Upper Rhine shows a configuration focussing on the regional and the district level; the latter on the German side not only represented by the *Kreise* but also by *Regionalverbände*; further institutions implicated as observers are not shown at this map (chambers of commerce etc.). Some municipality representatives, too, are observers. The two German Länder – *Rhineland Palatinate* and *Baden Württemberg* – play a particular role: As *institutions* on the regional level, they are full members. However, their territories are only partly included in the *political perimeter* of the Upper Rhine conference. If the Upper Rhine conference would consider the full territory of the Länder as parts of their perimeter, it would be of comparable size as the Greater Region. To turn it the other way round: The

Greater Region has yet not differentiated between institutional territories and political perimeter of the Upper Rhine and has, thus, to tolerate comments on the "great" size of the Greater Region.

From this comparison we can draw two preliminary conclusions: Firstly, the differentiation between institutional territory (*Vertragsraum*) and the territorial mandate or perimeter (*Mandatsraum*) is a key to the understanding of cross-border territories. This question will, thus, be further developed by means of the Delphi study.

From a conceptual perspective, and secondly, domestic geographies seem to remain dominant in cross-border contexts. This finding might differentiate the current discourse that sees national 'container spaces' lose their relevance (e.g. Priebis 2009, Sassen 2006) and 'variable geometries' getting increasingly important (e.g. Hooghe & Marks 2003).

4.2.3 Methodology Delphi Study and interviews

The aim of the Delphi study is to develop strategic options in each case study region with regard to foster the potentials of being a CBMR. A Delphi study consists of at least two survey rounds, while the later questionnaire uses the results of the first one (cp. Pütz 2004, Helmer 1967, 1983, Stratmann 2000: 129, Evalsed 2008; ESPON 2006/1.3.1). The addressees of the survey are experts for the political cross-border cooperation for each case study region. This so called 'policy' or 'strategic' Delphi allows detecting, developing, aggregating and assessing future development paths of the CBMR.

The survey has been prepared by a series of expert interviews. In both case study regions, the first round has been accomplished. The basic methodology can be summarised in some bullet points:

Status and selection of experts

In preparation of the Delphi study, several expert interviews were conducted in order to broaden and deepen the information already retrieved from literature, documents etc. The selection of the experts followed the same principles as the selection of the Delphi addressees without aiming to reach the same quantity: For the Metroborder policy Delphi, an expert is defined by the personal expertise, not primarily by his/her institutional experience. The expert is considered to have a profound idea about the future of the political development and, thus, the expertise is not restricted to pure technical matters (cp. Häder 2000).

The geographical focus is – as a starting point – on the largest cooperation space in both case study regions (Summit of the Greater Region, Upper Rhine Conference). Experts on purely bilateral cooperations have not been considered. As well, experts on the highest political level have not been addressed either (prime minister from national level etc.). In the Upper Rhine, the smaller cooperation space of the *Trinational Eurodistrict Basel* is however also taken into consideration in order to allow a zoom in on the local cooperation level.

The aim is to address a high quantity of experts within both case study regions. Also, the idea was to keep a certain balance: This applies in particular to the different levels of governance (communes, districts, regions, nation state level) and to the regional balance (for the Greater Region 4 countries/5 regions involved - see cp. Table 9, Table 10). In this context, a statistical representativeness is not the relevant criteria: A homogenous quantitative 'density of experts' cannot be assumed on all regions or on all levels. However, the aim is to have all potential types of perspectives included.

	F	L	D		B
	Lorraine	Luxembourg	Rhineland Palatinate	Saarland	Wallonia
EU	2	1	2	1	2
national	2	39	1	0	
regional	24	0	17	20	34
local	46	16	31	24	20
<i>Total</i>	74	56	51	45	56

Table 9 Addressees of the Delphi Survey Greater Region: balancing regions and levels

	F	CH	D		Other
	Alsace	North-West Switzerland	Baden- Württemberg	Rhineland- Palatinate	
EU	1	1	1	2	19
National	2	5	5		
Regional	57	56	59	21	
Local	35	18	25	3	

Table 10 Addressees of the Delphi Survey Upper Rhine: balancing regions and levels

In the course of the exploratory interviews, for both case study regions it turned out that governance issues were debated primarily in the political arena. In the Greater Region, actors of the economic sector or the civil society are either barely involved or are contributing to the debate via political arenas (e.g. *Conseil économique et social*). Thus, a concentration on these formalised political arenas within the Greater Region seems valid.

Due to the establishment of the so called Trinational Metropolitan Region Upper Rhine, actors of the economic and educational sectors in this case study region are involved in the governance debate. Despite new efforts of the different cooperation partners, the involvement of the civil society remains also in the Upper Rhine quite difficult. In the Upper Rhine, the survey was therefore addressed to few actors of the economic and educational sectors as well.

In each case study regions, ca. 300 addressees have been identified and contacted individually in the first Delphi round (280 in the Greater Region, 315 in the Upper Rhine).

Preparation and design of Delphi questionnaire

In both case study regions about 30 interviews have been conducted in the Greater Region, about 15 interviews in the Upper Rhine, and further interviews are foreseen.

The interviews followed a guideline that addressed the three 'classical' domains of the political arena:

- Questions of *polity* concern the institutional questions – who is involved in which processes (or should be), what are the relations to exterior actors, what is the territory of a political cross-border mandate etc. Which trends can be identified for the future of these cooperation institutions?
- Questions of *policies* mainly concern the content side – on which subjects should cooperation be intensified etc.
- Questions of *politics* address the procedural side, especially differences in administrative, cultural and language contexts. What are the main barriers for the cooperation, how to overcome them?

The results of the interviews have been the basis for the design of the Delphi study. In order to illustrate the approach, the policy aspect is illustrated as an example: One outcome of the interviews was that most political topics are usually debated on a particular political level (regional, European etc.). At the

same time, debating certain policies comes along with a different degree of political sensitivity (university cooperation tends to be an easier subject than taxation). In a first step, the aim was to understand which policies are (high) on the agenda and where they can be positioned in the political arena. In a second step the political options for the future are determined.

The main subjects that have been identified are transport infrastructures, social security, public health sector, education, nature parks, spatial planning, promotion of economic development, airports, and taxation.

Fig. 11 gives an example of an analytical grill. Interviews and the analysis of documents aimed to position each policy within the grid: On which political level is the policy debated most (y-axis)? How can the degree of political sensitivity be described? Of course, the positioning is the result of several aggregations and simplifications and often has to be made for different types of actors; for the preparation and analysis of the Delphi study, however, these steps proved to be helpful. Aim of the interviews and the surveys is to detect, what the perspective for what policies are – again, with regard to both dimensions.

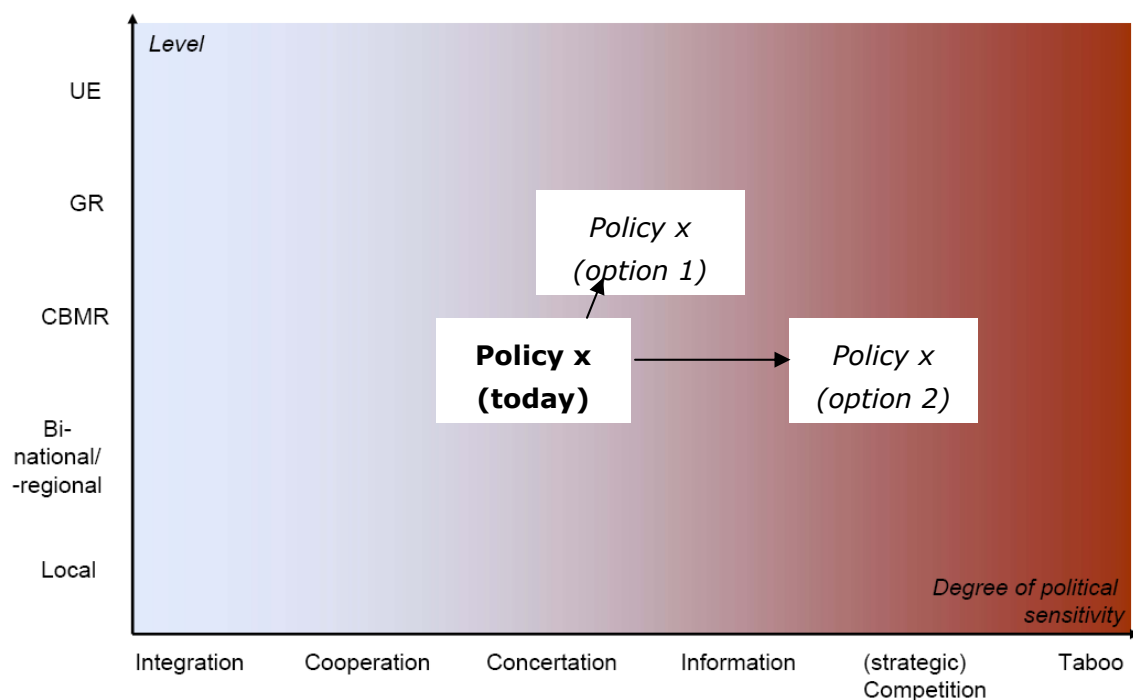


Fig. 11 Exemplary analytical grid for expert interviews (policy development)

The Delphi questionnaire has been developed in German and French in both case study regions in order to allow the experts to reflect on the complex

issues in their mother tongue. Sending the Questionnaire as pdf-Annex to emails proved to be the appropriate way: Online-Surveys had turned out to be not flexible enough with regard to the map element and coming along with several technical problems.

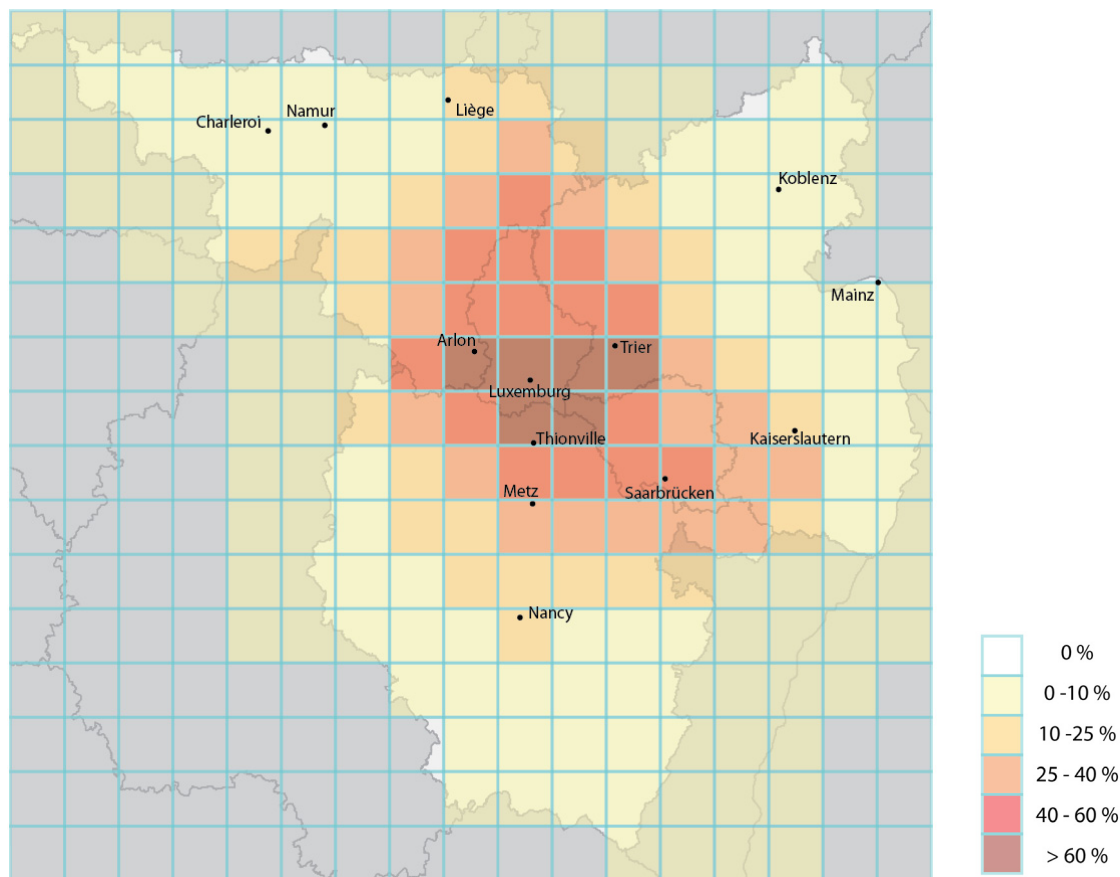
The questionnaire form comprises four parts: Thematic questions (policy), geographical aspects, institutional setting (polity and politics) and the personal background. The Delphi design had to respect restrictions with regard to quantity and complexity in order to have a good response rate.

4.2.4 Interim results Greater Region (first survey)

In the Greater Region, the first round of the survey is completed and is currently being analysed. The response rate in the Greater Region is very positive (> 50 % i.e. more than 150 experts have responded; this interim presentation has to be based on the consideration of 126 responses; the full analysis will be shown in the next report).

Neither a full interpretation nor the design of the 2nd tour can yet be illustrated. However, the very preliminary results – purely based on descriptive statistics – are promising, especially with regard to the strategy building process.

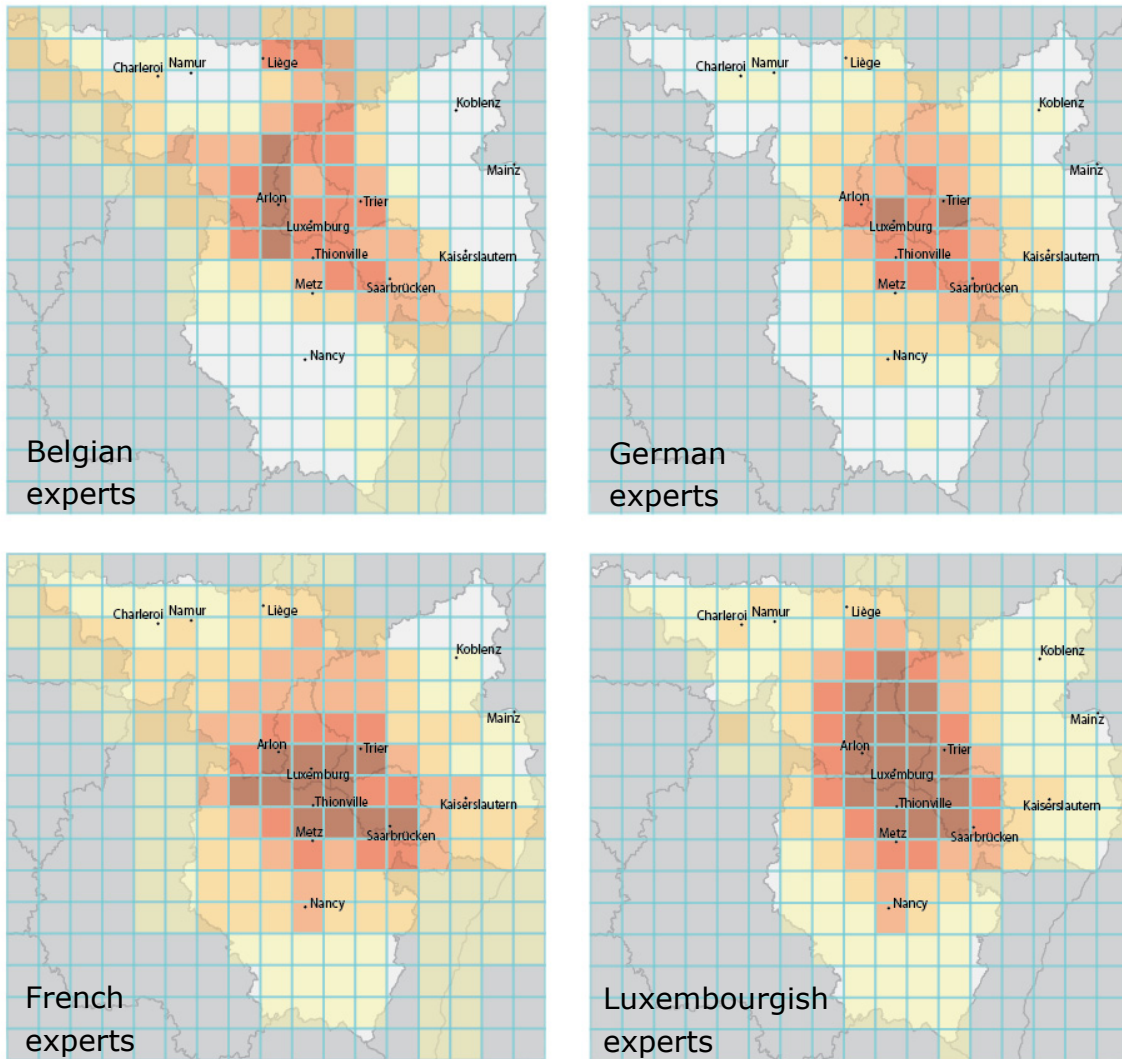
According to the first analysis, the experts do not propose fundamental changes in the participation of the political actors – the institutional setting of the Greater Region seems to be accepted. However, the experts do not consider the whole territory to be subject to the cross-border politics in the same extent: The Delphi questionnaire contained a map of the Greater Region with an overlaid grid of check boxes; all experts were asked to tick those spaces for that they see a particular need to be subject to cross-border cooperation. The result shows a clear focus on the core space comprising Luxembourg, Trier, Thionville, and Arlon (cp. Map 18). This matches to a certain extent the findings of work package 2.1: the intense commuting as well as the economic performance in this region can be considered as an important explanation for this geography.



Map 18 'Territories that need the particular attention of the cross-border cooperation within the Greater Region'

Percentage of squares ticked by all responding experts (preliminary results, n= 123). Sources: Metroborder UL; basemap GfK Geomarketing

For the second tour of the Delphi study as well as for the strategy building, the experts' maps will be analysed towards numerous factors. One – just exemplary – possibility is to analyse the response while differentiating the national background of the experts (cp. Map 19). The reference to the domestic background is obvious, but maybe less influential than one could have expected. Experts from all sides of the border agree to a certain extent to a similar spatial pattern.



Map 19 Territories that need 'the particular attention of the cross-border cooperation within the Greater Region' – distinguishing the location of the expert

(n= 126; BE=19, DE= 48, FR=28, LU=28). Sources: Metroborder UL, basemap GfK Geomarketing

The experts have been asked to name the main barriers to cross-border cooperation (cp. Fig. 12). Within the option "very important barrier" two responses prevail: the differing political competences between the involved partners are seen as main problem (so called *multi-level-mismatch*); the 'lacking common strategy' is seen as the second most important problem. All further problems are considered as less important. The large geographic size of the Greater Region is even seen as least problematic. Despite the public discourse that often stresses the extremely large size of the territory

involved, it is not assessed as a barrier by the experts. The experts already seem to differentiate between the several institutions' territory ("Vertragsraum") and the cross-border perimeter ("Mandatsraum").

For the second tour of the Delphi study and for the strategy building, the focus will be laid on the question how to overcome the multi-level mismatch and how to develop a common strategy.

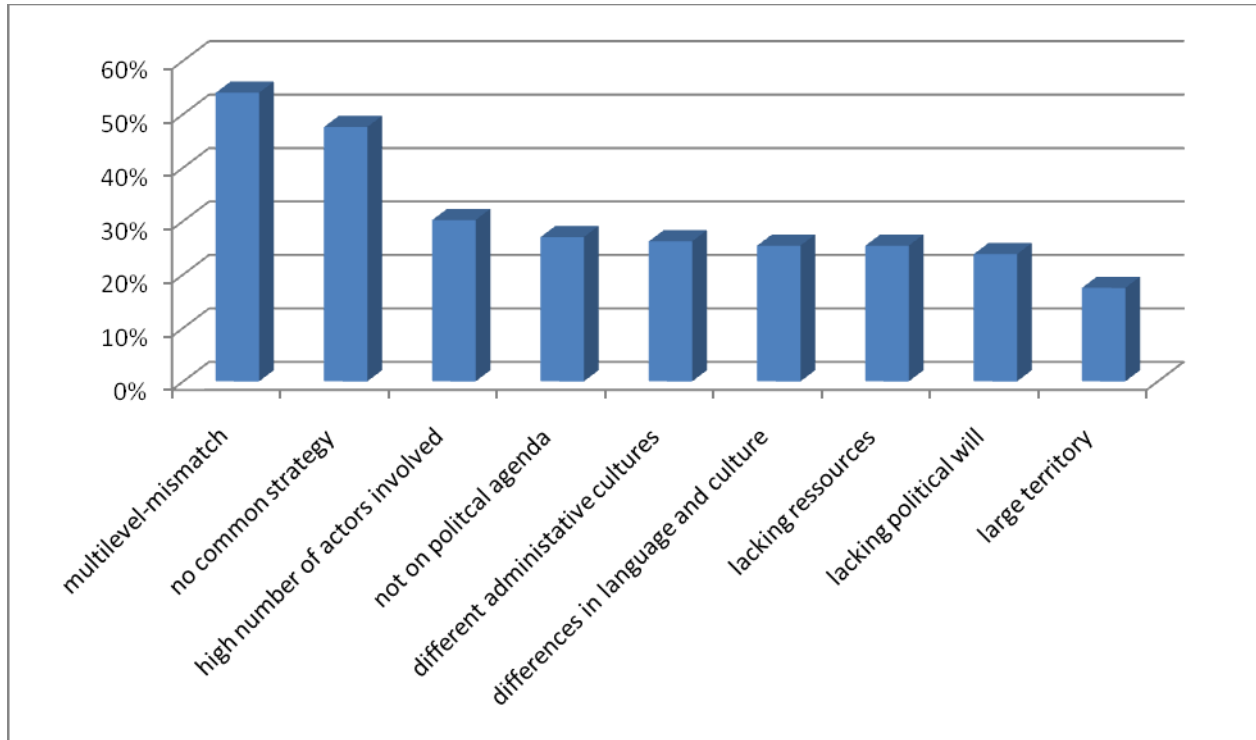


Fig. 12 "very important barriers" to cross-border cooperation in the Greater Region (in %, n=126)

In general, the experts appreciate the political vision of enforcing the quality of being a CBMR – the official political agreement is approved by the experts (approx. 92% agree at least in general). With regard to some dimensions of that political vision, there is much consensus; with regard to others, however, there is much more difference (cp. Fig. 13).

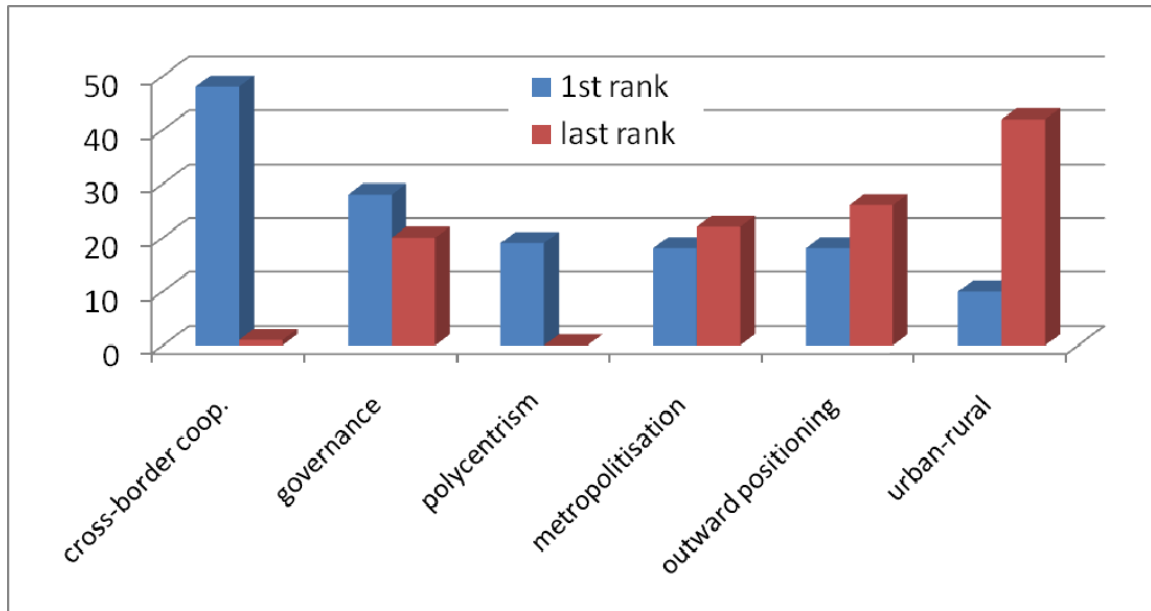


Fig. 13 Ranking concerning the priorities of the current political vision to enforce the quality of being a CBMR (1st and last rank; in absolute numbers; n=126)

The very abstract aim of improving 'cross-border cooperation' is appreciated almost unanimously. Also polycentrism as an aim is not questioned. However, the aim of strengthening the metropolitan dimension is disputed: For some experts, this is the top priority; others see it as the least important priority (of 6 or 7 possible entries). For the outward positioning, very different priorities seem to be relevant right now.

More concretely, the experts have been asked to specify the policies on which the cooperation should be much more intensive (cp. Fig. 14). In the Greater region, the transport issue is seen as mostly relevant. This is not surprising, as the intense cross-border commuting is causing many problems that can only be solved in a cross-border arena. Further developing the possible intensification on certain policies will be the task of the coming work of Metroborder – in parallel with developing institutional perspectives.

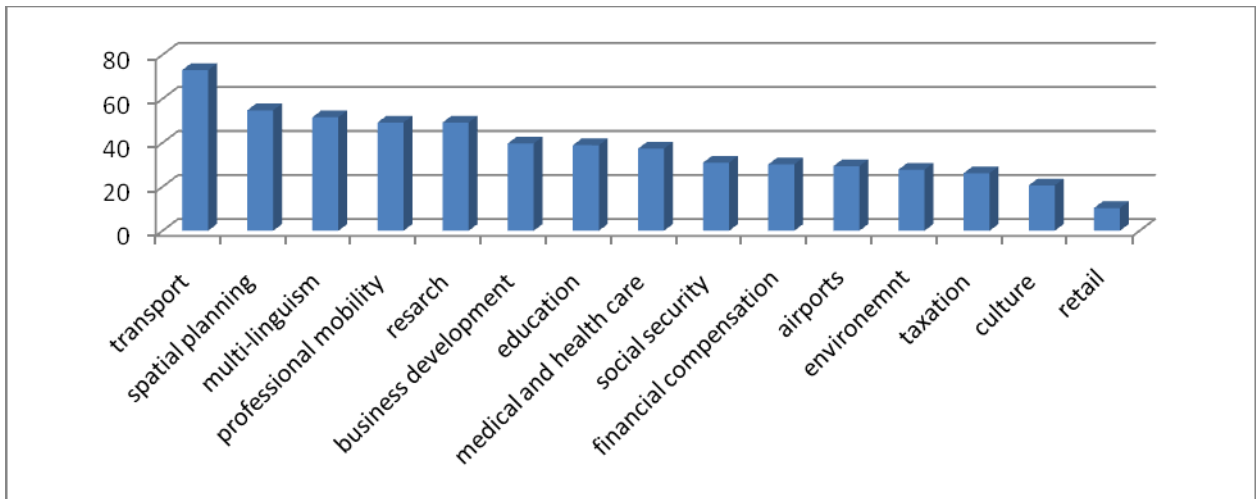


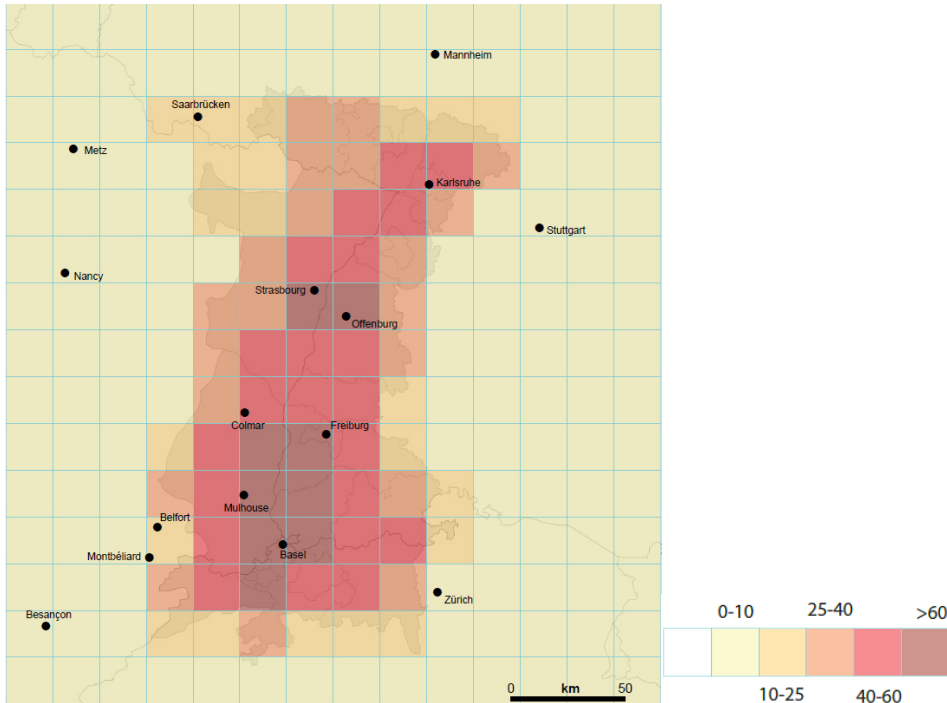
Fig. 14 Responses on the question on which policies (in %, n=126)

4.2.5 Interim results Upper Rhine (first survey)

The first round of the Delphi Study in the Upper Rhine region is currently going on; very first interim results can be based on a response rate of 12% (n=38). The response rate will further increase. Because the first round is not closed yet, it is not possible to provide a profound analyse of the output. However, some examples of the very preliminary results may be given here.

In parallel to the map developed for the Greater Region, the Delphi questionnaire showed a map of the Upper Rhine with an overlaid grid of check boxes (Map 20).

The overall picture shows the need to cooperate along the whole border from the North-West Switzerland up to Rhineland-Palatinate. A certain focus on the urban areas located close to the border like Basel, Mulhouse and Freiburg as well as Strasbourg and Offenburg gets obvious. Similar to the Greater Region, the intense commuting and the economic vitality in these regions may explain this geographical focus.



Map 20 'Territories that need the particular attention of the cross-border cooperation within the Upper Rhine region'

Percentage of squares ticked by all responding experts (preliminary results, n= 38). Sources: Metroborder RegBas/UL; basemap GfK Geomarketing

The experts in the Upper Rhine were also asked to name the main barriers in cross-border cooperation (see Fig. 15). The different administrative and legal systems in the three countries as well as the different competences of the cooperation partners seem to be seen as the most important problems. It must be stressed that Metroborder will not be able to propose final solutions to overcome these complex differences of the political, administrative and legal systems in the involved countries. Another interesting first result: The fact that the Upper Rhine does not constitute a coherent economic space, is not considered as a barrier to cross-border cooperation from about 30% of the experts, who have already sent back the questionnaire.

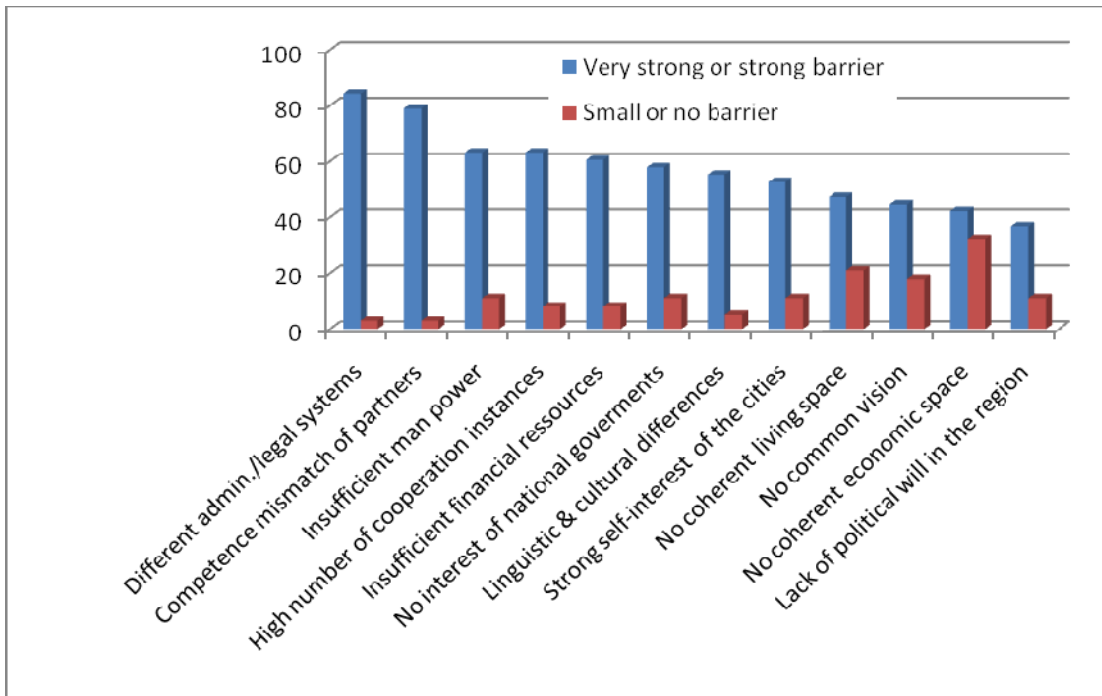


Fig. 15 Policy fields in which the cross-border cooperation should be intensified (in %, n=38)

A further question concerned the policy fields in which the cross-border cooperation in the Upper Rhine should be intensified (see Fig. 16):

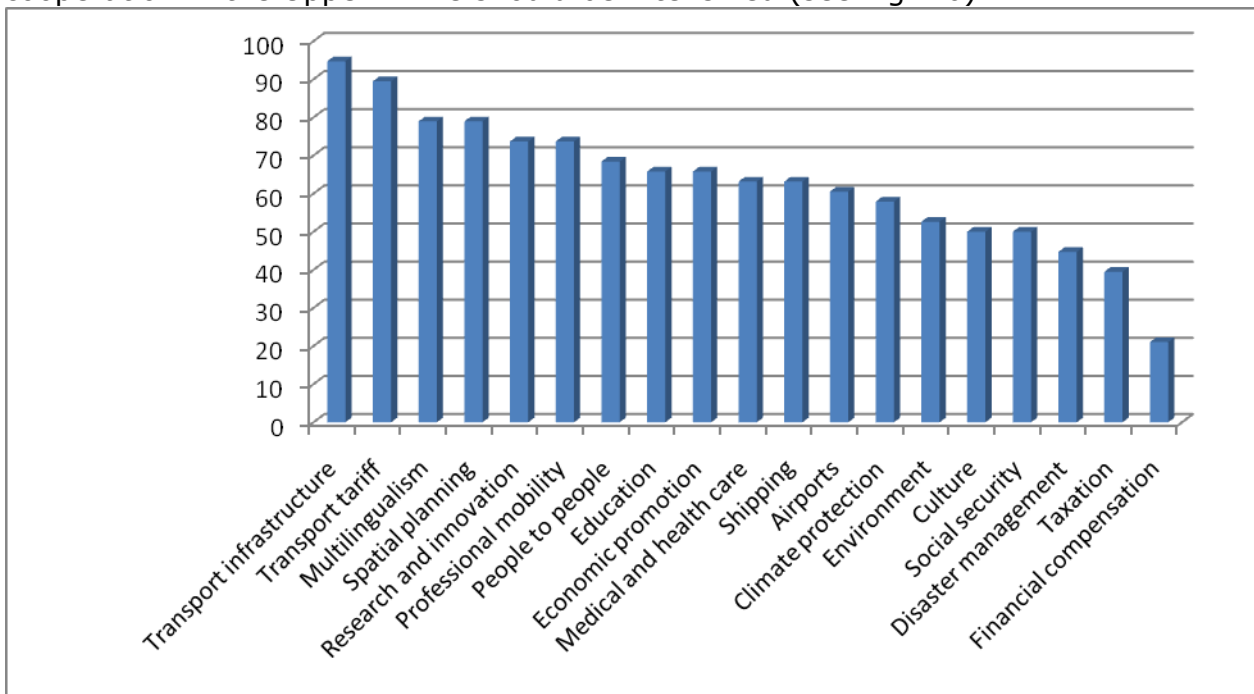


Fig. 16 Policy fields in which the cross-border cooperation should be intensified (in %, n=38)

Like in the Greater Region, transport issues (infrastructure and tariff cooperation) in the Upper Rhine are seen as mostly relevant. The cross-border commuting and the short distance traffic flows which it generates may explain to some extent the judgement of the experts. The location of the Upper Rhine within the European North-South traffic corridor from Rotterdam to Genoa with its long distance traffic flows gives another potential explanation.

More than half of the responding experts considered even 15 out of the 19 policy fields which were proposed in the questionnaire as relevant for intensified cross-border cooperation. This seems to show a need to cooperate not only punctually in specific policy fields, but way more to cooperate broadly in various policy fields.

For the second round, one of the relevant questions is which policy fields should be tackled on the regional level of cross-border cooperation (eg. Upper Rhine Conference) and which on the local level (eg. Eurodistricts). The question whether a clear "task sharing" between the different cooperation levels is necessary will be examined as well.

The interviews which were conducted in the Upper Rhine have shown that the creation of a so called Trinational Metropolitan Region (TMR) is a very actual issue in this case study region. The preliminary results of the survey confirm this. For a large majority of the experts who have already sent back the questionnaire (71 %), the TMR is very important or important

Against this background, it is not surprising that most of the experts (68 %) do *not* agree with the thesis that the Upper Rhine cannot compete with the other European metropolitan regions, despite the fact that the Upper Rhine does not have one dominating economic centre (Fig. 17).

It may be more surprising that, despite the high acceptance of the TMR, 42% of the experts agree completely or mostly with the thesis that the different political and legal systems in the three countries involved make the creation of a functioning TMR impossible. A relevant question for the second round of the survey is why it is important to establish a TMR although it might not be able to function properly due to the different political and legal systems.

Lastly, the majority of the experts believe that the TMR does not really play any role for the big companies in the Upper Rhine – this might indicate that the TMR does not primarily pursue economic goals. The analysis of the answers to the question regarding the goals of the TMR does not deliver yet a clear picture. Therefore, the final results will have to be carefully analysed

and will be taken into consideration for the preparation of the second round of the survey.

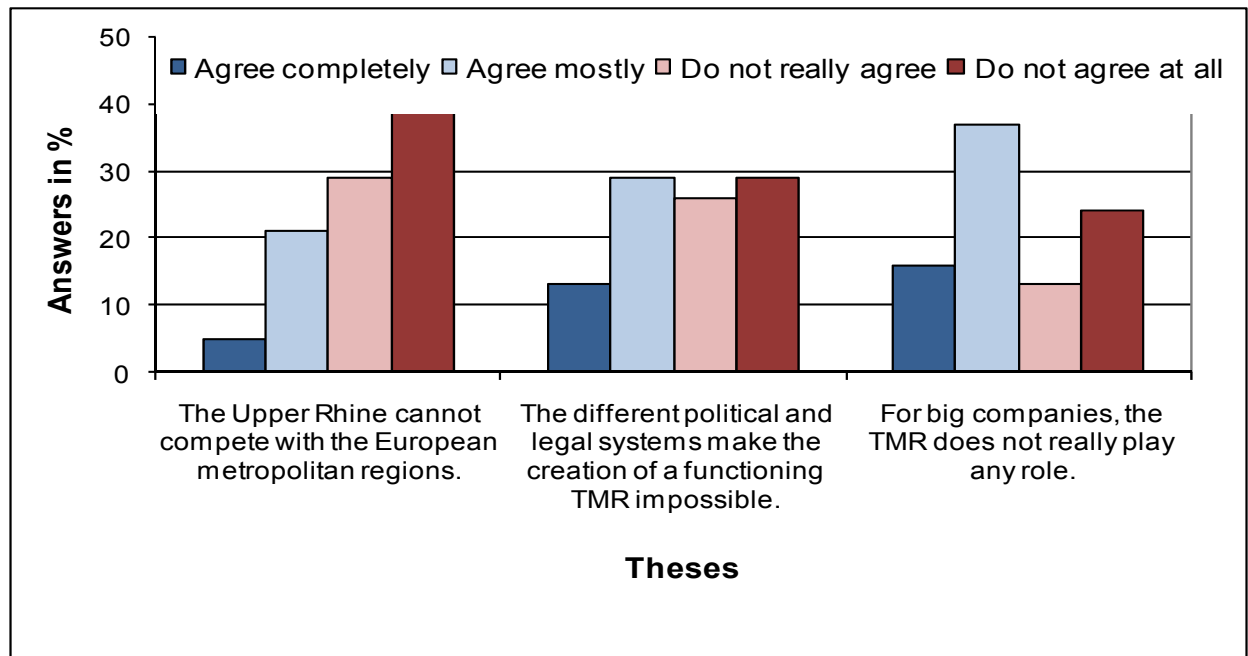


Fig. 17 Positions of experts towards theses on *the Trinational Metropolitan Region* (n=38)

4.2.6 Next steps

The overall objective is to develop the results of the Delphi study in order to formulate concrete options and visions for the future governance in both regions. These options have to be closely linked to the dimension of functional integration.

The concrete next steps with regard to work packages 2.2 and 2.3 are the following:

- Winding up of the institutional mapping for both case study regions
- Development of second tour on the basis of interpretation 1st round, conducting in parallel further expert interviews (in particular with regard to thematic foci, institutional options and territorial visions)
- Linking / comparing the Delphi studies in the two regions, analysis.
- Further linking functional and institutional integration

4.3 Secondary centers and poles in the Upper Rhine (WP 2.4)

4.3.1 Conceptual and methodological framework

This work package contributes to the analysis of the institutional integration in the Upper Rhine region. The focus is on the relation between cities, in particular with regard to secondary centers.

The Upper Rhine valley is a cross-border region with some specificity already elaborated in previous sections of this report. The Upper Rhine is especially characterised by a polycentric urban structure. Analysing secondary centres postulates the existence of a primary pole. From the ESPON perspective, we cannot define any MEGA in the Upper Rhine Valley. Basel, however, counts a global score which is much higher than the score of the other FUAs (ESPON 1.4.3, p. 159-174). The global score of 5.67 which is very close to the score of Genève which is considered as a MEGA and much higher than Strasbourg (3.87), Karlsruhe (3.78) and Freiburg (3.17) the main other FUAs in the URV. The score is especially high in three functions: decision, transport and knowledge. First, Basel is the seat of some global firms specialised in the life sciences sector (Novartis, Roche). Second, it is also a transport node and it has a good connectivity on air, railway, and shipping networks. Third, it is a centre of innovation, with several public and private research centres.

The city of Basel has shown important ambitions for its development: it took the initiative to associate the French and the German neighbour cities and territorial authorities to elaborate a metropolitan project. Since the first version published in 2002, new propositions were made. An urban planning agency has been created to transform the project into concrete actions. The Trinational Eurodistrict Basel (ETB) can be considered as a governance structure which tries to coordinate the political orientations of the public actors at the level of the urban area of Basel. Since 2006, another project called *metrobase* has been developed by the main firms of the city: this project also considers the cross-border dimension, but it is more a tool of territorial marketing than of urban development. All the cities of the URV have developed strategic projects in which they try to guide their future development.

The spatial focus of this study are the secondary poles located within the PUSH of Basel (Potential Urban Strategic Horizons – based on the 45-minutes-isochrone; cp. ESPON 1.1.1). The population of the Basel PUSH is 7 times larger than the population of the FUA.

The aim is to answer to the following questions:

- Does the proximity help to build intense relations between the cities?

- Are the institutional relations between the cities organised according to a polycentric structure or does the city of Basel ensure a strong leadership? If yes – with regard to which territory?
- Are the secondary poles developing partnerships to the metropolitan pole or are they trying to develop relations to other cities in the regions? On which level are these partnerships developed?
- Has the liberalisation of the border helped to increase the institutional relations between the cities?

4.3.2 Selection and analysis of secondary poles / centers

Polycentrism is considered at 2 levels within the study. Firstly, we select *secondary poles* on the intra-regional level: they are urban poles which are close enough to the metropolis to be influenced by it, but far enough to organise their own region. Secondly, on the inter-urban level of the cross-border metropolitan area we look at secondary *centres*. These are cities located on the other side of the border or in the same country having their own FUA (cp. chapter 7.5).

Our hypothesis is that the cities can develop five types of strategic relations: ignorance of the other cities, defence, competition, cooperation, and domination (see Fig. 18). Our aim is to give a general overview of the institutional relations of the cities at two levels: the REGIO and the cross-border urban area of Basel.

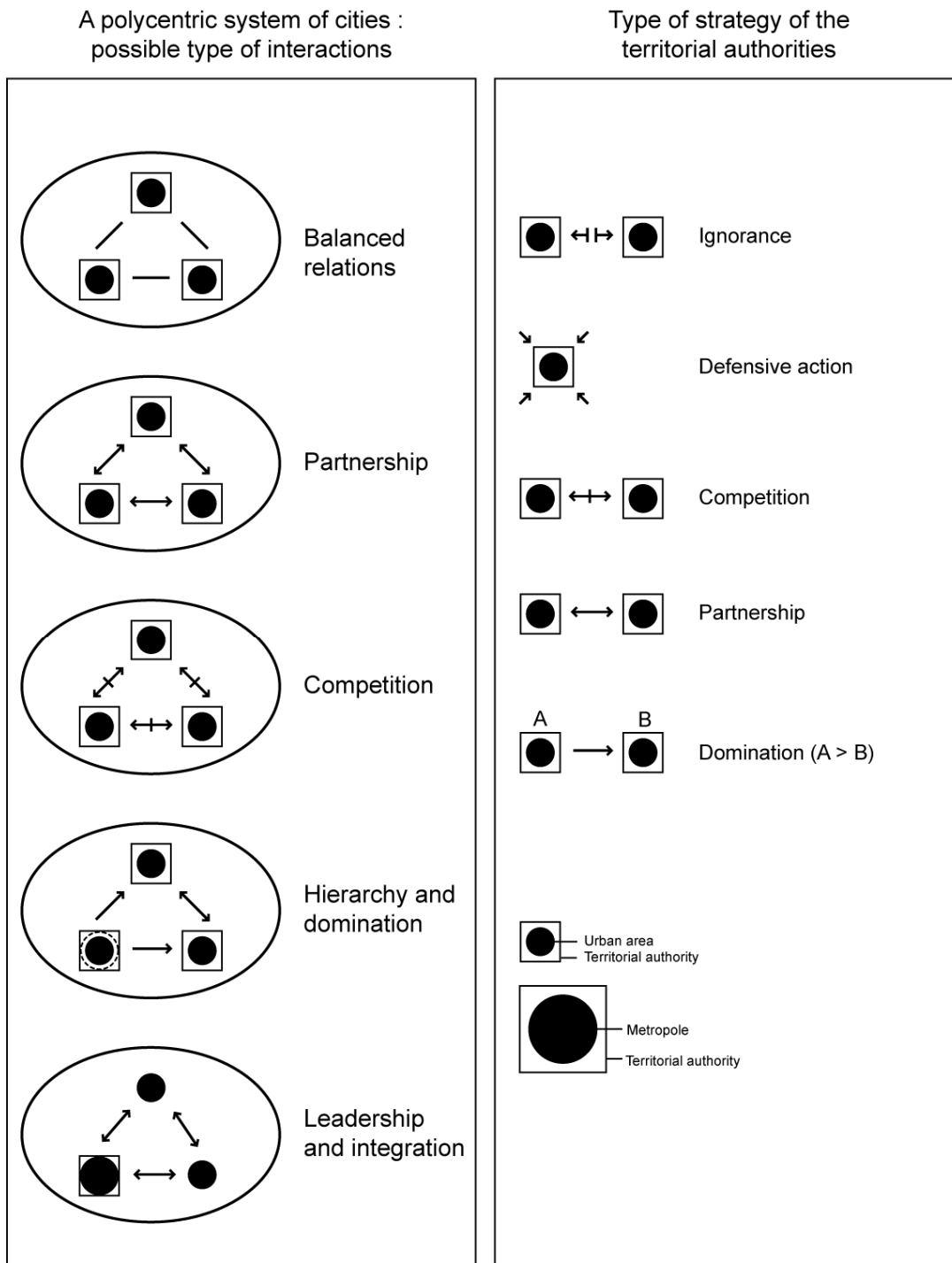


Fig. 18 Types of relations between cities

After the selection of the secondary poles and the secondary centres, two methods are applied. Firstly, expert interviews were conducted in order to scrutinise the following issues:

- cross border space : identification of the reference spaces and territories
- polycentricity : the main geographic centres of the region
- the key-actors of the region
- central issues on the political agenda
- partnerships and concurrence situations at different levels
- positioning relative to the metropolitan projects of the Basel urban area.

The interviews have been conducted in city institutions as well as in further political institutions having an influence on the city strategies (e.g. *Département du Haut-Rhin* or *Région Alsace* having a significant influence on the cities of Mulhouse and Colmar through their initiatives). Twelve interviews have been realised, another fourteen interviews are scheduled.

Secondly, the second questionnaire of the Delphi Study will be used to develop future relations between the cities in the Regio and between the cities in the transborder agglomeration of Basel.

4.4 Feasibility Study: Access to emergency related services (WP 2.5)

An equal access to essential services throughout the EU territory has been recognised as a component of territorial cohesion (Green Paper on Territorial Cohesion, European Commission 2007; DG Regio 2009). This question is all more significant in border regions where the localisation of service providers is in general framed only on a national basis and thus rarely provides a coherent and harmonised territorial supply.

An originality of the current study lies in considering the accessibility to basic services not only at the cross-border level but also at the transnational level of the Greater Region and the Upper Rhine region. Actually, the cross-border perspective generally only considers a very close template from side to side of a boundary, not exceeding a time distance of fifteen minutes. The transnational level includes a global spatial vision for which a network analysis better fits. We aim at framing a multiscalar approach and at questioning the appropriateness of the transnational framework.

Within the global subject of accessibility to essential and basic services, the focus has been put on emergency related services for two reasons:

- Spatial accessibility is more significant than social accessibility for this kind of service. In other terms, the distance from the inhabitants to the service providers is determinant for the chances of survival. Thus, the question of a cross-border harmonisation of emergency systems is likely to improve the level of service for the inhabitants living close to the boundaries. For other services like universities or airports, social conditions often prevail before spatial accessibility.

- The emergency related services rank high in the agenda of policy priorities in the Greater Region and in the Upper Rhine region (cf. annex 7.7.1).

The following pages provide a feasibility study for such an analysis in the Greater Region: conceptual definition in the cross-border and in the transnational contexts; overview of methods; conclusion on the interests of a multiscale approach.

Emergency related services and complementarities between hospitals: Scale matters

Providing the inhabitants a common access to emergency related services supposes some technical and administrative arrangements between national systems. The objective is that someone phoning to the emergency number could be answered by a common platform, and helped by a rescue team coming from the nearest point, whatever the side of the border. The experience gained in the French-Belgian context shows that such coordination can be achieved at the condition that juridical, technical, administrative and even cultural challenges are puzzled out (cf. annex 7.7.1). From a territorial point of view, an important distinction must be set between the primary transport and the secondary transport, leading to two scales of intervention:

- The primary transport means the movement from an ambulance, with on board a doctor and a nurse, to look for an injured or ill person on the real place of occurrence of the accident or disease. As soon as the ambulance arrives, first cares are provided and if necessary the patient is driven to the nearest or to the most appropriate hospital. In France, 80% of the emergency transports are primary (French Ministry of Health, 1998).

- The secondary transport means an inter-hospital emergency movement to transfer a patient from a hospital to another, in order to provide him the most suitable care without interrupting the treatment sequences (20% of emergency transports in France).

Following this distinction, the primary transport is a matter of making the hospital going to the place of accident, while the secondary transport mainly

deals with transportation of the patient to a specialised hospital. In both cases there is a tremendous interest of shortening the time of transportation. But the time proximity is more challenging as regards the primary transport, because as soon as the patient is stabilised thanks to the first care provided by the emergency doctor, the state of emergency may be reduced.

In other terms, the primary transport supposes a localisation of the emergency services as close as possible to all the places; by the way, a time of intervention exceeding 30 minutes is usually considered as detrimental to the chances of survival. The secondary transport mostly depends on the diversity of specialised hospital services, hopefully not too far away.

Whatever the type of transport, cross-border arrangements and cooperation may contribute to improving the access of inhabitants to emergency services. But the cross-border level seems too local as regards the secondary transport and the need to assess complementarities among various hospital specialities, sparsely localised across the territory. The transnational level of the Greater Region shows its relevance as regards the following topics, (1) a possible incentive towards a generalisation of cross-border cooperation between emergency services, (2) a coordination of all the primary transport actions in this region so densely doted of boundaries, (3) complementarities between hospital specialties throughout the Greater Region so as to foster the efficiency of secondary transport.

As a first output, the interest of studying the accessibility to emergency services in a transnational context lies in a multiscale approach: coordination of the local cross-border arrangements; proposition of a common use of hospital specialties at the transnational level.

Methodological stakes of a multiscale approach

The definition of the study objectives leads to specific methodologies. In the frame of this feasibility study, we aim at underlining the main features of the most used methods in the topic of accessibility to emergency services. If we follow a multiscale approach, three distinct questions can be asked leading to three particular methods:

- In a context of emergency, with a threshold of maximum 30 minutes between a phone call and the arrival of rescue teams, where are the most badly accessed areas? This would lead to a diagnostic of the Greater Region territorial heterogeneity. The method of the shortest path proves interesting in this topic.
- In a policy-driven perspective, where should be located the rescue teams for an optimal coverage of the territory? The current localisation of rescue teams would not be taken into account, leading to alternative

proposals interesting for policy makers. This is typically a question of location-allocation modelling.

- Considering specialty hospitals and the interest of complementarities, what added value would provide a network of hospitals across the Greater Region in its whole? A potential accessibility model considering the supply, the demand and the time-distance could be built and calibrated following the various specialties.

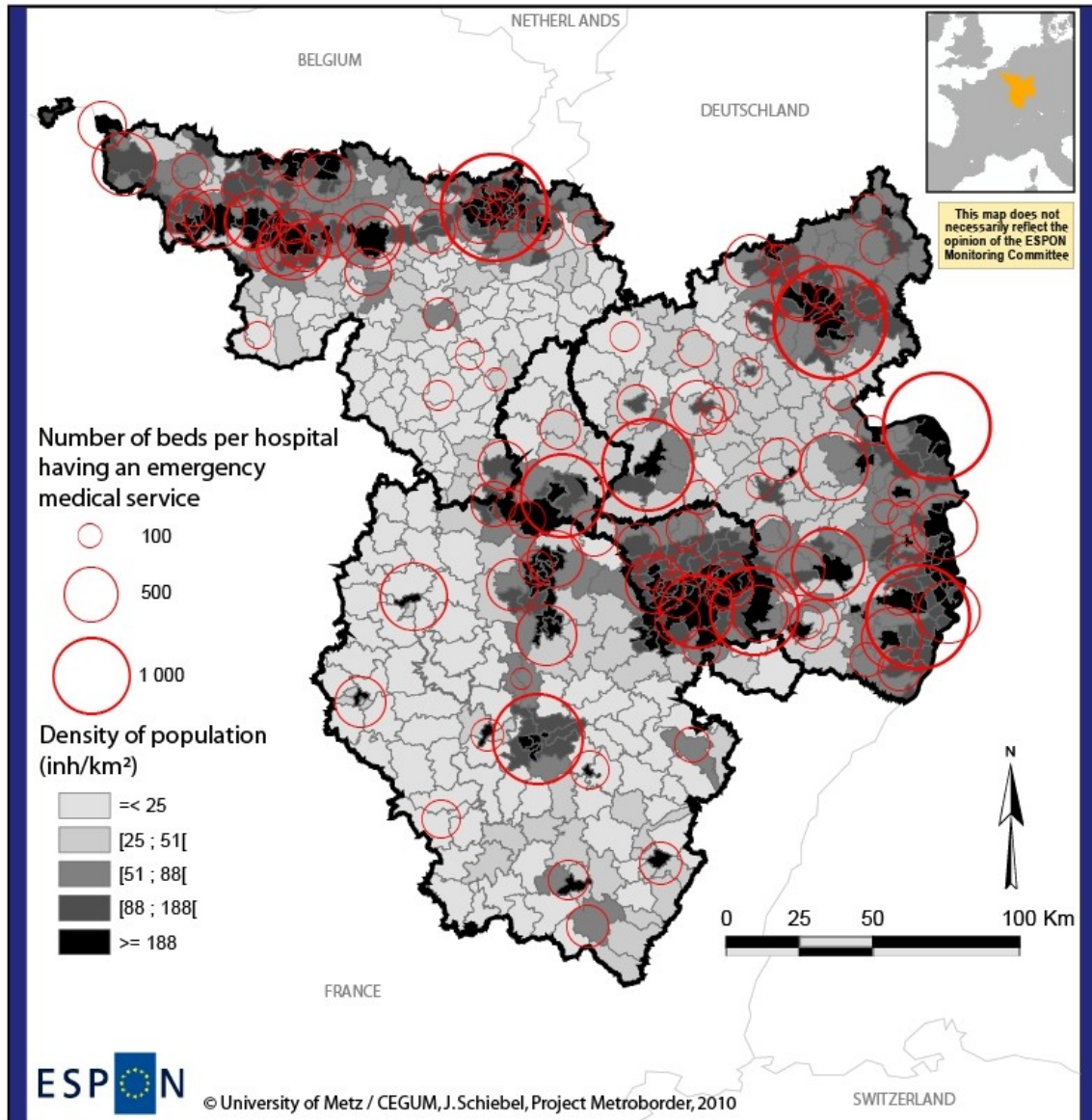
These three methods (shortest path, location-allocation and potential accessibility) are based on time distances. The way of computing these distances is displayed in the annex (chapter 7.7.2), as well as the three distinct methodologies.

As regards the localisation of emergency hospitals in the Greater Region (cp. Map 21), first hypotheses can be set on the interest of combining these methods in a multiscale way:

Several rural areas are far away from any emergency medical service, namely in the East of the Walloon region or in the West and the South of Lorraine region.

Some of these remote areas compensate this drawback by the relative closeness to hospitals richly doted in various specialties, as the rural areas surrounding Nancy in the South of the Lorraine region. In other words, the easy secondary transport and the quality of services may balance a relative remoteness.

Other areas located close to the boundaries would gain an additional quality of service only through a transnational management of the medical supply, as at the border between Belgium and Germany, at an equal distance of Liège, Trier and Koblenz.



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Local level : LAU1 Rheinland-Pfalz, Luxembourg ; LAU2 : Saarland, Wallonia ; Other : Lorraine
Source : Sarre and Rhénanie-Palatinat : www.krankenhaus.de ;
Wallonie : www.ccabe.com ;
Lorraine : <http://etablisements.hopital.f> ;
Luxembourg : www.112.public.lu
Origin of data : Lorraine : bases Finess 97, Fédération hospitalière de France 2008 ;
Luxembourg : Administration des services de secours, 2008 ;
Sarre : Der Gemeinsame Bundesausschuss ;
Rhénanie Palatinat : Der Gemeinsame Bundesausschuss ;
Wallonie : L'Association belge des Hôpitaux
© Eurogeographics Association for administrative boundaries

Map 21 Localisation of emergency services and total number of beds of the hospitals having an emergency medical service

Questioning complementarities between hospitals is an important step before the territorial modelling. An observation and comparison of hospital specialties between the four countries is a prerequisite. The work achieved in the framework of the Interreg IIIA project Saar-Moselle "Comparative study

of health systems in Saarland and Moselle” is a good starting point, cf. specialties like neurosurgery, paediatric surgery, neonatology, severe burn injuries, coronary angioplasty.

As regards the metropolitan concern of the Metroborder project, the analysis of the specialty hospitals can help identifying the places having some metropolitan functions to the extent that some specialties are rarer and imply research activities as well as the presence of highly qualified staff. A comparison of the classification of specialty hospitals within each country will be helpful. For example, in France the health care system is organised in each region by a regional plan of care organisation (SROS, Schéma régional d’organisation des soins). The specialty hospitals are ranked following they answer to proximity, regional or interregional needs (Coldefy & Lucas-Gabirelle 2008). The specialties at the interregional level are: cardiac surgery, severe burn victims treatment, neurosurgery, interventional activities by endovascular way in neuroradiology, transplants of organs and hematopoietic cells. These specialties could be used as a first test of potential accessibility modelling.

Paving the way for a study on accessibility to emergency medical services

Two main questions have shaped this feasibility study: (a) the relevance of the Greater Region level on the topic of emergency accessibility; (b) the meaning of a multiscale approach.

- (a) The Greater Region level interest is not always obvious, e.g. regarding the primary transport for which local cross-border cooperation is enough and the transnational level would look too far away from local needs. The transnational level would be especially appropriate for a diagnostic of the Greater Region territory, or for assessing complementarities between hospitals in the aim of helping the secondary transport. The Table 11 summarises the methods and the added value of the Greater Region level following different objectives.

Objective	Spatial level	Elementary unit	Method	Added value of the Greater Region level
To improve the cross-border accessibility to emergency services	Local, close to the borders	Below the municipal level	network	No clear added value, except political incentives to foster cross-

				border agreements
Diagnostic of the Greater Region territory on a comparative basis	Transnational	Commune/canton/district	Potential accessibility	Knowledge of the Greater Region in its whole
Complementarities between hospitals regarding secondary transport	Transnational	Commune/canton/district	Potential accessibility OR k-median	Strengthening the global supply of hospital specialities (critical size)

Table 11 Objectives and methods to measure the accessibility to emergency services

(b) A multiscale approach of the accessibility to emergency medical services means considering the spatial positioning of each place of the Greater Region following different spatial contexts. The steps of the multiscale approach have been set in the framework of the ESPON Hyperatlas developed in the project ESPON3.1 (see the 3rd Interim Report of ESPON3.1, 2004, Annex A 61p.): taking into account the situation of a spatial unit following a local context (vis-à-vis the neighbouring units), a national context and a global EU context. This methodology can be transferred to the emergency services, if the different places are considered following:

- a local context – the time distance to the closer emergency medical unit (primary transport);
- a regional/national context – level of specialties diversity per region or per country;
- a transnational context – level of specialties diversity at the Greater Region level.

Combining these three territorial contexts would lead to a robust territorial diagnostic of the Greater Region internal weaknesses and strengths, and would emphasise the gains for the inhabitants of a hospital supply common transnational management.

5 Strategy Building (WP 3)

The development of important milestones for the creation of a (better) functioning of the two metropolitan regions is an expected outcome of the Metroborder project, including constitutional steps and a respective timetable.

This strategy building process will be based on the scientific evidence produced within work packages 1 and 2. The outcomes will be prepared as input for political processes. As described in the Inception Report in more detail, a SWOT analysis will contain a focused interpretation towards the political arena.

It is worth mentioning, that another research project on cross-border regions ("MORO Grenzüberschreitende Partnerschaften", funded by the German Federal Institute for Research on Building, Urban Affairs and Spatial Development, BBSR) simultaneously conducts SWOT analyses on both case study regions. The Metroborder lead partner is in frequent contact with the MORO coordinators and will work towards synergies, in particular with regard to the SWOT tool.

A second tool foreseen in the context of the Metroborder context is the scenario building, also described in more detail in the Inception Report. The Metroborder TPG is aware of the attempts within the framework of the ESPON programme to bring together the different projects that use the scenario technique and will keep in touch with the respective researchers (panel on the ESPON seminar in Malmö, 3.12.09; cp. FOCI Intermediate Report Annex p. 193 ff.).

The strategy building process is supposed to have a strong interactive dimension. According to the Metroborder timetable, this phase starts in spring 2010 just after submission of this interim report. In practical terms, and apart from pure dissemination activities, the strategy building process should comprise workshops on a more technical and informal level as well as events that address the broader political public – specifically adapted to each region. The organisation of the events will react to the political agenda in the region (e.g. the Summit of the Greater Region in Dec. 2010).

The ongoing expert interviews as well as the Delphi study have already lead to fruitful and constructive exchanges with numerous decision makers in both case study regions.

Currently, it appears most promising to develop perspectives of future governance structures, of certain sector policies (transport, spatial planning,

research, employment) and with regard to the outward positioning of the respective region.

6 Dissemination (WP 4)

So far, the dissemination activities have followed the foreseen schedule and have reacted to different occasions for meetings: ESPON Priority 2 requests an 'on demand approach' with regard to dissemination activities that takes into account the political agenda.

The Metroborder Project will go on to disseminate towards the stakeholders of different levels as to the scientific community and to ESPON. For the moment being, the dissemination activities can be summarised in the following manner (Table 12).

ESPON & other European programmes	
PAST EVENTS	
01-02.06.09	ESPON seminar, Prague (moderation of a table discussion on cross-border issues)
02-03.12.09	ESPON seminar, Malmö (presentation of the project)
05.11.09	ESPON workshop on "approaching new functional areas": presentation of the project, Luxembourg
12.02.10	URBACT workshop "Citylab on metropolitan governance": presentation of the project, Lille
COMING EVENTS	
Spring 10	ESPON seminar, Spain
Autumn 10	ESPON seminar, Belgium
PAPER DOCUMENTS ALREADY DELIVERED	
09.04.09	Inception report
28.02.10	Intermediate report
COMING PAPER DOCUMENTS	
31.10.10	Draft final report
31.12.10	Final report
WEB DISSEMINATION	
ESPON page dedicated to the project (with reports) under www.espon.eu	
At leadpartner's webpage https://metroborder.uni.lu	

STAKEHOLDERS	
(EU & consultation committee)	
PAST EVENTS	
09.01.09	Stakeholders meeting, Strasbourg
04.05.09	Stakeholders meeting, Brussels
05.05.09	Presentation of the project, organised by the Luxemburg Presidency of the Greater Region in the Committee of the Regions, Brussels
29.10.09	Workshop DIACT-MOT-Metroborder: presentation of the project, Paris
COMING EVENTS	
10-11.03.10	Metroborder Consultation Committee and stakeholders meeting: presentation of the Interim Report, Walferdange (LU)
XX.10.10	Open days (Brussels)
XX.11-12.10	Metroborder Final event (Basel)
WEB DISSEMINATION	
Available as from June 09	“Metroborder A la une”: one short page informing about the latest developments of the project (in French and German) – constantly updated www.uni.lu
PAPER DOCUMENTS	
10 short input papers (Delivery depends on the stakeholders’ demand)	
STAKEHOLDERS – GREATER REGION	
PAST EVENTS	
03.03.09	Presentation of the project to the stakeholders of the GR, Luxembourg
22.04.09	MORO Workshop (coordination with the German research project MORO), Aachen
12.05.09	Presentation of the inception report to the stakeholders from the GR (comité de suivi), Luxembourg
25.06.09	Bilateral BBSR/Metroborder meeting, Luxembourg
COMING EVENTS	
12.03.10	Presentation of the intermediate report to the „comité de suivi GR“, Luxembourg
STAKEHOLDERS – UPPER RHINE	
PAST EVENTS	
19.02.09	Conference Metropolitan region Upper Rhine
26.02.09	Upper Rhine conference coordination committee
27.03.09	“Präsidium” Upper Rhine Conference
11.12.09	Plenum Upper Rhine Conference

COMING EVENTS	
02.12.10	12 th tripartite congress on "education research innovation"
Spring 2010	"Präsidium" Upper Rhine Conference
Nov/Dec 10	Plenum Upper-Rhine conference
SCIENTIFIC COMMUNITY	
22.09.09	Presentation of the project, Deutsche Geographen Tag, Vienna
May 2010	Regional Studies Association, Annual Conference, Pecs

Table 12 Overview dissemination activities

7 Annexes

7.1 Literature

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7.2 Annex WP 1.1

7.2.1 CBMR-MUAs

Morphological Urban Areas (MUAs)	Population 2001	Population 2006	Average annual growth (%)
Luxembourg Total	120,331	129,517	1.5
Genève Total	447,179	477,681	1.3
Basel Total	566,331	555,635	-0.4
Strasbourg Total	556,537	579,799	0.8
Saarbrücken Total	628,267	611,638	-0.5
Nice-Monaco-Sanremo Total	1,193,202	1,239,836	0.8
Lille Total	1,401,644	1,458,504	0.8
Aachen-Liège-Maastricht Total	1,577,469	1,588,592	0.1
København-Malmö Total	1,714,305	1,778,928	0.7
Wien-Bratislava Total	2,084,715	2,174,365	0.8
Katowice-Ostrava Total	2,644,319	2,507,825	-1.1

Table 13 Morphological Urban Areas (MUAs): population in 2001 and 2006

Notes: København-Malmö: Malmö population 2005. Katowice-Ostrava: Katowice population 2008

Sources: Luxembourg: STATEC, Statistisches Landesamt Rheinland-Pfalz, Statistisches Landesamt Saarland, IGEAT, Insee. Basel: OFS, Statistisches Amt des Kantons Basel-Landschaft, Basel-Stadt Statistik, Statistisches Landesamt Baden-Württemberg, Insee. Genève: OFS, Office cantonal de la statistique du canton de Genève, Statistiques Vaud, Insee. Nice-Monaco-Sanremo: Insee, Istat. Lille: Insee, IGEAT. Saarbrücken: Statistisches Landesamt Saarland, Insee. Aachen-Liège-Maastricht: Statistisches Landesamt Nordrhein-Westfalen, IGEAT, Statistics Netherlands. København-Malmö: Ørestat databank. Strasbourg: Insee, Statistisches Landesamt Baden-Württemberg. Wien-Bratislava: Statistik Austria, Statistical Office of the Slovak Republic. Katowice-Ostrava: Czech Statistical Office.

Between 2001 and 2006, most of the cross-border metropolitan cores experienced a positive average annual growth, with the exceptions of Basel, Saarbrücken and Katowice-Ostrava. Luxembourg and Genève went through a

particularly strong annual demographic growth compared to the other MUAs. Previous studies suggest that this growth is primarily linked to the development of a knowledge-intensive economy, notably in finance and business services (Walther and Dautel, 2010).

Functional Urban Areas (FUAs)	Population 2001	Population 2006	Average annual growth (%)
Katowice-Ostrava	4,319,991	3,956,937	-1.7
Wien-Bratislava	3,496,574	3,628,679	0.7
København-Malmö	2,645,546	2,658,435	0.1
Aachen-Liège-Maastricht	1,990,946	2,005,498	0.1
Lille	1,773,063	1,846,699	0.8
Nice-Monaco-Sanremo	1,282,703	1,395,866	1.7
Saarbrücken	1,192,745	1,170,563	-0.4
Basel	960,538	952,139	-0.2
Luxembourg	882,285	931,771	1.1
Strasbourg	848,591	899,155	1.2
Genève	731,281	807,909	2.0

Table 14 Functional Urban Areas (FUAs): population in 2001 and 2006
Notes: København-Malmö: Malmö population 2005. Katowice-Ostrava: Katowice population 2008

Source: See Table 15.

7.2.2 Numbers of cross-border commuters (2000 and 2006)

Case study	Number of cross-border commuters 2000	Number of cross-border commuters 2006	Proportion of commuters to each country 2000	Proportion of commuters to each country 2006	Average annual growth 2000-2006	Rank 2000	Rank 2006
Luxembourg	87,908	127,251			6.4	1	1
Luxembourg	87,300	126,723	99.3	99.6	6.4		
France	200	200	0.2	0.2	0.0		
Germany	108	196	0.1	0.2	10.4		
Belgium	300	132	0.3	0.1	-12.8		
Basel	43,165	48,887			2.1	2	2
Switzerland	42,565	48,287	98.6	98.8	2.1		
France	100	100	0.2	0.2	0.0		
Germany	500	500	1.2	1.0	0.0		

Genève	28,382	47,514			9.0	4	3
Switzerland	28,198	47,354	99.4	99.7	9.0		
France	184	160	0.6	0.3	-2.3		
Nice-							
Monaco-							
Sanremo	28,592	34,073			3.0	3	4
France	200	200	0.7	0.6	0.0		
Monaco	28,157	33,638	98.5	98.7	3.0		
Italia	235	235	0.8	0.7	0.0		
Lille	19,500	27,500			5.9	6	5
France	5,000	5,000	25.6	18.2	0.0		
Belgique	14,500	22,500	74.4	81.8	7.6		
Saarbrücken	22,700	21,623			-0.8	5	6
Germany	21,700	20,623	95.6	95.4	-0.8		
France	1,000	1,000	4.4	4.6	0.0		
Aachen-							
Liège-							
Maastricht	16,587	17,695			1.1	7	7
Netherlands	5,115	5,895	30.8	33.3	2.4		
Germany	10,308	10,375	62.1	58.6	0.1		
Belgium	1,164	1,425	7.0	8.1	3.4		
København-							
Malmö	3,291	13,494			26.5	9	8
Denmark	3,010	12,744	91.5	94.4	27.2		
Sweden	281	750	8.5	5.6	17.8		
Strasbourg	6,409	5,959			-1.2	8	9
France	70	70	1.1	1.2	0.0		
Germany	6,339	5,889	98.9	98.8	-1.2		
Wien-							
Bratislava	N.A	1,055				-	10
Austria	N.A	954	-	90.4	-		
Slovakia	N.A	101	-	9.6	-		
Katowice-							
Ostrava	N.A	N.A				-	-
Poland	N.A	N.A	-	-	-		
Czech Republic	N.A	N.A	-	-	-		

Table 15 Cross-border commuters, 2000 and 2006

Sources: Luxembourg: IGSS, ADEM Eures, BA, INAMI. Basel: OFS, MOT and own estimations. Genève: OFS and own estimations. Nice-Monaco-Sanremo: Fusco 2009, Principauté de Monaco 2009. Lille: Groupe de travail parlementaire franco-belge, Insee. Saarbrücken: BA, Insee, IGSS, Observatoire 2001. Aachen-Liège-Maastricht: EU 2007, Euregio Meuse-Rhin. København-Malmö: Öresundstatistik. Strasbourg: CCI Strasbourg et Bas Rhin, Eurodistrict 2008 and own estimations. Wien-Bratislava: Arbeitsmarktservice Austria, OECD and own estimations; Katowice-Ostrava: no data available.

Spatial units: Luxembourg: Greater Region. Basel: Canton of Basel-Stadt and Basel-Land, France, Germany. Genève: Canton of Genève, France. Nice-Monaco-Sanremo: France, Italy. Lille: metropolitan regions. Saarbrücken: Saare, Lorraine. Aachen-Liège-Maastricht: Euregio. København-Malmö: Öresund Region DK, Scane County. Strasbourg: Eurodistrict. Wien-Bratislava: Centrope; Katowice-Ostrava: no spatial units.

7.2.3 Cross-border public transport networks – geographical representation

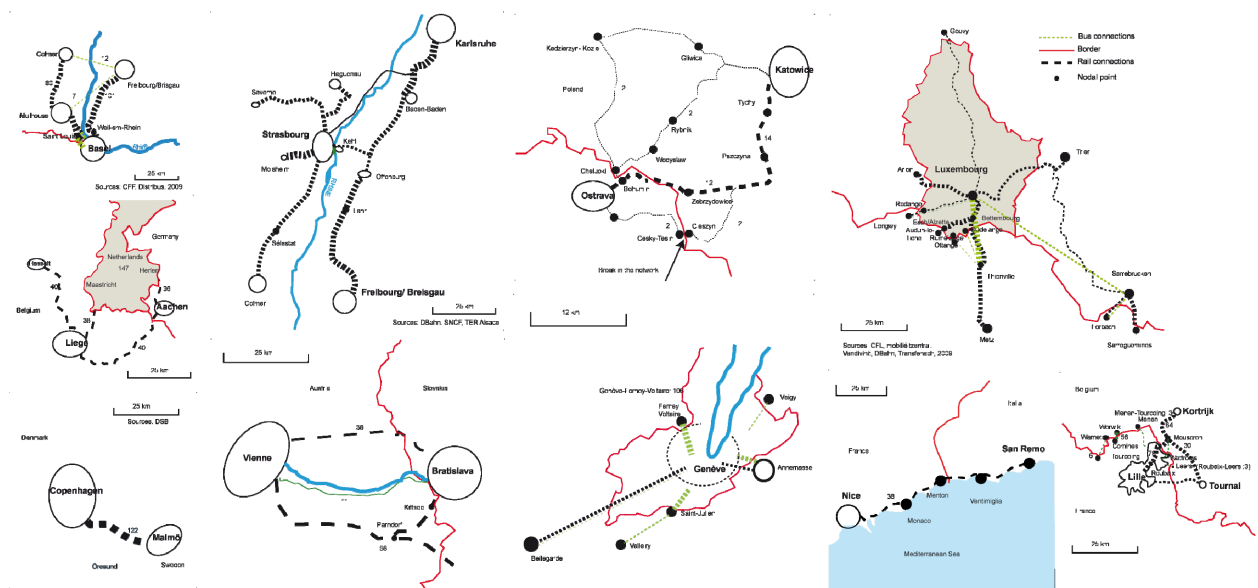
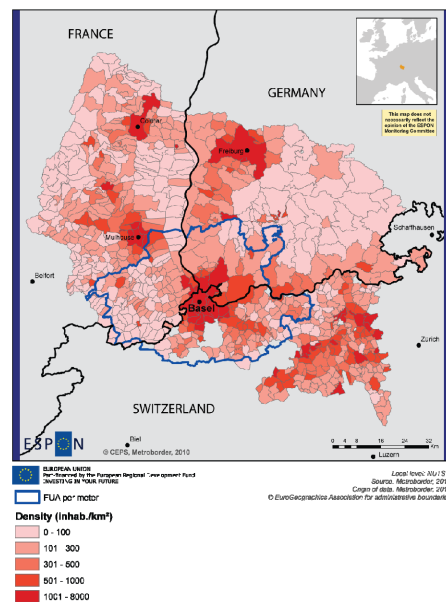
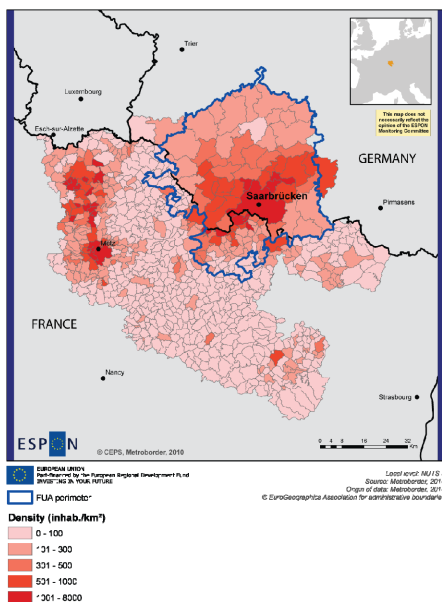
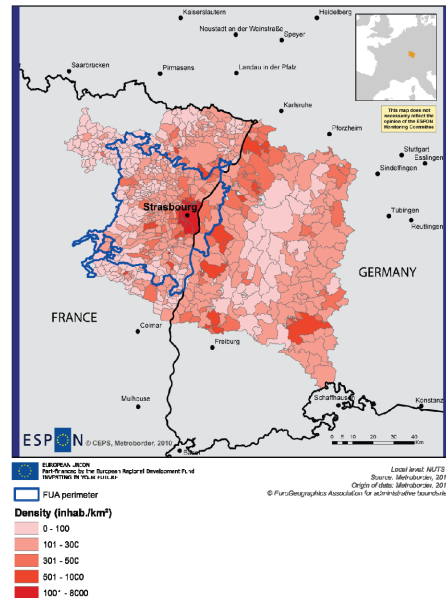
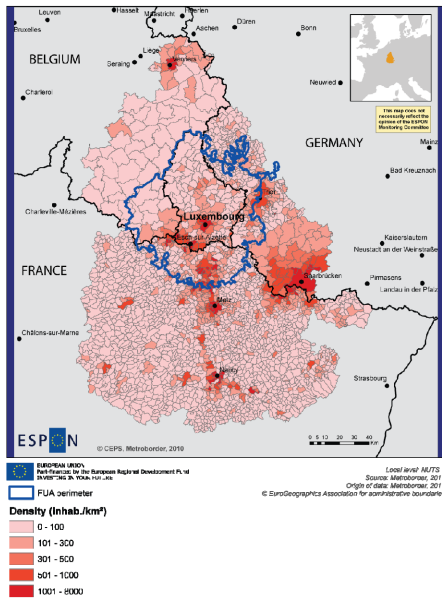


Fig. 19 Structure of cross-border public transport networks – geographical context

Sources: Strasbourg: SNCF, Deutsche-Bahn. Basel: SNCF, Deutsche-Bahn, CFF, København-Malmö: DSB, SJ Katowice-Ostrava: Polrail, České dráhy. Lille: SNCF, SNCB, Transpole, TEC Hainaut, De Lijn. Genève: SNCF, CFF, Frossard, TPG. Wien-Bratislava: ÖBB, ŽSR, PostBus, slovaklines, Twin city liner. Luxembourg: CFL, SNCF, SNCB, Deutsche-Bahn, Weber, TEC, mobiliteit. Aachen-Liège-Maastricht: Nederlandse Spoorwegen, Deutsche-

Bahn, SNCB, Veolia, De Lijn, ASEAG, TEC. Nice-Monaco-SanRemo: SNCF, Trenitalia. Saarbrücken: Deutsche-Bahn, SNCF, Transbus.

7.2.4 Population Density – mapping the case study regions

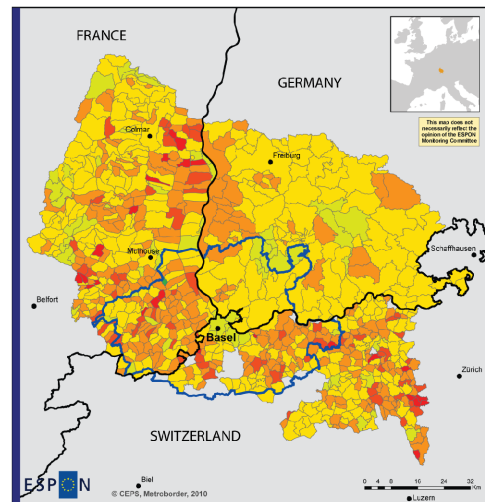
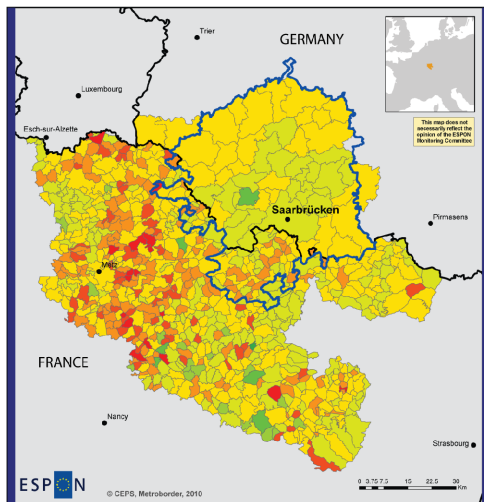
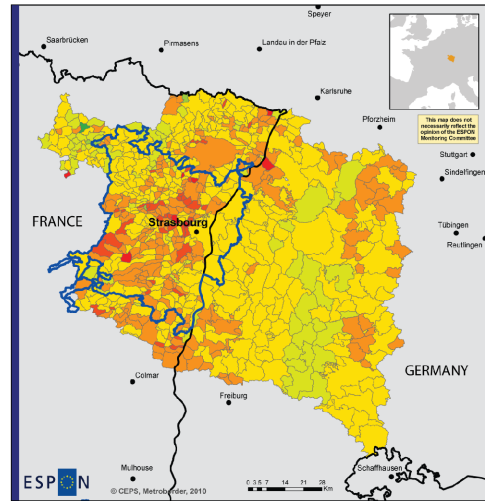
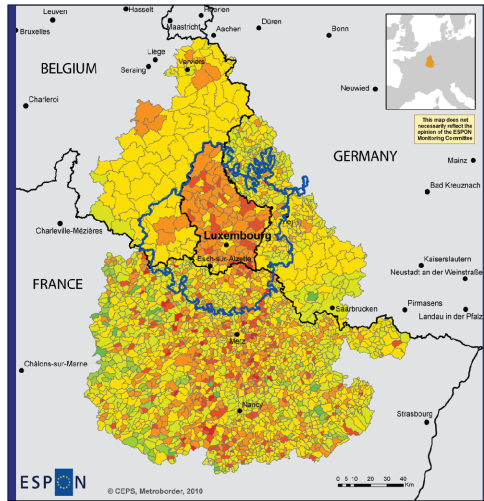


Map 22 Population density Basel, Luxembourg, Saarbrücken and Strasbourg

Note: only municipalities from a selection of NUTS 3 are represented

In the case of the Greater Region, the main centers of population are cross-border (with the exception of the metropolitan area of Luxembourg City): the sector of Esch-sur-Alzette-Differdange-Longwy-Villerupt, the sector of Saarbrücken-Sarregeumines-Forbach-Saint-Avold, and the sector of Metz-Thionville, areas in structural change now benefiting from the economic dynamic of Luxembourg. In the case of the Upper Rhine, the two main cities (Strasbourg and Basel) form urban border areas, since the neighboring municipalities also have population densities similar to these two centers. There is a spreading effect of high density from urban centers, which subsequently diffuse over space. Between these two population centers, several sub-centers are spread across the Rhine area (Mulhouse, Colmar, Freiburg im Breisgau).

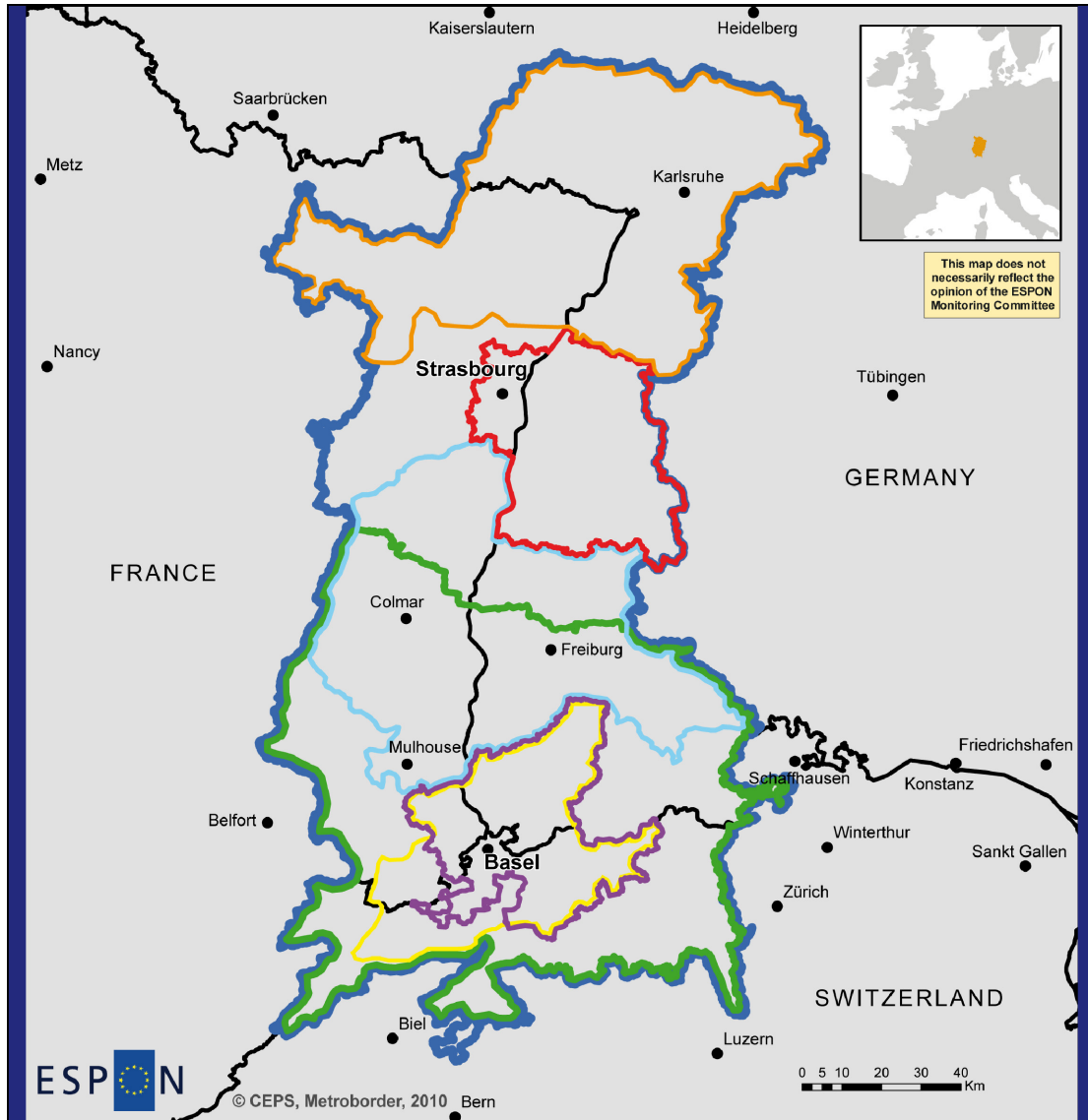
7.2.5 Annual Growth rates – mapping the Case study regions










Map 23 Average annual growth rate in the four selected cases studies: Basel, Luxembourg, Saarbrücken and Strasbourg

7.3 Annex WP 1.2

7.3.1 Institutional Mapping CBMRs

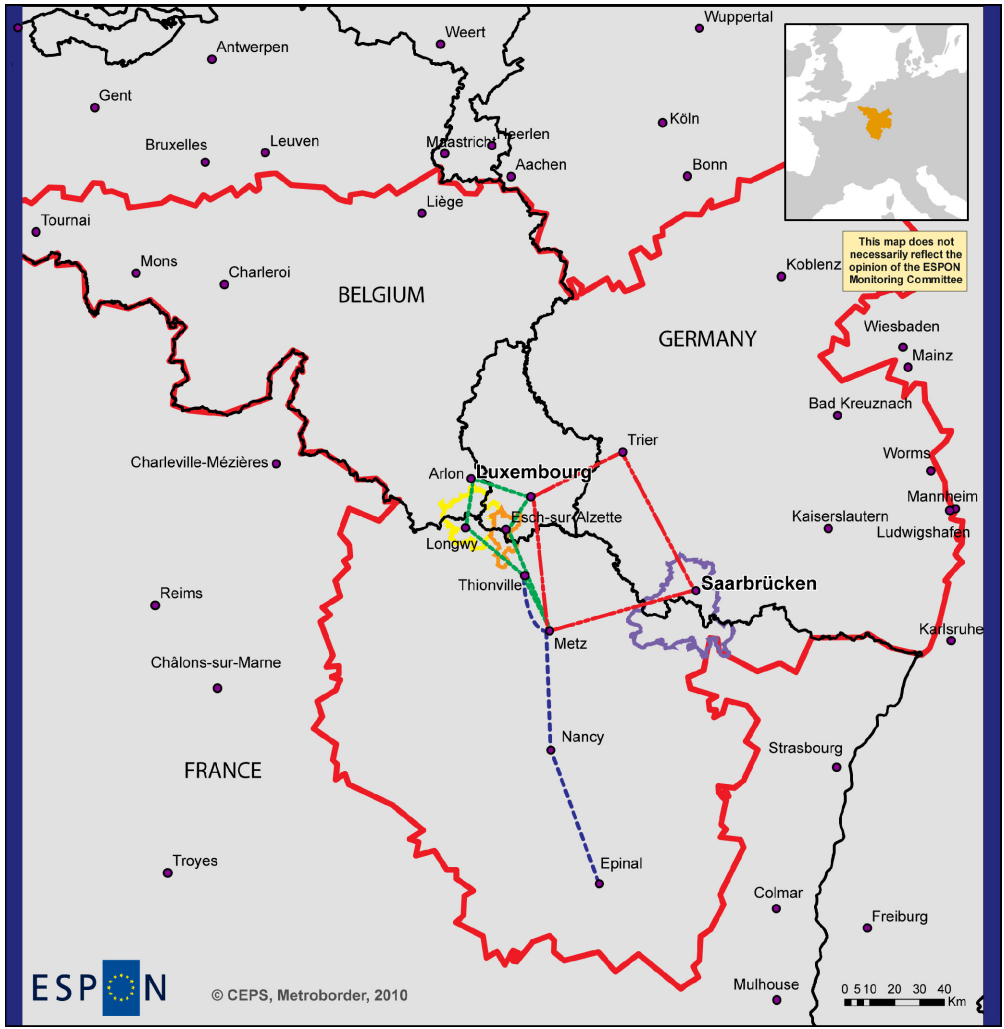



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- | | |
|--|--|
|  Eurodistrict Strasbourg-Ortenau |  Regio TriRhena |
|  Trinationaler Eurodistrict Basel |  Conférence du Rhin Supérieur |
|  Metrobasel |  Eurodistrict Region Pamina |
|  Eurodistrict Freiburg / Centre et Sud Alsace | |

Local level: NUTS 5
 Source: Metroborder, 2010
 Origin of data: Metroborder, 2010
 © EuroGeographics Association for administrative boundaries

Map 24 Upper Rhine: Institutional perimeters of cooperation

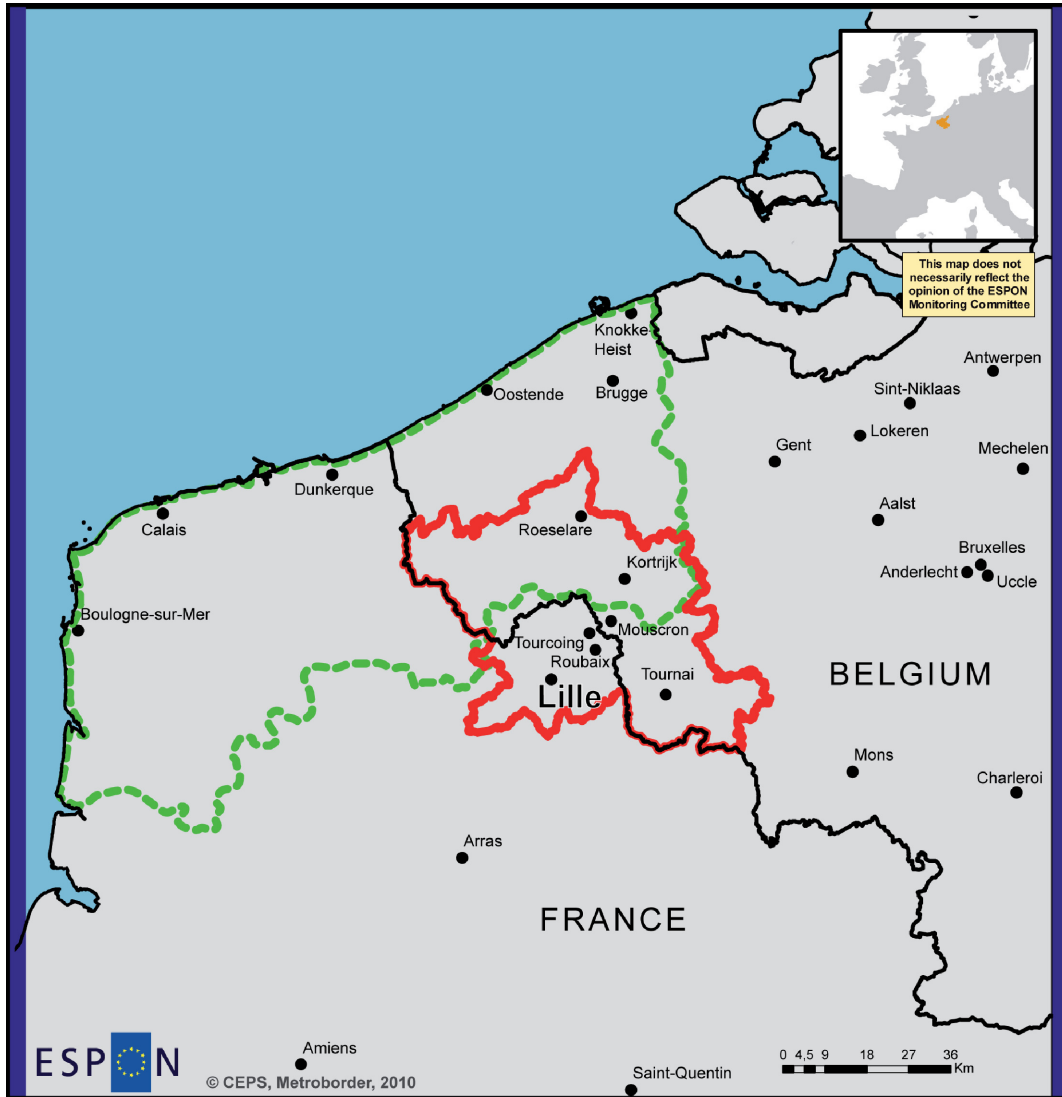


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Local level: NUTS 5
 Source: Metroborder, 2010
 Origin of data: Metroborder, 2010
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Greater Region	Quattropole city network
Eurodistrict SaarMoselle	LELA+ city network
Esch-sur-Alzette/Villerupt EGTC	Sillon Lorrain city network
European Pole of Development	

Map 25 Greater Region: Institutional perimeters of cooperation



This map does not necessarily reflect the opinion of the ESPON Monitoring Committee

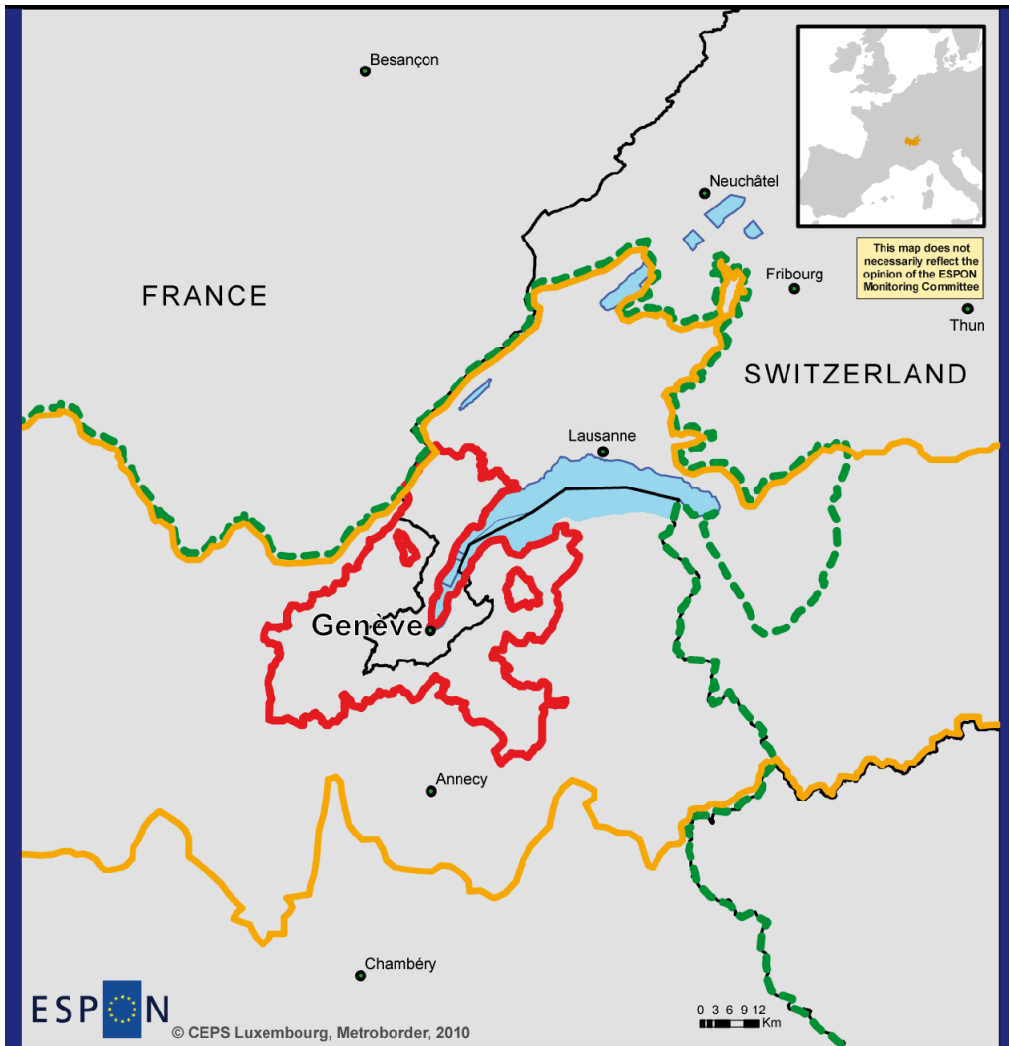
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EGCT Eurométropole Lille-Kortrijk-Tournai

EGTC West-Vlaanderen/Flandre occidentale-Dunkerque-Côte d'Opale

Local level: NUTS 5
Source: Metroborder, 2010
Origin of data: Metroborder, 2010
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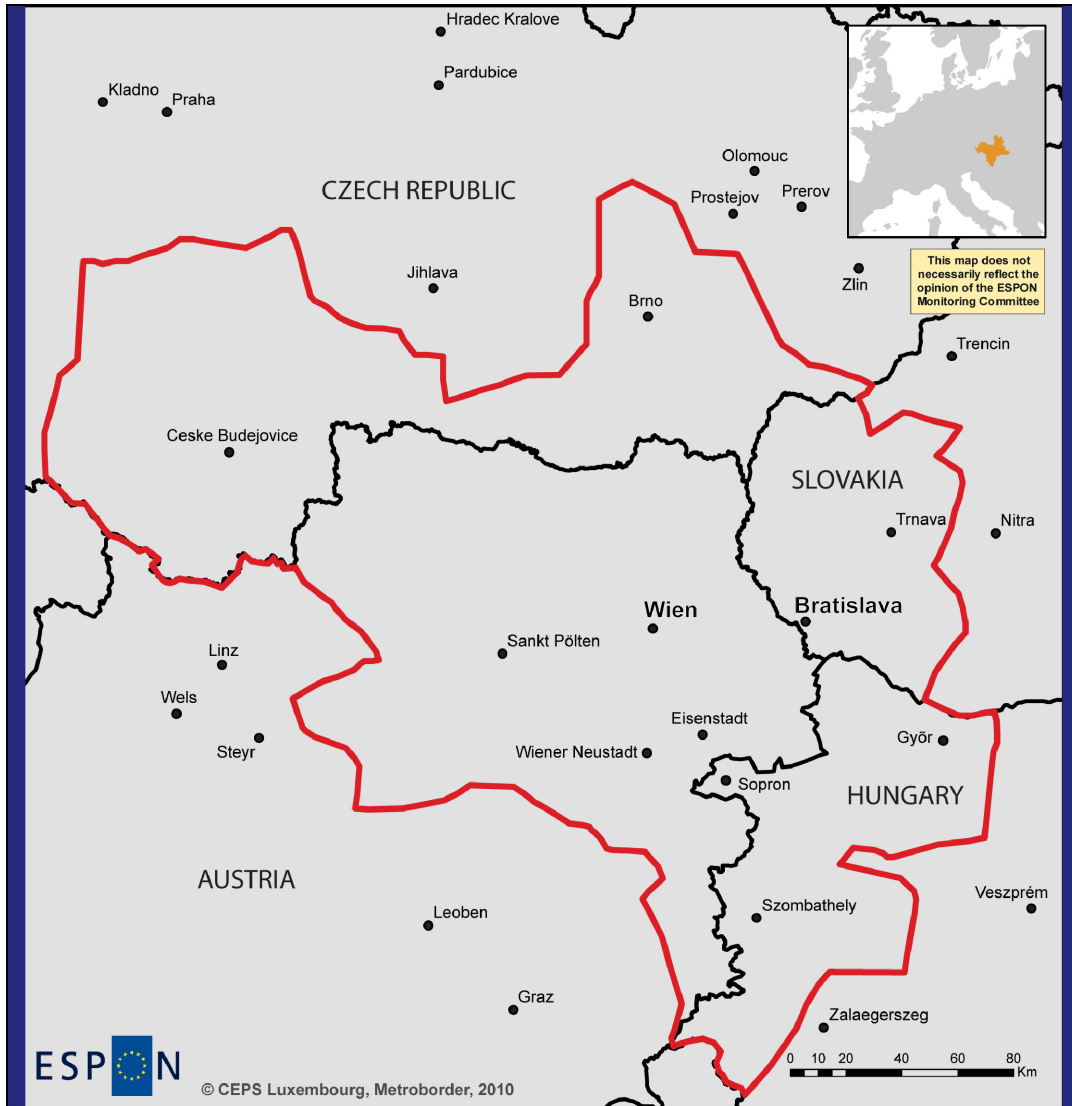
Map 26 Lille: Institutional perimeters of cooperation



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- 
Comité Régional Franco-Genevois (CRFG)
- 
Conseil du Léman
- 
Projet d'Agglomération Franco-Valdo-Genevois

Local level: NUTS 5
Source: Metroborder, 2010
Origin of data: Metroborder, 2010
 © EuroGeographics Association for administrative boundaries

Map 27 Genève: Institutional perimeters of cooperation

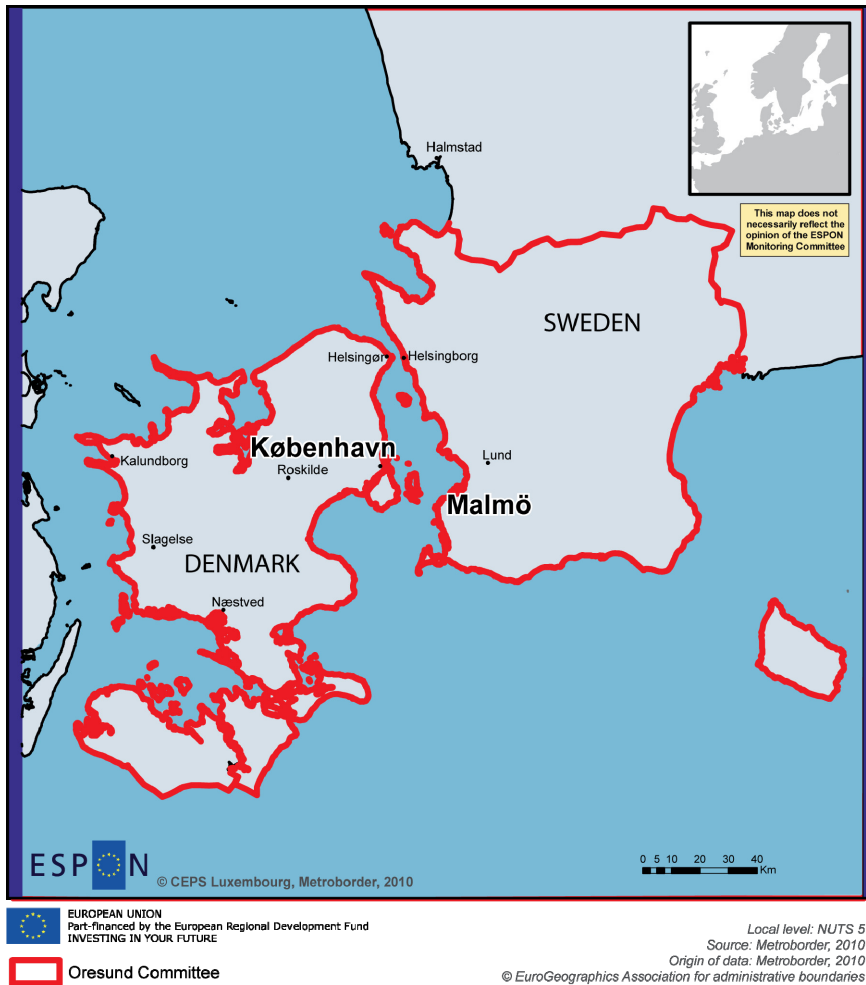



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 Centrope

Local level: NUTS 5
 Source: Metroborder, 2010
 Origin of data: Metroborder, 2010
 © EuroGeographics Association for administrative boundaries

Map 28 Wien-Bratislava: Institutional perimeters of cooperation



Map 29 København-Malmö: Institutional perimeters of cooperation

7.3.2 Institutional setting in CBMRs in more detail

- Comments on Table 4 -

Aachen-Liège-Maastricht

Two cross-border cooperation groupings coexist in this tri-national region: the Euregio Maas-Rhine involves regional and national authorities and was founded in 1976 (one of the oldest cross-border cooperations in Europe); the network of cities MAHHL was formed in 1991 and involves the five main cities of the region (Maastricht, Aachen, Heerlen, Hasselt and Liège). The two structures of cooperation cover more or less the same thematic within the same region, but their territorial focus is different as the former is made of continuous territories and the latter is a network of five municipalities. In

fact, MAHHL and the Euregio are partners but also competitors and a certain lack of coordination has been highlighted as a factor limiting cross-border cooperation (MOT 2006).

Basel

The Basel region is involved in a variety of cross-border institutions, the first initiatives having started in the early 1960s. Today, this region has a particularly complex institutional setting, since several cross-border cooperation groupings coexist.

On the level of the tri-national conurbation, two cross border initiatives have been established - one being an initiative from local and regional public actors (ETB) that began in 1994, the other being an emanation of business circles from Basel (metrobasel). At the regional scale, there are also cooperation initiatives, in particular four Eurodistricts, the Regio TriRhena, and the Upper Rhine Conference, which extends its scope along the Upper Rhine Valley from Basel (CH) to Karlsruhe (DE) including the Alsace Region.

Despite some concurrence between cooperation initiatives and a certain lack of coherence at a regional scale, this nested structure of cooperation groupings appears promising as it allows Basel and its partners to take into account the different scales at which a cross-border metropolitan region may be constructed. For further Details see WP 2.2-2.4.

Genève

Like Basel, also Genève and its French partners have started to develop cross-border cooperation at an early stage, notably in order to tackle problems related to the rising phenomenon of cross-border commuting. And like Basel, nowadays there are several organisations, both public and private, that intervene in the field of cross-border cooperation (the Comité regional franco-genevois created in 1973 or the Conseil du Léman launched in 1983, just to mention a few). The urban development of the agglomeration has been considered from a cross-border perspective as from 1992 on and has resulted in the elaboration of a cross-border agglomeration project in 1997. Nowadays, this cooperation grouping involving local and regional actors, but also representatives of the French State is engaged in an ambitious project aiming at developing the franco-valdo-genevois space in a coherent manner and strengthening the international attractiveness of the Swiss metropolis. The Projet d'Agglomération franco-valdo-genevois is supported by the French State under the call for metropolitan cooperation driven by the Datar and by the Swiss Confederation in the framework of its Agglomeration Policy.

However, the challenges of this project at the interface with other scales and other cooperation structures, in particular the Lemman metropolitan area associating Genève and Lausanne supported by the Conseil du Léman, remain unresolved.

København-Malmö

This cross-border cooperation is coordinated by the Öresund Committee, an association created in 1993 in order to anticipate the building of the bridge linking København to Malmö. The particularity of this structure is that it comprises all institutional levels, with the Danish and Swedish States as observers. The Öresund Committee plays the role of a platform promoting the interests of the border region and coordinating various cooperation activities. Despite its regional scale, the territorial grouping is very much focussed on urban issues due to the importance of the cities of København and Malmö as metropolitan cores. The Öresund Committee is the only cross-border institution in the region, but several cross-border networks have been developed, like Öresund University, a consortium of eleven universities and university colleges on both sides of the Danish-Swedish region of Öresund.

Lille

Since the beginning of the 1990's, the cross-border conurbation of Lille is involved in a project aiming to develop its metropolitan dimension. Having worked for several years on the development of a cross-border metropolitan strategy in the framework of the Cross-border Standing Conference of Intermunicipal Organisations (COPIT), an EGTC named Eurométropole Lille-Kortrijk-Tournai was created in 2008. This was the first EGTC ever created. This territorial grouping is the only one involved in the development of the cross-border metropolitan region around Lille, although its Flemish part also belongs to another territorial grouping named Flandre-Dunkerque-Côte d'Opale/Flandre occidentale belge.

Luxembourg

In the metropolitan region of Luxembourg, we find numerous cooperative structures. The oldest one is the Greater Region, a cross-regional structure formed progressively from 1971 on and often better known through its previous name Saar-Lor-Lux. Other forms of cross-border cooperation are notably urban networks involving municipalities (QuattroPole, Lela+, and the Sillon Lorrain) and cross-border agglomeration projects like the European

Pole of Development (PED) since the mid-1980s, and more recently Esch-Belval as GECT project. So far, these initiatives implemented at different scales and with different actors appear fragmented, none of them having taken cross-border metropolitan governance as their main objective. Since the project of building of a cross-border polycentric metropolitan region has been made official at the eleventh Summit of the Greater Region in 2009, the situation has changed. The articulation between the different initiatives represents a challenge. For more details see WP 2.2/2.3.

Saarbrücken

Since the early 1990s, the city of Saarbrücken and municipalities in eastern Moselle are involved in a Eurodistrict project and have developed several projects including the economic zones, the setting up of a train-tram between Saarbrücken and Sarreguemines, etc. This initiative has received support from the national level in France (DATAR) as part of the policy of metropolitan cooperation and is currently engaged in a process of establishing an EGTC. The Eurodistrict SaarMoselle must also deal with other forms of cooperation implemented at other geographical scales, in particular the Greater Region and the network of cities QuattroPole.

Strasbourg

Since 2003, the urban community of Strasbourg – jointly with the Kreis Ortenau – is engaged in a Eurodistrict that has been transformed in an EGTC in early 2010. Cross-border cooperation between local actors on both sides of the Rhine is however much older and institutionalised exchanges between the municipalities of Strasbourg and Kehl exist since 1975. Like Basel, Strasbourg's metropolitan development could benefit from a multiscale approach: the territorial grouping between Strasbourg and Ortenau devoted to the urban development of the cross-border agglomeration and its economic space appears complementary with a regional initiative aimed at promoting a polycentric metropolitan region across the Upper Rhine.

Strasbourg is – as the Basel region – part of the Upper Rhine conference.

For more details see WP 2.2.-2.4.

Wien-Bratislava

Given the presence of the Iron Curtain between Austria and Slovakia until 1989, cross-border cooperation in this area is recent and still in an early stage of its development. After having conceived an initial regional development plan for the Vienna-Bratislava-Győr region between 2000 and

2005, the Centrope project was launched in 2003 with the aim of creating a Euroregion over the 4 countries (Austria, Hungary, Czech Republic, and Slovakia). In order to improve transportation between Wien and Bratislava and foster cross-border economic integration, passenger transport on the Danube (Twin-City Liner) has been developed. If Centrope has been set at a large scale, the core of a cross-border metropolitan cooperation involves the bipole Vienna and Bratislava as the economic engine for the cross-border region. The reinforcement of cross-border cooperation lies thus at first in the hand of the two main cities.

7.3.3 The construction of CBMR: a multiscale process?

When considering different scales for cross-border metropolitan cooperation, we should highlight the fact that – on the scale of the FUA – a city can claim to be (or become) a metropolitan area on its own. And the same city can, at a regional scale, be part of polycentric metropolitan region. One of the rationalities behind such interplay is that the construction of a metropolis (mono-centric or polycentric) cannot be achieved through the mobilisation of one spatial scale. Some metropolitan functions are related to urban development issues and call for proximity. Some other metropolitan thematic like the connection to regional, national and European transportation networks deserve to be treated at a wider scale. In any case, geographical scales must be considered as social constructions and not spatially given. That means that they depend on political choices and actors' strategies.

When looking at the nine CBMRs under scrutiny, there are obvious similarities between Basel, Genève, Saarbrücken and Strasbourg as far as their cross-border metropolitan cooperation is concerned. In fact, all four cases present a cross-border agglomeration and this spatial proximity between the metropolitan urban core and the border plays a structuring role (Lefèvre 2004; Sohn, Reitel and Walther 2009). But in addition, these cases also highlight the multiscale dimension of constructing a cross-border metropolitan region as other initiatives set up at different scales are at play. Other CBMR like Lille, København-Malmö, or Wien-Bratislava do not develop such complex institutional arrangements as they implement their metropolitan cooperation through one main institutional structure. Of course, the existence of a unique cooperation grouping set up over a cross-border urban agglomeration (e.g. Lille) or an urban region (e.g. the Öresund Committee) does not necessarily mean that the metropolitan cooperation is restricted to one scale; it just means that the multiscale dimension of the

metropolitan governance is managed differently, maybe in a more centralised way.

In conclusion, it is probably not the number of cooperation initiatives present in a given region that matters for the construction of a cross-border metropolitan region, nor is it the juxtaposition of tangled structures. What definitely matters lies in the functional and political articulation of the territorial imaginaries at play and the power relationships at stake.

7.4 Methodology Functional Integration Greater Region (WP 2.1)

Developed within the framework of the theory of knowledge and on a European level, the work initiated by the OECD in the mid-1980s is not subject to the above criticisms (OECD, 2006). Based on the intensity of research and development (R&D) and the technological level of activities, these analyses initially concerned the manufacturing sector (Hatzichronoglou, 1997). Subsequently, they were extended by Eurostat (2006) to cover service activities, and finally provided a European classification of high-technology and knowledge-intensive sectors. The resultant classification distinguishes between four categories of manufacturing industry as a function of their technological level, as well as six categories of services of which four are highly knowledge-intensive and two are less knowledge-intensive. Table 1 shows these different sectors on the basis of the NACE classification of activities adopted by the European Union (EU) and shows in grey the high-technology and knowledge-intensive services (KIS) which are discussed in the subsequent analysis.

The main drawback of this sectoral classification is associated with the heterogeneity of the activities considered as highly or less highly knowledge-intensive. The financial sector, for example, consists of several very diverse specialisations (asset managers, IT workers, secretaries, security staff). There is also the fact that enterprises are increasingly inclined to specialise in terms of type (function) of job and no longer only in terms of economic sector. The management and production functions thus tend to occupy different places within the same economic sector, as shown by Duranton and Puga (2005), who describe this as the passage from sectoral specialisation to functional specialisation.

Economic sectors	NACE version 1.1 codes
Manufacturing industry	
High technology	24.4, 30, 32, 33, 35.3
Medium-high technology	24 (-24.4), 29, 31, 34, 35 (-35.1 and 35.3)
Medium-low technology	23, 25 to 28, 35.1
Low technology	15 to 22, 36, 37
Services	
High-technology Knowledge Intensive Services (KIS)	64, 72, 73
Market Knowledge Intensive Services (KIS)	61, 62, 70, 71, 74
Financial Knowledge Intensive Services (KIS)	65 to 67
Other Knowledge Intensive Services (KIS)	80, 85, 92
Market Less Knowledge-Intensive Services (LKIS)	50 to 52, 55, 60, 63
Other Less Knowledge-Intensive Services (LKIS)	75, 90, 91, 93, 95, 99

Table 16 Manufacturing and services sectors

Note: high-tech industries and knowledge-intensive services are indicated in gray.

Sources: OCDE (2006) and Eurostat (2006).

Adaptation for the case of Luxembourg and identification of high-technology and highly knowledge-intensive sectors

The methodological process includes two stages. Firstly, the OECD-Eurostat classification is adapted to the specifics of Luxembourg, to the extent to which this is mandated by the nature of the data used. Then, a procedure selecting the jobs corresponding to highly knowledge-intensive sectors is carried out.

The classification of highly knowledge-intensive activities produced by the OECD and Eurostat is based on the classification of economic activities within the EU (NACE version 1.1). Taking into account the data available at the European level, the identification of high-technology manufacturing industries has been made using the NACE codes to three figures, while the highly knowledge-intensive services are aggregated on the basis of the NACE codes taken to two figures. The use of figures from the IGSS's administrative files allows the classification to be refined and to better take into account the specific features of the Luxembourg economy by using the NACE code to five positions for all those in active employment and registered for social security. This statistical opportunity allows two types of modification to be made to the OECD-Eurostat classification. Firstly, certain sectors which are aggregated when the NACE codes are taken to two positions are disaggregated to select the most relevant activities (in purple in Table 17). This operation was

carried out for the following activities: post and telecommunications (64), other business activities (74), education (80) and health and social work (85). In each of these activities, only the sectors with the highest level of knowledge intensity as identified by Krätke (2007) in his analysis of the knowledge economy at the level of the European metropolises have been retained, viz. telecommunications (64.2), certain other business activities (75.1-5), higher education (80.3) and the human health activities (85.1).

Secondly, the classification has been completed by sectors of activity linked to the other supporting transport activities (63.2) and the organisation of freight transport (63.4), which are particularly highly developed thanks in particular to the Luxembourg airport facilities, as well as certain activities within the general (overall) public service activities, foreign affairs, justice and judicial activities (75.111, 75.210, 75.230) and the extra-territorial organisations and bodies (99).

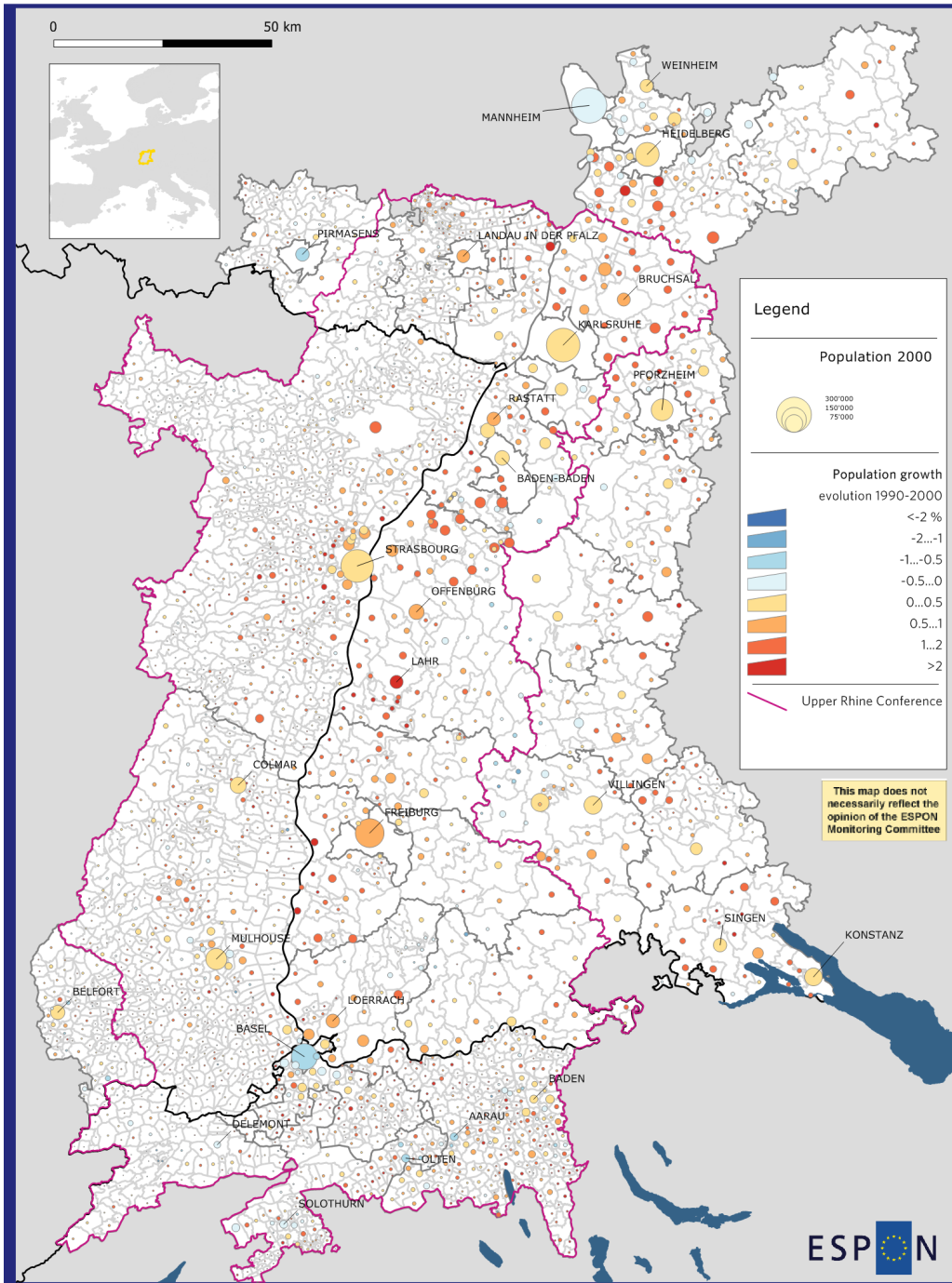
This modified classification has been used as the basis for the identification of high-technology and highly knowledge-intensive jobs. Socio-professional status has been taken into account in order to exclude the analysis of blue-collar workers, as this category of employees generally corresponds to less qualified positions which are thus not representative of high-technology and knowledge-intensive employment. Although the IGSS data provides neither the NACE code nor the location of the head office of self-employed intellectual workers, this category has been taken into account in calculating high-technology and knowledge-intensive jobs because of the specific profile of the professions in question (doctors, lawyers, insurance agents etc.). The international civil servants included by STATEC and absent from the IGSS data have also been included in the calculation of these jobs. These two additions, however, concern only the statistics aggregated at the national level, as no information relating to the location of these jobs is available for the dates studied.

OECD classification	NACE	adapted classification for Luxembourg	NACE
Manufacturing industry		Manufacturing industry	
High-technology		High-technology	
Aerospace	35.3	Aerospace	35.3
Computers, office machinery	30	Computers, office machinery	30
Electronics-communication	32	Electronics-communication	32
Pharmaceuticals	24.4	Pharmaceuticals	24.4
Scientific instruments	33	Scientific instruments	33

Knowledge-intensive services		Knowledge-intensive services	
Knowledge-intensive high-tech services		Knowledge-intensive services	high-tech
Post and telecommunications	64	Telecommunications	64.2
Computer and related activities	72	Computer and related activities	72
Research and development	73	Research and development	73
Knowledge-intensive market services		Knowledge-intensive market services	
Water transport	61	Water transport	61
Air transport	62	Air transport	62
		Other supporting transport activities	63.2
		Activities of other transport agencies	63.4
Real estate activities	70	Real estate activities	70
Renting of machinery and equipment without operator and of personal and household goods	71	Renting of machinery and equipment without operator and of personal and household goods	71
Other business activities	74	Other business activities	74.1-74.5
Knowledge-intensive financial services		Knowledge-intensive services	financial
Financial intermediation	65	Financial intermediation	65
Insurance and pension funding	66	Insurance and pension funding	66
Activities auxiliary to financial intermediation	67	Activities auxiliary to financial intermediation	67
Other knowledge-intensive services		Other knowledge-intensive services	
Education	80	Higher education	80.3
Health and social work	85	Human health activities	85.1
Recreational, cultural and sporting activities	92	Recreational, cultural and sporting activities	92
		Other less-knowledge-intensive services	
		General (overall) public service activities, Foreign affairs, Justice and judicial activities (selection)	75.111, 75.210, 75.230
		Extra-territorial organisations and bodies	99

Table 17 High-technology manufacturing and knowledge-intensive services sectors. Sources: OCDE (2006) and Eurostat (2006).

7.5 Population development Upper Rhine 1990-2000 (WP 2.1)



Regional level: LAU2
 Sources & origin of data:
 France / INSEE (Recensements de la population 1999-2006)
 Switzerland / BFS (Recensements fédéraux de la population et des entreprises 1998-2008)
 Germany / Statistisches Landesamt Baden-Württemberg & Bundesagentur für Arbeit (1999-2008)
 Administrative divisions: : SABE 01

Map 30 Population development Upper Rhine 1990-2000

7.6 Definition of Secondary Centers and Poles (WP 2.4)

On the level of the system of cities, the definition of the poles is based on three types of criteria - demographic, connectivity and functions (see Table 18):

- located within the PUSH of Basel: the city is accessible in less than 45 minutes from the centre of Basel;
- Demography: the FUA must have more than 50,000 inhabitants;
- Connectivity: the FUA is a regional node: stop of the national or international inter-city trains;
- Functions: more than 25,000 jobs in the FUA;
- administration: centre of administration or political power of regional level;
- tourism: place of interest.

The secondary poles or centre have to fulfil all the conditions. Delémont is considered as exception and, thus, as a secondary pole even if it does not fill the condition in demography and in economy. We are considering the city as a secondary pole because it is the capital of the Canton of Jura in Switzerland.

On the level of the cross-border urban area, the definition of the secondary centres lays also on the same types of criteria (demographic, connectivity and functions, cp. Table 18):

- The secondary centre must be located in the FUA of Basel or in the contiguous FUA if it is located in the neighbour country;
- Demography: the FUA must have more than 10,000 inhabitants;
- Connectivity: the FUA is a local node: regional railway station or location of a harbour;
- economy: more than 5,000 jobs in the FUA;
- administration: centre of administration or political power (transmunicipal level)
- Commerce: shopping centre of regional level.

The secondary centres must fill at least three conditions.

The political and administration and the demographic functions of the secondary centre are the more important according to our aim. For these reasons, some secondary centres will be excluded.

Type	Level	Population	Transport	Economy	Administration	Symbolic centrality
Secondary pole	System of cities	> 50 000 inhabitants (FUA)	Regional node (railway, shipping, air, road)	> 25 000 jobs	Centre of administration (CH : Canton, D : Reg. Bezirk, Kreis; F : Département, Région)	Place of tourism (cf. Michelin)
Secondary centre	Urban area (FUA)	> 10000 inhabitants (municipality)	Local node : port or important railway station	> 5000 jobs	Centre of transmunicipal administration (CH : ?; D : kreis ; F : structure intercommunale)	Shopping centre

Table 18 Indicators for the selection of secondary poles and centres

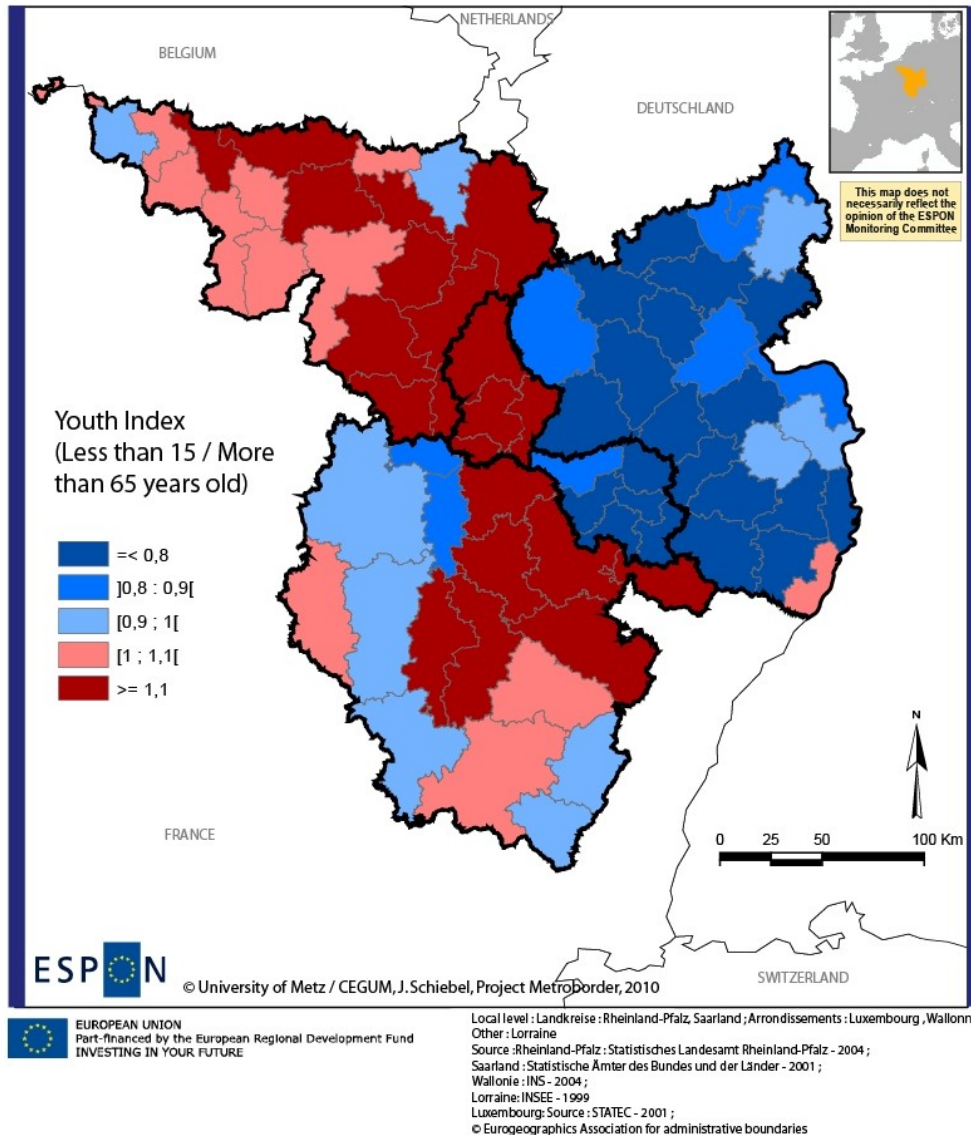
7.7 Annexes Feasibility Study (WP 2.5)

7.7.1 Political context: from cross-border agreements to a transnational approach?

The political decision makers of the Greater Region have expressed concerns about the health topic throughout the boundaries for several decades. Some diplomatic agreements were created as soon as the 1970s, but the real impetus began on the 18th November 2005 in Mainz, when the Greater Region authorities decided to create a working group on health. This framed the further orientations of cross-border cooperation and several bilateral conventions between countries (CESGR 2009).¹

¹ The working group n°4 is entitled « Impacts of demographic change in the Greater Region in the sector of health: Adjustment to the needs of an ageing society ». Its first recommendation is: « Strengthening the cooperation between the actors of the health sector in the regions (including the retirement homes and care) to improve the exploitation of care structures and to allow a regional planning of medical supply. The working group on health is divided into 4 subgroups, from which one deals with emergency services.

In 2009, the Social and Economic Committee of the Greater Region and the Luxembourg Presidency of the 11th Summit state the significance of the health sector in the transnational area, especially in a context of demographic change and ageing.



Map 31 The youth index in the Greater Region (less than 15 / more than 60 years old)

On the one hand, the ageing process is general in the Greater Region with important differences between areas: the German Länder are deeply concerned, so as the old coal industry basin in France and Belgium, the derelict rural areas of the French department of Vosges and Meuse (Map 31

). On the other hand, a demographic dynamism is patent in Luxembourg, around the bigger cities and along the "sillon mosellan" which is the axis going from Epinal (F) to Luxembourg via Nancy, Metz and Thionville. This spatial configuration is important as regards the emergency services perspective, because aged people are amongst the population having a more frequent use of these services, and the remoteness in some rural areas accurately raises the question of equity in the access to the services.

Moreover, first studies and achievements have already been made in this field:

- bilateral cooperation between couples of hospitals, for example Arlon (B) and Mont-Saint-Martin (F). A convention of twinning exists since 1990, leading for example on a common use of a scanner; a common management of emergency services has begun between Verdun and both hospitals;
- Study of comparison of the health public structures between Saarland and Moselle, including emergency related services, in an Interreg IIIA project².
- Cooperation between specialty hospitals: cooperation for emergency care towards severe burn victims between the French hospitals from Lorraine and Alsace on the one hand, and the Ludwigshafen Red Cross hospital on the other; cooperation between the hospitals of the South Belgian province of Luxembourg (CSL Vivalia) and the University hospital centre (CHU) of Nancy for electrophysiology since July 1st 2009.
- France-Belgium convention on cross-border emergency care, signed on 20th March 2007, allowing in the territory of the other state the intervention of services of emergency care (which are called SMUR in France as in Belgium)³. An integrated cross-border zone of health care has been framed between the South Belgian province of Luxembourg and the Meuse and Meurthe et Moselle départements. In the frame of the Interreg IVA programme, the project luxlorsan aims at extending the French-Belgian cooperation procedures to a larger area including the Grand Duché du Luxembourg and the *Département Moselle* – but there is still no such

² Project "Mise en Place d'un Outil de Comparaison Economique des Systèmes de Santé en Sarre et en Moselle" lead by the Centre Lorrain des Technologies de La Santé (Forbach-57) and the LandesArbeitsgemeinschaft für Gesundheitsförderung Saarland (Saarbrücken-D), 2003-2006.

³ *Convention franco-belge en matière d'aide médicale urgente*. Signed the 20th March 2007 in Tournai by the Belgian Ministry of Health, the Director of the ARH-Regional Agence of hospitalisation Nord-Pas-de-Calais (as a mandatory of the French Ministry of Health), with delegation for the ARH of the French regions Champagne-Ardenne, Picardie and Lorraine. The 19th March 2008, a convention has been signed in Mont-Saint-Martin (F) between the regions of Lorraine and Wallonia.

convention between the Grand Duchy and the Belgian province of Luxembourg.

Although these cooperation projects are still young, they look really promising as they respond to the vital challenge of harmonising and improving the health supply. But they are fragmented throughout the Greater Region territory. An interest of the Greater Region level lies firstly in the coordination of all the bottom-up achievements signed since the beginning of the years 2000, i.e. cooperation procedures between couples of hospitals, secondly in widening the bilateral conventions such as the French-Belgian health zone (ZOAST Arlwy). The challenge would be to overcome the local territorial cooperation into a global spatial vision.

7.7.2 Methodological specifications (shortest path problem, location-allocation problem and potential accessibility)

Reducing the time distance: the interest of the graph theory

To be efficient, emergency services need to be able to arrive on the accident place less than thirty minutes after the emergency call. Shorter is the intervention time, better it is for the victim. Once on the accident place, the emergency doctor begins to treat the victim and continue the healthcare during the transportation of the victim at the nearest hospital or the most suitable hospital. So, the most important moving is the one from the emergency service to the accident place. Consequently, to improve their efficiency, the main objective of the emergency services is to reduce the time distance between them and all part of the territory.

One problem: a low accessibility in the borders of emergency areas.

Each emergency service has its own area of intervention, a perimeter determined by the distance of the other service locations. The problem of the distance to the service often affects the borders of these areas. In these places, the better distance with an emergency service is not always the distance to the assigned service. And the emergency areas are sometimes not as good as they could be. One of the reasons is that the intervention areas boundaries are often the same that the administrative or countries frontiers. Also, some places could be over the limits of thirty minutes of time distance to an emergency service.

In spite of cross-border solutions as the emergency cooperation programme between France and Belgium, this problem affects all the Greater Region because that is not a state border problem only. Each emergency area can have its own peripheral spaces which have a low accessibility to the medical rescue teams.

To analyse the emergency services locations by the road network.

An analysis of the places of the emergency services by the road network, used by the rescue teams, will be useful:

- to find the zones of bad accessibility;
- to define the best emergency location for each place (the emergency team with the shorter distance);
- to compare previous results to the current allocations;
- and, if necessary, to (re)locate the emergency services.

Methods of the graph theory will help us to do this.

Programs & data's requirements:

- G.I.S. software;
- Network analysis add-on;
- Road network data as NavteQ® or TéléAtlas® (including speed limits and traffic constraints);
- Emergency services locations data.

Shortest path problem

Shortest path problem is a classic problem of the graph theory. Its objective is to calculate for each point (a graph's vertex) of a network the shortest distance to the others by using the roads (the graph's edges). In our problem, we can consider that edges are all the roads of the network and the vertices are either the crossroads or the city centres. Because of the big number of calculations, it will be better to use only the city centres as vertices. Then the emergency services locations are specific vertices. All the shortest paths will be calculated from these network's points, so they are the source vertices.

Shortest path problem can be solved by using the Dijkstra's algorithm. The network analysis G.I.S. add-ons include some tools able to apply this

algorithm. It must be repeated for each source vertex, i.e. each emergency services location.

The algorithm operates by calculating the distance between the source vertex to its neighbours. If it exists more than one path between a vertex and another, the algorithm selects the shorter one by using the triangular inequality rule ($\forall x,y,z \in E, d(x,z) \leq d(x,y) + d(y,z)$). Gradually, the algorithm finds the shortest path for its neighbours and the next nodes. When all the shortest paths from source vertex to the other vertices are found, the process is stopping. So, by this algorithm, we obtain a shortest path tree and we know exactly what the distance between the source vertex and the others is.

Because rescue teams need to go as fast as possible on the accidents places, it is important to give time parameters at the network. The model could use the speed limits to calculate these parameters. It is a good compromise between the maximum speed of the ambulances and the traffic slowdowns. Using these parameters, a study on emergency services accessibility in Upper-Normandy (France) has produced good results, near from the speed reality of the rescue teams (Drieu & Mary 2005).

By this method, we could expect to obtain the access time from emergency services to each place and compare it to the real division in emergency perimeters. If there are areas with a bad accessibility, the results could help us to define which emergency service is the most suitable.

Location-allocation problem

The method of location-allocation completes the results obtained by the shortest path problem (Peeters & Thomas 1997). Its aim is to determine the number of establishments, their locations and their influence areas by using the road network as in the shortest path problem. In our problem, this network is transformed in a graph with the same vertices and edges than previously. And the time distance is also the measurement unit. But this method can take account of other variables like number of risked population (like the old people) of each place.

Several location-allocation models but the p-median is appropriate to our problem. Its principle is to minimise all the weighted distances between the source vertices and the places of potential accident. This model provides an answer to the question of the optimum location following a certain number of constraints: no overlap between catchment areas; use of some existing emergency hospitals or not; maximum number of emergency hospitals.

Additional constraints could be added such as the maximum time distance from each place to an emergency unit or a maximum number of emergency units, in order to keep the global cost of these services under control.

This model would essentially prove useful to answer to local needs as regards primary transport. The secondary transport raises other issues leading to other methods.

Potential accessibility models

The secondary transport depends on the presence of various specialty hospitals. The interest of the Greater Region level lies in the eventual complementarities between the hospitals of the five entities. Sharing all the specialty hospitals would represent a clear added value of this transnational level for the inhabitants.

Several considerations must be taken into account to build the appropriate model:

- the actual specialty hospitals will shape the basis of the model;
- the actual flows of patients between hospitals located in different countries can hardly be known, and must not enter in the model;
- the possible inter-hospital network will be framed differently following the specialty scope: the Greater Region level may look appropriate for specialties present in each entity as specialised surgery; it is too restricted for the rarer specialties like treatment for severe burn victims.

Potential accessibility models would fit these requirements as they rely not on actual data but on potential ones. For example, in the ESPON3.2 project, scenarios have been designed on the accessibility to maternity hospitals in the Greater Region, taking into account the supply (number of beds per maternity hospital), the demand (number of births per local administrative unit) and the time-distance. The overlaps between catchment areas have been displayed thanks to the use of the fuzzy sets theory.

The application of potential accessibility to the secondary transport would imply a different calibration of the model. Each hospital specialty deserves a particular modelling:

- the supply: number of beds for a particular specialty;
- the demand: number of beds in each other hospital, potentially needing a secondary transport;

- time-distance between each hospital and the specialty hospital.

Each particular model would result in a map of influence areas of specialty hospitals. Taking into account all the influence areas will represent an interesting stake, in order to emphasise which areas are provided the best access to specialties and which ones are the most derelict.

7.7.3 Note on data collection and cartography

A first technical and cartographic test has been made on the localisation of emergency related services in the Greater Region. The achievement of the map of emergency hospitals (Map 21) required choices on the appropriate territorial template, and on the data.

a) Which territorial template?

The achievement of the study requires the choice of a harmonised and local territorial template. A mixture of LAU1, LAU2 and sometimes other partition has been designed, in a similar way as in the ESPON3.2 project.

Belgium and Saarland have the larger LAU2 in the Region, and do not have any LAU1 partition. So the territorial template cannot be more precise than this level. The corresponding units in size are, in France, the "cantons" (aggregation of French LAU2), in Luxembourg the "cantons" (LAU1) and in Rheinland-Pfalz the "Verwaltungsgemeinschaften" (LAU1).

b) Data collection

The aim was (1) to localise the emergency related services, (2) to provide a representation of the emergency supply. The emergency supply should ideally be displayed through the number of emergency vehicles. Nevertheless, such data is not easily available in the transnational context of the Greater Region. As a consequence, the supply has been shown on the Map 21 through the total number of beds per hospital having an emergency unit. This is only an approximation of the total hospital supply per city, as the beds from hospitals without emergency services are not indicated.

Data on the emergency hospital services were collected through five different sources (one per territorial entity: Saarland, Rheinland-Pfalz, Wallonia, Lorraine and Luxembourg, cf. the sources of Map 21). These sources are as heterogeneous as the organisation of the health systems in these entities.

The main problem was that the official listings of emergency hospitals were not updated, and some hospitals were absent. For example, there was no data on the emergency hospital of Mont Saint-Martin (France) although the hospital, located close to the boundary, plays a key role in the French-Belgian inter-hospital cooperation. The harmonised data base was achieved through the following principles:

- In each territorial entity, overlap between different sources to identify the emergency hospitals; control of the existence of the identified emergency services via the hospitals web sites (due to the vital stakes of this information, we suppose that the hospitals web sites display right facts in this matter)
- The total number of beds has been calculated only for hospitals having an emergency service. For example, there is a total of 1800 hospital beds in Saarbrücken but only 900 in the hospital having an emergency service. So the number of 900 has been taken into account. The beds for elderly accommodation were not taken into account in each country. The work achieved so far under the Interreg IIIA programme "Etude comparative des systèmes de santé en Sarre et en Moselle" gave some insights for the comparison between the French and German hospital systems.

In a thorough study on emergency hospitals in the Greater Region, it would be necessary to consider the complete hospital supply, as an emergency ambulance may lead the victims not only to the hospital where the ambulance is from, but also to any appropriate hospital. This supposes an important work on the comparability of hospital practices in these countries, namely the share of home hospitalisation and the correspondence between hospital specialties.

On Map 21 , the classes of density data were set by the quantile method.

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