Blekinge Institute of Technology

European Spatial Planning and Regional Development
2010/2011

Master Thesis

CROSS-BORDER POLYCENTRIC
METROPOLITAN REGIONS
THE CASE OF THE GREATER REGION

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Submitted to Blekinge Tekniska Högskola for the Master of European Spatial Planning and Regional Development on the 15 May 2011
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<th>Description</th>
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<tbody>
<tr>
<td>AEBR</td>
<td>Association of European Border Regions</td>
</tr>
<tr>
<td>ARL</td>
<td>Academy for Spatial Research and Planning</td>
</tr>
<tr>
<td>BBR</td>
<td>Federal Office for Building and Regional Planning</td>
</tr>
<tr>
<td>BBSR</td>
<td>Federal Institute for Research on Building, Urban Affairs and Spatial Development</td>
</tr>
<tr>
<td>BMBau</td>
<td>Federal Ministry for Regional Planning, Building and Urban Development</td>
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<td>BMVBS</td>
<td>Federal Ministry of Transport, Building and Urban Development</td>
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<td>CBPMR</td>
<td>Cross-border Polycentric Metropolitan Region</td>
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<tr>
<td>ESDP</td>
<td>European Spatial Development Perspective</td>
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<td>ESPON</td>
<td>European Spatial Observation Network</td>
</tr>
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<td>EU</td>
<td>European Union</td>
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<td>FUA</td>
<td>Functional Urban Area</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>IBA</td>
<td>Interregionale Arbeitsmarktbeobachtungsstelle</td>
</tr>
<tr>
<td>LAU</td>
<td>Local Administrative Units</td>
</tr>
<tr>
<td>MKRO</td>
<td>Conference of State Ministers for Spatial Planning</td>
</tr>
<tr>
<td>MORO</td>
<td>Demonstration Projects of spatial Planning</td>
</tr>
<tr>
<td>MUA</td>
<td>Morphological Urban Area</td>
</tr>
<tr>
<td>WSAGR</td>
<td>Economic and Social Committee of the Greater Region</td>
</tr>
</tbody>
</table>
ABSTRACT

This thesis aims to analyze the extent to which the concept of cross-border polycentric metropolitan regions (CBPMR) can be applied to the cross-border region “the Greater Region”. The concept of CBPMR is rather new since metropolitan regions have not been suspected of existing in cross-border locations until recently, due to the separating function of national borders. This analysis is based on a theoretical discussion of the concepts of cross-border regions, polycentricity and metropolitan regions. The application of the concepts to the Greater Region leads to the result that the core of the region can be defined as a small scale CBPMR. The elaboration of strengths and weaknesses of this regions helps to identify opportunities to develop the small-scale CBPMR as an internationally well known region.
SUMMARY

Until recently, metropolitan regions used to be located in the economic centers of nation states and not close to national borders. In contrast, border regions have been perceived as the periphery of economic activity and being less populated for a long time. With increased co-operation across national borders the development potential of these regions was strengthened. Recently, the concept of cross-border polycentric metropolitan regions (CBPMR) appeared in the discussion regarding the regional development of border regions. Based on this discussion the thesis applies the concept of CBPMRs on the cross-border region “the Greater Region”, located between France, Germany, Luxembourg and Belgium, to elaborate to what extent the region fits the concept.

To collect the necessary information about the concept of CBPMRs, a theoretical discussion is done. This method is the most appropriate to collect the needed information about the underlying concepts of cross-border regions, polycentricity and metropolitan regions. Subsequent, the strengths and weaknesses of the Greater Region are elaborated to derive opportunities for the further development of the region.

The application of the concept of CBPMR leads to the conclusion that only the core of the Greater Region can be defined as CBPMR and not the whole territory of the region. Since the size of the centers is too small according to the classification of metropolitan regions, the core of the Greater Region can be defined as a small-scale CBPMR, with Luxembourg City as the main center. The classification is mainly based on the strong functional integration within the region. After the application of the different concepts, strengths and weaknesses of the small-scale CBPMR are elaborated. The derived development opportunities are focused on an increased use of the population growth in Luxembourg for the whole region, the enhancement of accessibility of the CBPMR to increase the use of the location in the strong core of the EU, and the increase of recognition of the CBPMR at the international level by a stronger co-operation between the centers.

As a conclusion of the research, it can be stated that the Greater Region can be classified as CBPMR at a small-scale. The main weakness of the region is the small size of the centers, but since the functional integration is high, based on the international labor market in the region, this weakness can be overcome.
1 INTRODUCTION

Until recently, metropolitan regions used to be located in the economic centers of nation states and not close to national borders. In contrast, borders have been perceived as the periphery of economic activity and being less populated for a long time. However, many border regions began to co-operate based on common development problems. Since the late 1980s, the number of cross-border co-operations have increased based, on a stronger focus by the EU and nation states. Recently, the concept of cross-border polycentric metropolitan regions (CBPMR) appeared in the discussion regarding the regional development of border regions.

The concept of CBPMR deals with the existence of metropolitan regions across national borders. The evolution of this concept within the EU is based on the ongoing European integration process and the reduction of the separating function of national borders. Based on the efforts of the Council of Europe and the European Commission in the 1980s, the ability of local and regional authorities to work together across borders has increased. The Council of Europe is responsible for the development of a legal basis for cooperation, and the European Commission provides financial support for initiatives concerning cross-border cooperation under the INTERREG Community Initiative. Before this support started in the 1980s, cross-border co-operation was based on individual agreements between local authorities. Today there are practically no local or regional authorities located at national borders that do not participate in some way with those of the neighboring country. It is expected that the classification of a region as a CBPMR will increase the international recognition of the region and therefore will improve the competitiveness of the region.

The increased cross-border co-operation at the regional level strengthened the international significance of border regions and started discussions about the importance of these regions and their economic potential. The importance of cross-border regions for European development should not be underestimated. 30% of the inhabitants of the enlarged EU are living in a cross-border region and they capture more than 40% of the EU territory (BMVBS 2011). The process of European integration has had a direct influence on the cross-border regions, for example with the introduction of common currency or the Single European Market. These developments increased the cross-border connections and drive the territorial integration process on the local and regional level. Due to these developments the cross-border regions are seen as laboratories for European Integration. The existence of cross-border polycentric metropolitan regions can be seen as an important step in the Regional Policy of the EU and helps to overcome the general assumption that there are weaknesses inherent in cross-border regions.
The Greater Region is a cross-border region located between France, Germany, Belgium and Luxembourg. This cross-border region is characterized by a high density of national borders and different political and administrative frameworks of the participating countries. Still, the region has a long tradition of co-operation based on coal and steel production in the beginning of the 20th century as well as the attendant following problems caused by structural changes beginning in the 1960s. Based on a long tradition of co-operation and a location in the strong core of the EU, the cross-border region is suspected to have the potential to be a CBPMR.

This thesis aims to identify the extent to which the Greater Region fits the concept of CBPMR. The growing importance of cross-border regions as economically integrated regions and as engines for the regional development has been neglected on the national level. If the research leads to the conclusion that the Greater Region is a CBPMR, this may influence the view of national planning policies and lead to a stronger focus and support of the cross-border region. Since the concept of CBPMRs is rather new in the discussion of spatial development, this thesis contributes to a further elaboration of basic criteria to define such a region. Furthermore, the case study improves the theoretical discussion by linking it to an existing cross-border region.

Subsequent, chapter two provides information about the applied methodology. Chapter three is dealing with the theoretical discussion about the involved concepts. To investigate the question of the extent to which the region fits the concept, the quality of the cross-border region must be analyzed. According to Perkmann, a region needs to fulfill several criteria to be classified as a cross-border region. Moreover, different types of cross-border regions can be distinguished. A subsequent discussion about the development of polycentricity and polycentric urban regions is provided. The discussion includes an elaboration about size, functional integration and the need for governance structures. Also criteria that define a metropolitan region are discussed. All three concepts will be applied to the Greater Region to illuminate the extent, to which the cross-border region fits the concept of CBPMR. Based on an elaboration of the strengths and weaknesses in chapter four, chapter five is providing development opportunities for the CBPMR.

2 Methodology

The aim of the thesis is to apply the concept of CBPMR to the case of the Greater Region to elaborate the extent to which the region fits the concept of CBPMR.

To collect the necessary information about the underlying concepts of CBPMRs (cross-border regions, polycentricity and metropolitan regions) a theoretical discussion was done. This approach is the most appropriate to collect the needed information about the characteristics of polycentric metropolitan regions. The
theoretical discussion gives the opportunity to illuminate and compare different approaches and to make a qualitative examination of the existing concepts. The literature used was collected by a literature research that included scientific books, articles, analytical studies and policy documents. The choice of literature was based on their relevance according to the following research questions:

- What are the characteristics of a cross-border polycentric metropolitan region and to what extent does the Greater Region fit into this concept?
- How can the development of the Greater Region as a CBPMR be strengthened?

The case study of the Greater Region was chosen because the region is crossing the borders of four countries, which have been part of the EU since its founding in the 1950s. The region can review on a long common history, which is also influenced by several changes of the borders. Moreover, the cross-border region has a long tradition of co-operation, the institutionalization of co-operation started as early as the 1970s. The region is also located in the strong economic core of Europe. All of these preconditions are assumed to have a positive influence on the economic structure of the region.

The data available on the Greater Region was limited due to language barriers and missing comparable data. As a result a recent study of ESPON about CBPMRs was used as one resource for statistical data. The study is concerned with the same topic and also deals with the Greater Region as a case study.

The thesis is divided in two main parts. In the first part, the theoretical discussion addresses the main underlying concepts and each of the concepts is applied to the Greater Region. In the second part, strengths and weaknesses of the Greater Region are elaborated on. Based on these findings, opportunities for a future development are discussed.

3 THEORETICAL BACKGROUND

3.1 CROSS-BORDER REGIONS

This thesis aims to analyze to what extent the Greater Region fits the concept of CBPMRs. The first step in the theoretical discussion is concerned with the characteristics of cross-border regions. The discussion is based on the classification of cross-border regions by Perkmann.

According to Perkmann, it has to be distinguished between cross-border co-operation and cross-border regions. He defines cross-border co-operation by 4 criteria:

1) Public authorities must always be integrated in the co-operation,
2) cross-border co-operation takes place between sub-national authorities,

3) cross-border co-operation is mainly concerned with the solving of practical problems in everyday administration life and

4) cross-border co-operation supports the stabilization of cross-border contacts.

In the Greater Region, all of these four criteria of cross-border co-operation are fulfilled. The co-operation takes place between the regional authorities of the regions involved. Furthermore, co-operation deals with current problems and the future development of the Greater Region. The large number of different initiatives at different levels - including the co-operation of municipalities, local and regional levels - strengthens cross-border contact and leads to a better understanding between the involved participants.

Cross-border regions are based on the definition of cross-border co-operation and are defined as “a bounded territorial unit composed of the territories of authorities participating in a cross-border initiative” (Perkmann 2003, p.156). As Perkmann mentions, it is not only important to understand a cross-border region as a functionally integrated unit but also as a “socio-territorial unit” with a certain amount of common strategic development plans that are based on an organizational structure.

Perkmann identifies three types of cross-border regions by using the following criteria: geographical scope, co-operation intensity and the structure of actors. The following description will explain the different criteria and apply them to the Greater Region, to discover which kind of cross-border region the Greater Region can be described as.

**GEOGRAPHICAL SCOPE**

According to Perkmann’s classification, two different geographical scopes can be distinguished: small-scale cross-border co-operation and Working Communities. The former are “agreements among contiguous border authorities belonging to different nation states” (Perkmann 2003, p. 159). In these small-scale cross-border regions, only the local authorities - not regional authorities - are involved, whereas third-party organizations like development agencies or chambers of commerce can be involved. The small-scale co-operations are often organized by a council, a presidency, subject-matter oriented working groups and a common secretariat. The spatial extension usually ranges from 50-100km. In contrast, Working Communities are much bigger and usually consist of five or more regions. Most of these cross-border regions were founded between 1975 and 1985 and can geographically stretch between several nation states. Working communities are normally organized by a
general assembly, an executive committee, thematic working groups and secretariats (Aykaç 1994). The co-operation in those cross-border regions is based on the regional authorities.

The Greater Region is located between Rhine, Moselle, Saar and Maas and obtains the territories of Wallonia as well as the French and German speaking communities of Belgium, the Saarland and Rhineland-Palatinate in Germany, Lorraine in France and the whole area of Luxembourg. The geographical size of the region lasts 400km from East to West and 350km from North to South. With a size of 65.000km² and 11.2 million inhabitants, the region is listed as large scale cross-border co-operation by the AEBR (AEBR n.d.).

**Figure 1: Spatial scope of the Greater Region**

The fact that the Greater Region is made up of seven regions belonging to four different countries with different political and administrative frameworks at the national and regional level makes the region heterogeneous. The area of the Greater Region has been location for several wars during the last centuries, but since the 1960s a tradition of co-operation started. This co-operation was based on the coal and steel production and on the following problems of the structural change in the regions.


The institutionalization of the co-operation started in the 1970s and is characterized by the foundation of interregional institutions and the development of a regulatory framework. Before, the co-operation was based on informal co-operation agreements between the regions. A further explanation of the institutional structures is following in the section of co-operation intensity.

The distribution of inhabitants between the different regions in the Greater Region is rather heterogeneous as it is shown in Table 1. Luxembourg is hosting the smallest amount of inhabitants (4.26%) and most of the people are living in Rhineland-Palatinate (35.61%) (Homepage Greater Region 2009). The large variation between
the numbers of inhabitants can be traced back to the different sizes of the regions but also to a varying population density.

**Table 1: Proportion of inhabitants on the total number of inhabitants and population density in 2008**

<table>
<thead>
<tr>
<th></th>
<th>Saarland</th>
<th>Lorraine</th>
<th>Luxembourg</th>
<th>Rhineland-Palatinate</th>
<th>Wallonia</th>
<th>Greater Region</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of inhabitants</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1.036.598</td>
<td>2.337.000</td>
<td>483.799</td>
<td>4.045.643</td>
<td>3.456.775</td>
<td>11.359.815</td>
</tr>
<tr>
<td><strong>Inhabitants in %</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>9.13%</td>
<td>20.57%</td>
<td>4.26%</td>
<td>35.61%</td>
<td>30.43%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Density (inhabitants/km)&lt;sup&gt;²&lt;/sup&gt;</strong></td>
<td>403.4</td>
<td>99.4</td>
<td>187.1</td>
<td>203.8</td>
<td>205.2</td>
<td>173.7</td>
</tr>
</tbody>
</table>


The highest population density is measured in the Saarland with 403.4 inhabitants/km<sup>²</sup> in the year 2008. In the same year the lowest density can be found in Lorraine with only 99.4 inhabitants/km<sup>²</sup> (see Table 1). Figure 2 illustrates this heterogeneous picture of population density in the Greater Region. Based on this figure the mixture of densely populated areas and less populated areas becomes visible. The highest density is identified in the area of the agglomerations of Trier, Saarbrücken, some regional centers in Rhineland-Palatinate and in the North of Wallonia. Furthermore, a densely populated area at the borders between Luxembourg, Saarland and Lorraine can be identified. Those centers are surrounded by a low density, which is also reflected by the high number of nature parks (BMVBS 2011).
CO-OPERATION INTENSITY

A second dimension classifying cross-border regions is the intensity of co-operation. This criterion provides information to what extend a cross-border region has become autonomous from the single participation authorities. To analyze the co-operation intensity, Perkmann refers to a catalogue of criteria proposed by the Association of European Border Regions (AEBR) (Perkmann 2003, p. 159f).

- Is the co-operation based on some type of legal arrangement?
- Does an explicitly documented development strategy exist?
- Does a broad scope of co-operation in multiple policy areas exist?

The Greater Region can review on a long history of co-operation over 40 years. Based on this co-operation tradition, an intensive institutional structure has developed until today.

The first step for the co-operation on a legal basis at the national level was build with the foundation of the German-French Government Commission in 1970. In 1971 Luxembourg joined the Commission and in 1981 Belgium, since then it is called the German-French-Luxembourgish-Belgian Commission. Until today, the Commission is responsible for laying down the essential formal preconditions for the cross-border co-operation between the regions. The Commission is set up by regional delegates from each of the four countries (Ministerium für Inneres und Europaangelegenheiten Saarland n.d.).
In 1971 the Government Commission decided on the foundation of the Regional Commission as the executive organ on the interregional level. The full name of the Commission is “Regional Commission of the Saarland - Lorraine - Luxembourg - Trier/Western Palatinate”. The Regional Commission is meeting every 18 months to get informed about the work of the working group and to decide on new development proposals. The chair of the Commission is rotating. The operational implementation of the development proposals is done by the working- and project-groups (Ministerium für Inneres und Europaangelegenheiten Saarland n.d.).

In 1994 it was decided to introduce regular summit meetings. At these summits the highest political ambassadors of the Greater Region are meeting and it is announced to be the central political institution for the interregional cross-border co-operation. Furthermore, it is dealing with questions concerning the co-operation of the regions and is giving recommendations. The summit is fixing the political guidelines and is advised by the Economic and Social Committee (Ministerium für Inneres und Europaangelegenheiten Saarland n.d.).

The Economic and Social Committee is dealing with problems concerning the economic, social and cultural development of the Greater Region as well as the issues of spatial planning (BMVBS 2011).

The legislative institution is the Interregional Parliamentary Council, which is also dealing with the economic, social and cultural importance of the Greater Region and is boosting the cross-border co-operation. Moreover, it is developing a perspective to contribute to the development of the co-operation (Ministerium für Inneres und Europaangelegenheiten Saarland n.d.).
Additionally, economic assemblies like chambers of crafts, chamber of industry and commerce and labor unions are co-operating at the interregional level. The aim of their co-operation is to reduce the negative outcomes of differences in national economic, social and legal systems (Ministerium für Inneres und Europaangelegenheiten Saarland n.d.).

Even on the municipal level co-operations between certain municipalities exist. The most prominent example is the association Saar Mosel Avenir, which is supporting the co-operation between municipalities between the Saarland and the Département Moselle. In this network 26, municipalities and municipal associations are co-operating. (Ministerium für Inneres und Europaangelegenheiten Saarland n.d.)

In the year 2003 a common vision for the future of the Greater Region until 2020 was published. Based on this vision, the future co-operation and development aims of the region are stated. This paper is dealing with the topics of culture, education and further training, universities and research, economy and employment, social networks, traffic and transport infrastructure, institutions, environment and spatial development (Politische Kommission 2003). The wide range of topics in the vision for 2020 reflects the co-operation in the region in a many different policy fields.

The institutional structure emerged during the last 40 years step by step and was introduced by the regional actors within the Greater Region. Although a broad range of institutions is established, it has to be kept in mind that the Greater Region is not lead by an independent government system, but by a multi-faced regional governance system. As strength of the co-operation, good coordination of the work concerning the content can be mentioned. Further, a unique institutional arrangement developed, putting the Summit of the Greater Region on the top of it, despite its informal character and the horizontal and vertical interconnected co-operation. As Kohlisch points out, the co-operation system is still dealing with some weaknesses, which slow down the dynamic of the co-operation. The heterogeneous system of national political and administrative systems leads to unclear responsibilities between the actors and further, to long lasting processes of decision and acclamation. Different opinions on the intensity of co-operation become apparent with the allocation of financial and personal resources. The absence of engaged individuals in some regions and the different election periods hamper the development of social capital and trust in the region. Moreover, the progress of the Greater Region is based on voluntariness and consensus. This means that the region will only make as much progress as the most reluctant region allows (Kohlisch 2008).

**STRUCTURE OF PARTICIPATING ACTORS**

The last dimension describes the different set-up of actors involved in a cross-border co-operation. Whereas small-scale cross-border regions are mainly lead by the local
authorities, large-scale co-operations are driven by the regional authorities. The important fact to remember in this classification is the different set-up of territorial organization in the nation states (Perkmann 2003).

As already mentioned, the development of the Greater Region is mainly driven by the regional authorities due to the big size of the region. The participating authorities are: the sovereign state Luxembourg, two federal states of Germany, three Belgian sub-regions and one French region sub-divided into three Départements, which are partially co-operating. This mix of different legal and administrative systems leads to a heterogeneous picture. The main problem is based on the different levels of responsibility between the regions (BMVBS 2011).

CONCLUSION

According to these findings, the Greater Region can be defined as a large-scale Working Community with a high intensity of co-operation. This high intensity is reached because of a well developed system of institutions dealing with problems and co-operation at different levels. Because of the large scale of the region, the co-operation is mainly driven by the regional authorities, although small-scale co-operations between municipalities are accomplished as well. As mentioned before, some weaknesses still exist and hamper a faster development of the region.

3.2 POLYCENTRICITY

3.2.1 DEVELOPMENT OF POLYCENTRICITY

The model of monocentric urban development was the core concept of urban development until the 1970s, based on the population concentration that took place in many cities in the world. The concept of monocentric urban growth is dealing with the development of a city around one core. Three main concepts of urban development can be distinguished. The model of “concentric circles” of Burgess from 1925 divides a city into five concentric zones with different functions. The concept is based on the assumption that a city will grow circular around one center. Around the center the “zone of transition” follows where the migrants from the countryside settle. This zone is followed by the “zone of workingmen’s homes”, the “residential zone” for the middle class and the “commuting zone” where the more privileged people are living. This means that the social status increases with the distance from the center (LeGates and Stout 1996). The concept was criticized because only one center was taken into consideration. The following “sectoral model” by Hoyt in 1939 described the development of a city in different sectors leading from the economic core to the periphery along transportation corridors. Still, this concept was also based on one
center. The third concept, the “multiple nuclei model”, was introduced by Harris and Ullman in 1945 arguing that “cities developed around several, not just one, center of economic activity” (LeGates and Stout 1996, p. 156). The centers can differ by size, specialization and importance (Davoudi 2003). These three models of the theory of urban development describe the change from a monocentric to a polycentric urban structure. Still, the concept of polycentricity as an analytical tool did not gain more attention until the 1960s (Kloosterman and Musterd 2001).

Since 1970 the new growth pattern of polycentric urban development became more relevant to the researchers. This process of several emerging cores was influenced by “the rapid decentralization of economic activities; the increased mobility due to new transport technologies; the multiplicity of travel patterns; the fragmentation of spatial distribution of activities; the changes in household structure and lifestyle; and, the existence of complex cross-commuting” (Davoudi 2003, p. 981). Davoudi distinguishes between three spatial levels of polycentricity: the intra-urban level, the inter-urban level and the inter-regional level.

The intra-urban scale is dealing with the internal structure of cities and the existence of several cores within a city. This development is driven by the agglomeration economies and the clustering of firms in different locations within one city. Researchers also identified re-centralization processes since the 1980s, but not as a complete reversal of the polycentric development, more as a process leading to a greater variation of spatial patterns (Cheshire 1995).

Polycentricity at the inter-urban scale is dealing with regions that comprise separate cities, which interact to a certain extent (Davoudi 2003). Those first two levels are dealing with the description of an observed phenomenon by researchers, which is taking place in the spatial development of cities and regions.

The third level, the inter-regional scale, is used in the European Spatial Development Perspective (ESDP) from 1999 and is a normative concept expressing the ambitions of planners how the EU should develop in the future. The ideas of the ESDP, which was approved by the EU Ministers responsible for Planning in the EU, takes the development of the whole EU into consideration. It demands the development of polycentric structures in the EU to reduce the existing regional disparities. The polycentric development shall be reached by the development of “zones of global economic integration” outside of the economically strong pentagon located between London, Paris, Milan, Munich and Hamburg (ESDP 1999). This means that urban centers outside the economically strong area of the EU shall be further developed. The approach is not based on the functional integration between the different centers but on the aim to develop a balanced system of centers across Europe.

Because the thesis is dealing with the development of polycentric metropolitan regions, the following analysis will focus on polycentricity at the inter-urban scale.
3.2.1 Development from intra-urban to inter-urban polycentricity

Today not only cities are considered to be of economically importance. The focus has changed from monocentric organized cities to whole regions. This is influenced by so-called “concentrated de-concentration”. This term was introduced by Dutch planners and it describes the “disperse [of agglomeration] over the scale of a wide city region, but simultaneously re-concentrate at particular nodes within it, limited only by continuing time-distance constraints” (Hall and Pain 2006, p. 11). Typically those centers are located close to each other in the sense of distance and travel time and they are connected by rail, roads and public transport.

The concentrated de-concentration causes a more polycentric urban structure. The new centers can become more specialized over the years because companies of a certain field start to cluster in the same location. According to the Cluster Theory this raises the level of innovation and knowledge transfer, based on a balance between competition and co-operation. A successful cluster is able to attract new firms and the network of producers and suppliers makes it easier for new firms to settle in this area. The functional division and the dense flow of labor force are increasing the economic strength of the region (Delgado, Porter and Stern 2010).

Furthermore, the development of polycentric regions is influenced by technological progress. The introduction of high-speed railways and other transport infrastructures have increased the distance one can travel within a certain time. Therefore, functions and offices can move out of the core of a city, but they are still accessible in a short time period. This increases the radius of access to functions provided by the centers within a region.

Especially in Northwest Europe a particular urbanization pattern has developed during the last decades. A dispersed pattern of urbanization developed, in which a large number of cities of a moderate size are located in close proximity. Due to the suburbanization process and a tight transportation infrastructure they have developed as functional integrated areas. According to this development “some regions in Northwest Europe are often perceived as a single functional unit, one polynucleated metropolitan region”, and no longer as single nodes (Dieleman and Faludi 1998). Polynucleated metropolitan region in this quotation means the same as polycentric metropolitan region. The most famous examples for this urbanization pattern are Randstad in the Netherlands or Rhine-Ruhr in Germany.

This explanation for the development of inter-urban polycentricity is due for domestic regions. In the case of the development of inter-urban polycentricity in cross-border regions further conditions need to be taken into consideration. The fact that different cities emerged close to the border and started to interact over a certain period of time is mainly based on common problems and was introduced based on political decisions. The European integration process, the creation of the Single Market and
the support of border regions by the Regional Policy of the EU are supporting the establishment of those polycentric cross-border regions. Compared to the development of domestic polycentric regions, they still face some restrictions, which complicate the development of functional integration across the borders. Restrictions are for instance the differences in legal and social systems or language barriers. The functional integration was mainly hindered by the separating functions of the borders, but they have been reduced with the European integration process. The different preconditions for cross-border regions and domestic regions have to be kept in mind by developing cross-border polycentric regions.

### 3.2.2 INTER-URBAN SCALE: POLYCENTRIC URBAN REGIONS (PUR)

**Definition of Polycentric Urban Regions**

As Kloosterman and Musterd state the analysis of the concept of polycentricity at the inter-urban scale lacks of a clear definition (Kloosterman and Musterd 2001). The research on this spatial level moved away from the analysis of separate cities to the focus on urban regions. Until today several studies dealing with polycentricity at the inter-urban scale have been published dealing with different lines of sight. For example Dieleman and Faludi (1998) focused on policy aspects, Kloosterman and Musterd (2001) took care about empirical and conceptual observation. Since the concept is not clearly defined until now, different approaches can be distinguished. For instance the Commission of the European Communities (CEC) published a definition of a polycentric urban region defining it as “a region with two or more historically and politically separate cities without a clear hierarchical ranking in a reasonable proximity and with functional interconnection” (Davoudi 2003, p. 986, European Commission 1999). According to Davoudi, this definition raises two main issues that have to be discussed. Firstly the reasonable proximity of the cities has to be further defined. Secondly the functional interconnection between the centers has to be defined (Davoudi 2003). In 2003 Parr published an article also dealing with the definition of polycentric urban regions (PURs) (Parr 2004). He distinguishes between several conditions, which have to be fulfilled for the classification as a PUR. The conditions are: clustering of centers, upper limit on center separation, lower limit on center separation, size and spacing of centers, size distribution of centers, interaction among centers and center specialization. These conditions will be further explained in the following discussion and also in relation to the case of the Greater Region. Moreover, Kloosterman and Musterd state that the governance structure in polycentric urban regions is important for the development of a region. This aspect will also be discussed later on.
SIZE OF THE CENTERS

One condition a PUR needs to fulfill according to Parr, is the clustering of centers. The centers have to be separated from each other by open land, but still be located close enough to stand in relation with each other. The spatial distribution can appear in different patterns for example linear, circular or even polygonal (Parr 2004).

Additionally Parr states that the centers in a PUR are of equal size meaning that none of centers is more dominant in terms of population (Parr 2004). Kloosterman and Musterd as well mention that a PUR lacks “a clear leading city which dominates in political, economic, cultural and other aspects (although, inevitably, one of these cities has the largest number of inhabitants)” (Kloosterman and Musterd 2001, p. 628). This means that the centers in a PUR are equal in their significance.

Figure 4: Inhabitants Greater Region

![Map of Greater Region with city names and population distribution](image)

Source: BMVBS 2011, p. 27, figure edited by author.

Figure 4 shows the cities in the Greater Region with more than 50,000 inhabitants. This figure illustrates that the cities in the Greater Region are differing in size. The biggest difference in size exists between Luxembourg City (90,800) and Charleroi (201,550). All the other regional centers provide a number of inhabitants between
those two cities. This leads to the conclusion that the region is not dominated by one center, but still a hierarchy based on their size can be identified. The concrete numbers of inhabitants of the dominant cities in the Greater Region can be seen in Table 2.

**Table 2: Inhabitants in the centers of the Greater Region**

<table>
<thead>
<tr>
<th>Region</th>
<th>Year</th>
<th>City</th>
<th>Number of inhabitants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wallonia</td>
<td>2007</td>
<td>Charleroi</td>
<td>201.550</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liege</td>
<td>188.907</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Namur</td>
<td>107.653</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mons</td>
<td>91.196</td>
</tr>
<tr>
<td>Lorraine</td>
<td>2007</td>
<td>Nancy⁴</td>
<td>105.349</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metz⁵</td>
<td>123.580</td>
</tr>
<tr>
<td>Saarland</td>
<td>2010</td>
<td>Saarbrücken</td>
<td>175.305</td>
</tr>
<tr>
<td>Rhineland-Palatinate</td>
<td>2009</td>
<td>Trier</td>
<td>104.587</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kaiserslautern</td>
<td>99.275</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ludwigshafen</td>
<td>163.340</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mainz</td>
<td>197.778</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Koblenz</td>
<td>106.445</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2010</td>
<td>Luxembourg City</td>
<td>90.800</td>
</tr>
</tbody>
</table>

Sources:
⁸ Statec Luxembourg 2010.

Since the size of the centers is not the only requirement to define a PUR the discussion will come back to the factor size after the discussion about the distance between the centers.

**DISTANCE BETWEEN THE CENTERS**

According to the discussion about the definition of PURs by the CEC the question of “reasonable proximity” between the involved cities has to be further defined. Parr states that it has to be distinguished between the upper and the lower limit on center
separation. According to the upper limit separation the main researchers in this field bring up different views on this aspect. In general a distance of one hour travel time between neighboring centers is used (Bailey and Turok 2001). But for instance Batten is suggesting a period of 30 minutes (Batten 1995). This is criticized by Bailey and Turok because it disqualifies several regions in Northwest Europe, which have been announced to be a PUR. Since there are different ideas about the definition of the distance between the involved cities Parr states that “whatever the measure employed, the condition of maximum separation is an unavoidably arbitrary one” (Parr 2004, p. 232).

On the other side Parr also argues for a lower limit of center separation to discriminate PURs from other spatial units like multi-centered metropolitan areas but a further specification of this limit is lacking. According to Parr, the difference to multi-centered metropolitan areas is that they comprise a continuously build-up or urbanized territory. In contrast, a PUR is separated by open land (Parr 2004).

The development of transportation infrastructure has to be taken into account by defining a PUR by commuting time. The technical development allows people to travel faster within a certain time period. By this people are able to travel more far within one hour than before “this will lead to an outward expansion of the boundaries of polycentric urban regions” (Davoudi 2003, p. 986).

According to the large geographical scale of the Greater Region the distance between the different centers is rather high. Most of the different centers cannot be reached within one hour traveling time by car (e.g. Charleroi - Luxembourg City 115 min, Mainz - Trier 110 min, Charleroi - Mainz 215 min, Liege - Nancy 175 min).

Due to this fact not all cities in the Greater Region can be taken into account for a PUR. Just taking the distance between the centers into consideration, three possibilities for a PUR can be distinguished according to Figure 5. The first possibility includes Charleroi, Namour and Liege and several smaller centers (PUR 1). The second possibility includes the centers of Luxembourg City, Trier, Saarbrücken, Metz and Nancy (PUR 2). Last, Koblenz, Mainz, Ludwigshafen and Kaiserslautern build a third PUR (PUR 3).
Since the case study is concerned with the concept of cross-border polycentric metropolitan regions, only the PUR 2 between Luxembourg City, Trier, Saarbrücken, Metz and Nancy is taken into the further discussion. The other two possible PURs are neglected because they do not cross national borders.

The travel time between the centers of PUR 2 takes between 60 and 90 minutes according to Google Maps. Only Nancy is rather weak connected to Luxembourg City and Trier, the fastest connection between these cities takes nearly two hours by car. According to this, it has to be discussed whether Nancy should be included in the PUR or not. Although the distance from Nancy to Luxembourg City and Trier is rather high the distance to Metz is still less than one hour. A concluding decision on this question will be taken after the discussion of the remaining conditions. The travel time between the different centers can be seen in Table 3.

**Table 3: Distance between the centers in minutes**

<table>
<thead>
<tr>
<th></th>
<th>Luxembourg City</th>
<th>Trier</th>
<th>Saarbrücken</th>
<th>Metz</th>
<th>Nancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luxembourg City</td>
<td></td>
<td>64</td>
<td>93</td>
<td>78</td>
<td>115</td>
</tr>
<tr>
<td>Trier</td>
<td>64</td>
<td></td>
<td>63</td>
<td>77</td>
<td>115</td>
</tr>
<tr>
<td>Saarbrücken</td>
<td>93</td>
<td>63</td>
<td></td>
<td>53</td>
<td>92</td>
</tr>
<tr>
<td>Metz</td>
<td>78</td>
<td>77</td>
<td>53</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>Nancy</td>
<td>115</td>
<td>115</td>
<td>92</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>


After the delimitation of the PUR by distance, the size of the remaining cities in the region needs to be taken into closer consideration. The center with the most
inhabitants in the PUR is Saarbrücken with 175,305 inhabitants. The second biggest city is Metz with 123,580 inhabitants, followed by Trier and Nancy (each around 105,000). The smallest center is Luxembourg City with 90,800 inhabitants. This leads to the conclusion that the region is not build up by equal sized centers. Saarbrücken is nearly two times bigger than Luxembourg City. Therefore the region does not fit the requirement of the scientific definition of a PUR, according to the requirement of equal sized centers. Nevertheless it will be investigated, whether the region fulfills the remaining requirements to be defined as a PUR.

**Table 4: Inhabitants in the centers of the PUR**

<table>
<thead>
<tr>
<th>Region</th>
<th>Year</th>
<th>City</th>
<th>Number of inhabitants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorraine</td>
<td>2007</td>
<td>Nancy</td>
<td>105,349</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metz</td>
<td>123,580</td>
</tr>
<tr>
<td>Saarland</td>
<td>2010</td>
<td>Saarbrücken</td>
<td>175,305</td>
</tr>
<tr>
<td>Rhineland-Palatinate</td>
<td>2009</td>
<td>Trier</td>
<td>104,587</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2010</td>
<td>Luxembourg City</td>
<td>90,800</td>
</tr>
</tbody>
</table>

Source: Excerpt from Table 2

**MEASURING POLYCENTRICITY BY FUNCTIONAL INTEGRATION BETWEEN THE CENTERS**

A further issue connected to the CEC definition is the measurement of “functional interconnection”. In most cases the interconnection is measured by the commuting flows of the workforce. Some researchers argue that also trips, which are not connected to work and the flow of information and resources should be included in the measurement of interconnection and interdependency. But the measurement of those indicators is more complex than the measurement of labor market flows and because of that they are only seldom available (Davoudi 2003). Parr is stating that the economic interaction among the centers in a PUR is high and can take place in different forms. As well as Davoudi, Parr is mentioning the overlapping of the labor markets causing commuting patterns. Furthermore the economic interaction based on trade is mentioned to be a significant indicator (Parr 2004).

The result of measuring polycentricity in a region is strongly connected to the definition of used criteria. The use of settlement patterns and population density can bring a rather different result than the criterion of the degree of commuter flows and general traffic patterns (Dieleman and Faludi 1998).

The economic integration of the whole Greater Region can be illustrated by the amount of cross-border commuting according to Table 5 and Table 6. The cross-border commuting for the Greater Region is ranging among the highest in Europe with an amount of 203,000 commuters. This is an evidence for a high level of
functional integration in the whole region, even though it does not state to which particular center the commuting flows are going. Specific data for the commuting between the centers is not available.

The Greater Region publishes data about economic development in the region, which is collected by an agency for inter-regional observation of the labor market. The data is only available for the regional level and not for the local level but it shows that Luxembourg is the most attractive region in the Greater Region for cross-border commuters. 72% of the cross-border commuters are working in Luxembourg. One half of the commuters come from Lorraine, one quarter from Belgium and the other quarter from Germany. But the amount of commuters from Rhineland-Palatinate is more than three times higher than the amount from the Saarland. Lorraine and Rhineland Palatinate are attracting the smallest amount of commuters. The analysis of the numbers implies that Luxembourg can be seen as the economic center of the region because the highest amount of the commuters is working in Luxembourg. This can be backed up by the low number of outgoing commuters of Luxembourg; only 900 citizens are leaving the country to work. The economic importance of Luxembourg can be drawn back to the high number of workplaces in the knowledge and R&D sector and the financial services but also to the fact that Luxembourg City is the capital of the nation state, therefore many functions are concentrated in the city.

**Table 5: Incoming cross-border commuters in the Greater Region**

<table>
<thead>
<tr>
<th>Target area</th>
<th>Germany</th>
<th>France</th>
<th>Luxembourg</th>
<th>Belgium</th>
<th>Total amount of incoming commuters</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saarland</td>
<td>19.477</td>
<td>54</td>
<td>14</td>
<td>19.545</td>
<td>30.06.2009</td>
<td></td>
</tr>
<tr>
<td>Rhineland-Palatinate</td>
<td>4.965</td>
<td>176</td>
<td>151</td>
<td>5.292</td>
<td>30.06.2009</td>
<td></td>
</tr>
<tr>
<td>Lorraine</td>
<td>ca. 1.120</td>
<td>ca. 200</td>
<td>ca.130</td>
<td>ca. 1.450</td>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>Luxembourg</td>
<td>37.067</td>
<td>72.967</td>
<td>37.565</td>
<td>147.599</td>
<td>30.06.2009</td>
<td></td>
</tr>
<tr>
<td>Wallonia</td>
<td>708</td>
<td>28.273</td>
<td>324</td>
<td>29.305</td>
<td>30.06.2009</td>
<td></td>
</tr>
<tr>
<td>Greater Region</td>
<td>38.895</td>
<td>135.682</td>
<td>754</td>
<td>37.860</td>
<td>203.191</td>
<td>30.06.2009</td>
</tr>
</tbody>
</table>

Source: IBA 2010.
Table 6: Outgoing cross-border commuters in the Greater Region

<table>
<thead>
<tr>
<th>Area of origin</th>
<th>Germany</th>
<th>France</th>
<th>Luxembourg</th>
<th>Belgium</th>
<th>Total amount of outgoing commuters</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saarland</td>
<td>ca. 1.000</td>
<td></td>
<td>7.156</td>
<td></td>
<td>8.156</td>
<td>31.03.2009</td>
</tr>
<tr>
<td>Rhineland-Palatinate</td>
<td></td>
<td>ca. 120</td>
<td>25.406</td>
<td></td>
<td>25.526</td>
<td>31.03.2009</td>
</tr>
<tr>
<td>Lorraine</td>
<td>19.693</td>
<td>69.584</td>
<td>5.387</td>
<td>94.664</td>
<td>31.03.2009</td>
<td></td>
</tr>
<tr>
<td>Luxembourg</td>
<td>333</td>
<td>ca. 200</td>
<td>416</td>
<td>949</td>
<td>31.03.2009</td>
<td></td>
</tr>
<tr>
<td>Wallonia</td>
<td>2.850</td>
<td>4.719</td>
<td>34.132</td>
<td>43.701</td>
<td>31.03.2009</td>
<td></td>
</tr>
</tbody>
</table>

Source: IBA 2010.

The statistics also include atypical cross-border commuters, those are especially common in the commuting areas with the target area of Luxembourg. Commuters are defined as atypical cross-border commuter if they are moving in the border region of the neighboring country but still return to their original country to work. Reasons for this behavior are for example high living costs and different tax systems (IBA 2010).

The functional integration of Luxembourg City with its hinterland is shown by Figure 6. Not only workers living in the closer neighborhood around Luxembourg are commuting to Luxembourg City, also labor from Trier, Thionville and Metz can be identified on this figure to be commuting to the center. Especially at the southern border of Luxembourg the cross-border commuting is high. Unfortunately Nancy is not included in this figure and no data for Saarbrücken was available. Therefore not the full extension of the cross-border commuting can be shown in the figure. Nevertheless this map gives more detailed information about the economic importance of Luxembourg.

Figure 6 is a result of the analysis of ESPON in the project Metroborder, which is also concerned with the topic of CBPMR. The aim of the research is to “map and to better understand the organisation and the positioning of the cross-border metropolises and to explore ways how to (better) use their potentials” (ESPON 2010a, p. 7). Therefore, a general analysis was done to identify the main characteristics of CBPMR in Europe. Moreover, a specific analysis of two case study regions was done - one of them the Greater Region. These case studies were done to identify the position of the two regions in relation to the general aspects that were analyzed before. Since not a lot of common data for the Greater Region is available, the results of the analysis of ESPON are partly used in this thesis.
Taking the previous results of functional integration into account Luxembourg City can be characterized as the economic center of the PUR. Assigning Luxembourg City
as the main economic center of the PUR leads to the question if Nancy should still be included in the PUR, based on the long distance to Luxembourg City. Since no data concerning the economic integration is available this question cannot be answered at this stage of work.

**CENTER SPECIALIZATION**

As last condition of a PUR, Parr mentions the economic specialization of the centers. According to him, centers in a PUR have a higher specialized economic structure than centers, which are not located in a PUR. The specialization of the centers within the PUR can tend to be similar or extremely different. Both cases are possible (Parr 2004).

Nevertheless, the economic specialization of a center is based on the historical background of the center and not only on its role as a center. It appears to be more important how the centers interact with each other than if they are more specialized than other centers. In the case of the Greater Region Luxembourg City can be seen as a specialized center for financial services. Still, not the fact that the center provides this service, but the fact that it is strongly interconnected by commuting flows with the other centers can lead to a classification as PUR. Therefore, not the degree of specialization but the relation between the centers seems to be more important for a PUR. This does not exclude the fact that centers can have a specific role within the region based on the historical development, not only connected to economic strength. For instance, Trier can be classified as the cultural center of the four centers. Trier is announced to be the oldest city Germany and many monuments of the time of the Romans are attracting tourists to the city.

**GOVERNANCE AND INSTITUTIONAL CAPACITY BUILDING**

The concept of PURs can be seen from two different perspectives. The first one is the description of the PUR by researchers based on the observed development in reality. In this case the existence of the PUR emerges because of the functional integration of the urban agglomerations located in proximity. Those PURs are able to use the economic advantages like greater labor market and higher diversified economic structure, which appear with the functional integration with other agglomerations. These regions are not necessarily depended on further co-operation because they already profit from the functional integration. The second perspective describes the co-operation of centers, based on policy decisions. In this case concrete co-operation between centers is used to achieve the aim of developing a PUR. In this case the co-operation is based on the political decision to build a PUR with the aim to strengthen the competitiveness and the economic growth.
Franz and Hornych are discussing the importance of regional governance in the case of the development of a polycentric metropolitan region based on policy decision. Their case study is dealing with the Saxony-Triangle in Germany and shows the difficulties that the development of such a region has to face. The development of governance structures is highly connected to the will of co-operation of the participants. The development of the Saxony-Triangle as a polycentric metropolitan region was a political top-down decision. According to Franz and Hornych one of the problems in the Saxony-Triangle is the low willingness of the cities to cooperate. Furthermore, they claim that the development of governance structures is easier within monocentric metropolitan regions because they are suited with actors with political importance and leadership potentials. This makes it easier to activate stakeholders and politicians to participate in the creating of governance structures. In contrast, it is more complicated to motivate the actors in polycentric metropolitan regions to cooperate under regional governance, especially if no outstanding center exists to take the role of leadership in this process. Additionally the marketing of a region becomes more difficult with a higher number of actors like in a polycentric metropolitan region, starting already with the naming of the region (Franz and Hornych 2010).

Meijers and Romein are stating that planners and policy makers favor the development of a PUR based on the policy decision because they see a need to strengthen the competitiveness of a single city by cooperating with other cities. The co-operation is based on the introduction of a regional governance structure, helping to achieve certain potentials in a PUR. The three potentials of polycentric development in contrast to the development of individual cities are identified as pooling of resources to achieve a critical mass, the development of complementarities and the achievement of spatial diversity. Furthermore the authors state, that the establishment of a regional governance system is based on spatial-functional, political-institutional and cultural factors. The governance system should include the relevant stakeholders like public actors, private market parties and non-governmental organizations. However it has to be kept in mind that the cities are still competitors even if they are co-operating. The political decision to implement a co-operation may not fit the ideas of the further development of the cities. This is reflected by the few examples where a regional organization capacity has been introduced successfully (Meijers and Romein 2003).

In the case of governance systems in cross-border regions some further issues have to be taken into account. Kohlisch is pointing out that the separating impact of borders has been reduced since the start of the European Integration and especially since the creation of the European Single Market in 1993, but still borders are more than an administrative delimitation of spatial units (Kohlisch 2008). Although the free movement of goods, people, capital and services is possible today, the nation states
of the EU still have different legal and administrative systems, as well as different languages and economic mentalities (Newrly 2002). Student identifies three problematic issues in the development of governance systems in cross-border regions. The first issue identified is connected to legal-institutional differences. The scope of action is restricted by the dominance of the national law. Because of this many cross-border co-operations do not show up in a standard legal concept. Student mentions that this issue can be overcome by a strong will of co-operation among the actors. A further issue is based on political and psychological problems. Political problems are based on the slowing down influence of the national governments, which tend to try to control the policy of regions. And also cultural differences can constrain the development of a governance system. These differences are mainly based on language and shared history. The last issue identified by Student is based on socio-economic problems. Different levels of development can cause anxiety of migration flows, unequal competition conditions and fear to lose employment. Furthermore is the limited financial situation of the regional institutions a hindrance for the development of governance structures (Student 2000). In the case of the Greater Region it was already mentioned in chapter 3.1 that an organizational structure is in place. This structure developed over 40 years and shows the willingness of the regions to work together. This is considered as a positive factor for the further development of the whole region as well as for the PUR in the center of the Greater Region.

In the case of the PUR, a cross-border city network between the municipalities Luxembourg City, Trier, Saarbrücken and Metz is already established, called “QuattroPole”. These cities have been identified to be the centers of the PUR, only Nancy is not included in this cross-border co-operation. It was developed out of the city co-operation between Metz and Trier and exists in the current structure since 2010. The aim of the co-operation is the realization of common projects, to foster synergy effects and to increase the economic attraction of the location (QuattroPole n.d.).

The co-operation of the cities in this city network is lead by a steering committee. This committee is build by the four majors of the cities. The committee takes strategic decisions, which define the target course of the network. The co-ordination board is set up by appointed members of the city councils of the four cities and deals with the definition and preparation of

common projects. Local offices in every city are coordinating the projects in their own city and take care of the administrative tasks, which are required for the co-operation with the partner cities. The project groups are responsible for developing the projects with regard to the content and to device issue-joint projects. Since 2011, the former working groups have been displaced by four so called “poles”. Every city is taking care of one of these poles. This structure shall increase the flexibility and the dynamic of the co-operation. Luxembourg City is taking care about the pole “administration”, dealing with the improvement of the co-operation of the partner cities and the exchange of experience with other city networks. Trier is responsible for the pole “citizens”. This pole is concerned with the task to increase the awareness and the interest of the citizens for history and attractions of partner cities. Saarbrücken is in charge of the pole “economic attractiveness”, aiming to make the city network more competitive and attractive. The actors of the economy shall become better coordinated and a common marketing strategy shall increase the perception of the Quattropole. The pole “space” is collecting data about the city network and encourages scientific studies. Furthermore the mobility and access to infrastructure are an important topic. This pole is taken care of by Metz.

**ADVANTAGES AND DISADVANTAGES OF THE SPATIAL STRUCTURE OF A PUR**

In the last years the concept of polycentricity has gained more and more attention among spatial planners and policy makers. This section aims to illuminate why the concept became this popular and what are advantages and disadvantages of a polycentric spatial structure. Since the real impact of polycentric structures is not yet scientifically proven the concept is often not uncontested (Meijers 2008). Still, the polycentric spatial structure is suspected “to reap the advantages of urban size, and at the same time avoid at least some of the obvious disadvantages such as those concerned with high factor costs, congestion, pollution, etc” (Parr 2004, p. 236). One of the advantages mentioned is the concept of “borrowed size” introduced by Alsonso. According to this concept PURs are able to provide urban functions that are normally only found in larger cities, based on the proximity and the well interconnection of the cities (Alonso 1973). Also Burton states that “the functions of the missing regional center have in part been taken over by the next lower group of centers” (Burten 1963, p. 287).

Further, it has to be taken into account that the structure of PURs brings some disadvantages in comparison to monocentric regions. For instance the travel flow and flows of commodities are longer and the size of the different cities cannot just be summed up and be compared to other larger cities because “some of the advantages of urban size stem from the nature of the metropolitan environment, and are related
to such factors as density, proximity, face-to-face contact, informal structures, unplanned interaction etc.” (Parr 2004, p. 236).

Despite these disadvantages the concept of polycentric urban regions is gaining high interest by policymakers and planners. One of the reasons why policy makers and planners favor the spatial pattern of PURs can be seen in the raising national and international competition about citizens and job opportunities. The concept of polycentricity implies to policymakers that the economic growth of a city can be increased by being part of a polycentric urban region because the cities can pool their potentials and become more visible in the competition with other cities.

**CONCLUSION**

After applying the concept of polycentricity to the case of the Greater Region, the following conclusion can be drawn. Not all centers of the Greater Region can be included in one huge PUR because the distance between the several centers in the large territory is too high. According to this 3 smaller PURs can be identified, but only one of them is taken into closer consideration, since the other two alternatives do not cross national borders. The remaining alternative includes the centers of Luxembourg City, Trier, Saarbrücken, Metz and Nancy. The further analysis of functional integration and the existing governance system between four of the centers raises the question, whether Nancy should be included in the PUR or not. Nancy is located in proximity to Metz, therefore an inclusion in the PUR could be possible. But the high distance to the economic center Luxembourg City and the exclusion in the city network “QuattroPole” lead to the result that Nancy is not functional integrated to the PUR. However the PUR is not only made up by the municipalities of the four centers, the functional integrated hinterland of the centers is included, too. This leads to the integration of parts of Wallonia, although Wallonia does not provide a center in the PUR.

The amount of functional integration between the different parts of the PUR can be drawn back to the efforts of co-operation, which already started in the 1970s. Since the PUR is located in a region, which is divided by four national borders, a governance structure to coordinate the co-operation and to deal with the explained hindrances is important. Without this co-operation structures the functional integration in the region would not be as strong as it is today.

Besides the further explained results the cross-border region does not fit the requirements of the scientific discussion according to the claim that the centers should be equal in size, economic and political terms. Saarbrücken is the center of the region in terms of size. The city is nearly two times bigger than Luxembourg City. Luxembourg City is identified to be the main economic center and it also provides strong political functions, since it is the capital of Luxembourg. Nevertheless, the
region is perceived as a PUR in reality, with Luxembourg City as the dominating economic center of the region and high functional integration between the centers.

3.3 Metropolitan Regions

Policy makers and researchers consider metropolitan regions to be outstanding urban agglomerations according to their economic capacities as nodes in the globalized world, providing services for a large area surrounding the core area (BBSR 2011, Krätke 2007). As outlined before, metropolitan regions have mainly been identified within nation states during the recent years, but only few close to national borders. Cross-border regions have been perceived as peripheries of nation states, but today they are taken stronger in consideration, based on the process of European Integration. The economic competitiveness of cross-border regions shall be strengthened by supporting their development. The following chapter will discuss the concept of metropolitan regions and apply this concept to the case of the Greater Region.

Effect of the Status as Metropolitan Region

According to Krätke, the spatial development of the European urban and regional system is mainly based on the processes of Europeanization and globalization (Krätke 2007). Europeanization is fostering the economic integration within the EU. Globalization leads to a further integration of the EU in the global economy and puts regions into a global and regional competition about the attraction of companies and qualified work force. The importance of metropolitan regions in this competition is high because they can provide high quality infrastructures and they are part of global networks, making them attractive for global acting companies. Moreover, they are considered as “key places for economic growth, different kinds of infrastructures and breeding places for innovation” (METREX 2010, p. 12). The shift from manufacturing industries to a greater focus on services and knowledge production within the knowledge-society is also influencing spatial patterns because this branch has different requirements on locations than for instance manufacturing industry (Hall and Pain 2006, METREX 2010). “The increasing economic weight of metropolitan areas in the European urban system can for the most part be attributed to the spatial logic and territorial needs of the knowledge-based economy though other industries, such as those associated with human capital, infrastructure developments, critical mass, cultural assets and creative milieus, are also important” (METREX 2010, p. 12).

German policy makers and planners mention that metropolitan regions are engines of economic growth and competitiveness (BMVBS & BBR 2007). The increased competition of location puts the metropolitan regions in the center of political and
scientific discussions because they are attractive locations based on agglomeration effects (BMVBS & BBR 2007). Agglomeration effects can be divided into positive, negative, internal and external effects. Positive agglomeration effects are resulting in cost savings, based on the spatial concentration. They can be divided into internal savings and external effects. Internal savings are leading to cost savings of a company, based on the internal clustering of the company in one place and the improvement of the organizational structure. External effects are a conglomerate of cost reducing factors. They can be divided in localization economies and urbanization economies. Localization economies are leading to cost savings due to the spatial proximity of companies of the same branch and the common use of labor markets, suppliers and research institutes. Urbanization economies are in general based on the advantages of urbanization, speaking of the size of the market and infrastructure facilities. Negative agglomeration effects are for example the pollution of the environment caused by the high amount of traffic in the agglomeration (Haas and Neumair n.d.).

According to these effects, spatial clustering of people and economy in a region leads to a fostering of work- and capital-productivity, which is increasing the competitiveness of the region (Blotevogel 2005). Furthermore, metropolitan regions are considered to be important locations for R&D as well as hub for trade, traffic and information because of the high amount of qualified labor and the participation in international networks (Adam and Göddecke-Stellmann 2002).

3.3.1 DEFINING METROPOLITAN REGIONS

Until today, no common definition about metropolitan regions exists. One reason for the absence of a common definition is based on the different urban structures within countries and different domestic definitions. In Europe the dominant patterns of urbanization are characterized by cities ranking between 200,000 and one million inhabitants even though there are exceptions like Paris or London with several million inhabitants, which are defined as very large cities (Dieleman and Faludi 1998). This structure is rather different from other countries like for example the USA or Japan. In these countries “relatively more people live in very large cities, which are defined as having two or three million people” (Dieleman and Faludi 1998). Furthermore the definitions used by researchers and policy makers are differing from each other.

With the help of the general scientific definition of Forstall et al. about metropolitan areas, different criteria to define metropolitan regions will be discussed. The authors state that a metropolitan region generally “consists of a large urban nucleus together with adjacent areas with a high degree of economic and social integration with that nucleus”. Further, they state that “every metropolitan area is geographically larger than its core urbanised area” (Forstall, Greene and Pick 2008, p. 282). According to
this definition, a metropolitan area is generally a larger area than the urbanized center with a considerably larger population. This definition implies that the size of the core area and the interconnection with the hinterland are crucial indicators to define a metropolitan region. This definition is used by researchers although it needs some further specification concerning the “large urban area” and the “high degree of economic and social integration”. The definition is based on the observation of the spatial development.

Furthermore, the concept of metropolitan regions can be used as a policy tool in a normative sense like it is done for instance in Germany. There, the concept is applied by policy makers and planners to make regions more competitive. The metropolitan character of a region is measured by the provision of metropolitan functions in the fields of politics, economy, science, transport and culture. Those functions are measured by different indicators. The thesis is going to discuss the different named criteria of the scientific approach (size and integration with the hinterland) and the policy approach (metropolitan functions), but it is not aimed to give an overall definition for metropolitan regions. It has to be mentioned at this point that the use of different indicators will lead to diverse results. This makes it more complicated to compare different studies.

**Size**

The rather wage definition of Forstall et al. leaves space for further discussion. First of all the term “large urban nucleus” has to be further defined. A definition of the core by geographical size seems to be unsuitable because it does not take the functional integration and the level of urbanization into consideration.

Blotevogel states that the core of a metropolitan region needs to have at least 500,000 inhabitants and the whole region about 1 million to 1.5 million (Blotevogel 2005). This minimal number of inhabitants is based on the fact that a city needs a certain amount of inhabitants to provide functions and services, which cannot be provided by smaller cities. This is the point that differentiates a normal city from a metropolis. Of course the concrete number of needed inhabitants can also be discussed but the claim that the number of population is important to identify the core shows that a critical mass is needed.

However, a definition only based on the number of inhabitants or population density is not enough to identify a metropolitan region since the integration between the core and the hinterland is neglected. Because of this also the interconnection with the hinterland has to be taken into account.
INTEGRATION WITH THE HINTERLAND

The “large urban center” can be described as a metropolis, pooling functions that are not available in the hinterland, based on a high number of citizens and a high population density. The development of the metropolis is driven by the development of a global information economy, which is able to foster the dynamic growth of cities. The metropolization process leads to a change in the inner structure of the city and to a change in the relation to the hinterland. The relation between the center and the surrounding areas are influence in two ways. The spread of the center into the metropolitan area can lead to the development of a metropolitan area. In this case the relation between the center and the hinterland are strong. On the other side the ties become less if the center becomes more integrated in the network of global cities. But this development has not been researched in depth until today (ESPON 2010b).

An evolutionary development of the relation between an urban agglomeration and its surrounding region can be done. During the industrial economy the relation between metropolis and region were strong. The region provided the metropolis with resources like labor, food and raw material. On the other side the metropolis provided the region with earnings from work and higher level services. Today, in the information economy, the metropolis is less depended on the region. The region still provides the metropolis with labor and environmental resources like recreational places. This leads to a functional integration of the hinterland with the center based on commuting flows. The metropolis is concentrating global information and capital flows and is no longer reliant on food or raw material, provided by the region (Smetkowski and Gorzelak 2008).

This leads to the conclusion that the hinterland should be included in the metropolitan region if a strong connection to the core area can be measured. The remaining question is how this integration can be measured. Forstall et al. state that the metropolitan region has a bigger geographical scale than the core. This is based on the social and economic integration of the hinterland with the core. This integration is mostly measured with the indicator of work force commuting, like it is also used in the discussion about polycentricity. This indicator can be defined in different ways, which leads to differences in the results of analysis. For example the criterion to define metropolitan regions in Canada includes 50% of the work commuting in a county in its definition and the USA only demand 25%. Additionally they are measuring on different spatial scales. Those differences make it more complicated to compare studies of metropolitan regions of different states (Forstall, Greene and Pick 2008). The intensity of connection to the hinterland is influenced by preconditions like the quality of transport infrastructure and public transport.
METROPOLITAN FUNCTIONS

The discussion about metropolitan regions in Germany is mainly characterized by political and strategic development ideas. This leads to a use of the concept as a planning tool to influence the social and economic development of regions and not as an analytical tool to describe the previous development. Therefore, the approach of the concept of metropolitan functions needs to be distinguished from the scientific approach, based on the two criteria explained above. They are used by researchers to understand how metropolitan regions developed.

However, the scientific concepts of size and integration of the center with the hinterland are a basis for the concept of metropolitan functions, to define the spatial delimitation of a metropolitan region. Additionally the concept is based on the provision of functions with national and international importance.

The concept of metropolitan regions was introduced to the German planning policy with the “Political Framework for Regional Planning” of 1995. The Conference of Ministers for Spatial Planning (MKRO) defined metropolitan regions as “spatial and functional locations whose outstanding functions on an international scale have an impact beyond national borders. As engines of societal, economic, social and cultural development, they contribute to the maintenance of efficiency and competitiveness of Germany and Europe and contribute to speeding up the European integration process” (BMBau 1995, p.27). According to Blotevogel, the term metropolitan region is focused on spatial as well as on functional conditions. Concerning the functional aspects a metropolitan region is a location (cluster) of metropolitan institutions with wide ranging control, innovation and service functions, which act as engines for the local and regional development. In the spatial sense a metropolitan region is build by one or more in proximity located cities including their hinterland. It can be determined between monocentric metropolitan regions, made up by one big city and the hinterland and polycentric metropolitan regions that are build by a group of cities (more or less equal size and importance) including the suburban areas between them (Blotevogel, Metropolregionen 2005).

The concept is based on four functions that need to be provided by metropolitan regions. The decision-making and control function, innovation and competition function, gateway-function and the symbol function (ARL 2007). Indicators for each function are listed in Table 7.
The main focus of this approach is put on the provision of metropolitan functions. For example a large industrial city with more than 500,000 inhabitants may not be classified as a metropolitan region if it is not able to provide enough metropolitan functions, even though the number of inhabitants could classify it as a metropolitan core. On the other side the German polycentric metropolitan region Saxony Triangle would maybe not be defined as a metropolitan region because of its low number of inhabitants in the cores (only Dresden and Leipzig are having more than 500,000 inhabitants) or by functional integration between the different cities. Since the cities are providing metropolitan functions, they are classified as a polycentric metropolitan region by the German policy makers.

A research of the BMVBS and the BBR in Germany is dealing with the potentials of a polycentric spatial development of metropolitan regions. In this research a definition

<table>
<thead>
<tr>
<th>Functions of Metropolitan Regions</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decision and control function</strong></td>
<td><strong>Indicators</strong></td>
</tr>
<tr>
<td>Private sector</td>
<td>Headquarters of national and transnational companies</td>
</tr>
<tr>
<td>Nation State</td>
<td>Financial services (bank, stock exchange)</td>
</tr>
<tr>
<td>Other organizations</td>
<td>High advances services</td>
</tr>
<tr>
<td></td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Supranational organizations (EU, UN)</td>
</tr>
<tr>
<td></td>
<td>International NGOs</td>
</tr>
<tr>
<td><strong>Innovation and Competition function</strong></td>
<td></td>
</tr>
<tr>
<td>Generation of knowledge, attitudes and</td>
<td>R&amp;D institutes, Universities, knowledge based services</td>
</tr>
<tr>
<td>Economic-technological innovation</td>
<td>Cultural facilities (Theater, Museum, major</td>
</tr>
<tr>
<td>Social-cultural innovation</td>
<td></td>
</tr>
<tr>
<td><strong>Gateway function</strong></td>
<td></td>
</tr>
<tr>
<td>Access to people</td>
<td>Transportation infrastructure (highways, train connection, airports)</td>
</tr>
<tr>
<td>Access to Knowledge</td>
<td>Media, libraries, congresses, broadband</td>
</tr>
<tr>
<td>Access to markets</td>
<td>Trade fair, exhibitions</td>
</tr>
<tr>
<td><strong>Symbol function</strong></td>
<td></td>
</tr>
<tr>
<td>Theatre, museum, major events</td>
<td>Culture (theatre, museums, art), media, events, architecture, image, townscape</td>
</tr>
</tbody>
</table>

Source: Blotevogel 2005.
of polycentric metropolitan regions is given, saying that such a region contains at least two core cities, which are competing with each other. Furthermore, the rural areas between the cores are also included in the polycentric metropolitan area, which leads to different levels of density within the region. The cores can be located in close proximity or further apart. Last but not least the definition is dividing different kinds of polycentric metropolitan regions, depending on quantitative and functional differences and similarities. Three different types are named: polycentric regions with one dominant core, with two dominant cores or several equal cores (BMVBS & BBR 2007). In this approach the functional connection between the different cores of polycentric metropolitan regions seems to be neglected, compared to the discussion about polycentric urban regions in chapter 3.2.2. This issue can be connected to the fact that this approach is used as a policy tool, leaving a lot of freedom for decision for the politicians. Moreover, it is unclear, which minimal amount of functions needs to be provided to justify a classification as metropolitan region. The BMVBS and the BBR are stating that in principle every metropolitan region has to provide all of the four functions, but the strength of the occurrence of the different functions differs from region to region (BMVBS & BBR 2007). The absence of a clear definition can also be connected to the fact that this concept is used as a policy tool. By leaving the criteria to define the metropolitan regions rather wage the politicians can decide on their own if they want to use the concept (Adam, Gödecke-Stellmann and Heidbrink 2005).

3.3.2 CURRENT RESEARCH ON METROPOLITAN REGIONS IN EUROPE

In 2010 the Federal Institute for Research on Building, Urban Affairs and Spatial Development in Germany (BBSR) published a study, which identifies metropolitan regions in whole Europe. The study is measuring the spatial dispersion of metropolitan functions and is defining associated metropolitan regions in Europe. This is the first attempt to analyze the metropolitan structure for the whole EU territory. To define the metropolitan regions five metropolitan functions have been identified and they are measured with 38 different indicators visible in Figure 7. The four functions of the political approach explained above have been further developed and are now defined as the following five functions: politics, economy, science, transport and culture. The idea of the study is that every function is equally important, so every function is measured with 20%. The weight of the indicators depends on the number of indicators that are used to define the function. In contrast to other studies no pre-selection of special areas has been done, to be able to analyze the whole EU.

The assignation of metropolitan regions according to this study should not be confused with the metropolitan regions, which develop in Germany or the rest of Europe based on political co-operations. This study is just analyzing the spatial distribution and aggregation of metropolitan functions across Europe (BBSR 2010).
Figure 7: Operationalization of functional areas by indicators

Source: BBSR 2011.
The study identified 8,480 locations in Europe where at least one metropolitan function is provided, measured on municipality and LAU 2 level. But only a small number of locations show a high number of functions in the aggregate index. Only 184 of the identified 8,480 locations are identified to achieve more than 3 of 100 index points. Because the results of every location vary dramatically, the BBSR introduced a classification system based on the spatial concentration of significant metropolitan functions to identify metropolitan areas.

Based on a GIS system, the locations providing metropolitan functions are merged to analyze the functions in a regional context. The identification of metropolitan areas is done in three steps. First the density of metropolitan functions is measured. This is done by a search radius of 50 km because it “implies that mutual relations and dependencies of locations with metropolitan functions range within this radius of about one hour of car traveling time” (BBSR 2011). In a second step the significant locations of metropolitan functions are identified because they are building the core of the metropolitan areas. In this study all locations with at least three points in the aggregated index are defined as a metropolitan core. In a last step the metropolitan areas are defined with the BBSR Accessibility Model. The metropolitan areas are defined by a time isochrone capturing 60 minutes of car travel. This isochrones are drawn around the identified cores. If two isochrones overlap in the hinterland, it is assigned to the nearest core (BBSR 2011). The result is shown in Figure 8, but the figure does not show, which of the locations have hardly achieved three index points and which agglomerations are providing a much higher number of functions.

This analysis can be seen as an improvement for the European research about the distribution of metropolitan regions because it identifies them by using the same criteria for the whole area of Europe. Furthermore it only identifies agglomerations to be metropolitan if they can possess at least three index points. In comparison to the approach of metropolitan functions explained before, this means that an agglomeration needs provide a concrete minimal amount of functions, to be announced as metropolitan region.
3.3.3 POTENTIALS AND RESTRICTIONS OF POLYCENTRIC METROPOLITAN REGIONS

The development of a polycentric metropolitan region does not only bring development potentials but also some restrictions compared to the monocentric metropolitan region.

Source: BBSR 2011.

Figure 8: Metropolitan areas and significant locations of metropolitan functions
The settlement patterns in a polycentric metropolitan region will develop different to those in a monocentric metropolitan region. In a polycentric region less agglomeration disadvantages will develop because there can be an intraregional mix of land use. This leads to lower rents in the cores because more locations for commerce and housing are available (Blotevogel 1998). Furthermore, the rural spaces between the cores can be used for recreational purposes for the inhabitants of the cores. But it has to be taken into consideration that a polycentric structure can cause more traffic volume due to commuting between the different centers. And also the possibility that infrastructure, like airports or theaters are repeated in the region is rising. This leads to a higher competition between the cores. Due to these problems, a high-quality traffic infrastructure and good connections between the cores are needed and the development plans of the different actors have to be harmonized to avoid parallel infrastructure development (Hall and Pain 2006, Knieling 2005).

The polycentric structure leads to a spatial distribution of functions. Some of the functions can be summed up and reach higher levels of recognition but this summing up is not possible with all functions. According to Meijers, this is true for cultural, leisure and sports amenities. One example is the existence of three medium sized theaters in three medium sized centers in polycentric region does not lead to the attraction of top-end productions because these productions demand more space and a bigger audience. Moreover the duplication of such amenities leads to a higher competition between the different centers (Meijers 2008). This can lead to a weaker positioning of the polycentric metropolitan region on the national and European policy level because it is harder for the centers to achieve a national or global identity (Blotevogel 1998, Hall and Pain 2006). Furthermore, it is more difficult to generate synergy effects due to the spatial fragmentation of functions. Face-to-face contacts are still an important part of the communication and co-operation between actors and become more difficult to realize if the centers are not located in close proximity, since the travel time has to be taken into consideration. Face-to-face contacts are not completely replaceable by e-mail or phone contact (Blotevogel 2005, Hall and Pain 2006). On the other side, fragmentation can lead to a complementary division of labor and functions and bring specialization effect for the different cores. The actors can use the same capacities, leading to fewer expenses and an optimized use of resources. (Metzler 1997).

If the concept of metropolitan regions is used as a planning tool like in Germany, co-operation structures are an important requisite for the development of the metropolitan region because the co-operation may not be based on strong functional integration between the centers. All actors should be involved equally in the co-operation. With increasing size of the region and distance between the actors the co-operation becomes more complex. But the distance normally does not influence the content of the co-operation, but more the organizational level (BBR 1999, Adam and
Göddecke-Stellmann 2002). Compared to this, monocentric metropolitan regions seem to have an advantage in developing. Monocentric metropolitan regions have a higher level of self-organization potential because the distribution of powers between the actors is less complex in monocentric regions with one strong core (Blotevogel 2005).

3.3.4 The concept of metropolitan regions in the Greater Region

In this chapter the results of the theoretical discussion about the metropolitan regions will be applied to the Greater Region. Since the discussion about the polycentricity already showed that not the whole Greater Region can be defined as a polycentric urban region, only the identified polycentric region in the core of the Greater Region will be further analyzed. The result of this discussion will show extent to which the region fits the concept of a CBPMR.

According to the definition of metropolitan regions by size it has to be stated that the centers of the PUR do no fulfill the requirements of Blotevogel, as illustrated by Table 8. Blotevogel demands at least 500,000 inhabitants in the center and 1.5 million in the region. One could say that all four cities together are able to provide a number of inhabitants around the amount of 500,000, but in this case the critical mass in each single city is still too small, since none of them is bigger than 200,000 inhabitants. Moreover, the distance between the centers is too high to perceive them as complementary centers.

The picture of size changes for Luxembourg City if one views the size of the city in comparison to the size of the country. In 2010 Luxembourg counted 502,100 inhabitants and Luxembourg City 90,800 inhabitants. Since only 502,100 inhabitants are living in the whole country it is not possible for the center to provide the claimed amount of population, to be classified as a metropolitan center. However, 18% of the Luxembourgish population is living in Luxembourg City (Statec Luxembourg 2010). In comparison to that only around 0.2% of the Germany population is living Saarbrücken, the biggest of the four centers (Federal Statistical Office Germany 2010). This relation shows the importance of Luxembourg in the sense of size and is taken as an argument why Luxembourg City is included as one of the centers of the CBPMR, although it is the smallest one.

Furthermore the results of the ESPON project Metroborder are based on the concept of Morphological Urban Areas (MUAs). MUAs have been introduced as an important tool for spatial analysis for research at the EU level. In general MUAs are densely built areas, they are defined as “agglomerations with a population density of not less than 650 inhabitants per square kilometer (ESPON 2010a, p. 75). In the ESPON project Metroborder these spatial units builds the core of a metropolitan region. This
classifies all four centers as densely populated areas. The high population density of Metz compared to the other three cities can be explained by a different statistical system to define the scale of administrative units.

**Table 8: Inhabitants in the centers of the Greater Region**

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2009</th>
<th>2010</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Luxembourg City¹</td>
<td>Trier²</td>
<td>Saarbrücken³</td>
<td>Metz⁴</td>
</tr>
<tr>
<td>Number of inhabitants</td>
<td>90.800</td>
<td>104.587</td>
<td>175.305</td>
<td>123.580</td>
</tr>
<tr>
<td>Inhabitants/ km²</td>
<td>1755</td>
<td>893</td>
<td>1052</td>
<td>2946</td>
</tr>
</tbody>
</table>

Sources:
¹ Statec Luxembourg 2010.
² Statistisches Landesamt Rheinland-Pfalz 2010.

The population development for the different parts of the region brings up a further issue for the definition of a CBPMR in the core of the Greater Region. During the time from 2000 until 2009 the region inhabiting the smallest center (Luxembourg) has been growing (+13.3%) and the region inhabiting the biggest center (Saarbrücken) has been shrinking (-3.8%). Since the critical mass for metropolitan region is already not reached a further loss of inhabitants has to be prevented.

As mentioned above, more indicators than size and population density have to be taken into account to define a metropolitan region by quality and not only by quantity. The further discussion and the elaboration of other factors to classify a metropolitan region will show if it is possible to classify the PUR as metropolitan region even if the size of the centers is too small according to the definition.

The functional integration of the PUR was already elaborated in the discussion about the PUR and it was identified that cross-border commuting of workforce exists, especially to Luxembourg. The research of ESPON identified several Functional Urban Areas (FUAs) in the whole Greater Region. According to the definition of FUAs more than 10% of the workforce within this area is commuting to the included Morphological Urban Area (MUA) (ESPON 2010a, p. 75). In the case of the PUR both, the FUAs of Luxembourg City and Saarbrücken, are attracting people across national borders. This leads to the classification as core FUAs in the PUR according to Figure 9. In this constellation the FUA of Saarbrücken is the larger FUA in terms of size and the FUA of Luxembourg City the more important one in economic terms. The core FUAs are slightly touching each other. This can be regarded as an
important indicator for the interaction in this area and the strong cross-border integration and is identified as a unique phenomenon in the ESPON research. Furthermore the FUAs of Trier, Thionville and Metz are announced to be neighboring FUAs of the two core FUAs. They are influenced by the cross-border labor market but the FUAs do not cross national borders. In comparison to that the FUA of Nancy is classified as surrounding FUA because of the high distance to Luxembourg City as economic center but also to Saarbrücken.

Figure 9: Functional and Morphological Urban areas in the Greater Region

Source: ESPON 2010a.

The last indicator to qualify the PUR as a metropolitan region is the indicator of metropolitan functions. This indicator will be applied to the Greater Region based on the current research of the Federal Institute for Research on Building, Urban Affairs and Spatial Development in Germany, explained in chapter 3.3.2.
The research identifies two metropolitan regions, which match the territory of the PUR. The metropolitan regions are Nancy and Luxembourg. Figure 10 shows the spatial scale and the metropolitan functions of the metropolitan regions in the core of the Greater Region. The number of metropolitan functions is illustrated by the size of the circle. Compared to other identified metropolitan regions like Randstad or Rhine-Main the number of provided functions is smaller but still, all centers are visible in the results of the study. It is taken as obvious that the functions are not that dominant, since the region is not yet established as a polycentric metropolitan region.

**Figure 10: Metropolitan Functions Greater Region**

![Map showing metropolitan functions in the Greater Region](image)

Source: BBSR 2011, edited by author.

The metropolitan region of Luxembourg comprises the cities Luxembourg City, Trier and Saarbrücken as cores with the most metropolitan functions. Some more cities are visible in the metropolitan region but in general they provide only one of the metropolitan functions and the functions are not strongly pronounced. According to the number of metropolitan functions, Luxembourg City can be seen as the most important agglomeration in the PUR. It provides the most metropolitan functions in comparison to the other cities. This makes Luxembourg City the clear leader in terms of metropolitan character. The map shows that the biggest share of metropolitan functions in Luxembourg City is located in the political field. This is based on the location of the European Court of Justice and the European Court of Auditors in Luxembourg City but also due to the fact that the city is the capital of Luxembourg.

The economic importance of Luxembourg has already been mentioned in the previous discussion. The BBSR classifies Luxembourg as a metropolitan region of type 2. This type is including “larger metropolitan areas characterised by a high
Saarbrücken and Trier are providing metropolitan functions, too but remarkably less than Luxembourg City. The number of metropolitan functions is equally distributed between the two cities, no order can be identified, but they are providing metropolitan functions in different fields. Saarbrücken is mainly providing functions in the fields of economy, followed by transport and culture and science. The metropolitan character in Trier is dominated by cultural functions and further science and transport. No outstanding function in the field if politics and economy can be measured.

The metropolitan region of Nancy is dominated by the cities Nancy and Metz, providing metropolitan functions. In comparison to each other Nancy is providing a higher amount of functions and a higher variety than Metz. Metz is providing metropolitan functions in the field of economy, transport and culture. Nancy is providing functions in every field except politics but the main share of the functions is dedicated to the field of culture.

Metz is included in the metropolitan area of Nancy and not in the metropolitan region of Luxembourg. This leads to the question if Metz should be part of the CBPMR. The reason why Metz is assigned to the metropolitan region of Nancy is based on the method of the research of the BBSR. If a city is located at the edge of two metropolitan areas, it will be assigned to the metropolitan region of the center, which is located in closer proximity since the research is not connected to real functional integration between the centers but to commuting distances. However, the discussion if the core of the Greater Region can be defined as a metropolitan region is also based on the functional integration with the hinterland. The discussion about polycentricity showed that Metz is functional integrated with Luxembourg City (see Figure 6, p. 21). Based on this argument Metz is defined as part of the CBPMR.

### 3.4 Conclusion for the Greater Region

To sum up the results of the application of the theories on the Greater Region it can be stated that not the whole region can be classified as a PUR, mainly based on the fact that the distance between the centers is too high and therefore the functional integration is too low. Three different possible polycentric regions within the Greater Region can be identified but only the one in the core of the Greater Region, comprising Luxembourg City, Trier, Saarbrücken and Metz, is crossing national borders. Therefore only this region was taken into closer consideration to build a CBPMR. A strong cross-border commuting within the region can be measured. The cross-border commuting is mainly targeted to Luxembourg City. The second but
decreasing commuting flow is measured between the Saarland and Lorraine. The general high amount of cross-border commuting emphasizes the high functional integration across the national borders and strengthens the character as a cross-border region.

The result of the application of the concept of metropolitan regions to the PUR in the core of the Greater Region leads to the result that the core fits the requirements of functional integration and metropolitan functions. The functional integration is based on high cross-border commuting flows. Moreover, all four centers are providing metropolitan functions. Luxembourg City is providing the most significant amount of functions with a high concentration of political functions. On the other side, the requirement of minimal size of the centers is not fulfilled because the centers are too small. However, the analysis shows that centers, under certain circumstances, are able to provide metropolitan functions although they are smaller than demanded; especially the case of Luxembourg City is an exceptional example. Luxembourg City happens to be the smallest center in the region but at the same time it is the economic center of the region and also provides a high number of political functions. In general Luxembourg City is providing the highest amount of metropolitan functions in the region. This leads to the conclusion that the region may not fulfill the theoretical requirements of size, but in practice the small size does not exclude the provision of metropolitan functions. Compared to already established domestic polycentric metropolitan regions, the PUR can be seen as a small scale CBPMR with Luxembourg City as the main center. It is suspected that the region would not be as important on the international level if Luxembourg City would not participate in the co-operation.

The main problem of the small scale CBPMR is the shrinking population in some parts of the region. Since the centers are already smaller than demanded the further population loss can endanger the classification of a small scale CBPMR, since with a loss of population also the provision of functions in a center will be reduced.

All these findings lead to the result that the core of the Greater Region between Luxembourg City, Trier, Saarbrücken and Metz does not fit all criteria of the definition but the exceptional position of Luxembourg City leads to a classification as small scale CBPMR. The following chapter will deal with different strengths and weaknesses of the region and point out opportunities, how the CBPMR can attract more attention from the outside and how the character as a CBPMR can be strengthened.

4 Strengths and Weaknesses of the CBPMR

The core of the Greater Region has been identified to be a small-scale CBPMR since the functional integration between the centers is high but the size of the centers is too
small to fit the criteria of metropolitan regions. The concept of CBPMR can be used to develop the core of the Greater Region and to make it more competitive in the regional competition. In order to develop the CBPMR further, the strengths and weaknesses of the region need to be elaborated. Based on this elaboration, development opportunities can be discussed, aiming to strengthen the existing strengths and to weaken the weaknesses. The strengths and weaknesses will be discussed according to four different fields: demography, functional integration and economy, spatial structure and co-operation structure and governance. These four fields are chosen for the elaboration of the strengths and weaknesses because they fit the former discussion about polycentricity and metropolitan regions. These fields have to be further improved in order to strengthen the region as a CBPMR.

Table 9 gives an overview about the general strengths and weaknesses in the CBPMR. Subsequent they will be discussed in more detail.

**Table 9: Strengths and weaknesses of the CBPMR**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demography</strong></td>
<td></td>
</tr>
<tr>
<td>High population growth in Luxembourg</td>
<td>Strong decline in Saarbrücken and its hinterland</td>
</tr>
<tr>
<td>Population growth from Luxembourg to the neighboring regions</td>
<td>Need to improve the mobility of the commuters</td>
</tr>
<tr>
<td><strong>Functional integration and economy</strong></td>
<td></td>
</tr>
<tr>
<td>Biggest international labor market in the EU</td>
<td>Cross-border labor market hindered by legal, social, educational and fiscal systems</td>
</tr>
<tr>
<td>Located in the economical strong center of Europe</td>
<td>Bad access to the economic center of Europe</td>
</tr>
<tr>
<td>Employment rate increasing</td>
<td>Low employment rates of women and youth</td>
</tr>
<tr>
<td>Bi-lingual professional labor</td>
<td>Language barriers and cultural differences</td>
</tr>
<tr>
<td><strong>Spatial structure</strong></td>
<td></td>
</tr>
<tr>
<td>Polycentric cross-border structure</td>
<td>Size of and distance between the centers</td>
</tr>
<tr>
<td><strong>Co-operation structure and governance</strong></td>
<td></td>
</tr>
<tr>
<td>Co-operation between the centers of the CBPMR</td>
<td>Lack of a metropolitan image</td>
</tr>
</tbody>
</table>

Source: Image created by author.
DEMOGRAPHY

One of the major weaknesses of the CBPMR is the small size of the centers compared to other metropolitan regions. Since the centers are already small sized, a further shirking of population in the centers and the hinterland needs to be prevented. To elaborate the concrete situation in the region the demographic situation, as well as the population development need to be analyzed.

Since only few comparable data is available for the area of the CBPMR, the information about the whole Greater Region is used to show the tendencies of the demographic development in the sub-regions in the Greater Region.

The Greater Region can record a growth of population of 6.9% since 1970. This is a rather low growth compared to the development in the EU, the average growth in the EU-27 over the same time period was 14.8% (IBA 2010).

Figure 11: Population development Greater Region and sub-regions 1970 till 2009

The regional distribution of growth from 1970 until 2009 shows a more differentiated picture of the population development. The general population growth in the Greater Region is mainly based on the strong growth in Luxembourg (45.2%) and the German speaking Community of Belgium (DG Belgien: 20.7%). Furthermore Rhineland-Palatinate (9.7%) and Wallonia (9.1%) are also contributing but with a
lower growth rate. Those growth rates were able to balance the stagnation of population growth in Lorraine (1.5%) and the decline in the Saarland (-8.6%). The population development from 2000 until 2009 gives an even more differentiated picture. Luxembourg is still influenced by an extraordinary growth rate of 13.3%. The German speaking Community of Belgium and Wallonia are having stable growth rates of 5.2% and 4%. The growth in all three regions has become even stronger since 2004. In contrast, Lorraine is characterized by a less dynamic population growth. The German regions Saarland (-3.8%) and Rhineland-Palatinate (-0.4%) are already facing population decline. A population growth could be recognized until 2005 in Rhineland-Palatinate but since then the population is shrinking (IBA 2010).

**Figure 12: Population development Greater Region 2000 till 2009**

![Population development Greater Region from 2000 until 2009](image)

Source: IBA 2010.

Figure 12 shows the situation of population development for the Greater Region from 2000 till 2009. In this figure the development for the CBPMR can be seen, too. The centers of the CBPMR are marked red. According to this figure it can be stated that the three centers Luxembourg City, Trier and Metz are growing. The growth in Luxembourg City is the highest with more than 10% growth. Luxembourg City is
followed by Trier with a growth between 2.5 and 5% and Metz with a growth between 0 and 2.5%. In contrast, Saarbrücken is shrinking and lost between 2.5 and 5% of the population.

The high population growth of Luxembourg is an important strength of the CBPMR and is assigned to the growth of the natural population development, as well as to the high degree of migration to the center. The migration flows are based on the high demand for workforce as well as on the good economic situation of the country. The smallest of the four centers in the CBPMR is showing the highest population growth. Contrasting to that Saarbrücken, the largest of the four centers, is the one with the highest population decline. This is considered to be one of the major weaknesses for the development of the CBPMR. The centers of the CBPMR are already small compared to the demand of the concept. Therefore a population decline in Saarbrücken is not in favor for the development of the CBPMR. The development in the Saarland is influenced by both, shrinking birthrates as well as a negative balance of migration. The Saarland has the worst demographic condition of all sub-regions. The shrinking birthrates have already been measured since 1971 and increased steady since 2000. The balance between birthrates and mortality rates is the worst in all sub-regions. Since 2004 the migration balance of the region is also declining and increases the negative population development in the hinterland of Saarbrücken.

The other regions are located in between the development of Luxembourg and the Saarland. The population growth in Lorraine is mainly based on a birth surplus and is weakened by the outmigration. But still the region can attract citizens based on the job opportunities in Luxembourg. Rhineland-Palatinate is characterized by a higher rate of mortality than birthrates. This could be covered by a positive migration balance, but since 2007 the migration is decreasing. Both, Wallonia and the German speaking Community of Belgium are influenced by a low birth surplus, but the migration is the influencing factor for the growth.

Both figures (Figure 11 and Figure 12) are underlining the status of Luxembourg City as main center of the CBPMR based on its role as main engine of population growth in the region. The economic strength and the high demand for workforce are not only influencing the growth of Luxembourg itself. Also the border regions close to Luxembourg are profiting from the attractiveness of the country. The attractiveness of Luxembourg for labor is the reason why Trier can review on a population increase in the last years. In contrast to the rest of Rhineland-Palatinate only Trier and the county of Trier-Saarburg could record a population growth. The same phenomenon can be recognized close to the Luxembourgish borders in the Saarland, Lorraine and Wallonia (IBA 2010). This shows a new form of commuting. People are moving in one of the neighbor countries of Luxembourg close to the border but they are working in Luxembourg. This development leads to the need of coordination and co-operation in the Greater Region especially in the field of public transport and mobility. The
mobility of the commuters from the border regions to Luxembourg needs to be increased.

Furthermore the demographic change will also bring a change in the age structure in the CBPMR based on the decreasing birth rates, a higher life expectation and out-migration. The out-migration of young and professional labor leads to a lack of skilled labor and an increase of the number of elderly and less educated people in the region. Migration flows are more dependent on the economic, political and social development as the natural population development. Therefore, these factors are seen as indicators for the attractiveness of a region (IBA 2010). No comparable data is available for the CBPMR, only for the Greater Region. Since 1990 the number of people older than 60 years increased by 4.6 percentage points and the share of the people younger than 60 years declined by 2.5 percentage points (IBA 2010). This leads to an aging of population in the Greater Region.

The following conclusions for the CBPMR can be drawn from this analysis. The economic prosperity and the demand of workforce in Luxembourg can be seen as a strong influence for the population development in the region. It is able to balance the decline, which is mainly based in Saarbrücken and its hinterland. Furthermore, Luxembourg’s population growth is spreading to the neighbor regions. To be able to handle this population growth and to be attractive for the settling commuters the public transport and the transport infrastructure need to be improved.

FUNCTIONAL INTEGRATION AND ECONOMY

Because only few comparable data about the economic development of the CBPMR is available, the development of the sub-regions of the Greater Region is taken into closer consideration to give a general view about the development in the recent years. The report of the Interregional Economic and Social Committee shows that the Greater Region was influenced by the financial crisis by a loss of GDP of -3.8% in 2009. This is the highest decrease in the economic performance since the post-war period. Still, the loss is lower than the average loss of the EU of -5.6%. The regional distribution of the losses shows that the Saarland had to deal with the highest decrease of GDP (-7.1%) based on the export-based industrial companies. Lorraine had to face a decline of -5.3%, Luxembourg -4.3%, Rhineland-Palatinate -3.6% and Wallonia -1.4%. The economic stimulus packages of the regional governments had a diminishing influence on the effects of the crisis. The branches of handcraft and other branches of industry and the service sector can be viewed as stabilizing factors. The first six month of 2010 showed an economic recovery mainly based on the recovery of the export industry (WSAGR 2010).

The major strength of the CBPMR is the huge international labor market. The Greater Regions is providing the biggest cross-border labor market in the EU. The main share
of the labor is commuting to Luxembourg. The second biggest share is commuting from Lorraine to the Saarland but these flows are decreasing since 2001, based on the tight labor market and the staff reductions in the manufacturing industry between 2003 and 2005. The main share of the commuters has been working in this sector (Wille 2011). These two regions are both fully included in the CBPMR. This leads to the assumption that the main share of the cross-border commuting takes place in the CBPMR. This can be seen as a unique feature of the CBPMR and leads to a high functional integration within the region as already discussed earlier. However, a stronger integration between the regions is hindered by differences in the national legal, social, educational and fiscal systems. Because of these obstacles many people refuse to cross the national border to work. An example for differences in the educational system leads to the result that degrees, which have been achieved in one of the regions are not accepted in the other regions or the review of the degree and the acknowledgement take a long time. A second example is the regulation about income tax. The unawareness about tax regulations for cross-border commuters leads continually to tax liabilities.

The CBPMR is located in the strong economic core of the EU. Figure 13 shows the GDP per head in 2007. According to this the CBPMR is located between the strong economic south of Germany, Randstad in the Netherlands, London and Paris. Furthermore it is located in the “pentagon”. The pentagon is located between London, Paris, Milan, Munich and Hamburg, the picture of the pentagon was developed in 1999 and in this time the area of the pentagon “covered 20% of the EU territory, 40% of its population and 50% of its economic performance” (BBSR 2011). This is now more than 20 years ago and the territory and the population of the EU changed since then based on several enlargements. Still, the western part of the EU is economically stronger than the East. Although the CBPMR is located in the strong economic area of the EU, it is not well connected to the other economic centers. This location advantage of proximity to other economically strong centers like Paris, Strasbourg or Frankfurt/Main leads to a further sales market but the connection by rail and road is not strong enough to exploit this market efficient until now. To make better use of the location in the core of Europe the high speed connection to the other economic centers outside the CBPMR needs to be improved. This includes for example the connection to Brussels and Randstad, as well as the connection to the South. Furthermore the transcontinental connection to Eastern Europe also needs to be improved, to strengthen the accessibility from outside the region.
Since comparable data for the development of the employment rate for the CBPMR is not available, the data of the Greater Region are taken into consideration. The loss of jobs in 2009 was lower than it was expected in the Greater Region. The Saarland lost 0.8%, Rhineland-Palatinate could stay stable and Luxembourg achieved a plus of 0.9%. The employment rate was slightly growing and reached 65%, but this does not yet fit the aim of 75% demanded by the Europe 2020 strategy. Still, there is still a demand to increase the employment rate of women and youth. The gender-specific difference in the employment rate between men (70.4%) and women (58.3%) is still high in the Greater Region, although the employment rate of women is equal to the one of the EU-27. The employment rate for young people could not be increased since 2000. However, especially those two groups still need to be supported (IBA 2010). It is important for the development of the region to be attractive for both groups. Women are needed for the reproduction in the region and young and well skilled labor is important for the innovation potential of the region and to avoid a lack of professionals. Therefore political strategies are necessary to increase the employment opportunities for both groups.

The involvement of four countries makes the labor market even more special and leads to a provision of bi-lingual professionals. Especially the Luxembourgish labor is
attractive because in general they speak French and German. Moreover, the labor is expected to speak at least English. The provision of bi-lingual professionals is attractive for companies, especially if they are operating internationally. In contrast, language barriers and cultural differences are still a problem for the development of the region. Large parts of the population, especially older people and people with a lower education, are not able to participate in the bi-lingual labor market because of missing language skills. Therefore the aim of the Greater Region for 2020 is the development of language skills from the early childhood on to make sure that the next generation is able to communicate in German, French and English (Politische Kommission 2003). Furthermore differences in workflows can be announced to different cultures of working and can lead to a further refusing to participate in the cross-border labor market.

A progressing structural change in the former industrial areas of the Greater Region is reported. The structural change to a knowledge-based economy leads to a higher importance of education, science, research and technological development. In 2007 the Greater Region ranked in the middle-field of innovation-production in the EU. To strengthen the development of the different sectors a higher investment in R&D is mandatory. The aim of the Europe 2020 strategy claims an investment of at least 3% of the GDP in R&D, in 2007 the investment in the Greater Region was only 1.68% (WSAGR 2010). The investment in R&D is seen as an investment in the competitiveness of a region, since knowledge and innovation are a driving factor for economic growth in a region. Furthermore it needs to be invested in the education of future workforce, since the economic growth depends on the qualification of the workforce and innovative strength of the region.

A good example for the efforts to increase the quality of education in the Greater Region is the INTERREG project “University of the Greater Region”. By this project the connection between the seven universities in the Greater Region shall be increased. This project aims to strengthen the mobility of students, researchers and lectures and increase the science location in the Greater Region. A further co-operation and coordination shall lead to an increased educational supply. The degrees of the different universities will be acknowledged in all regions. This leads to an easier access to the international labor market in the CBPMR. The project shall be finished in 2012.

**Spatia l Structure**

The polycentric structure of the CBPMR includes four centers in three different nation states. Moreover, the functional integration is spread over four countries. The high density of national borders strengthens the international character of the region. The polycentric structure is based on the functional integration between the centers.
Based on the economic and political importance, Luxembourg City is the main center in the CBPMR. It is important to attract more attention from outside the region. The importance of Luxembourg can be used to strengthen the region.

Furthermore, the region is characterized by the small size of the centers. The small size leads to a lower level of awareness about the centers. The centers are not located in close proximity, although they fit the criterion of distance between the centers to be classified as a polycentric urban region. Although the CBPMR is highly interconnected by commuting flows the regional identity is rather low. People still feel a stronger national identity connected to their home country. This leads to a lower interest about the development of the CBPMR and people feel less responsible. It is important to strengthen the regional identity to reach a higher commitment of the civil society for the development of the CBPMR. One reason for the low regional identity is the large size of the Greater Region. Citizens are not feeling connected to the other sub-regions because of the long distance. Therefore the identity to live in the CBPMR needs to be strengthened. Furthermore, the lack of a common identification symbol for the whole region can be mentioned as a reason.

**CO-OPERATION STRUCTURE AND GOVERNANCE**

The development of the CBPMR needs to be supported by a co-operation between the centers. The city network QuattroPole between the centers of the CBPMR is already established and can be used for the future development of the region. The existence of this network is as an advantage for the CBPMR because the institutional structures for the co-operation at the local level are already established. Furthermore, the actors are already familiar with each other, leading to a certain amount of trust between the actors and increasing the quality of the co-operation. The hinterland of the centers needs to be included in the governance structures of the CBPMR (BMVBS 2011). The co-operation is based on 4 different fields: administration, citizens, economic attractiveness and space. One aim of the co-operation must be to increase the image as a polycentric metropolitan region to the inside as well as to the outside of the CBPMR. Until now the CBPMR is not recognized as an important polycentric metropolitan region from the outside. This aim is connected to the increase of accessibility on the international level. With a stronger connection to other economic centers the level of awareness of the region can be improved.

The existing co-operation and governance structures in the Greater Region are considered to be important for the development of the CBPMR because the co-operation is dealing with topics like transport, spatial planning and education on the regional level. An improvement of these topics on the regional level will also have a supportive influence on the CBPMR. Therefore, the established governance structures in the Greater Region are a precondition for the further development of the
CBPMR. Moreover, the governance system at the regional level needs to be aware about the CBPMR in the core of the Greater Region and support the development of the CBPMR specifically.

Main strength of the co-operation structure in the Greater Region is the long tradition of co-operation. The beginning of the informal co-operation can already be dated to the 60s. With the 1970s the administrative institutionalization was started and the co-operation structures have been further developed until today. Not only the public administration is included in the co-operation, but also social and economic actors. They are participating in the Social and Economic Committee, which has an advising character.

The co-operation is characterized by a high degree of formalization and the range of topics addressed is broad. On the regional level mainly actors of the regional government are participating. On the local level the co-operation is driven by the actors in the municipalities. The regional identity of people working in field of cross-border co-operation is higher than of the remaining citizens. Only the cross-border commuters are assumed to have a stronger perception of the Greater Region than the rest of the population because they are using the advantages the co-operation brings.

The strongest weakness of the Greater Region concerning the co-operation structure is the multi-level-mismatch, which includes the asymmetric organization of competences on different political and administrative levels on either side of the border (ESPON 2010a). The differences in the national administrative structure lead to a slowing down of the co-operation based on the institutional and personnel efforts of coordination. The actors have to communicate the cross-border issues in the domestic administrative and political committees. The issue that the cross-border co-operation is often not an independent policy field but a cross-sectional task leads to further delays of decision making because of complex processes of coordination. The complexity of decision making can also lead to frustration between the actors and reduce the motivation for co-operation. Furthermore, the decision making processes based on the need for consensus and the rotating presidency of the Summit of the Greater Region are further factors for a slow development in the region. The rotating of the presidency is to include the sub-regions with the same strength but is not helpful to develop a path dependency and continuity of development. To accelerate the decision making process the other forms of co-operation, like a supra-national organization, should be taken into consideration and be discussed. The co-operation in the Greater Region is based on common projects, but the region does not have an own budget to finance these projects. This leads to a dependency on the INTERREG financing.
At the moment the Greater Region is processing several reforms to make the cooperation more effective. The reform does for example aim to increase the number of meetings of the Summit of the Greater Region as well as the introduction of an own budget. Furthermore the connection between the municipalities and the stronger integration of the civil society in the work of the Greater Region is part of the reform.

**DATA AVAILABILITY**

The issue of data availability is not mentioned in Table 9 since it is an underlining issue in all mentioned fields. Until now the sub-regions of the Greater Region are collecting data independently from each other. This leads to different sets of regional data, which is not usable for comparing studies. The collection of comparable data is important for all political sectors and further political decisions, which should be based on reliable data. Therefore, a data platform where all the participating regions collect comparable data is mandatory. The data needs to be collected for the whole Greater Region but also on the level of the CBPMR. Furthermore the data should also be available in English and not only in German and French to be attractive for external viewers, interested in information about the Greater Region.

Two positive examples can be named until now to improve the situation of data availability. The Greater Region has established an interactive atlas where regional data can be mapped and also further explaining articles are provided. The webpage is providing thematically maps giving information about human, social and natural science (GR-Atlas 2011). The statistical information is also available in tables and figures. Furthermore in 2009 it was decided on the establishment of a common GIS system as an indispensable tool for the co-operation in the field of spatial planning and for a balanced spatial development (Homepage Greater Region 2010). Based on this, political decisions can be grounded. The project is founded for three years by INTERREG and is not finished yet. The data collection is mainly focused on planning documents, demography as well as traffic and cross-border mobility. Since the project is not finished important information is still missing until now, but the webpage is regularly updated.

5 **DEVELOPMENT OPPORTUNITIES FOR THE CBPMR**

Several strengths and weaknesses of the CBPMR have been discussed in the previous chapter. The discussion about development opportunities in this chapter will be based on the strengthening of existing strengths by a reduction of weaknesses. It will be focused on the development of the existing strengths because this will lead to a faster and stronger development of the region. Opportunities how to strengthen the
region will be provided and the possible influence of these opportunities will be discussed.

The discussed strengths in this chapter are:

- The population growth from Luxembourg to the neighbor regions
- The location of the CBPMR in the economically strong center of Europe
- And the co-operation between the centers of the CBPMR.

The choice of these strengths is based on the fact that they can be developed in a short or medium term, meaning the next five to ten years.

5.1 Population growth from Luxembourg to the neighbor regions

Luxembourg City is the only one of the four centers, which has a high birth surplus and a positive balance of in-migration. Therefore, the center is seen as the engine of population growth in the CBPMR. These abilities of the center can be used for the development of the CBPMR. In recent years a new form of commuting to Luxembourg developed. People are not moving directly to Luxembourg, but close to the border in one of the neighboring regions. This development has to be used more efficient to attract people to move to the CBPMR. Luxembourg City can be promoted as the prosperous center of the region attracting the workforce based on the high wages and the high demand for professional labor. Since the prices for housing and living are higher in Luxembourg the close border regions can be promoted as alternative for the settlement of the labor. This may reduce the migration flows to Luxembourg, but the demand of professional labor in the center can still be satisfied.

Improvement of commuter mobility

To strengthen the attractiveness of the neighbor regions as attractive housing location for the workforce the aspect of mobility and accessibility needs to be strengthened. At the moment around 144,000 inhabitants of the Greater Region are commuting to Luxembourg. 93% of these commuters are using the car to commute to work. This leads to a high amount of congestion in the peak time of commuting flows every day (WSAGR 2010). If the amount of commuters will be raised by the settlement of commuters outside Luxembourg, the traffic infrastructure needs to be improved to avoid a collapse of the traffic system. The solution for this problem should be based on a reduction of car traffic by an increase of attraction of bus and rail for the commuters. This is not a new topic the CBPMR. The report of the Economic and Social Committee (WSAGR) of 2010 shows that several
improvements have been introduced already, for example the introduction of a bus line between Luxembourg and Lorraine, the improvement of the time table information system between the transport system of Luxembourg and the Saarland and the improvement in the coordination of timetables. Although these are all positive developments to improve the situation of the commuters there is still a lot of potential to make the public transport more attractive. The WSAGR points out further dimensions that need to be improved in the co-ordination of the public transport systems (WSAGR 2010).

- Introduction of an electronic cross-border information system about time tables and prices, including all agencies providing public transport in the Greater Region
- Co-ordination of the time tables to reduce waiting time for connecting trains
- Harmonization of the fare system in the Greater Region (based on the national influence this will not be possible for all parts of the Greater Region in a short- or medium term)

Those three important improvements of the public transport are outlined for the Greater Region as a whole. But since the main centers of commuting are located in the CBPMR these improvements will have a strong influence for the commuting in the CBPMR.

**Figure 14: Accessibility inside the CBPMR**

Furthermore it is essential that the administrative units responsible for the development of transport infrastructure develop a common cross-border strategy, to avoid different planning activities on each side of the border. Figure 14 shows the improvement of the connection between Saarbrücken and Luxembourg City by a fast bus line, this leads to a higher use of public transport by commuters from Saarbrücken to Luxembourg City.

EXPECTED RESULTS

The raise of labor, working in Luxembourg and living in the neighboring regions, will lead to several results.

The settlement of the workforce in the neighboring regions will increase the migration balance of those regions although it will be mainly based on a small spatial area close to the border. The attraction of cross-border commuters does not only raise the population in these regions but also leads to a higher buying power. The wages in Luxembourg are higher than in the neighbor regions and the commuters will spend their money mainly in the neighbor region where they live. This fosters a positive development in the region because people are spending more money in the regions than before. A higher buying power in the regions will also lead to a further attraction, not only for inhabitants, but also for fields like gastronomy and retail. To increase the buying power in the region, and not just move it from Luxembourg to the neighbor regions, mainly new labor force from outside CBPMR should be attracted. Since this settlement opportunity is also attractive for the existing labor force in Luxembourg, a migration from Luxembourg to the neighbor regions cannot be prevented. This fact has to be accepted if the neighbor regions will be more promoted for cross-border commuters.

The higher demand for land increases the prices. This is a negative side effect for those who are already living in the regions and want to build a house there. For landowners, in contrast, it brings an increase of value for their land when they sell it.

Since the mobility of commuters will not only be increased for the neighbor regions close to the border but for the whole Greater Region, a further increase of the cross-border labor market is created. For example the fast bus line from Saarbrücken to Luxembourg City makes the commuting from center to center more attractive. And also the fast rail connection between Metz and Trier will have an influence on commuting patterns. This leads to an even stronger functional integration of the CBPMR and strengthens the unique feature of the international labor market in the region.

In the case that people are working in another state than they are living in, special regulations need to be respected. This regulation preserves the employees from paying taxes in both states. The regulation is based on bi-lateral contracts between all border countries. Normally the contract gives the right to raise taxes to the country the person is employed at (Tax office Trier n.d.). This leads to the conclusion that the neighbor countries cannot raise income taxes for the employees in Luxembourg. To reduce the issue of tax liability and other issues connected to cross-border commuting the commuters need to be better informed about their rights and duties. The Greater Region is planning to establish a task force dealing with the cross-border commuting. This task force shall provide information about differences in the legal
and fiscal systems between the countries and shall support cross-border commuters as well as employers to deal with those issues. This offer is helping to increase the cross-border commuting.

5.2 **The Location of the CBPMR in the Economically Strong Center of Europe**

The CBPMR is located in the economically strong center of the EU between the South of Germany, Paris, Brussels and Randstad. Moreover, the CBPMR is also located in proximity to other metropolitan regions like Strasbourg and Rhine-Main. To make a better use of this location it is important to increase the traffic infrastructure connection to these centers. Transport infrastructure is considered to be an important aspect for the regional competitiveness and it is also a comparative advantage for businesses in this area. According to the annual European Cities monitor, business decision-makers identified the international links of a region to other important economic centers as the third important criterion how to determine the location of investment (European Commission 2007). A further research identified a significant direct influence of investments in infrastructure on the GDP on the national and regional level (London School of Economics and Political Science, under direction of Dr. Robert Leonardi 1999). This leads to the conclusion that the international connection of the CBPMR to other economic centers needs to be improved.

**Accessibility from Outside the CBPMR**

To positioning of the CBPMR in the international infrastructure system is important to improve the connection of the region in a better way with the international transport corridors.

First of all, the CBPMR should have a good rail and road connection to the neighboring domestic and cross-border metropolitan areas. The domestic metropolitan regions in proximity to the CBPMR are Paris, Brussels and Rhine-Main. Further metropolitan regions crossing national borders are Lille, Aachen-Liège-Maastricht and Strasbourg. Easy access to the CBPMR shall attract more people and companies from the outside of the region. Furthermore the infrastructure is important for the export of goods and services from the region. High-speed transportation lines need to be developed to improve the transport infrastructure.

The region does not only need good connections to metropolitan regions in close proximity but also a good accessibility in a broader European sense. This leads to the integration of the region in the Trans European Network (TEN). European policy makers introduced TEN to increase the mobility of persons and goods within Europe and to strengthen the territorial cohesion. The aim is to establish “a single,
multimodal network that integrates land, sea and air transport networks throughout the Community” (European Commission 2010). By building the missing links in the traffic infrastructure, the use of the economic and social potentials of the EU shall be improved. According to the priority list of the European Commission the CBPMR is part of three TEN projects (European Comission 2005).

The first project is the High-speed Railway Axis East shown in Figure 15. This project connects the high speed rail of France and Germany and also links this track to Luxembourg City. The project is based on the building of new railway lines and upgrading of existing ones. The project shall improve the transport links between the three countries, passing through the CBPMR. The new created high-speed link will cut the travel times and is assumed to strengthen the economic and regional development. The project is seen as the “first stage of an east–west corridor linking Europe’s major economic centers with the new Member States of central and eastern Europe” (European Comission 2005, p. 20). The east-west corridor is shown in Figure 16. It is building an axis from Paris over Strasbourg, Stuttgart and Vienna to Bratislava. This project overlaps with the first project and will lead to a high-speed connection trough a heavily populated area in Europe. Furthermore, the axis connects western Europe with the new eastern member states. The whole project shall be finished by 2015 (European Comission 2005).

**Figure 15: High-speed Railway Axis East**

![Image](image_url)

Source: European Comission 2005.
The third project in the area of the CBPMR is called “Europarail” and links Brussels, Luxembourg City and Strasbourg with each other (Figure 17). This link aims to conclude the north-south corridor in north-western Europe for goods and passengers from the North Sea to Italy. This project will enhance the intra-regional development because of the advantages for commuters and it will also improve the connection of the three main administrative centers of the EU: Brussels, Luxembourg City and Strasbourg. The project shall be finished in 2013 (European Comission 2005).

All three projects will increase the international accessibility of the Greater Region. In addition to that the improvement of the connection to the other economic centers in closer proximity shall improve the competitiveness of the region, based on a higher attractiveness for businesses and investment.
EXPECTED RESULTS

The improvement of the infrastructure is considered to raise the regional competitiveness of the CBPMR because the connection to other economic centers makes the region more attractive for further business investments. This will increase the attractiveness for new business to settle down in the CBPMR, in addition to the already existing advantages, like the international labor market and the provision of bi-lingual professionals.

On the other side it has to be taken into consideration that the interconnection with other economic centers will also increase the competition for the CBPMR. This includes the competition for workforce as well as for companies. But since Luxembourg City is already considered as a strong economic center with high political functions it is assumed that the CBPMR will not suffer from a competition with other economic centers.
Moreover, the development of traffic infrastructure lines, in an international context is not the responsibility of the regional and local level. Also national level is involved in these decisions. Since infrastructure development is connected with high costs, it is important to raise the perception of the importance of the region at the national level, to increase the willingness of the national authorities to invest in the development of infrastructure, to improve the accessibility of the region. In comparison to that, the TEN projects are already decided and will be co-financed by the responsible levels.

5.3 CO-OPERATION BETWEEN THE CENTERS OF THE CBPMR

The existing city network “QuattroPole” is seen as a strength for the development of the CBPMR since it already includes the four centers of the region. The existing institutional structures can be used. This saves time, since the structures do not need to be developed from the beginning. The fact that the different regions are already co-operating for a long time under the governance structure of the Greater Region shows the will inside the region to co-operate. This is an important precondition for a successful co-operation within the region. The co-operation of the city network is focused on different aims: common location marketing, structural and economic development, increase of the information exchange and positioning of the CBPMR in the Greater Region. The effects of this strength can be increased if the CBPMR is not only perceived from the inside as a strong region but also from the outside. Until now the CBPMR is not perceived as metropolitan region from the outside. Therefore the image as a metropolitan polycentric region needs to be developed. In the case of the CBPMR regional marketing is considered as a suitable tool to create and promote this image.

REGIONAL MARKETING

The aim of regional marketing is to promote the advantages of a region. Those advantages can be based for example on the location of the region or competitive advantages (Maier 2005). It is an instrument to promote the qualities of a region by different initiatives for example events or the use of media (Goppel 1997). Regional marketing can be described as an interdisciplinary communication tool for regional development to increase the attractiveness and competitiveness of a region in a long term. The communication process is aiming to increase the efficiency of used resources and to foster the internal potentials (Bühler 2001). It is targeted to the inside as well as to the outside of a region. Inside the region, the regional marketing shall increase the awareness of the inhabitants and the economic actors about the advantages of the region. The raising awareness of people for the pinpointed advantages in their region leads to a stronger regional identity, which is able to tie
people to a region. The application of regional marketing outside the CBPMR shall raise the awareness and acknowledgment of the region and attract new inhabitants and companies, based on a certain image (Gorlik 1999).

To introduce a successful regional marketing for the CBPMR some basic research about the region needs to be done. This includes a SWOT analysis about the strengths, weaknesses, opportunities and threats of the region as well as an analysis about the social and economic structure. Furthermore, an analysis of the image inside and outside the region should be done to see how the region is perceived at the moment. Based on this research a delimitation of target groups is possible. Potential target groups are: internal and external political actors, economic investors and the civil society. Furthermore, the basic analysis is mandatory to develop a marketing strategy, which fits the potentials of the region.

Since the CBPMR is not yet established as an official region it seems to be important to find a name for it. The name should be short, concrete and easy to remember. To give people already an idea where the region is located, at least one name of the centers should appear in the name of the region. Two solutions for this issue are possible. The region has the choice to create a name, which includes all four centers. This will lead to a creation of an acronym because the simple sequence of the names will be too long. The second alternative is to name the region after the strongest and best known center, which would be Luxembourg City in this case. It is to expect that the naming of the region will lead to political discussions and dissension especially if only Luxembourg is occurring in the name. But the different participants have to keep in mind that the name is an important part of the marketing strategy and will lead to greater success if it is carefully chosen.

**EXPECTED RESULTS**

The successful creation and promotion of the image of the CBPMR will lead to a higher recognition of the region at the international level. The image of the CBPMR can be based on the current advantages like the huge international labor market, the economic importance of Luxembourg and the location in the core of Western Europe, in proximity to other economic centers.

A possible hindrance for the successful development of the image of the CBPMR can be seen in the small size of the centers. Only Luxembourg City is an internationally known center. Therefore the risk that the region becomes narrowed to Luxembourg has to be taken into account.

Last but not least it has to be considered that the effects of the regional marketing will not be visible in a short term. The development of the marketing strategy may not take longer than five years but the promotion and the establishment of a picture in
the heads of the actors outside the region is a tedious process. This leads to the advantage that the other named development opportunities can already be realized during the development of the marketing strategy and they can be used for the promotion of the region.

5.4 RESULTS

The discussion about the opportunities to develop the CBPMR shows that there is still a high potential for the region to be developed. The strengthening of the strengths is mainly based on the reductions of existing weaknesses. All three development opportunities can be realized in the next five to ten years. However, it has to be taken into consideration that the effects may not be visible in the same time period, especially the effects of the regional marketing.

6 CONCLUSION

The application of the concept of CBPMR leads to the conclusion that the Greater Region as a whole does not fit the concept. The spatial scale of the region is too big to develop a polycentric structure all over the region because the distance between the centers is too high and therefore the functional integration too low. However, the core of the Greater Region fulfills the criteria of polycentricity and it is also located across the borders of four national states. The application of the concept of metropolitan regions to the core of the Greater Region leads to the conclusion that the region fulfills the criteria of integration with the hinterland and also the approach of metropolitan functions, but due to the small size of the centers the region only can be classified as a small scale CBPMR. Based on the existing strengths of the small scale CBPMR the region has the potential to be further developed to become a well known and integrated polycentric metropolitan region in Europe. The most important strengths of the CBPMR are the international labor market, the location in the strong core of the EU, the population growth in Luxembourg and the long standing governance structure.

The main weakness for the establishment of the CBPMR is the small size of the centers. Therefore, it can be discussed if the concept of metropolitan regions should be applied to cross-border regions without any adaptations, since the preconditions for urban development in border regions are different to those for domestic cities. The national governments did not pay the same attention to border regions than to the development of economically strong domestic regions. An adaptation of the criteria of size of the centers to this fact will improve the abilities of cross-border regions to fit the criteria to be classified as a CBPMR. On the other side this leads to less
comparability to domestic polycentric metropolitan regions because they are not based on the same definition anymore. Furthermore, the criterion of size is based on the ability of the centers to provide outstanding functions that cannot be provided by the hinterland. It is questionable if the criterion of size can be changed without decreasing the quality of a CBPMR compared to a domestic region.

Apart from that, the CBPMR can be seen as an example for the cross-border co-operation and the territorial cohesion within the EU. Still, the national governments should pay more attention to the development of cross-border regions, to help them to increase the development potential and to become more competitive, especially in the increased regional competition fostered by the globalization. The example of the CBPMR shows that border regions are not longer the periphery of economic development in nation states.
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