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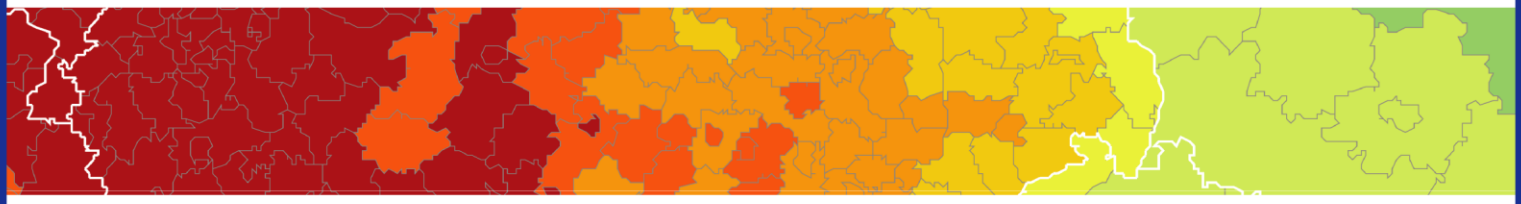

SPIMA - Spatial dynamics and strategic planning in metropolitan areas

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SPIMA- Spatial dynamics and strategic planning in metropolitan areas

Table of contents

List of Figures iii
List of Maps iv
List of Tables iv
Abbreviations vi
Executive Summary 1
1.1 Background 1
1.2 Objectives and research questions 1
1.3 Delineating metropolitan areas 1
1.4 Spatial planning at metropolitan scale 2
1.5 Emerging urban trends and spatial dynamics of metropolitan areas 2
1.6 Institutional frameworks to support metropolitan planning 3
1.7 Key challenges in managing metropolitan spatial development 3
1.8 Key success factors for implementing metropolitan planning and governance 4
1.9 Guidelines for implementing metropolitan planning approach 4
1.10 A typology for metropolitan areas 5
1.11 Recommendations for strengthening spatial planning in metropolitan areas 6
2 Introduction 7
2.1 What is the problem? 7
2.1.1 Understanding the spatial dynamics of metropolitan areas 7
2.1.2 Strategic planning at the metropolitan scale 8
2.1.3 Exploring planning practices across metropolitan areas 8
2.2 Objectives 10
2.3 Research questions 11
2.4 Research approach 12
2.4.1 The case studies: stakeholders' metropolitan areas 12
2.4.2 Analytical framework 12
2.4.3 The scope of the metropolitan spatial planning approach 13
2.4.4 Methods of data collection and analysis 14
2.5 Structure of the report 17
3 Delineation and categorization of metropolitan areas 18
3.1 Introduction 18
3.2 Methodology 18
3.3 Key findings 19
3.3.1 Definition of a metropolitan area 19
3.4 Discussion 25
3.5 Conclusions 26
4 Key socio-economic trends and spatial dynamics 27
4.1 Introduction 27
4.2 Methodology 27
4.3 Key findings 28
4.3.1 Trends in land use change 28
4.3.2 Urban sprawl and densification 29
4.3.3 Population dynamics 30
4.3.4 GDP change 33
4.3.5 Mobility and accessibility 35

4.3.6 Environment and natural landscapes ... 36
4.4 Discussion ... 37
4.5 Conclusions ... 38
5 Institutional frameworks, planning practices and challenges ... 39
5.1 Introduction ... 39
5.2 Methodology ... 39
5.3 Key findings ... 40
5.3.1 Present situation in the metropolitan areas ... 40
5.3.1.1 Current characteristics ... 40
5.3.1.2 Understanding the status and identity of the metropolitan areas ... 41
5.3.2 Institutional frameworks for metropolitan planning ... 44
5.3.2.1 Spatial planning systems ... 44
5.3.2.2 Strategic planning ... 46
5.3.2.3 Statutory planning ... 46
5.3.2.4 Perception among actors of the spatial planning practices ... 47
5.3.2.5 Collaborative planning ... 47
5.3.2.6 Perception among actors of the relevant scale of metropolitan collaboration 48
5.3.3 Shared governance: horizontal and vertical coordination ... 49
5.3.3.1 Perception among actors of the need for a metropolitan institutional body ... 50
5.3.4 Key challenges ... 51
5.3.4.1 General overview ... 51
5.3.4.2 Perception among actors of the current challenges ... 51
5.3.4.3 Summary of key challenges per stakeholder area ... 53
5.4 Discussion ... 58
5.5 Conclusions ... 58
6 Success factors, incentives and policy tools ... 60
6.1 Introduction ... 60
6.2 Methodology ... 60
6.3 Key findings ... 60
6.3.1 Perception among actors of the success factors for achieving the desired metropolitan development and collaboration ... 60
6.3.2 Perception among actors of the opportunities for implementing a metropolitan planning approach ... 63
6.4 Discussion ... 68
6.5 Conclusions ... 69
7 Policy implications for metropolitan governance ... 70
7.1 Introduction ... 70
7.2 Methodology ... 70
7.3 Key findings ... 70
7.3.1 Embracing metropolitan area challenges in policy making ... 70
7.3.2 Major policy implications at the national level ... 72
7.3.3 Discussion ... 73
7.3.4 Conclusions ... 73
8 Extrapolation of findings to other metropolitan areas ... 74
8.1 Introduction ... 74
8.2 Methodology ... 74
8.3 Key findings ... 76

8.3.1 Key challenges per type of area 76
8.3.1.1 Typology A 76
8.3.1.2 Typology B 78
8.3.2 Relevant policy tools per type of area 80
8.4 Discussion 82
8.5 Conclusions 82
9 The future of metropolitan planning: an evidence-based knowledge agenda 83
References 86

List of Figures

Figure 0.1 Metropolitan planning approach in eight action areas 5

Figure 2.1: SPIMA project objectives 11

Figure 2.2: SPIMA's three-step analytical framework 13

Figure 2.3: Assessing the scope of a metropolitan approach (example of Turin) 14

Figure 2.4: Data collection and analysis 15

Figure 2.5: The SOEI matrix (example of Turin) 16

Figure 3.1: Framework for assessing the spatial planning process in metropolitan areas 22

Figure 4.1 Land use categorization at the level of the MDA per stakeholder area (%) 28

Figure 4.2 Urban sprawl based on night light intensity increase in the MDA 30

Figure 4.3 Comparative overview of population change in the MDA in 1975-2015 31

Figure 4.4 Comparative overview of relative population change in the MDA in 1975-2015 (%) 32

Figure 4.5 Comparative overview of population density change in the MDA of the stakeholder areas 1975-2015 32

Figure 4.6 Comparative overview of relative population density in the MDA of the stakeholder areas 1975-2015 (%) 33

Figure 4.7 *Change in GDP in the MDA of the stakeholder areas* 34

Figure 4.8 *Relative GDP change in the MDA of the stakeholder areas* 34

Figure 4.9 TomTom Car Traffic Congestion Index 2015-2016, peak congestion and extra travel time; extracted for the 10 inner city areas 35

Figure 4.10 Percentage of the MDA with a protected status 36

Figure 4.11 Exposure to PM2.5 in metropolitan areas 37

Figure 5.1: Relation between the size of the MDAs and the number of municipalities 41

Figure 5.2: Involvement of different administrative levels in metropolitan area planning 45

Figure 5.3: Types of collaborations identified within the metropolitan areas 48

Figure 5.4: Challenges identified by the respondents in all stakeholder areas (% of cities in which the challenges occur) 56

Figure 5.5: Mean percentage of respondents that pointed out a challenge per actor group across all cities (within each group of challenges and for all challenges together)..... 57

Figure 6.1: Following steps Identified by the respondents in all stakeholder areas (% of cities in which the following steps were identified) 64

Figure 6.2: Mean percentage of respondents that identified following steps per category and per actor group across all cities..... 65

Figure 8.1 Relative importance of the potential policy tools to improve strategic planning per type of metropolitan area, based on typology A. 81

Figure 8.2 Relative importance of the potential policy tools to improve strategic planning per type of metropolitan area, based on typology B 82

List of Maps

Map 1.1: Differences in spatial patterns of urban development by Local Administrative Units (LAU, left) and Functional Urban Areas (FUA, right)..... 10

Map 2.1 Example of the MDA delineation in relation to FUAs and MUAs (Turin)..... 24

List of Tables

Table 2.1: Key characteristics of the MAs (based on current delineation by stakeholders) ... 12

Table 3.1: Indicative categorization of the SPIMA stakeholder areas..... 25

Table 5.1 Current status of the metropolitan areas (based on respondents and document analysis)..... 43

Table 5.2: Definition of the scale of metropolitan development by respondents in each stakeholder area (the scales mentioned most frequently are in bold)..... 44

Table 5.3 Scale of collaboration relevant to addressing metropolitan development challenges (the scales mentioned most frequently are in bold)..... 49

Table 5.4 Need for the establishment of a consolidated MA institutional body as identified by respondents..... 50

Table 6.1: Key success factors for achieving the desired metropolitan development in the stakeholder areas as perceived by respondents based on their experience and expectations (proportion of respondents (%) who mentioned each success factor per stakeholder area).. 61

Table 6.2: Key success factors for establishing and maintaining collaboration at the metropolitan scale as perceived by respondents based on their experience and expectations (proportion of respondents (%) pointing out each success factor per stakeholder area)..... 62

Table 6.3: Key incentives mentioned by respondents for enhancing a coordinated metropolitan spatial planning approach in each stakeholder area 67

Table 8.1 Typology A for metropolitan areas based on size of the metropolitan area (MA) and population density..... 74

Table 8.2 Typology B for metropolitan areas based on the status of the metropolitan area (MA) and number of municipalities 74

Table 8.3 Categorization of stakeholder metropolitan areas over six distinguished types of metropolitan areas on the basis of typology A. 75

Table 8.4 Categorization of stakeholder metropolitan areas over six distinguished types of metropolitan areas on the basis of typology B 75

Table 8.5 Key challenges per type of metropolitan area, based on typology A. 76

Table 8.6 Key challenges per type of metropolitan area, based on typology B. 78

Table 8.7 Potential policy tools for metropolitan areas per key challenge 80

Abbreviations

EC	European Commission
ESPON	European Territorial Observatory Network
EU	European Union
NUTS	Nomenclature of Territorial Units for Statistics
FUA	Functional Urban Area
MUA	Morphological Urban Area
LAU	Local Administrative Area
MDA	Metropolitan Development Area
LUZ	Large Urban Zone
MA	Metropolitan Area

Executive Summary

1.1 Background

To address the challenges of metropolitan development in Europe, we need a better understanding of the complex relations between city centres, suburbia and larger peripheries. A key concern in this regard is the response of traditional urban planning practices to the current urbanization trends that go beyond the core-centric spatial patterns and beyond the jurisdictions of a single administrative authority.

Metropolitan areas are characterized by close economic and social linkages between their urban and suburban parts that involve a number of local governments. There is very seldom a local authority that has the competency to address all challenges in a metropolitan area on its own. Currently, urban policies and governance practices, seem to lag behind in addressing these complex challenges.

Against this background the SPIMA project explores a range of urban development issues raised by ten metropolitan areas across Europe and how these issues are addressed within their current institutional frameworks and the local authorities. Whether transport, environment or social disparity issues are at stake, the key concern is in finding a “problem owner” who can address these issues at an appropriate spatial and administrative scale.

1.2 Objectives and research questions

As a targeted analysis, SPIMA is primarily a stakeholder-driven project. It is based upon the request of ten metropolitan areas in Europe which need a better understanding of the key challenges in spatial development in the metropolitan areas and of the governance processes that such development entails. Firstly, the project builds upon the experiences of the stakeholder areas and deconstructs these experiences by mean of institutional analysis, interviews and assessment of key urban trends and spatial scales. Secondly, by means of a comparative research approach, the project has developed policy recommendations and tools to support the relevant authorities in addressing key challenges and in achieving a coherent metropolitan spatial planning approach. The stakeholder areas include Vienna, Prague, Brno, Zurich, Brussels, Oslo and Akershus, Turin, Terrassa, Lille and Lyon.

The project analyses the following seven key issues: 1) definitions for delineating metropolitan areas, 2) key socio-economic and environmental trends that determine the spatial dynamics and the spatial scale for metropolitan development; 3) current challenges in the spatial development and governance and the institutional frameworks; 4) key success factors, incentives and policy tools for improving metropolitan governance; 5) types of metropolitan areas; 6) policy implications for metropolitan planning process; 7) relevant guidelines for implementing a coherent metropolitan planning approach.

1.3 Delineating metropolitan areas

One of the lessons learned from the SPIMA project is that there is no unified definition for delineating a metropolitan area. Different approaches are being used to delineate the metropolitan areas of the stakeholders. These approaches often differ from the one commonly referred to in previous studies of EU-OECD (2012), based on Functional Urban Areas (FUA).

In order to assess these differences in more detail and identify the most relevant configuration of the metropolitan areas in the ten stakeholder cities, the project developed an alternative approach for delineating a ‘Metropolitan Development Area’ (MDA). The MDA represents the most recent consideration of the scale of metropolitan development in each stakeholder area. In some cases, MDA is a legally binding area with fixed borders, while in other cases it has more fluid borders. Some MDAs are based on the extent of the transport infrastructure networks while others represent specific institutional arrangements between regions and

municipalities. The method uses GIS tools based on local spatial data and data from European and OECD databases. It allows a breakdown of spatial data at the spatial scales of MDA, FUA and MUA, based on aggregation of LAU2 (local administrative units).

The MDA method can be particularly beneficial in local policy making as it allows assessing the relevance of the potential or already existing MDAs with regard to key urban development trends (e.g. transport, urbanization, environment, housing etc.). This allows planners to assess the “spatial fit” of the proposed MDAs, visualise its overlap with FUAs and MUAs and show the relation between the local administrative units, within the core urban area and beyond the FUAs. This helps making a more precise definition of the metropolitan area in order to support the future spatial planning strategies.

The proposed ten MDAs, which have been discussed by the stakeholders, illustrate a generally increasing urbanization trend and the transformation towards polycentric spatial structures with more dynamic redistribution of services between core cities and the sub-urban settlements.

1.4 Spatial planning at metropolitan scale

As spatial planning is often a competency of the national (or federal), regional and particularly of the local governments, a multi-level spatial planning process needs to be established in order to address metropolitan developments in regional and local land use plans. As evidenced, planning for metropolitan areas should be based on key principles of spatial planning governance, embedding three key planning elements: strategic, statutory and collaborative planning.

Different experiences have been made by the stakeholders with regard to each of these planning elements. While metropolitan development is to one degree or another embedded in the current urban strategies and visions, the actual implementation of these strategies is in its early stages in most of the stakeholder areas. Further progress is needed in more firmly integrating metropolitan development issues in the statutory spatial planning practices at local level and in strengthening the coordination and collaboration across different local administrative units and governmental levels.

1.5 Emerging urban trends and spatial dynamics of metropolitan areas

The stakeholder areas have a number of unique characteristics related to the spatial distribution of urban functions (e.g. areas of urban intensification, rural-mountain, post-industrial, new growth etc.) and to the geographical extend of the areas (e.g. cross-border, inter-regional, inter-municipal and local). However, they also have a number of similarities.

Urban growth varies greatly among the cities. Most of the areas experience pressure for urban growth outside their core urban area. In most of the cities there are areas with intensified urban activities and areas where growth is being encouraged further and/or areas where on the contrary the wish is to restrict growth due to environmental reasons or due to rural developments and agriculture (e.g. Vienna, Turin, Lyon, Lille, Zurich, Oslo - Akershus, Brno, Prague). A few of the areas, such as Turin and Terrassa, Vienna, Prague, also have post-industrial urban spaces that need regeneration.

Both suburbanization and densification are common patterns in most of the areas, determined by a combination of factors, varying from substantial population growth in Vienna, Zurich, Oslo and Brussels to an intensified relocation of businesses and jobs in the suburbs, as in Prague, Brno, Brussels, Lille and Lyon. This process creates different spatial dynamics in the distribution of population and jobs and determines the need for a transport infrastructure that allows greater mobility and accessibility between the core city and its suburbs. In all ten areas the capacity of the current transport infrastructure is to some extent insufficient in meeting these demands. There are as well differences observed among the areas with regard to redistribution of population between the core city and suburban areas and in some areas there is a rather fragmented population pattern.

There is as well a high variation between the number of the local authorities within the metropolitan areas. To a large degree this determines the complexity of the spatial planning process and the need for coordinated efforts between different municipalities. A key issue is achieving a joint vision and a common understanding among municipalities about how to accommodate emerging urban trends across the metropolitan area as a whole. A sufficient evidence about key urban development trends and spatial planning scenarios at metropolitan scale is essential to support the development of such vision.

1.6 Institutional frameworks to support metropolitan planning

The experiences of the stakeholder areas show that a coordinated metropolitan planning approach is either not yet firmly institutionalized and/or not yet fully embedded in the routine planning practices of the regional and local authorities. Often the current institutional structures are fragmented which impedes the effective coordination and collaboration between local plans and policies. While a number of initiatives have been already implemented in the stakeholder areas, these are as yet not a common practice for all local authorities and their elected bodies. Many of the initiatives need to be scaled up in terms of territorial scope and policy issues.

The key evidence generated with this regard shows that the current strategies in the stakeholder areas indicate a growing commitment among regional and local authorities about the need for a joint spatial planning effort at the metropolitan scale.

The regional authorities, together with variety of inter-municipal collaborative bodies and clusters of municipalities, are gaining a prominent role in fostering spatial planning at metropolitan scale. Collaboration at regional scale is considered as essential by many actors.

The institutional status of the stakeholder areas varies between formal (based on top-down regulations), informal (based on purely collaborative arrangements) or semi-formal (based on formalized agreements between actors). The type of status is not in itself, however, a determining factor for effective metropolitan planning, in as far as it leads to a joint metropolitan strategy and an implementation plan accepted by all actors across governmental levels (vertically) and policy sectors/local jurisdictions (horizontally).

The research indicates that for some of the cities establishing a legally binding framework for metropolitan planning is an important precondition in fostering progress in metropolitan planning initiatives while for others collaborative institutional arrangements between the relevant authorities play the most important role. However, the generic guidelines and a combination of several success-factors for effective metropolitan planning may apply in every case, whatever the legal framework.

In all stakeholder areas there are currently collaborative bodies which, to some extent or another, address metropolitan development challenges, varying between thematic sector-oriented, inter-regional, inter-municipal and cross-municipal. Their role is essential in ensuring a wider stakeholder involvement in the preparation of metropolitan strategies and spatial plans.

1.7 Key challenges in managing metropolitan spatial development

There is a significant number of challenges present in all stakeholder areas. These challenges provide strong evidence that illustrates the diversity of issues that require actions to be taken at the metropolitan scale of planning. Among 51 challenges, divided into eight categories, the five most frequently cited are:

1) ensuring an efficient transport infrastructure;

2) the need for multilevel collaboration;

3) achieving a shared vision on strategic plans;

4) dealing with traffic congestion; and

5) political reluctance to address issues at the metropolitan scale.

Other key challenges include suburbanization, an inefficient spatial planning process, a lack of recognition of the metropolitan areas, and need for affordable housing. There is a consensus about the types of challenges identified among different groups of actors in the stakeholder areas.

1.8 Key success factors for implementing metropolitan planning and governance

Applying a coherent metropolitan planning approach necessitates establishing a shared-governance, process, enabling more dynamic interactions between the spatial scales, policy issues, land-use functions and a wide range of actors. The key success factors in this regard include:

• Combining top-down policy incentives with bottom-up collaboration and implementation.

• Collaboration between the relevant planning authorities at national, regional and local levels.

• Involvement of a wider range of stakeholders (e.g. businesses and branch organizations).

• Ensuring the transparency and openness of collaboration processes and build awareness

• Working towards a “minimum gain for all” when negotiation and compromise is needed.

• Starting with bottom-up initiatives (e.g. transportation) that can be convincing for most actors.

• Political commitment and support from higher levels of government (e.g. national).

• Mobilizing political leadership to engage with different actors in collaboration.

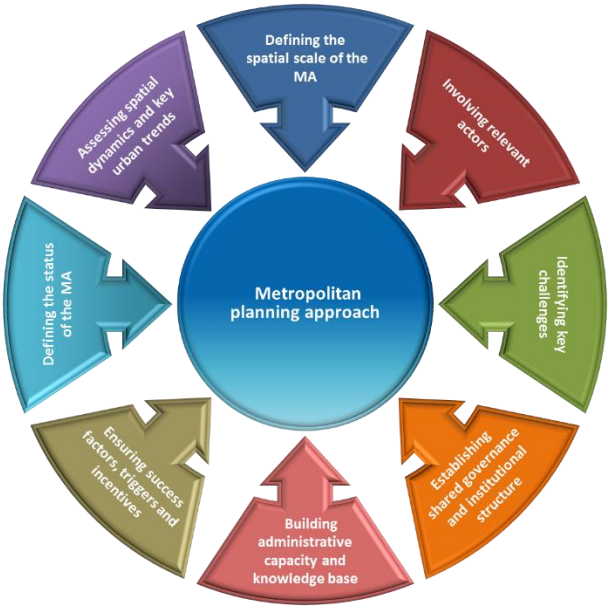
• Setting the rules of the game: combine flexible shared governance in spatial planning with the establishment of more restrictive/legal mechanisms for managing growth.

• Creating common funds and agencies for supporting the metropolitan scale of planning, that can enable expertise and financial incentives to be applied (e.g. EU and/or national sources).

1.9 Guidelines for implementing metropolitan planning approach

The implementation of the metropolitan planning approach embeds eight “action areas” that set different foci in strategic, statutory and collaborative planning processes. Implementing these action areas may help gaining better understanding of the current situation in the metropolitan areas, establish the suitable governance process and support decision-making about future plans and strategies (figure 0.1).

Figure 0.1 Metropolitan planning approach in eight action areas



Among the stakeholder areas there is relative progress made with regard to assessment of current urban trends and identification of key challenges. The action areas that are less well addressed relate to ensuring key success factors, incentives and triggers, the establishment of a suitable governance model and in the involvement of relevant actors. A metropolitan planning approach aims at delivering the following key benefits:

• Achieving synergy and complementarity between sectoral policy issues (e.g. transport, housing, public services, the environment, urban sprawl etc.).

• Preventing duplication of planning efforts by different authorities, including financial resources, in the preparation of individual spatial development (land-use) plans.

• Optimizing current organizational structures and the enforcement of planning procedures

• Achieving greater understanding among actors, including political bodies, of the potential mutual benefits and joint solutions in coordinated efforts in spatial planning.

• Strengthening institutional capacities and knowledge-based evidence for decision-making.

1.10 A typology for metropolitan areas

The SPIMA typology helps translating the recommendations on potentially relevant policy tools for metropolitan planning approach to other metropolitan areas in Europe. Typology A categorizes the stakeholder metropolitan areas by their spatial characteristics (i.e. size of the area and its population density). Typology B provides categorization by institutional characteristics (i.e. the formalization status and the number of municipalities). Based on typology A and B six categories of areas have been defined.

The importance of different policy tools to address key challenges show a very similar pattern for each of the six types of metropolitan areas, no matter which categorization was used. For most of the metropolitan areas, coordinative and collaborative policy tools are the most relevant. These tools show most benefits in addressing many of the key challenges of the stakeholder areas as they aim fostering a shared-governance process at metropolitan scale. The strategic and structural policy tools are seen as the second most important, while the procedural/financial tools are considered to be less significant.

1.11 Recommendations for strengthening spatial planning in metropolitan areas

The results of the SPIMA project suggest an operational metropolitan planning approach based on the following key recommendations and policy implications:

• The spatial planning systems may strongly influence the development of the metropolitan areas as these embed complex territorial governance processes between the national (federal) state, the regional (sub-regional) and local authorities. A coordinated spatial planning across these governmental scales is needed in order to address metropolitan development challenges.

• In many cases (except federal states) the national governments play a role in setting a spatial planning policy or legislation, but are not directly involved in actual development of spatial plans at regional or local level. Ongoing decentralization of planning competences in most of the areas requires strengthening the administrative capacity and the planning practices of local governments in managing multifaceted territorial developments at metropolitan scale.

• As there is no one single definition of a metropolitan area that matches ongoing urbanization trends, administrative borders or perceptions of actors, the delineation of its relevant spatial scale can be facilitated by the MDA tailor-made approach. An assessment of the "spatial fit" of a proposed MDA with regard to key urban trends and its relation to FUA and MUA can be a useful decision-support tool in planning and management of the metropolitan areas.

• Effective metropolitan planning depends on a shared-governance process that is more flexible and dynamic, and is at the same time clearly linked to the administrative levels of statutory spatial planning. This implies more coordination efforts and shared competencies between governmental levels (vertically) and across policy sectors/departments (horizontally).

• Implementing a metropolitan planning approach can be highly beneficial in ensuring a "spatial fit" between the "de jure city" and the "de facto city". Such an approach implies setting different foci in strategic, statutory and collaborative planning and involves eight specific "action areas".

• A mix of policy tools is needed to implement metropolitan planning approach. The most relevant set of policy tools to address challenges at metropolitan scale relate to coordination and collaboration processes such as: instituting metropolitan bodies to coordinate planning efforts at metropolitan scale or establishment of effective collaboration process among multiple actors.

• The formal status of the metropolitan area is not a strongly determining factor for the effectiveness of metropolitan planning and governance, whereas acceptance and recognition of the metropolitan areas as such is an essential trigger for initiating metropolitan collaboration.

• EU policy is a key incentive for regional and local authorities in initiating coordinated efforts in regional and local development. An EU metropolitan policy agenda and funding instruments can be highly supportive for the implementation of a metropolitan planning approach across Europe, including strengthening the commitment from national and regional governments.

2 Introduction

2.1 What is the problem?

2.1.1 Understanding the spatial dynamics of metropolitan areas

New urban forms and configurations have emerged as a result of the continuous transformations of European cities from social, economic and environmental perspectives, including suburbanization. Such transformations necessitate establishing different spatial relations between the urban centres and suburbia than the traditional relations. These new relations gain significance against the background of the growing urban archipelago of distinct economic and social spaces, constituted of multiple urban islands (Salet et al., 2015). Current urban transformations foster development of the metropolitan areas, which on its turn represent new spatial dynamics and have specific policy implications for urban planners and decision-makers in Europe.

Yet, as indicated in a number of studies, it is challenging to address the emerging problems of the ongoing metropolitan developments and to understand the complex relations between the city centres, suburbia and the larger peripheries (Healey, 2010; Ahrend, 2014; Salet et al., 2015; ESPON-POLYCE, 2013). A key question raised in the ongoing debate on metropolitan development in Europe is about the response of traditional urban planning practices to the ongoing urbanization trends that go beyond the core-centric spatial patterns and beyond the jurisdictions of a single local administrative authority (Salet et al., 2015). This is an essential issue in planning for metropolitan areas as they are characterized by close economic and social linkages between their urban and suburban parts that involve a number of local governments. This implies that no local government has the tools to address all challenges and opportunities within a metropolitan area on its own.

Despite the extensive knowledge of the patterns that are emerging at the urban, suburban and regional scales, current urban policies still seem to have problems in planning for metropolitan areas. Institutional structures and governance practices often remain geared towards the radial (core-centric) urban model, which may put outer areas in a dependent position in their relations with core cities. This pattern is evident in a range of issues from social and housing policies to infrastructure policies oriented to serve core city economies. Suburban areas and the large number of local authorities located there are thus often seen either as satellites or as anchors of core cities' development. This often prevents planners and politicians from finding adequate responses to problems like spatial fragmentation, uneven economic development and imbalance in the housing market, differences in the quality of life, or social disparities (Janssen-Jansen & Hutton, 2011). Regarding the many issues, whether transport, environment or social disparity, the key challenge is finding a *"problem owner"*, and addressing these issues at a sufficient scale to grasp the changing urban-metropolitan landscape.

In this context there is general agreement in the urban and regional planning literature that today's metropolitan development is part of a consistent change in the functional, political and representational relations between the core urban areas and the suburban areas (Salet et al. 2015). These relations need to be understood in its institutional context before planning interventions can be made effectively (Salet et al., 2015). On the one hand there is a need to understand the key driving forces and place-specific opportunities around key urban functions and spatial patterns. On the other hand better insight is needed in the onset of a new political and governance landscape with complex relationships and interdependencies between multiple actors at different governmental scales. Furthermore, the issue of representation of the metropolitan areas is struggling to get adequate support and is a matter of increasing concern for the local authorities. Obviously, a response to the current problems of metropolitan development cannot come about without a good understanding of current urban transformations and the way to address these through policy-making and adequate governance approaches (Brenner, 2003; Ahrent et al., 2014; Salet et al., 2015).

2.1.2 Strategic planning at the metropolitan scale

For more than a decade a number of local authorities in Europe have already been proactive in establishing strategic visions and plans oriented towards a larger scale of urban areas and even towards a metropolitan perspective (Albrechts, 2003; Healey, 2010; Ahrent et al., 2014). Such strategies are often seen as a way to guide the integration of different spatial developments and engage the authorities at different governmental scales, beyond the core city authority alone. The motivations of the local authorities for these efforts have typically been to articulate a more coherent spatial (territorial) development framework that can ensure effective decision-making when planning investments in urban regeneration, infrastructure, housing and other policy issues. Such strategic visions are also seen as a framework for formulating specific development initiatives and projects. However, making strategic plans fosters transformations of the local governance relations with a break away from the sectoral and/or hierarchical organization. This prompts the widening of governance relations to incorporate new actors in the urban planning arena (Albrechts et al., 2003; Salet et al., 2015).

It is generally acknowledged in various studies that cooperation among local governments and other stakeholders is required in order to ensure effective strategic planning at the metropolitan scale (Ahrent & Schumman, 2014). In a number of cases, institutionalized governance structures have been developed with the goal of strategic planning and coordination of policies across local governments in metropolitan areas. Often, these structures were developed by local actors and they vary not only between countries but also between different metropolitan areas within the same country. Such governance bodies differ greatly in their powers, their internal structure and the actors involved. In many cases, they have been created in a bottom-up approach as a response to the particular needs of local actors. Therefore, the exact nature of the cooperation is often unique, and fundamentally different approaches can be found within individual countries.

So far only a few representative studies indicate positive correlations regarding the benefits of existing metropolitan governance bodies for supporting coordinated efforts and strategies at the metropolitan scale. There are still questions about the effectiveness and efficiency of these bodies with regard to their organizational structures, formal status, responsibilities or political power in decision-making (Ahrent et al., 2014; Ahrent & Schumman, 2014, MAIA..)

While there is no one single governance approach for metropolitan planning, it is critical to have a better understanding on the context of the spatial and administrative relations within the scope of specific metropolitan developments. Such understanding is primarily needed for developing more effective strategic processes that lead to the integration of policy issues and that re-scale the conventional urban agendas across different governmental levels. The process of strategic planning at a metropolitan scale necessitates complex interactions between multiple actors. Ideally, such interactions should be based on governance models in which the core urban areas and the suburban areas are seen as equal players that can contribute to and share the benefits of metropolitan developments.

The aforementioned issues are gradually becoming recognized as part of the urban policy agenda. Yet more comprehensive empirical reviews across different countries in Europe are required to provide evidence-based knowledge of key challenges and solutions. In particular, more conclusive evidence is needed about the specific challenges and experiences of different local authorities in planning processes at the metropolitan scale.

2.1.3 Exploring planning practices across metropolitan areas

As indicated by Eurostat's *State of European Cities Report ,* about 72.5% of the EU's inhabitants live in cities, towns and suburbs (Eurostat, 2016). However, considerable differences are observed regarding the size and spatial distribution of urban development functions between the Member States. These differences are based on distinctive territorial development strategies and spatial planning systems of the countries in question (CEC, 2011a; Eurostat, 2016). Such strategies determine to a high degree the course of urban developments, which vary from the formation of more compact cites with intensification of urban services to an urban sprawl and suburbanization outside the core urban areas. While there is no one-size-fits-all solution to this urbanization dilemma, the population growth in

many cities generates more pressure on urban land uses and on the relation between core cities, suburban and rural areas. In addition, the creation of opportunities for better mobility, accessibility and quality of life has been an incentive for the formation of larger urban conglomerations with a commuting population, such as metropolitan regions (CEC, 2011a). At the same time, the strategic decisions of regional and local governments play a key role in ensuring more balanced urban functions and services within these metropolitan areas, while increasing the attractiveness and quality of life of the cities and the suburban areas. The main challenge in making these decisions is to achieve a metropolitan development that is competitive and inclusive (CEC, 2010).

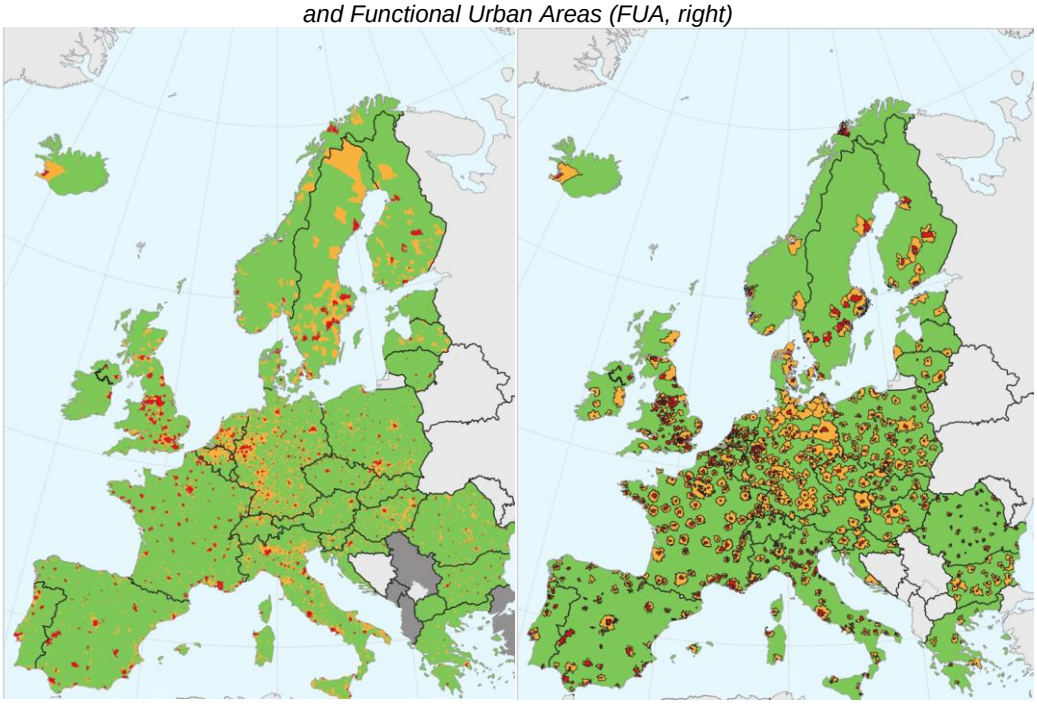
While definitions of a 'metropolitan area' vary among different studies and countries, it is ideally understood as a "functionally integrated area where there are links established between different spatial patterns of the city and its surroundings, including commuting zones, functional zones and local administrative units", (OECD, 2012).

More recently, the OECD and the European Commission developed a framework that attempts to harmonize the definition of a greater city and its commuting zone based on population size and density. Based on this definition, a 'greater metropolitan city' is defined as a city with an urban centre of at least 50,000 inhabitants (Dijkstra & Poelman, 2012). However, the applicability of the methods for defining the commuting zones and suburban development and the actual borders of the metropolitan areas needs to be further assessed. In this regard, studies refer to the need to explore more comprehensively the relation between these spatial elements, in particular between the local administrative units (LAUs) and the functional urban zones (FUAs) (figure 2.1). Based on a better understanding of these spatial patterns of the metropolitan areas, sound governance approaches can be developed.

These governance approaches need to steer a balance between the spatial developments based on collaboration, coordinated decision-making and citizens' participation (ESPON-TANGO, 2014; OECD, 2015). However, there is still no unified typology, spatial planning approach or governance framework which can systematically support decision-making processes for metropolitan development (Ahrend et al., 2014). There is a need for a better understanding of the role and the functions of the metropolitan areas by policy-makers in order to embed the metropolitan perspective in the local and regional development strategies and spatial plans.

In order to address the aforementioned challenges, a number of policy documents and academic studies highlight the need for a coordinated spatial planning approach (CEC, 2014). Spatial planning is seen as a policy mechanism that can potentially enhance the coherence between different categories of plans by the local and regional authorities at the strategic and operational levels (CEC, 2011a). Spatial planning is more often perceived as a cross-sectoral policy process which can provide a long-term strategic vision on urban developments. It does so by directing dynamic land use change in and around urban areas and their metropolises and by helping to reconcile different socio-economic and environmental interests (Healey, 2007; CEC, 2011a). Yet the spatial planning cultures of the Member States are not always effective in terms of collaborative practices at the inter-municipal level, which is essential for developing a metropolitan spatial planning approach (Healy, 2007; Simeonova & van der Valk, 2009; Reimer et al., 2014).

Map 2.1: Differences in spatial patterns of urban development by Local Administrative Units (LAU, left) and Functional Urban Areas (FUA, right)



source: Eurostat, 2016

The phenomenon of metropolitan area development has been addressed in many key policy frameworks, but it has not yet been comprehensively analysed from the point of view of the strategic spatial planning process across the Member States (Hall & Pain, 2006; Brezzi et al., 2012, OECD, 2012; Coutard et al. 2014; EUROSTAT 2016), nor has it been operationalized in the planning practices of the local and regional authorities. This is the departure point of this study.

2.2 Objectives

The key goal of the SPIMA project is to identify policy approaches that can help to develop more effective spatial planning policy that allows the key challenges in metropolitan development to be addressed. To do so, the project assesses the links between strategic planning and spatial development processes in the metropolitan areas (MAs). The project has four specific objectives (figure 1):

- O1: Support the ESPON-ECTG programme in filling the knowledge gaps with regard to the current and potential planning tools and governance approaches needed to implement a metropolitan area planning approach in Europe and, more specifically, in the ten participating European metropolitan areas.
- O2: Provide a better understanding of the governance, legal and financial systems which play a role in the pursuit of sustainable metropolitan development and that have the long-term support of metropolitan populations.
- O3: Enable stakeholders to better manage spatial development at a metropolitan scale by formulating appropriate governance processes that can ensure effective strategic planning, coordination and collaboration within the metropolitan areas.
- O4: Operationalize the long-term European policy goals (Urban Agenda) for sustainable and inclusive growth and territorial governance at the metropolitan scale.

Figure 2.1: SPIMA project objectives

Source: authors

The project is primarily stakeholder driven. It is based on the need expressed by ten cities in Europe to gain a better understanding about the key challenges in urban spatial development that foster the formation of their metropolitan areas. The project analyses the governance processes that such metropolitan development implies. Finally, the project identifies key action areas to implement metropolitan planning approach in order to meet current spatial development challenges.

An essential outcome of the project is an evidence-based comparative review of the current challenges in metropolitan spatial development and a range of policy tools, needed to meet these key challenges. The project develops Guidelines for the implementation of a metropolitan planning approach (see Annex 1). These guidelines collate a set of recommendations about the relevant policy tools for metropolitan planning and governance for the stakeholder cities and in general. The project develops a typology to extrapolate the key findings to other cities.

2.3 Research questions

The current research is based on the assumption of the ten stakeholder areas that a coordinated metropolitan spatial planning approach is needed to ensure synergy between the emergent urban developments, the strategic choices and the decisions in spatial planning. Such an approach is considered to particularly enhance interaction across the levels of government (i.e. national, regional and local) and with regard to sectoral (horizontal) issues (e.g. mobility, infrastructure, public services, housing, environment, etc.). Considering the current knowledge gaps and lack of sufficient empirical evidence regarding the benefits of such a metropolitan planning approach, the project addresses the following research questions:

1. What key definitions and spatial characteristics can be used for delineating metropolitan areas and what categories of metropolitan areas can be distinguished based on these definitions?
2. What key socio-economic and environmental trends determine the spatial dynamics of metropolitan areas and what are the suitable spatial scales for different metropolitan developments?
3. What are the current challenges in the spatial development and governance of metropolitan areas and are the current planning practices and institutional frameworks effective in meeting these challenges?

4. What are the key success factors, incentives and policy tools for improving metropolitan governance and the use of a metropolitan spatial planning approach?
5. What common approach (typology) can be developed to generalize policy tools relevant to different metropolitan areas in Europe?
6. What policy implications can be derived from the key findings about metropolitan planning processes in the stakeholder areas?
7. What specific guidelines can be provided for a coordinated metropolitan planning process at the EU level and for the national, regional and local authorities?

2.4 Research approach

2.4.1 The case studies: stakeholders' metropolitan areas

The research is based on ten case studies examining formally or informally recognized metropolitan areas across Europe. The stakeholder cities that form these metropolitan areas have requested the current research in the expectation of knowledge-based evidence on the benefits of more coordinated strategies for metropolitan spatial developments. The areas are located in eight European countries. The key characteristics of the areas are presented in table 1.1.

Table 2.1: Key characteristics of the MAs (based on current delineation by stakeholders)

Stakeholder metropolitan area	Key characteristics of the current or prospective MAs			
	Country	Size ($km^{2)}$	Population number million inhabitants	Number of municipalities
Vienna	Austria	7552	2.75	268
Zurich	Switzerland	6072	3.03	563
Prague	Czech Republic	5011	2.13	515
Brussels	Belgium	4332	3.37	135
Brno	Czech Republic	1755	0.62	166
Oslo-Akershus	Norway	5370	1.23	23
Turin	Italy	6846	2.25	316
Terrassa	Spain	584	0.89	11
Lille	France	7516	3.90	682
Lyon	France	12867	3.29	968

source: European Commission & Joint Research Centre, 2015, GHS Population Grid

2.4.2 Analytical framework

As the metropolitan dimension of spatial planning has not yet been comprehensively explored in all Member States, the project's research approach is geared towards the assessment of the ten stakeholder areas. The project uses targeted data collection from the stakeholder areas and comparative case-study research to explore and compare the planning systems and practices of the stakeholder areas. It therefore identifies key trends and challenges of the metropolitan development in these areas and determines to what extent the current planning systems and practices support a metropolitan planning approach and in which aspects. In addition, the roles of different actors are assessed, including that of local planners, development experts, policy makers and local political representatives. More specifically, the

institutional interplay between the local authorities and at different governmental levels is explored with a view to determining the relevant governance scale for metropolitan planning.

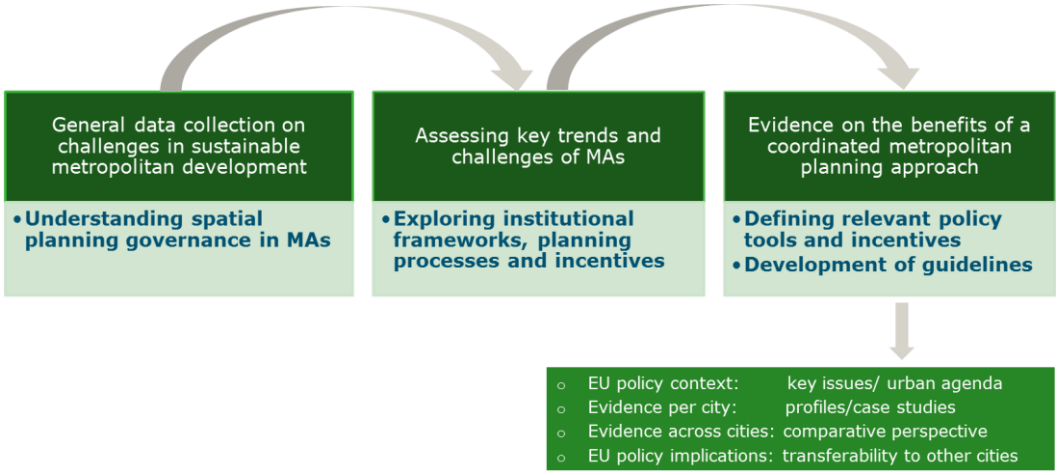
The research approach is based on three steps of analysis (figure 1.2).

- Step 1 comprises development of a framework for data collection and analysis of metropolitan development in general and for each of the ten stakeholder areas. This step is based on data collected from the stakeholder areas, European databases, policy documents and preceding studies;

- Step 2 comprises a detailed assessment of each of the ten stakeholder areas and comparative case-study research. The specificity of each metropolitan area is assessed in terms of: 1) spatial characteristics and delineation of the metropolitan areas, 2) key socio-economic development trends, 3) current challenges, institutional frameworks and governance processes and 4) current needs and success factors for managing metropolitan development. The comparative assessment identifies the similarities and differences across the areas and general conclusions about the current challenges in managing metropolitan development and the policy implications for spatial planning and governance at metropolitan scale.

- Step 3 uses the empirical evidence gathered in the preceding two phases to identify the benefits of a metropolitan spatial planning approach. In this step, guidelines are developed bringing together a set of recommendations and relevant policy tools for each stakeholder area and in a wider European policy perspective.

Figure 2.2: SPIMA's three-step analytical framework

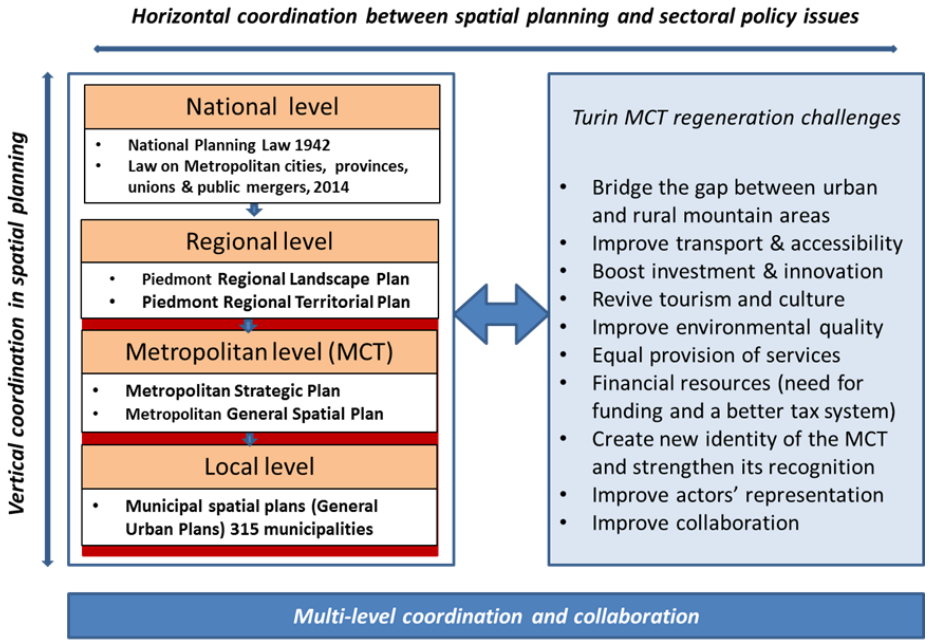


Source: authors

2.4.3 The scope of the metropolitan spatial planning approach

The specific context of the spatial planning systems and governance processes in the stakeholder metropolitan areas has been assessed in order to systematically review the degree to which the current institutional frameworks of the stakeholder areas embed developments that concern metropolitan scale of planning. The interaction between the scales of planning (vertical coordination) and the sectoral policy issues (horizontal coordination) has been assessed based on an integrated model. This model allows the scope of a potential metropolitan planning approach to be viewed in each stakeholder area (see figure 1.3). The assessment of each stakeholder area according to this model is presented in the profiles of the stakeholder areas (see Annex 2).

Figure 2.3: Assessing the scope of a metropolitan approach (example of Turin)



Source: authors

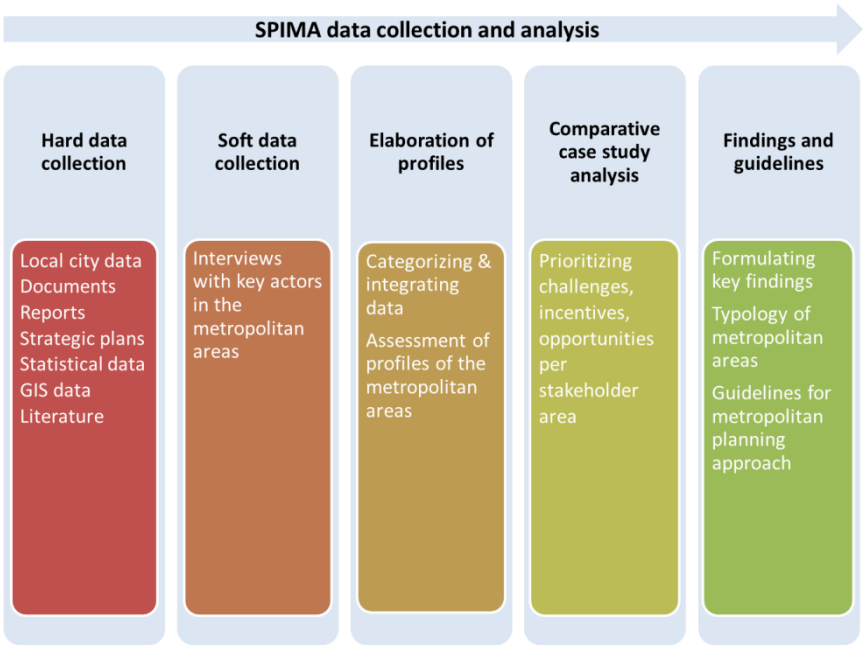
2.4.4 Methods of data collection and analysis

For the purpose of the analysis, data was gathered from a number of sources, including scientific literature, policy documents and reports from previous studies, specific data from the stakeholder areas, statistical data and GIS data (figure 1.4). The data was analysed and compared with a view to identifying the similarities and differences across the stakeholder areas. The key challenge regarding the relevance of the data has been achieving a reasonable degree of comparability between the stakeholder areas.

Two categories of data has been collected, namely 'hard' and 'soft' data. The 'hard' data was gathered from documents and databases, and has been reviewed and integrated to elaborate *profiles of the stakeholder areas.* The data consisted of both qualitative and quantitative information (descriptive statistics) about the stakeholder areas, including key urban development trends and indicators, the spatial structure and spatial dynamics, institutional frameworks and planning systems. The data received from the stakeholder areas was compared and where possible integrated with the data from European data, such as Landscan, ESPON, OLAP Data Cube, Land cover, OECD, GHS Population Grid and Eurostat.

The 'soft' data consisted of qualitative data gathered from semi-structured interviews with relevant actors in the stakeholder areas. Semi-structured questionnaires were used to conduct the interviews, which were then transcribed, analysed and compared.

Figure 2.4: Data collection and analysis



Source: authors

- ***Elaboration of profiles of the metropolitan areas***

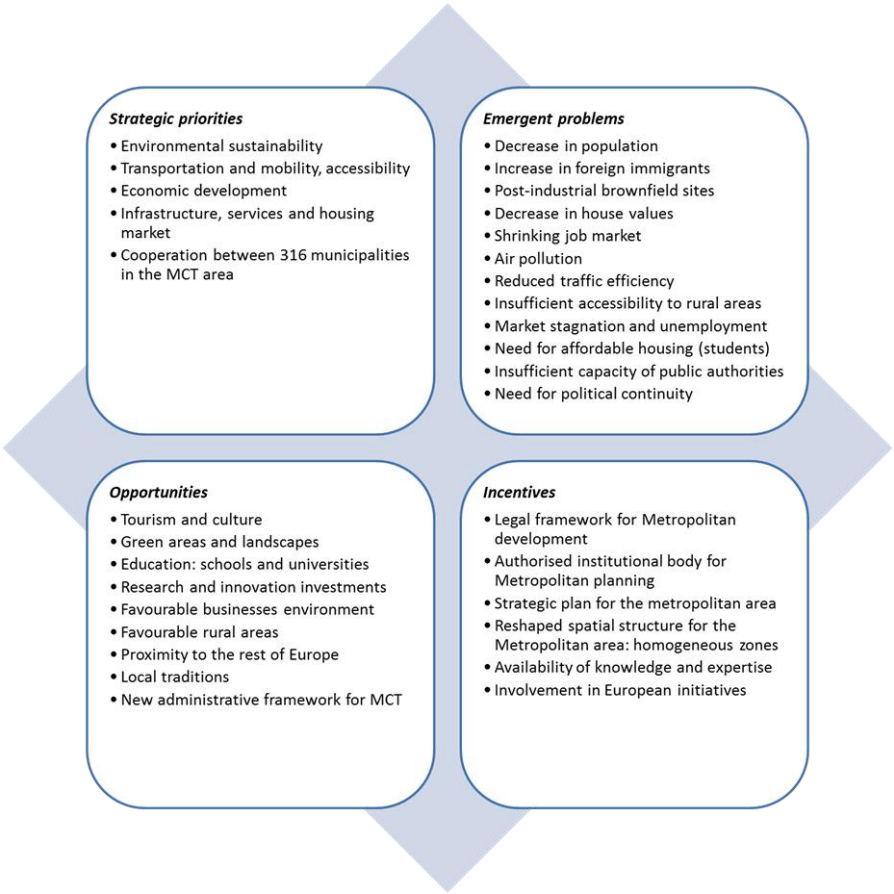
The profiles of the metropolitan areas were developed based on initially systematized and unified outlines (Annex 2). These are structured in four sections: 1) the characteristics of the areas; 2) the spatial structure; 3) the governance of spatial planning; and 4) the key spatial development challenges and incentives. The profiles integrate the data gathered from documentation delivered by the stakeholder areas, literature (i.e. policy documents, project reports and scientific publications) and European statistical data.

In addition, each profile includes maps illustrating the spatial dynamics of the area. The maps illustrate the size of the currently considered metropolitan development area (MDA), the relationship between the core city and its suburban areas (functional urban areas (FUAs), morphological urban areas (MUAs) and the local administrative units (LAUs).

Furthermore, the specific governance arrangements, planning frameworks, responsibilities, governmental systems for spatial planning and the current organizational structures are reviewed.

At the end of each profile, an assessment matrix entitled SOEI is presented that illustrates the current situation in the stakeholder areas' with regard to metropolitan planning (figure 1.5). SOEI (comparable to SWOT) has been developed for the purpose of comparability between the stakeholder areas and stands for (S) strategic objectives, (O) opportunities, (E) emergent problems and (I) incentives. The matrix is based on a synthesis of the findings from the analysis of the profiles and the interviews.

Figure 2.5: The SOEI matrix (example of Turin)



Source: authors

- ***Designing questionnaires and conducting interviews with relevant actors***

A key part of the case study research was the design and execution of semi-structured interviews with diverse actors from the stakeholder areas. The design of the semi-structured questionnaire included four key categories of questions regarding the most relevant issues of metropolitan development such as: 1) identity and understanding of the metropolitan area; 2) collaborative processes for the metropolitan area development; 3) spatial planning practices and key challenges for metropolitan development; and 4) opportunities for implementation of a coordinated metropolitan spatial planning approach. These categories comprised 30 questions in total.

With the help of the questionnaire, qualitative data was gathered that reveals the perceptions and understanding of different actors on the current course of action and actual practices in metropolitan development and spatial planning within each stakeholder area.

The design of the interviews and the analysis of the results are based on scientific methodology for qualitative data collection and analysis (Creswell, 2013). The protocol used based on this methodology included the following steps:

1) design of the questionnaire by identifying key categories of questions (four categories containing 30 questions)
2) selecting relevant respondents from each stakeholder area based on five target groups of actors: governmental (policy makers/planners), politicians, private, civil-society, non-governmental. Within these groups as well relevant members of current MA collaborative organizations were interviewed when possible.
3) conducting the interviews
4) sorting the data, transcription and interpretation
5) analysis and validation of the results

In total 75 interviews were conducted in the ten stakeholder areas. On average five to seven respondents were interviewed in each area. The respondents represent five key groups of actors including governmental (national, regional, local), research, non-governmental, private and politicians.

The interviews were organized in collaboration with the contact persons in the stakeholder areas and entailed two-day visits by the research team to each stakeholder area. The full questionnaire is presented in the SPIMA inception report.

The analysis of the interview results is based on categorizing and interpreting the data per stakeholder and across the stakeholders. The analysis has a qualitative character, meaning that each issue addressed by one or more of the respondents has been taken into account. The method therefore does not illustrate statistical significance based on an extended survey of large numbers of respondents; rather, it illustrates qualitative data based on selected sampling among groups of respondents within each stakeholder area. Based on this approach, the degree of consensus and/or differences in the opinions and perceptions of different groups of respondents were analysed within and across the cases. The answers from all respondents in total and in each group were aggregated across the stakeholder areas in order to indicate the proportion of respondents that agree or disagree on a specific issue addressed in the questions. The method of aggregation is based on estimating the proportion of respondents (%) in total and per group of respondents that mentioned the same issue/answer at least once.

2.5 Structure of the report

This report is structured in eight chapters. The introductory chapter recaps the key objectives of the SPIMA project, its research questions and analytical framework.

Each of the subsequent chapters is dedicated to one of the research questions. The chapters follow unified structure that describes; 1) the context of the research question, 2) the methods used for the analysis in answering the research question, 3) the key findings, 4) discussion and interpretation of the key findings, and 5) the key conclusions. The final chapter discusses a number of issues to be taken into considerations in the future research and policy agenda on metropolitan spatial development and governance.

3 Delineation and categorization of metropolitan areas

3.1 Introduction

This chapter reviews relevant definitions and concepts for delineating and categorizing metropolitan areas and formulating the spatial planning approach at the metropolitan scale. First, definitions of spatial planning and of a metropolitan area are reviewed. Second, current delineation methods for metropolitan areas are described. Based on this, a delineation approach and a categorization process of the stakeholder metropolitan areas have been developed, as presented in this chapter.

3.2 Methodology

Reviewing definitions of metropolitan areas

The existing definitions of metropolitan areas have been reviewed based on a literature review of scientific publications, previously implemented project studies and policy documents of the European Commission. The definitions most relevant to the project were reviewed, including the most recent definitions of the ESPON studies, OECD and the European Commission.

The delineation of the metropolitan areas

The delineation of the stakeholder metropolitan areas was made based on the methodology and definitions of the OECD and DG Regional policy of the European Commission and the information provided by the SPIMA stakeholders about the current or potential borders of their metropolitan area.

Based on this methodology and with the support of GIS spatial data analysis, the Morphological Urban Area (MUA) and the Functional Urban Area (FUA) were configured for each stakeholder area. In addition to the MUA and FUA, a Metropolitan Development Area (MDA) was delineated for each stakeholder area based on the definition of the existing or potential metropolitan area by the stakeholder city authorities.

The delineation of the MUAs, FUAs and MDAs was made by using the Geostat 2013 LAU2 database. If the spatial datasets were in the form of shape-files, with lists of municipalities where available, these were used directly and overlaid. If maps were not available from reports and data from the stakeholders, web services were georeferenced and the MDA area was manually attached to the Geostat LAU2 2013 database. The resulting MDA maps and borders did not show significant deviations from the input maps provided by the stakeholders.

In the next step, these MDA areas were combined with the European delineations of MUAs and FUAs, Large Urban Zones as described in the ESPON 2013 database. In this way, we were able to show the relationship between functional urban areas, as harmonized at the European level and available from ESPON data, and the reality of functional urban relationships formalized in the MDAs for the ten stakeholder areas. The same process was repeated for the indicator data available from the ESPON OLAP cube, ESPON GEOSPECS LAU2 database and other more up-to-date indicators such as the 2011 population figures from Eurostat and recent land use data from the Copernicus database.

All layers have been attached to the building block of the LAU2 unit, making it possible to obtain statistics at this level (see example in section 2.3.1, map 2.1). The same process is followed for other available indicators in the next step of the analysis.

3.3 Key findings

3.3.1 Definition of a metropolitan area

The OECD defines a metropolitan area as a social, economic, geographical and political space defined by shape, size and nature and by the interactions between individuals and organizations (OECD, 2013). Metropolitan areas can present a monocentric or, more often, a polycentric structure of an urban agglomeration, the latter being determined by the existence or formation of historically distinct and administratively and politically independent urban areas, located in close proximity and that have the potential to be connected through urban infrastructure. The merging of cities into metropolitan areas results, therefore, either from a process of incorporation when dominant cities extend their sphere of influence over a larger territory by incorporating smaller cities, or from the fusion of smaller cities as a result of continuing upscaling of urban activities (Halbert et al., 2006; Hall & Pain, 2006). Both forms of metropolitan areas require spatial planning policy and instruments that adequately address the degree of integration between a variety of urban functions and between the local authorities of the core cites and surrounding municipalities (OECD, 2013). Comparative information on the metropolitan performance of urban agglomerations can provide a better understanding of the dynamics of their spatial development (Brezzi et al. 2012). Issues such as the economy, living conditions, infrastructure and the environment are considered particularly important on the urban policy agenda. However, the lack of a unified definition of metropolitan areas is a key challenge in comparing the economic and social performances of metropolitan regions.

The issue of comparability of metropolitan areas is directly linked to the choice of the unit of analysis. Key considerations to be made are whether these units are defined on the basis of administrative boundaries, continuity of the built-up area or functional measures such as commuting patterns or other parameters) and to the size of components to be aggregated. Moreover, the accuracy of the definition depends on: a) the availability of socio-economic indicators in a certain metropolitan area and b) the possible cross-country comparability.

Several methodologies for identifying metropolitan areas have been developed at the national and international level (Brezzi et al., 2012). The level of comparison of metropolitan areas is directly influenced by the approach used for their identification. In fact, the demarcation of a metropolitan area will differ notably depending on the methodology used. Three common approaches are currently used to identify metropolitan areas:

1) The administrative approach defines metropolitan areas on the basis of legal boundaries and of additional criteria such as population size or population density. Metropolitan areas identified using this approach can be easily used by public administrations in terms of governance issues since metropolises are contained within administrative boundaries.
2) The morphological approach defines metropolitan areas based on the aggregation of continuous built-up areas that fit certain criteria of population density or the proportion of the municipalities covered by urban settlements. This approach provides a definition of metropolitan areas which is better suited for environmental issues such as land-use change or greenhouse gas emission or housing development and transportation policies. Currently, GIS techniques based on aerial or satellite imagery are being used to identify metropolitan areas worldwide.
3) The functional approach defines metropolitan areas on the basis of flows between a core area and its surrounding territories. Travel-to-work commuting flows represent the flow information generally used for this approach. Small administrative units, such as municipalities or census tracts, are the territories generally used to construct the core and the hinterland of metropolitan areas.

Of the different methodologies, the functional approach seems to better capture the socio-economic characteristics of a city. The social and economic area of influence of metropolitan areas often does not fit within administrative boundaries or continuous built-up areas, being either larger or smaller. The functional approach on the other hand has the advantage of capturing urban areas' interactions, and thus identifies self-contained socio-economic urban

units. Additionally, the functional approach is capable of defining the extension of metropolitan areas over time while the administrative approach captures static urban forms. The functional definition of metropolitan areas proved to be effective in delineating both the densely inhabited urban cores and the hinterlands of the cities. This methodology can be extended to all countries for which commuting data from censuses or travel surveys are available. Wide application of this methodology can generate the basis for building new comparable indicators of urbanization trends and quality of life in cities. However, the crucial data inputs needed for extending the analysis are national matrices of origin-destination commuting data.

Against this background of the functional methodology, the OECD in collaboration with the EU (Eurostat and EC-DG Region) has developed a more harmonized definition of urban areas as "functional economic units", thus overcoming previous limitations linked to administrative units (Dijkstra & Polman, 2012; Brezzi et al., 2012). Within this definition, the building blocks for the functional urban areas are the smallest administrative units for which national commuting data is available (LAU2 in Eurostat terminology and the smallest administrative units for which national commuting data is available in non-European countries). This methodology is a clear example of how geographic/morphologic information and census data can be used together to gain a better understanding of how urbanization develops. The guidance for applying this methodology is provided in the publication *Cities in Europe*, within which the new OECD-EC definition can be found (Dijkstra & Polman 2012).

Definition of spatial planning at the metropolitan level

Based on the existing theoretical and empirical understandings of spatial planning processes in Europe (box 3), the project refers to spatial planning *"as a key policy mechanism for governing spatial development in the metropolitan areas, which is based on strategies and plans for sustainable distribution of land use functions and on cooperation between different governmental levels and policy sectors"*. Based on this definition, a distinction has been made between the spatial planning process within a strategic perspective (*strategic planning*), that within an operational perspective (*statutory planning*) and that within a coordinating, multilevel governance perspective (*collaborative planning*). Strategic spatial planning refers to the preparation of long-term strategic plans that envision spatial development of the metropolitan area, while operational (statutory) planning refers to the procedural process based on regulatory spatial plans. Collaborative planning refers to the coordinating and multilevel governance of spatial planning that is based on collaboration between multiple actors and joint decision-making about metropolitan spatial development. Based on this understanding, the roles of the strategic, legal and collaborative governance aspects of spatial planning processes at the metropolitan level were assessed for each stakeholder areas. This forms the basis for the conceptual framework of the project on *governance of spatial planning*, used to assess the planning processes in the stakeholder areas (figure 2.1).

Box 1: Understanding the definition of spatial planning for the metropolitan areas

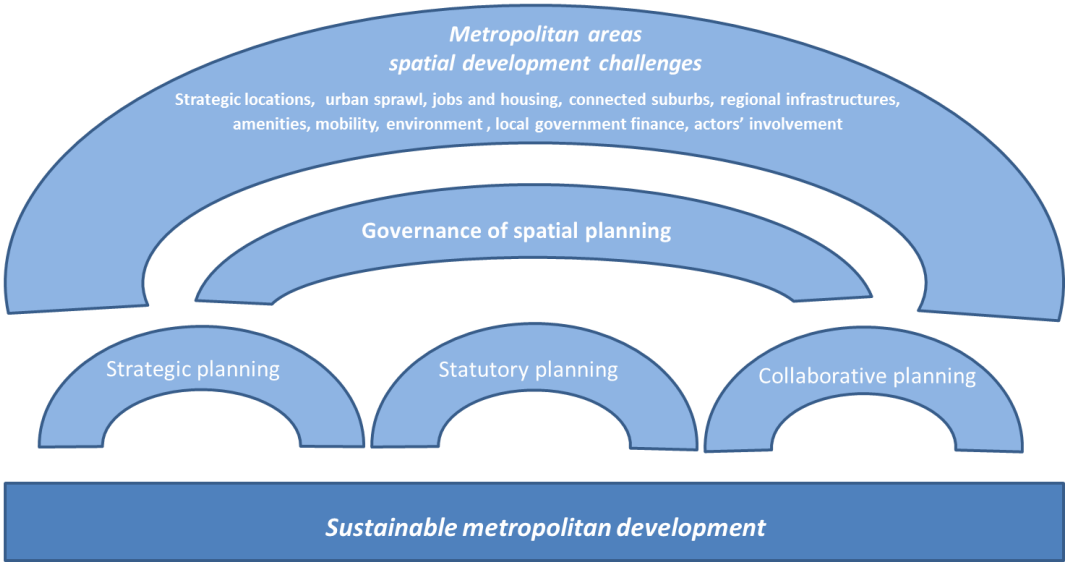
Traditionally, spatial development is steered by different governance levels, namely the national, regional (or provincial) and local levels. While the principle of subsidiarity is applied strongly in spatial planning policy at the EU level, the role of spatial planning is considered significant for addressing the EU-wide development of balanced European and polycentric regions such as metropolitan areas. In this regard, during the last two decades key policy frameworks at the European level have led to the identification of key governance principles that can guide spatial development at different scales. Among these policy frameworks are the European Spatial Planning Compendium, (1997), European Sustainable Development Perspective (1999), Territorial Agenda of the EU (2007), Green paper on territorial cohesion (2008), and the currently ongoing Urban Agenda partnership initiative led by the European Commission. In this context SPIMA takes into account the concepts of territorial governance and understandings of the role and functions of spatial planning policy as a distinct policy activity that has a strategic, statutory and coordinating role. The generic term 'spatial planning' is used to describe systems for managing spatial developments at different territorial scales (national, federal, regional and local). Spatial development is the geographical expression of the economic, social, cultural and environmental policies, each of which aims at specific sectoral developments in a territory. Sustainable urban development depends on the balance between these sectoral developments and on the consideration of the sectors' demands for land uses (Campbell, 1996; CEC, 2010).

According to the EU compendium of spatial planning systems and policies, spatial planning refers to "*methods used largely by the public sector to influence the future distribution of activities in spaces*. *It is undertaken with the aim of creating a more rational territorial organisation of land uses and the linkages between them, to balance demands for development with the need to protect the environment and to achieve social and economic objectives*" (CEC, 1997). Prominent planning scholars, e.g. Healy (1997), define spatial planning as a set of governance practices for developing and implementing strategies, plans, policies and projects, and for regulating the location, timing and form of development. Based on these definitions, spatial planning can be understood as an overarching policy process that has both a strategic and an operational dimension, through which it can envision, direct and regulate spatial developments on a given territory.

Across Europe, various terms are used more or less interchangeably to refer to spatial planning. These include land use planning, urban and regional planning, statutory or strategic spatial planning (ESPON, 2006; UN, 2008; Silva & Acheampong, 2015). In most cases however, these terms are used to refer to spatial planning as a policy field that embeds institutional and legal arrangements for the realization of spatial development objectives at different territorial scales. There is a general consensus across the academic discipline and practice of planning that the key objectives of spatial planning are to: *1) coordinate the spatial dimensions and impacts of other sectoral policies (transport, agriculture, tourism, urban development, housing, environment etc.); 2) integrate and functionally organize land uses; 3) balance the demand for socio-economic development with the need to protect the environment; and 4) achieve balanced distribution of the gains of economic development between regions and cope with regional disparities* (CEC, 1997; Albrechts, 2004; Allmendinger & Haughton,2009, Sliva & Acheampong, 2015). Based on these definitions, spatial planning has three key perspectives:

- *Operational spatial planning* (statutory planning): As a regulatory mechanism, the government (at local, regional and/or national levels) has to give approval for a given spatial development activity, based on regulations.
- *Strategic spatial planning* (strategic planning): The government (jurisdictions at the regional and local scales) has to develop strategies that guide the long-term developments of the territory while addressing the needs and competing claims for land uses for economic, social and environment developments.
- *Coordinating multilevel spatial planning* (collaborative planning): Spatial planning has a strong coordinating role across scales and sectors, and can steer different governmental actions and measures in terms of metropolitan developments. This coordination process requires the establishment of collaborative practices that allow the involvement of all relevant actors in the planning process.

Figure 3.1: Framework for assessing the spatial planning process in metropolitan areas



Source: authors

The stakeholder areas identified a number of challenging sectoral policy issues that are considered crucial for the spatial development of the metropolitan areas (box 2). These issues are considered as key policy areas of concern in addressing metropolitan governance and spatial planning processes in the stakeholder areas.

Box 2: Policy issues to be addressed at the metropolitan scale of spatial planning, as indicated by stakeholders

- Agreements on strategic locations (e.g. retail centres, transport hubs, hospitals, etc.)
- Limiting and managing urban sprawl; promoting areas for jobs and housing within the metropolitan area, e.g. secondary centres, station towns, strong (well-connected) suburbs, etc.
- Prioritizing regional infrastructures/amenities and mobility, in relation to land use and development (examples from ongoing research and partner cities)
- Conserving and protecting the environment and resources, including farmland (including short food supply chains) and valorizing green spaces (landscape, leisure, biodiversity etc.)
- Addressing potential imbalances in local government finance that are linked to spatial development (indicating the potential for stimulating the desired development through economic incentives and facilitation)

Delineation of the stakeholders' metropolitan areas

Based on the analysis of spatial concepts for the delineation of metropolitan areas, it was discovered that stakeholders often use a different delineation approach to the EU-OECD (2012) to define their metropolitan area. As a result, the approach for the delineation of the stakeholder metropolitan area provided by the stakeholders does not always fit with the approach defined by the EU-OECD, i.e. it is not in conformance with the definition of a Functional Urban Area. In order to assess these differences in more detail and identify the most relevant configuration of the metropolitan areas in the stakeholder areas given the EU-OECD delineation, a 'metropolitan development area' (MDA) was delineated.

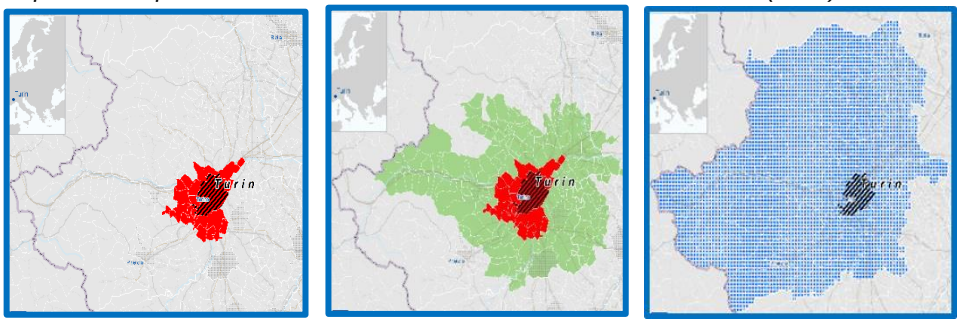
The MDA does not represent a new spatial concept. It is the delineation of the areas based on distinctive concepts/scenarios for each stakeholder area. MDAs illustrate the views of the local or regional authorities on the spatial extent of the metropolitan area. In some cases the MDA is based on a legally binding area with fixed borders, while in other cases it has more fluid borders and/or lacks a clearly defined scale. Therefore, the delineated MDAs illustrate different perspectives, e.g. based on the legal status of the area, administrative divisions, existing infrastructure networks, strategic plans or existing collaborative arrangements.

The spatial analysis has considered the potential MDA scenarios based on data from the stakeholders and juxtaposed these with the EU-OECD delineation. The differences, the gaps and the complementarities between the different spatial scales have been identified based on the mapping of the MDAs and the OECD scales of FUAs, MUAs and LAUs (see Map 2.2).

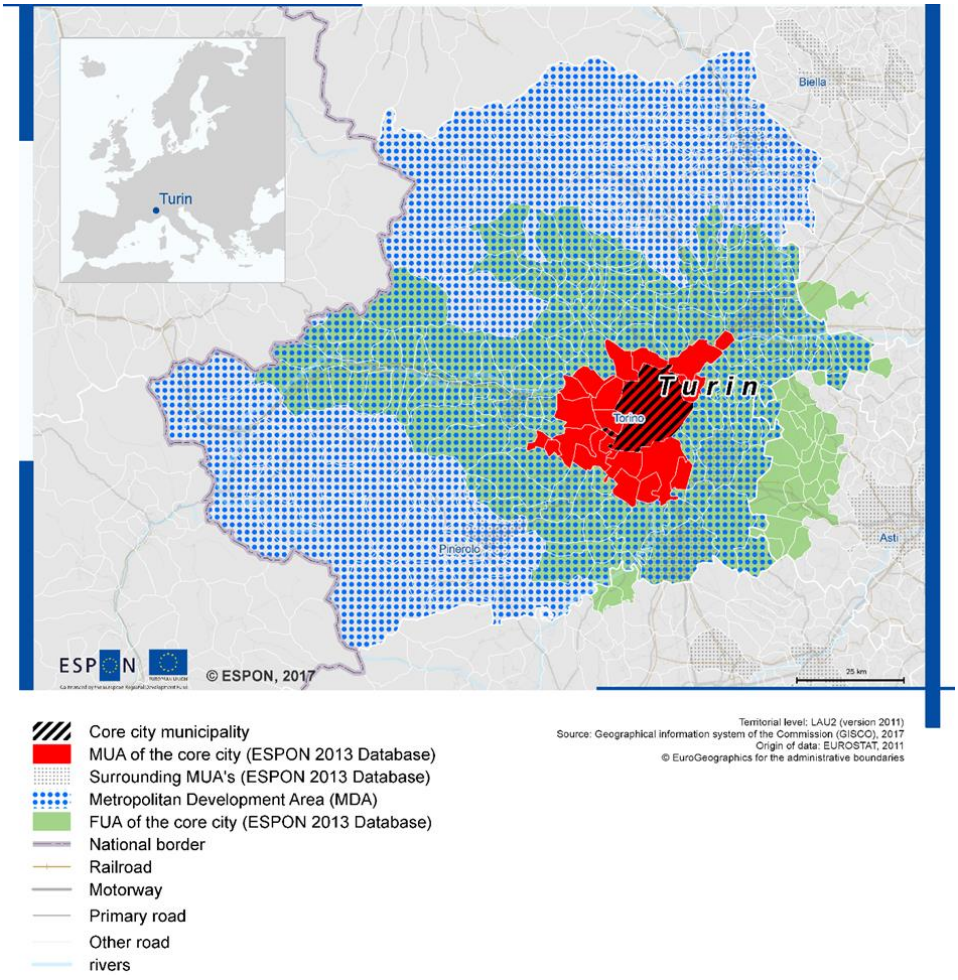
The data used to delineate the metropolitan areas comes from both the European databases (ESPON) and from the stakeholder areas' own delineation models. Both types of data sources are used to overlay the delineations at different scales and illustrate the differences. There is slight difference between the delineation of the FUAs by OECD and ESPON database and for this study the ESPON database was used.

The mapping process illustrates the most appropriate and usable solution for each stakeholder area to address metropolitan developments in order to promote a metropolitan planning approach. The delineation of the MDAs and their relation to the FUAs, MUAs and LAUs have been discussed with each stakeholder in order to arrive at an agreed delineation scenario. This is particularly important for the stakeholder areas where the MA delineation approach is still highly debatable (e.g. Oslo, Vienna etc.).

Map 3.1 Example of the MDA delineation in relation to FUAs and MUAs (Turin)



a) MUA and core municipality *b) MUA, core municipality & FUA* *c) MDA and core municipality*



Source: authors based on aggregation of Geostat LAU2 data, 2013

Categorization of the stakeholder metropolitan areas

In Annex I (profiles), a map is presented for each stakeholder area illustrating the overlay between the delineation of the LAU2s, MUAs, FUAs and the MDAs. In most of the cases there are considerable differences between the harmonized European definition of FUAs and the MDAs. Based on the delineation of each MDA and the assessment of its relation to the EU-OECD spatial scales of FUAs, different types of metropolitan areas have been identified among the ten stakeholder areas (see table 2.1).

The categorization of the spatial configuration is based on the general definition of polycentric metropolitan development as a 'functional' concept focusing on the way the urban centres organize the rest of the territory by supplying the functions that shape the territorial hierarchies (De Goei et al., 2010). According to the territorial scales of polycentric

development classified by ESPON 3.1 (2003) and the OECD study on assessing polycentric urban systems (OECD, 2014), a metropolitan polycentric perspective shows the way in which the spatial organization within the metropolitan space takes place. It indicates how people and economic activities are distributed across urban space and raises important issues of efficiency in terms of public service provision, face-to-face interactions among economic agents, transport, and environmental issues connected with patterns of land development (e.g. urban sprawl).

Based on this perspective, the stakeholder areas can be characterized as: 1) monocentric (concentrated urban functions in a single dominant core urban area); 2) polycentric (one or more core urban areas with extended functions to secondary urban centres); or 3) a monocentric area with potential for polycentric development (high potential for transforming into a polycentric area) (see table 2.1).

Table 3.1: Indicative categorization of the SPIMA stakeholder areas

Stakeholder metropolitan area	Type MA based on of spatial configuration	Type of MA based on the relation of the selected MDA to the FUA
Brno	Monocentric	Within the FUA; FUA is larger
Brussels	Polycentric	Partly overlapping, equal in size to FUA
Lille	Polycentric	Largely overlapping, much smaller than FUA
Lyon	Polycentric	Largely overlapping, much larger than FUA
Oslo-Akershus	Polycentric	Largely overlapping, larger than FUA
Prague	Monocentric	Overlapping, equal in size to FUA
Terrassa	Polycentric (satellite of Barcelona)	Within the FUA, much smaller than FUA
Turin	Polycentric	Largely overlapping, larger than FUA
Vienna	Monocentric	Within the FUA, much smaller than FUA
Zurich	Polycentric	Largely overlapping, much larger than FUA

Source: authors

3.4 Discussion

Using the current mapping and positioning of the spatial data from the stakeholder areas and the spatial data from other databases as a basis, the project results illustrate the complementarities and discrepancies between the data. The meaningful scale of analysis is considered for each stakeholder for a number of metropolitan development issues.

The reviewed definitions of metropolitan areas and of delineation approaches showed that there are still discrepancies in the literature and in the policy documents with regard to the most suitable basic indicators and spatial units that can be used to delineate a metropolitan area. The methodology for delineation from the EU-OECD (2014) adopted in this project, can be used as a basis, which can then be overlaid by other scenarios, such as those of the MDAs as developed within this project.

The key findings point to the possibility of considering additional perspectives on top of the commonly accepted FUA delineation. As the FUAs are based on commuting patterns, these reflect only one indicator of the degree of interaction between core urban areas and the suburban areas and periphery. In addition to this, the combined delineation of the FUAs, MUAs and MDAs at the LAU2 level shows the relation between the administrative borders across municipalities within the core urban area and beyond the FUAs. Such a combined mapping approach allows more extended analysis (if data is available) on the degree of urban sprawl, with socio-economic indicators that can be compared to institutional and administrative indicators.

As to the existing spatial categorizations of metropolitan areas, the most common categorization is based on assessing the polycentric and monocentric spatial structures. As a number of previous studies have shown, polycentrism is a useful concept that helps to identify

the spatial structure and spatial dynamics of the emerging metropolitan areas. While there is still a need to better understand the benefits of polycentric metropolitan development, achieving polycentric development is already defined as a goal in the spatial planning strategies of a number of cities (e.g. Oslo-Akershus, Vienna and Zurich). This points to the fact that the development of metropolitan areas to a certain extent fosters moving away from a single core compact urban area towards more complex urban structures of urban networks.

Regarding the understanding of the spatial planning processes of the metropolitan development, the key findings show a rather innovative approach. While comprehensive studies dedicated solely to the spatial planning processes of metropolitan areas are scarce, the concept of *spatial planning governance* developed in the current study may serve as a helpful assessment tool to conduct such studies in other areas in Europe and bridge knowledge gaps about the complex planning processes at the metropolitan scale. This concept points to the need to consider three key elements, namely *strategic, statutory and collaborative* planning. These are useful elements in assessing the degree of current strategic planning, to grasp the current legal procedures embedded in the spatial planning regulations and to assess the collaborative arrangements at a metropolitan scale. As claimed by prominent planning scholars, such concepts help to provide evidence for the fundamental need for combining the traditional-rational ways of spatial planning (*statutory*) with the communicative (*strategic and collaborative*) discourses in planning (Haley, 2010; Sager, 2014).

3.5 Conclusions

In this part of the study, we were able to draw conclusions about the delineation process of the metropolitan areas and the need for considering different spatial planning scales:

- The method of delineation used for the ten stakeholder areas introduces a tailor-made model for combining European-level data and specific local data relating to the urban areas. An essential part of this process is identifying how data can be used most effectively to map the metropolitan areas by mean of an MDA, based on assessment of different delineation scenarios and on the considerations of the local authorities.
- As a result of the comparative assessment across the stakeholder areas, including mapping and categorization, it can be concluded that the stakeholder areas present similar patterns of spatial development driven by key economic indicators and land use change. However, they also have unique characteristics regarding the relationship between the spatial scales of the MDA, FUA and MUAs. While there are areas that are within the overlay with the FUAs, some areas are outside the FUA and others have a number of FUAs that are outside the MDA. In other cases, the FUA is much larger than the MDA.
- Most of the ten areas represent current or potential polycentric development, based on which it can be concluded that metropolitan development fosters moving away from spatial development of a single, compact urban core towards more complex networks of urban areas.
- For all stakeholder areas, the role of spatial planning processes should be given more prominence with regard to metropolitan development. A clear spatial planning governance model is needed that reviews the *statutory, strategic* and *collaborative* processes of spatial development at the metropolitan level.

4 Key socio-economic trends and spatial dynamics

4.1 Introduction

This chapter reviews the results of the assessment of key socio-economic trends determining the spatial dynamics of the ten stakeholder metropolitan areas. It discusses selected key development indicators for each of the ten stakeholder areas and presents a comparative perspective across the areas. The key trends are used as a basis to map and assess the relevance of the spatial scales for metropolitan development such as the MDA, FUA and MUA.

4.2 Methodology

In order to illustrate and compare the general trends in the spatial dynamics of the stakeholder areas, key development indicators have been selected. The key indicators used include land use change, population dynamics, GDP, urban sprawl, accessibility (travel time by car to the MUA), environmental quality (air pollution by PM 2.5), and natural landscapes. Each of these indicators is presented at the level of the MDA, FUA and MUA (see figures 3.1-3.11).

The selection of the indicators is based on the availability of relevant data at the suitable scale for each stakeholder area. In this regard, there were a number of limitations to be taken into account such as the lack of comprehensive and synchronized data for a recent time period i.e. from 2009 until the present. This limitation does not allow observation of some dynamics during the period of economic recession in Europe and how that has influenced the process of metropolisation in the stakeholder areas. This is particularly the case for the most recent data on GDP and population dynamics. Hence, a departure point for comparing the key trends has been the available data at the LAU2 level, which was aggregated per indicator for the MDAs, FUAs, and MUAs. The time period used is between 2000 and 2016.

The data used is based on sources from EC & JRC, Eurostat, OLAP Cube and CORINE Land Cover and OECD. The indicators such as population change and density are based on new European data for 1975-2015. The indicator for land use change is based on data from 2012.

For the elaboration of the detailed profiles of the stakeholder areas, the most recent data provided by the stakeholders was used up to 2016.

Limitations in data availability and applicability

A comparative assessment has been performed for the indicators of income (GDP) in order to illustrate additional key trends and the relation between population change in the MDAs, FUAs and MUAs and the distribution of employment.

The figures provided about population distribution are based on NACE job sector category and data from the ESPON LAU2 database. The NACE database (coming from the ESPON GESOPECS project) is based on data from 2008, just before the economic crisis in Europe. EUROSTAT has population data available at the LAU2 level up to 2016. However, much of this data does not fit directly with the 2013 spatial database and some countries are still missing, so post-processing is needed to get a full spatial overview for the most recent timeframe. For GDP, only aggregated data from the stakeholder areas or larger administrative units (NUTS3) are available to compare with the statistics shown here, since homogenized European statistics at a more detailed spatial level are not available. There are limitations as well in the availability of comparable and synchronized data to show long-term trends in employment.

4.3 Key findings

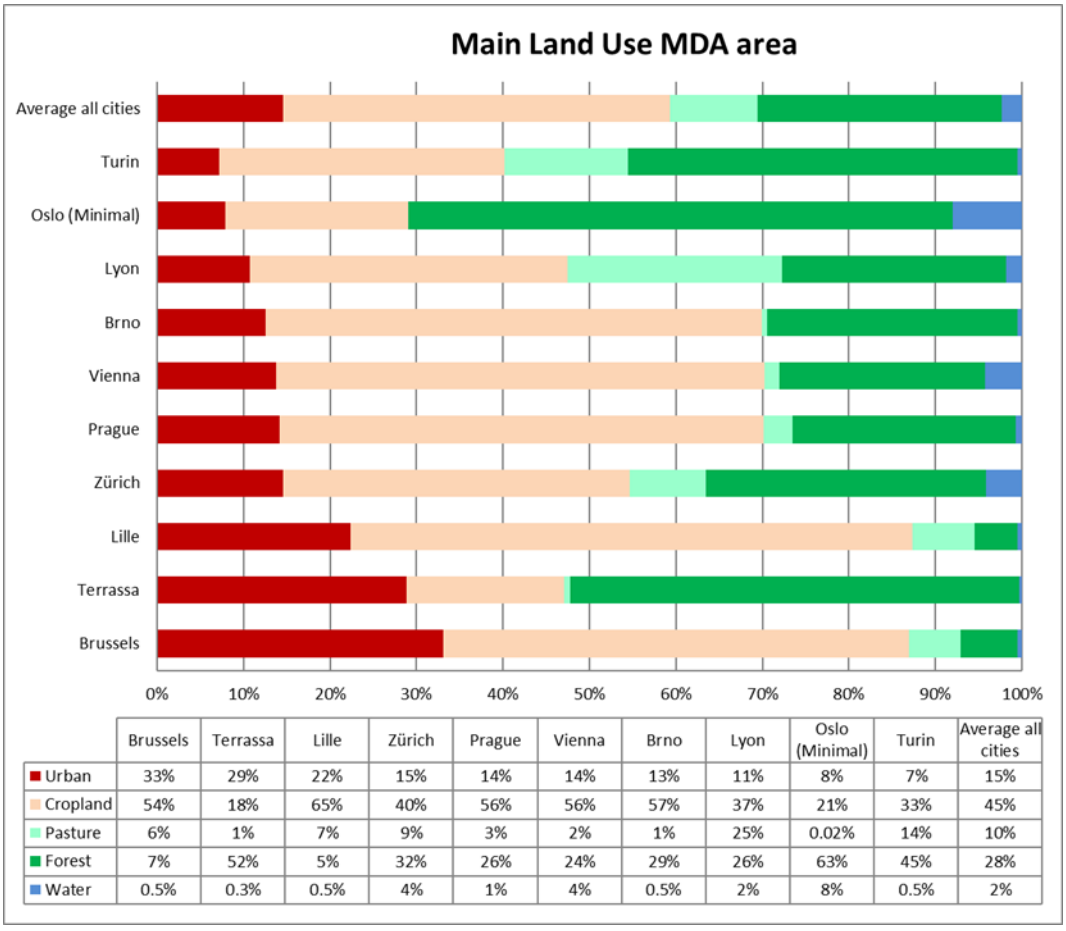
4.3.1 Trends in land use change

The overview of the land use change based on CORINE land cover data for 2012 shows the proportion of the area used for water, forests, agriculture and urbanized areas (in red) (see figure 3.1 for MDA and Annex 3, Chapter 1 for FUA and MUA).

No significant differences were found in the distribution of different land uses between the FUAs and the MDAs, while the MUAs are highly urbanized in all stakeholder areas. On average, urbanized areas account for 10% of the territory of the MDAs, with the highest degree of urbanization (intensification of urban functions) in Brussels, Lille and Terrassa and the lowest in Oslo & Akershus, Turin and Lyon. However, this degree of urbanization is relative as the sizes of the MDAs differ significantly between the stakeholders.

The highest proportions of urbanized areas at the FUA scale are in Brussels (29.8 %) and Terrassa (21.9%) and the lowest in Oslo, (4.4%), Brno (9.8%) and Vienna (10.1%). There is a gradual decrease in the proportion of land used for urban functions from the MUA to the MDA, while in many of the stakeholder areas the MDA is larger than or overlaps with the FUA.

Figure 4.1 Land use categorization at the level of the MDA per stakeholder area (%)



	Brussels	Terrassa	Lille	Zürich	Prague	Vienna	Brno	Lyon	Oslo (Minimal)	Turin	Average all cities
Urban	33%	29%	22%	15%	14%	14%	13%	11%	8%	7%	15%
Cropland	54%	18%	65%	40%	56%	56%	57%	37%	21%	33%	45%
Pasture	6%	1%	7%	9%	3%	2%	1%	25%	0.02%	14%	10%
Forest	7%	52%	5%	32%	26%	24%	29%	26%	63%	45%	28%
Water	0.5%	0.3%	0.5%	4%	1%	4%	0.5%	2%	8%	0.5%	2%

Source: Corine land cover

4.3.2 Urban sprawl and densification

The degree of urbanization has been assessed based on mapping the night light intensity increase in the MUA, FUA and MDA. The urbanization patterns indicate both the ongoing urban sprawl (urbanization of new open spaces) and the densification of urban functions (intensified urbanization within the current urbanized areas).

The data used is based on time series of maximum night light values in 1992, 1994-2000, 2002-2006, 2008-2012, summarized per LAU2 unit. In combination with the CORINE land cover data and the new EC/JRC GHS built-up grid with multi temporal information on the built-up presence from 1975 to 2014 (Pesaresi et al. 2015), the actual land use for urbanization can be illustrated. Based on both indicators, comprehensive maps have been developed per stakeholder area (see Annex 3). These maps review the extent to which urban sprawl has been taking place within the MDA, FUA and MUA, which in turn allows evaluation of whether the delineated MDA corresponds to the actual urbanization trend.

The comparative analysis across the areas presents distinctive observations (see figure 3.2 and Annex 3, Chapter 2).

Within the MDAs of Lille and Terrassa there is a slight increase in light intensity (= proxy for land use intensity) due to the fact that these areas have densely populated core urban areas with intensified urban land use which is not expanding towards new rural areas.

The MDA of Brussels can be characterized by a stagnant pattern in terms of urban sprawl, which can be explained, by the already strongly urbanized pattern of the area over a longer period. The urbanization patterns in Brussels are characterized by intensification and redistribution of urban functions between the core urban area and the suburbs rather than by a significant urban sprawl into new undeveloped areas in its suburbia and the periphery. Therefore, urbanisation is an important factor currently present in the MDA of Brussels.

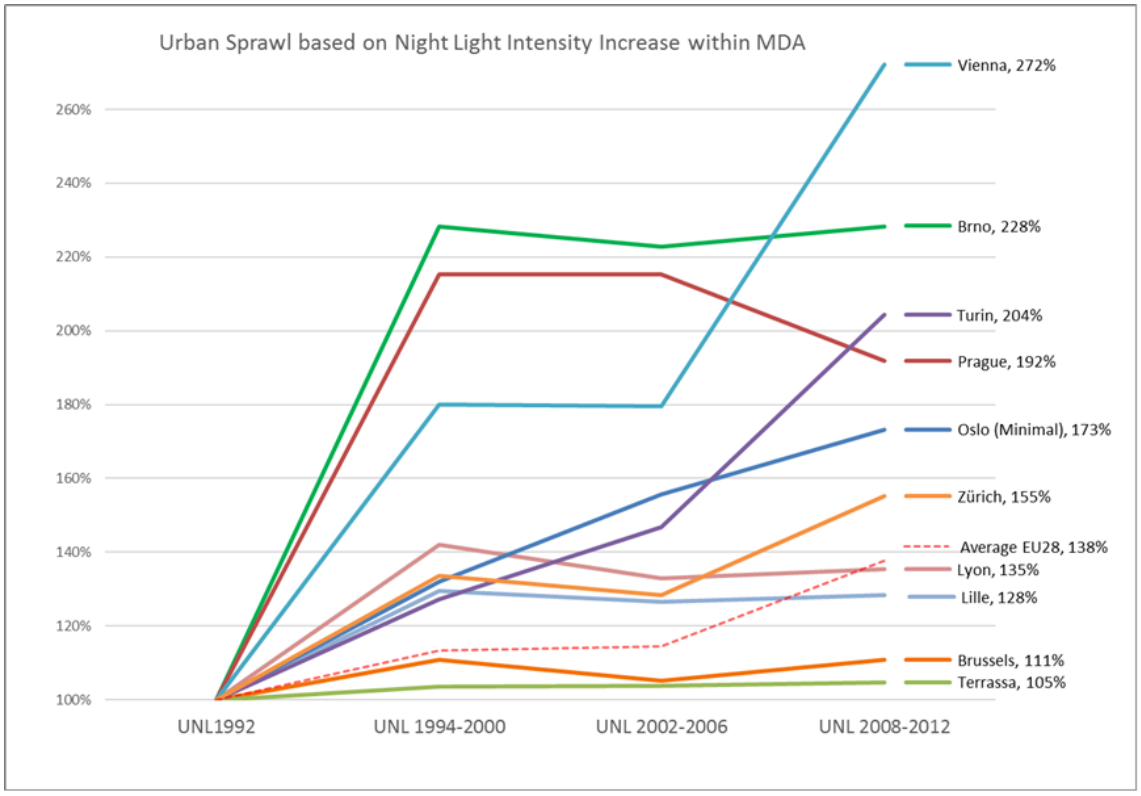
In contrast, Prague, Brno and Turin show a vast increase in urban sprawl towards suburban areas. However, there are differences within the different spatial scales. In Prague and Brno the sprawl is linked to the city itself (monocentral). Turin shows a clearer overall increase of light intensity in the Po area.

For Lyon and Vienna the sprawl is (also) extending towards the satellite towns and villages, which are expanding into the rural areas (polycentric). The large area of Lyon shows low urban sprawl on average, which is explained by its size and the presence of undeveloped areas.

This pattern is also visible in the densely populated, Central Plateau region of Switzerland ("Schweizer Mittelland"). [1] As a result Zürich MDA shows an average increase in urbanization patterns. The region of Oslo & Akershus has considerable urban sprawl, directly bordering the city of Oslo and the surrounding area, Oslo-fjord, which is not part of the MDA. There is a sharp border with other parts of the MDA where there is no urban expansion.

[1] There is no CORINE land cover data for Zürich and Oslo for 1990, but the EC/JRC GHS built-up presence (1975-2014) is available to show urban sprawl patterns (Pesaresi et al. 2015).

Figure 4.2 Urban sprawl based on night light intensity increase in the MDA



Source: CORINE land cover & EC/JRC GHS from 1975 to 2014

4.3.3 Population dynamics

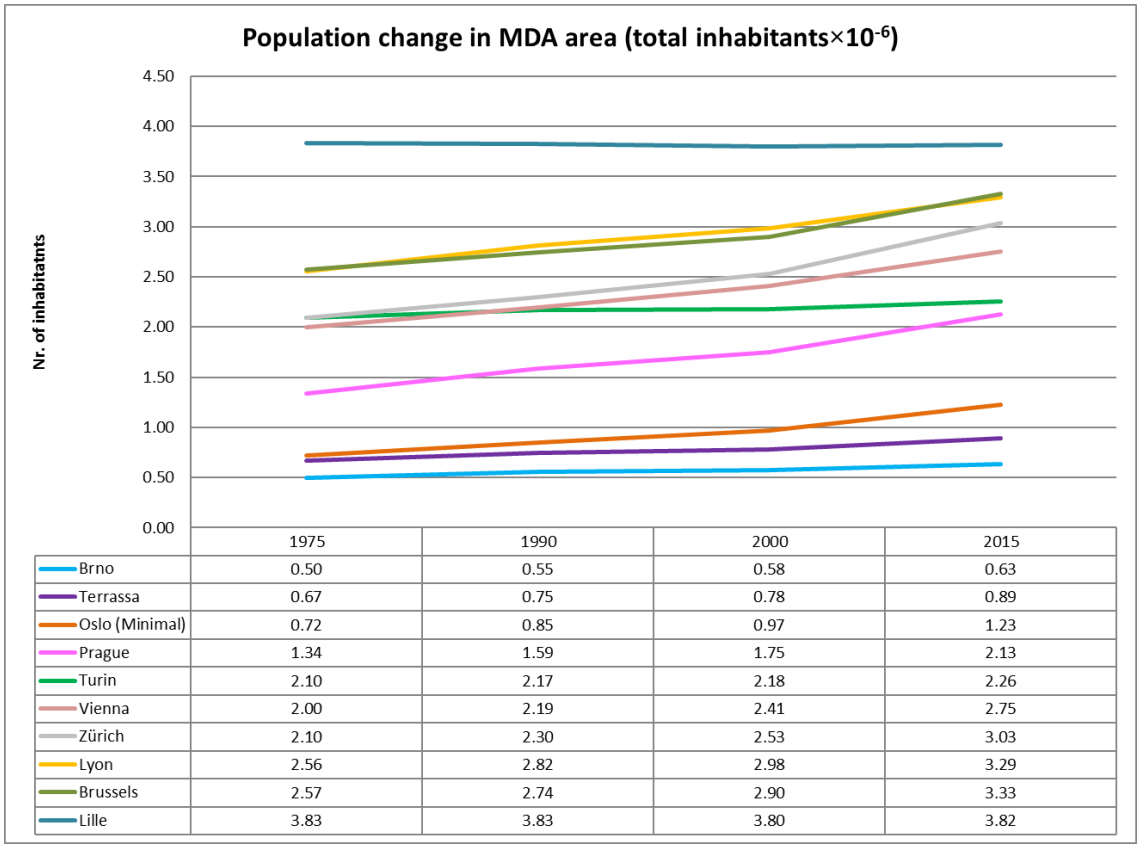
The overview of population indicators is provided per 1 km^2 (for MDA see figures 3.3-3.6 and for FUA and MUA see Annex 3, Chapter 1). The data has been extracted from the Global Human Settlement (GHS) framework (EC et al. 2015) as high resolution raster data (250x250m) and checked for consistency with EUROSTAT population statistics at the LAU2-EN km^2 level[2]. The data is homogenized and aggregated at the level of the MDAs, based on population numbers between 1975 and 2011.

The results show comparable increases in population sizes between the areas, although Lille, Turin and Brno stayed relatively stable over time. The most significant population growth in absolute numbers was measured in Brussels, Vienna, Zurich, Oslo & Akershus, Lyon and Prague. The biggest cities showed the most significant growth over time. However, from a relative perspective the smallest city, Terrassa, showed the largest increase (+33%).

At the same time, more recent data from the stakeholders indicate patterns of fragmented and unbalanced population distribution between the core cities and suburban areas that suggest a process of suburbanization. This is the case in Prague, where at the MDA scale the population increased by 55%, while at the level of MUA the population increased by 41%. But the opposite is seen in Brussels, where the MUA is growing faster in population (+55%) than the wider MDA (+29%), which suggests a densification of the core city, in line with the results showed for urban sprawl (1.3.2). In some cases, such as in Lille and Turin, the data indicates a slight population decrease within the urban core.

[2] Since 2011 Eurostat has changed its definition of population to include asylum seekers. In some cites e.g. Brussels the increase in population growth is influenced by the inclusion of this additional group. (http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_grids).

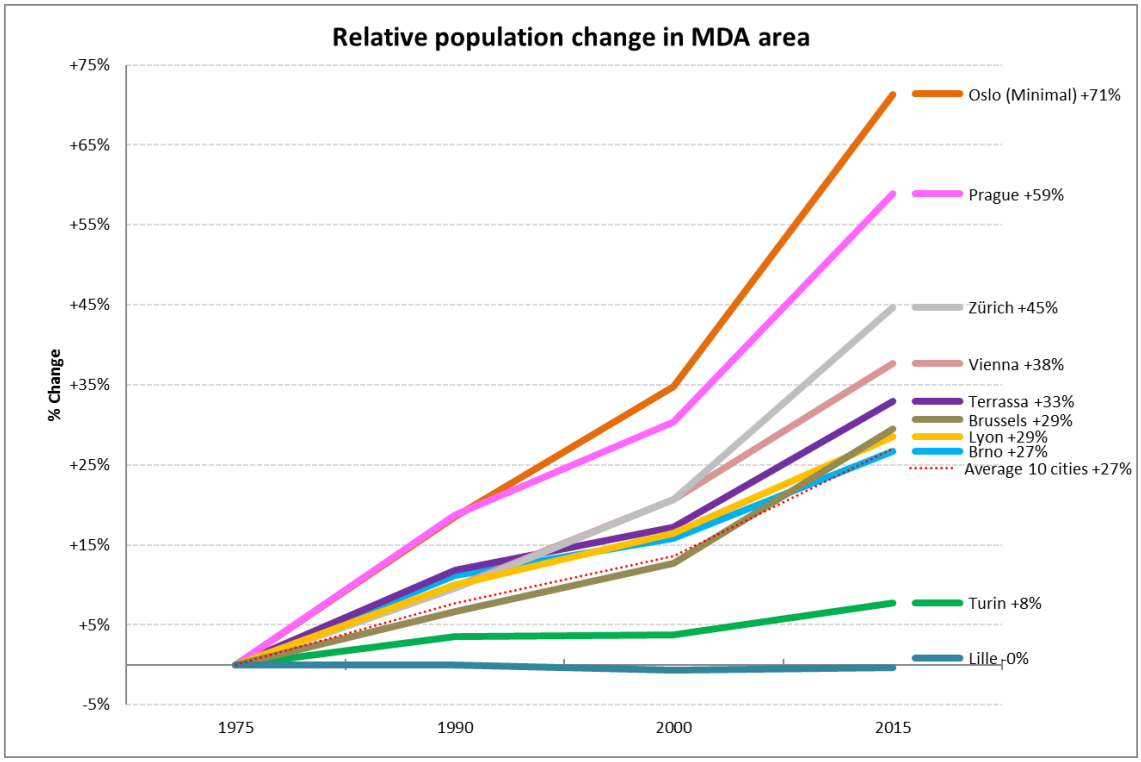
Figure 4.3 Comparative overview of population change in the MDA in 1975-2015



	1975	1990	2000	2015
Brno	0.50	0.55	0.58	0.63
Terrassa	0.67	0.75	0.78	0.89
Oslo (Minimal)	0.72	0.85	0.97	1.23
Prague	1.34	1.59	1.75	2.13
Turin	2.10	2.17	2.18	2.26
Vienna	2.00	2.19	2.41	2.75
Zürich	2.10	2.30	2.53	3.03
Lyon	2.56	2.82	2.98	3.29
Brussels	2.57	2.74	2.90	3.33
Lille	3.83	3.83	3.80	3.82

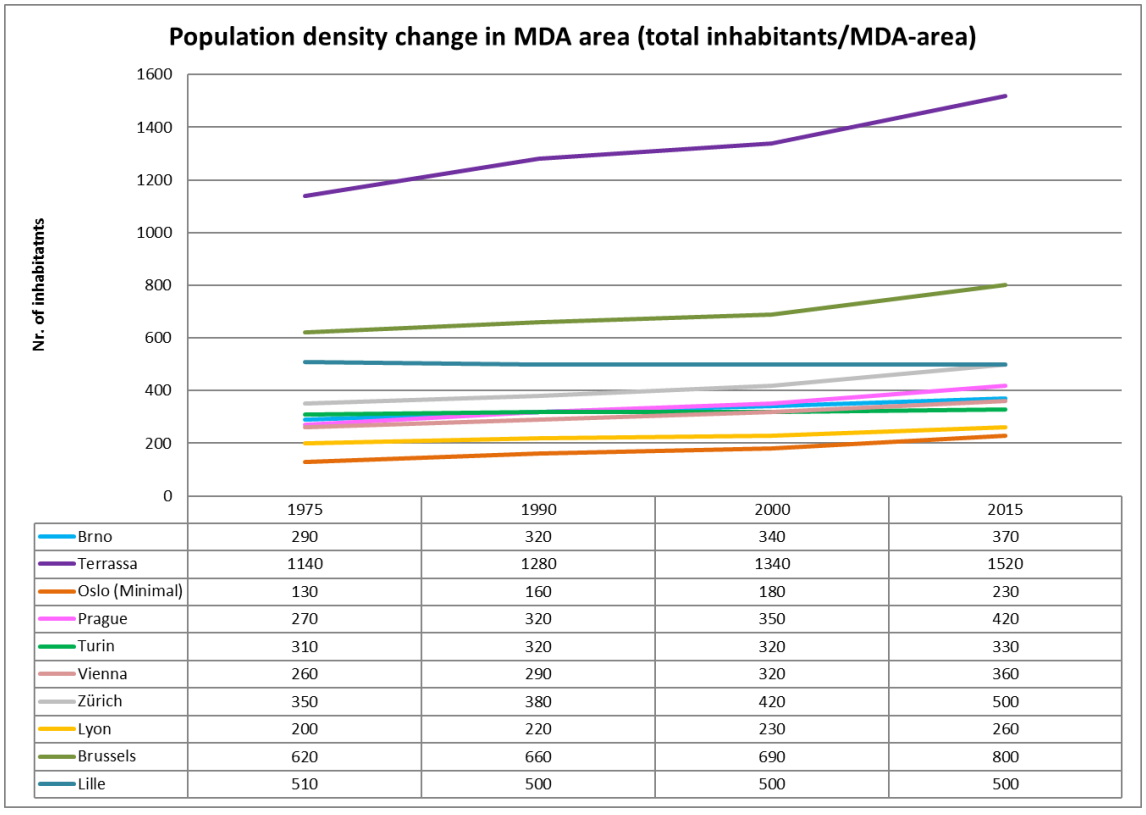
Source: EC et al. 2015

Figure 4.4 Comparative overview of relative population change in the MDA in 1975-2015 (%)



Source: EC et al. 2015

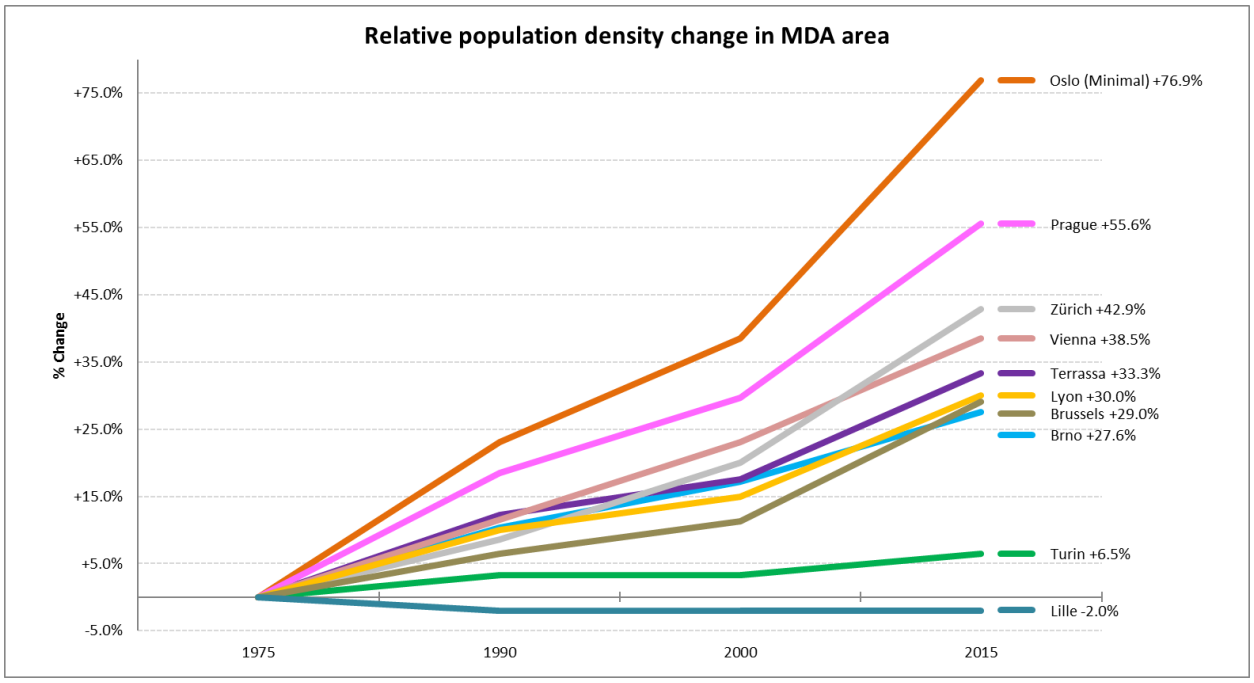
Figure 4.5 Comparative overview of population density change in the MDA of the stakeholder areas 1975-2015



	1975	1990	2000	2015
Brno	290	320	340	370
Terrassa	1140	1280	1340	1520
Oslo (Minimal)	130	160	180	230
Prague	270	320	350	420
Turin	310	320	320	330
Vienna	260	290	320	360
Zürich	350	380	420	500
Lyon	200	220	230	260
Brussels	620	660	690	800
Lille	510	500	500	500

Source: EC et al. 2015

Figure 4.6 Comparative overview of relative population density in the MDA of the stakeholder areas 1975-2015 (%)



Source: EC et al. 2015

4.3.4 GDP change

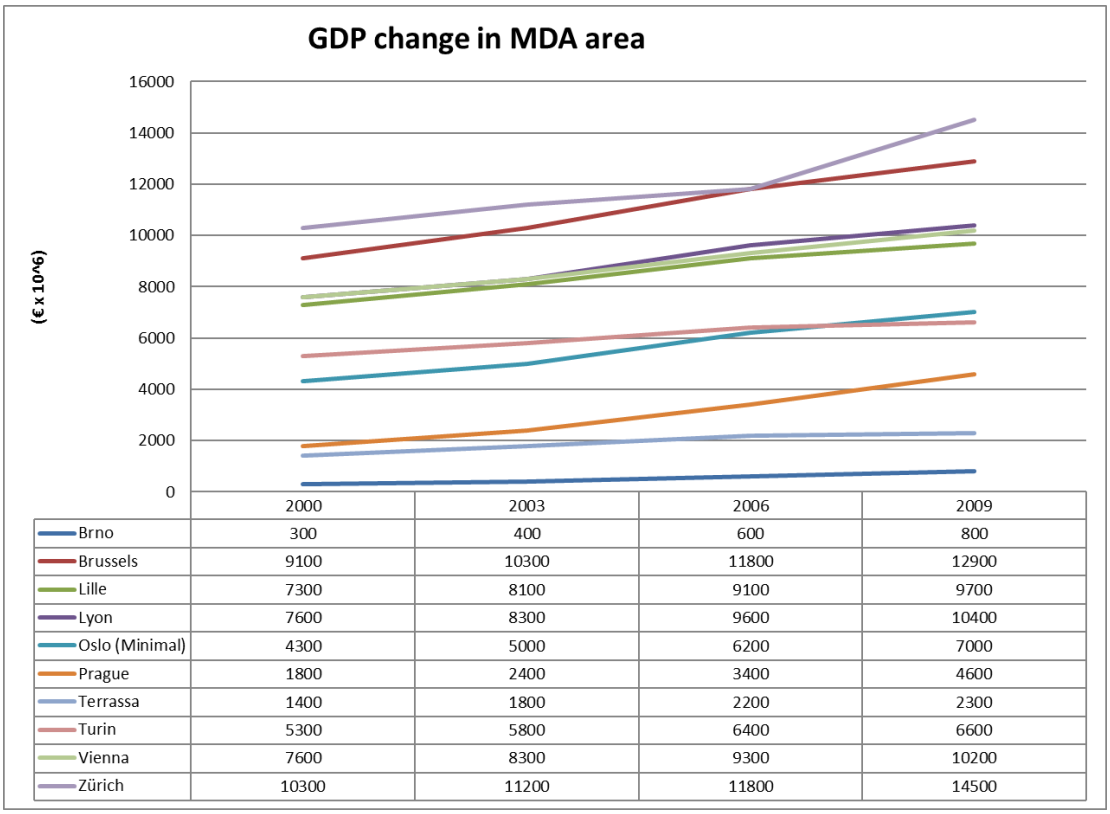
The GDP data used to make the comparative assessment across the stakeholder areas has been updated up to 2009 (ESPON OLAP-CUBE-v6 and Milego et al. 2014). Although the important data from the economic crisis and subsequent years is not available at the LAU2 level, this data is useful to illustrate some key trends (see figures 3.7-3.8 for MDA and figures in Annex 3 for FUA and MUA).

Between 2000 and 2009, all stakeholder areas showed an increase in GDP[3], ranging from +24.8% in Turin to +160% for Prague. It can clearly be seen that there were relatively big increases in Eastern European cities in this period as reflected by both Brno and Prague. The larger metropolitan areas do not show a bigger change in the GDP than the ones with a smaller absolute GDP, namely Brno, Prague and Terrassa.

Comparable GDP changes can be observed in the MUA and the FUA as well as in the MDA, and there are no significance differences between these different types of delineations. In absolute terms, the MUAs show a lower average GDP than their surrounding FUAs and the MDAs. This can be explained by the observed higher proportion of lower income groups inside the urban core cities.

[3] GDP is based on current prices including inflation and not on constant prices.

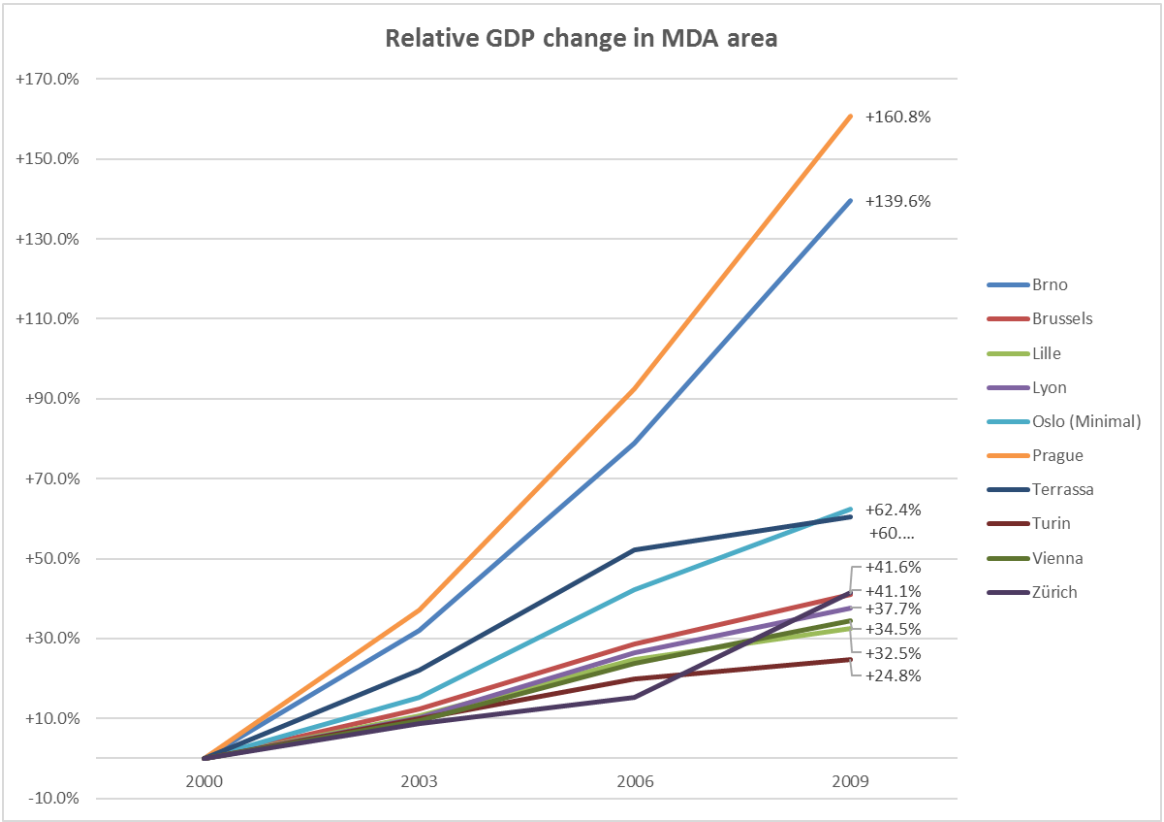
Figure 4.7 *Change in GDP in the MDA of the stakeholder areas*



	2000	2003	2006	2009
Brno	300	400	600	800
Brussels	9100	10300	11800	12900
Lille	7300	8100	9100	9700
Lyon	7600	8300	9600	10400
Oslo (Minimal)	4300	5000	6200	7000
Prague	1800	2400	3400	4600
Terrassa	1400	1800	2200	2300
Turin	5300	5800	6400	6600
Vienna	7600	8300	9300	10200
Zürich	10300	11200	11800	14500

Source: ESPON OLAP-CUBE-v6, 2000-2009

Figure 4.8 *Relative GDP change in the MDA of the stakeholder areas*



Source: ESPON OLAP-CUBE-v6, 2000-2009

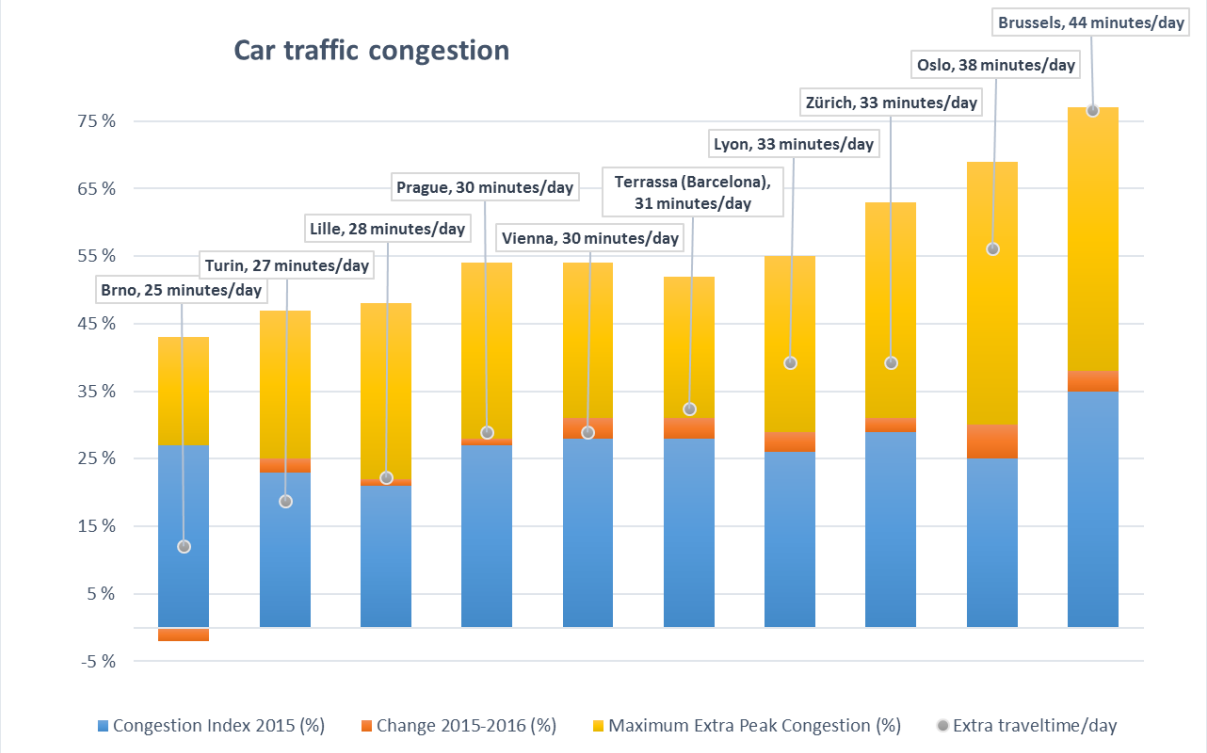
4.3.5 Mobility and accessibility

The analysis of the accessibility indicators is based on mapping the travel time to each inner city (see Annex 3). The maps are developed based on the MDA delineation and show the relationship between travel distances and travel time by car between the periphery and the core city in each stakeholder area. Synchronized commuting data was acquired from Eurostat for this assessment as well but the data was not available.

Figure 3.9 illustrates that congestion patterns are very noticeable within the metropolitan areas. In general, the daily extra travel time is estimated at about 30 minutes, except in Oslo & Akershus and Brussels where this time is 38 minutes and 44 minutes respectively.

For the current assessment, there was no synchronized data available to map public transport patterns as well. As shown by the ESPON TRACC project (ESPON & Spiekermann & Wegener,Urban and Regional Research (S&W), (2015)), for the calculation of public transport patterns detailed and synchronized data is needed about train and bus stops at the European level. Data and conclusions about the relationship between accessibility calculated at the regional level and that calculated at the European scale are very weak, meaning that a region that has low accessibility in the national context does not necessarily have low accessibility from a European perspective (ESPON & S&W, 2015). In order to make a reasonably accurate calculation at the metropolitan level, up-to-date data covering the running of the rail network and bus infrastructure schedules during the week and year are required for meaningful statistics. Although each of the stakeholder areas is able to provide basic numbers for their public transport systems (numbers of people transported etc), scaling it up to provide spatial figures within each specific delineation (MUA, FUA, MDA) is a rather complex process. Since the ESPON TRACC project also made clear that there is a high correlation between road and rail accessibility, especially around metropolitan areas, only accessibility by car is given.

Figure 4.9 TomTom Car Traffic Congestion Index 2015-2016, peak congestion and extra travel time; extracted for the 10 inner city areas



Source: https://www.tomtom.com/en_gb/trafficindex/

4.3.6 Environment and natural landscapes

To assess the environmental factors within the metropolitan areas two indicators were choose, namely protected areas and air pollution by fine particles.

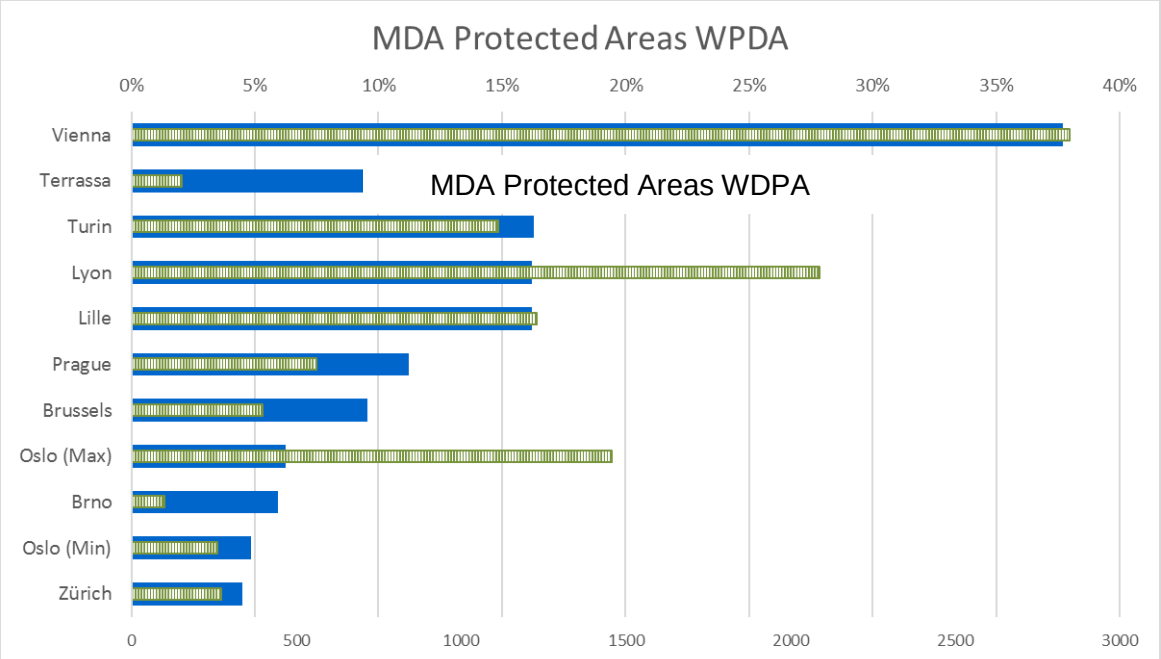
The assessment of the extent of protected nature areas across the stakeholder MDAs indicates that both Terrassa and Vienna stand out. The larger MUAs (Vienna, Lyon, Lille) have higher values of natural landscapes and protected areas in absolute and relative terms.

In Terrassa, the protected nature areas that are part of the MDA are the Serra de Collserola National Park which is located between Terrassa and the Metropole of Barcelona, including the Sant Llorenç del Munt i l'Obac, a Special Protection Area (Birds Directive), which is also part of their MUA.

In Vienna MDA, much of the protected landscape is accounted for by the Wienerwald ('Vienna Forest'), stretching into the MDA and in the south to the Neusiedler See which is Europe's biggest steppe lake, with pristine mixed woodlands, chalk grasslands and wetlands.

In Oslo, Brno, Brussels and Zürich only 10% of the area is protected landscape. When the maximum delineation of the MDA is used for Oslo & Akershus the situation becomes different (see figure 3.10), showing that the maximum delineation is very much related to natural features rather than anthropogenic metropolitan land use.

Figure 4.10 Percentage of the MDA with a protected status



	Zürich	Oslo (Min)	Brno	Oslo (Max)	Brussels	Prague	Lille	Lyon	Turin	Terrassa	Vienna
% of MDA	5%	5%	6%	6%	10%	11%	16%	16%	16%	26%	38%
KM2	274	260	102	1456	399	563	1230	2087	1114	152	2848

Source: World Data on Protected Areas (WDPA) & International Union for Conservation of Nature (IUCN) (2017)

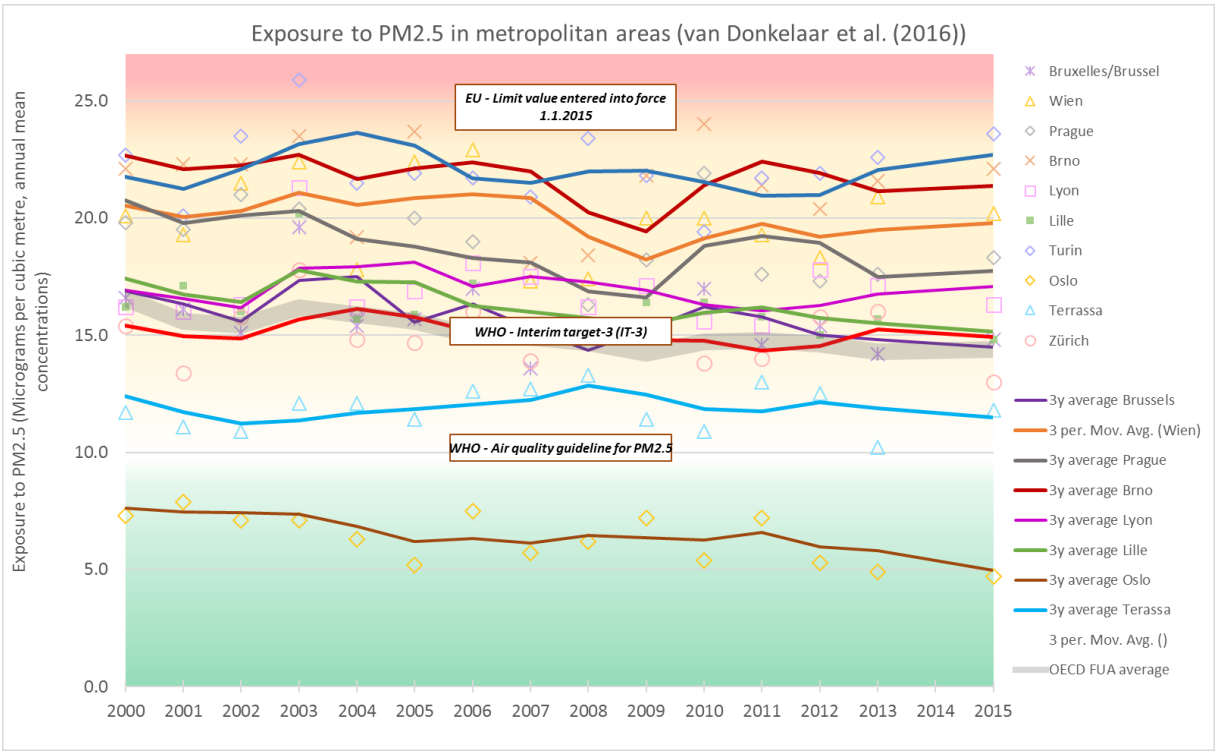
In terms of key environmental indicators, air pollution was taken as an indicator that shows environmental trends in the stakeholder areas. Air pollution is one of the most severe environmental and health issues in the metropolitan areas.

According to the WHO, ambient fine particles matter (PM 2.5) concentrations contribute significantly to global diseases in metropolitan areas. Exposure to fine particulate matter (PM2.5) has potentially the most significant adverse effects on health compared to other pollutants (Donkelaar et al. 2016).

The OECD PM 2.5 concentration estimates shown here (Figure 3.11) are based on calculations by Van Donkelaar et al. (2016). They have been derived using satellite observations and a chemical transport model, calibrated to global ground-based measurements at 0.01° resolution. Data at OECD-stat is aggregated at the level of the OECD-EC-FUA. Since original data by van Donkelaar et al. is calculated at 0.01° resolution (~1km2), very small deviations with respect to other aggregations (ESPON-FUA, MDA) are possible. The assessment of the PM2.5 indicates that on average all cities comply with the EU PM2.5 concentration threshold as of 1/1/2015 (http://ec.europa.eu/environment-/air/quality/standards.htm).

However it also indicates that the majority of the areas fail to reach the air quality standard according to the threshold set by the WHO, only Terrassa and Oslo are below that limit. Since these numbers are aggregated at (OECD) FUA level, it is expected that the values in the more densely populated MUA and inner city areas will locally be (much) higher than shown in figure 3.11.

Figure 4.11 Exposure to PM2.5 in metropolitan areas



Source: van Donkelaar et al. (2016) as available from OECD.stat. aggregated at the OECD FUA level

4.4 Discussion

The analysis of the key socio-economic trends of the ten stakeholder areas presents valuable findings about the key driving forces behind the metropolitan development in these areas. The spatial breakdown of the data per indicator for different trends at the level of the MDA, FUA and MUA (based on aggregation at the LAU2 scale) allows observations to be made at different scales of the individual metropolitan areas and across the areas.

Compared to previous studies, this type of analysis brings a number of benefits in the understanding of the metropolitan development across multiple European cities. The differences in development trends between the MDA, FUA and MUA levels indicate the extent of the scale of metropolitization, which is needed for identifying the policy interventions at the different scales and with regard to different spatial developments. The key findings of this analysis show that the consideration of the relevant scale for planning should be supported by additional data and knowledge about the differences in trends between the MUA, FUA and

MDA. Moreover, as soon as additional synchronized data becomes available at the LAU2 level, such an analysis can be extended to other relevant indicators.

4.5 Conclusions

The assessment of key trends in the ten stakeholder areas provides an insight into the key spatial developments and socio-economic trends as driving forces behind the emergence of the metropolitan areas. The key findings of the trend assessments show the importance of using evidence from data in these key trends for identifying the most relevant scale of planning based on the differences in trends between the MUA, FUA and MDA. Key conclusions derived from this assessment include:

- All the stakeholders defined MDA's from a functional approach focusing on the planning perspective in their stakeholder areas. Therefore, the presented key trends show whether this MDA planning perspectives is complementary with key developments in the selected MDA area.
- Since delineation of the MDA is independent from neighbouring metropolitan areas, existing commuting patterns and/or population density numbers (compared to the way Functional Urban Areas are defined), statistics and trends are not distorted by such predefined thresholds.
- The variations in size and extent in the number of LAU2 units within an MDA show different patters between the stakeholder areas. For Land use, Population, GPD and the amount of protected nature areas, size and number of municipalities such as between larger and smaller MDA's. However, for each analysed trend, a different set of stakeholder areas is standing out with clear distinctive higher or lower values.
- Economic data (like GDP) is not available at the LAU2 resolution (only spatially disaggregated from NUTS3 (OLAP CUBE)). This makes comparison between FUA, MUA & MDA challenging and complex.
- Urban sprawl and densification is a common pattern in all stakeholder areas and is present within their currently delineated MDAs. However, the urban pattern is spatially very variable within the territories. Often urban sprawl is taking place along infrastructures and more outside the MUA borders. Moreover, the degree of urban sprawl differs over time between the areas. Where e.g. Brussels showed significant expansion patterns mainly before 1990's, in Eastern Europe (Prague and Brno) there is a clear growth pattern visible from 1990 onwards.
- The air quality (PM 2.5) measured within the FUA of the majority of stakeholder areas is above the EU average and the interim threshold set by the WHO. Only two out of the ten areas are below the ultimate WHO air quality guidelines. However, this indicator is much more sensitive with regard to urban core centres where the air pollution is often a prominent trend.

5 Institutional frameworks, planning practices and challenges

5.1 Introduction

This chapter discusses the key findings of the analysis regarding the current challenges, the institutional frameworks and the planning practices of the ten stakeholder metropolitan areas. The chapter provides an overview of the current situation in the cities and draws upon their experiences with ongoing metropolitan developments in the urban and peri-urban areas. Furthermore it reflects on the uniqueness of the key challenges within each stakeholder area and in comparison across the areas, and presents differences and similarities between them.

5.2 Methodology

This part of the analysis was based primarily on qualitative research consisting of a comparative case study analysis. The analysis included two parallel phases of data collection and analysis, namely: 1) descriptive phase: document and data analysis; 2) interview phase: interviews with key actors.

In the descriptive phase, each individual case study area was explored and described in terms of its key characteristics, institutional frameworks, challenges and incentives in metropolitan development. This was based on documents and analysis of data from each stakeholder area and from the available European databases and project studies. A detailed profile document has been elaborated for each stakeholder area (see also section 1.4.4.). The profiles of each area are presented in Annex 3).

The interview phase included semi-structured interviews with key actors in each of the stakeholder areas (see also section 1.4.4). With the help of the questionnaire that had been designed, information was collected on the perceptions and understandings of different groups of actors with regard to the actual planning practices and challenges in the metropolitan development of each area. In total 75 interviews were conducted in the ten stakeholder areas. On average five to seven respondents were interviewed in each area. The respondents represent five key groups of actors: governmental (national, regional, local), research, non-governmental, private parties and politicians.

Based on the elaborated profiles and the analysis of the results of the interviews, an inventory was made of the current metropolitan development challenges within each stakeholder area and across the areas. The specific socio-economic and institutional differences between the countries and the cities were explicitly addressed. The comparative analysis addressed issues such as:

- Present situation: current characteristics, status and identity of the metropolitan areas
- Institutional frameworks: spatial planning systems and governance, strategic, statutory and collaborative arrangements, interaction between levels of government and across policy issues, division of responsibilities and competences
- Key challenges for metropolitan development and governance

5.3 Key findings

5.3.1 Present situation in the metropolitan areas

5.3.1.1 Current characteristics

The ten metropolitan areas have unique characteristics, but have a number of resemblances with regard to the driving forces behind their developments. Most of the areas experience pressure for urban growth outside their core urban area, which fosters metropolitization. Urban growth varies greatly among the cities and depends on the current socio-economic trends in the main cities and in the entire regions. In most of the cities there are areas with intensified urban activities and areas where growth is being encouraged further and/or areas where on the contrary the wish is to restrict growth due to environmental reasons or due to rural developments and agriculture (e.g. Vienna, Turin, Lyon, Lille, Zurich, Oslo-Akerhsus, Brno, Prague). A few of the areas, such as Turin and Terrassa, Vienna, Prague, have post-industrial urban spaces as well being considered for future transformation.

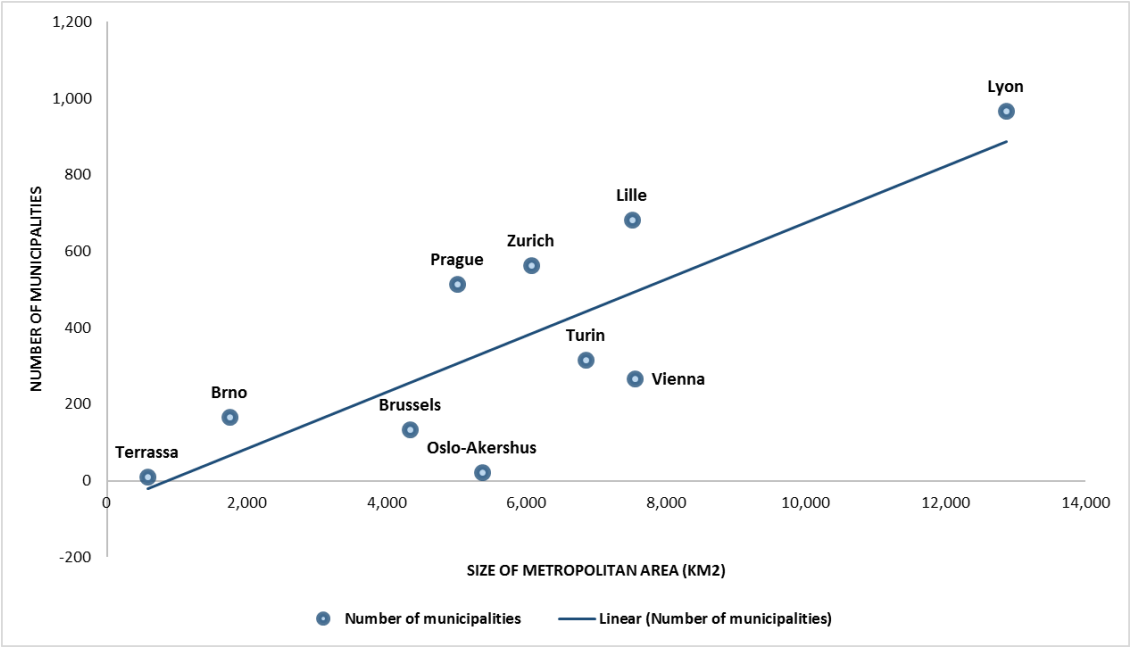
Suburbanization is a common pattern in most of the areas and is determined by a combination of different factors, varying from substantial population growth in Vienna, Zurich, Oslo and Brussels to an intensified re-allocation of businesses and jobs in the suburbs, as in Prague, Brno, Brussels, Lille and Lyon. This process creates different spatial dynamics in the distribution of population and jobs and determines the need for a transport infrastructure that allows greater mobility and accessibility between the core city and its suburbs. In all ten areas the capacity of the current transport infrastructure is to some extent insufficient in meeting these demands.

Metropolitan development does not present a unified spatial structure and the local authorities apply different spatial approaches to address different developments. For example, the formation of specific spatial structures may address different degrees of urbanization, growth and land uses. Specific examples are the metropolitan poles in Lille and Lyon, the homogeneous zones in Turin, and the growth areas or restricted-growth areas in Vienna, Zurich, and Oslo & Akershus.

Among the ten cities, a number of unique characteristics of metropolitan development are found. For example, in Turin the metropolitan development is characterized by population decline in the core urban area and a low degree of suburbanization determined by stagnation in the housing market. At the same time there is a change in the social groups of inhabitants, with an increase in foreign immigrants in the main city and migration of wealthier groups among the local population to the suburbs in search of better quality housing. A similar phenomenon is currently being seen in Vienna. Another example is the uniqueness of Terrassa in being a satellite metropolitan structure within the larger metropolis of Barcelona. It is a distinctive urban agglomeration characterized by the highest population density in the region and has a bridging function between a network of cities within the Barcelona metropolitan area. Another specific feature is represented by Oslo & Akershus and Vienna, which shows that urban development may escape regional borders and spread over two regions.

The sizes of the metropolitan areas as delineated in the project (MDAs) differ greatly among the ten cases, varying from very large areas, such as Lyon, to medium-sized areas, such as Vienna, Prague, Brussels, Turin, Zurich, Oslo & Akershus and Lille, and the relatively small areas of Terrassa and Brno. Considerable variation can be seen with regard to the number of municipalities embedded in the metropolitan areas (figure 5.1). While the biggest area, Lyon, has the highest number of municipalities, some much smaller metropolitan areas, such as Lille, Zurich and Prague, still have a relatively large number of municipalities, while Oslo has few municipalities in a relatively large territory. This indicates the patchiness of the local administrative units of the different metropolitan areas and the different territorial scope and number of administrative units to be considered in the planning processes. The greater the number of the municipalities, however, the greater the need for a coordinated spatial planning approach.

Figure 5.1: Relation between the size of the MDAs and the number of municipalities



Source: authors, based on delineation of the MDA

5.3.1.2 Understanding the status and identity of the metropolitan areas

This part of the analysis provides an understanding on the current status and the identity of the stakeholders' metropolitan areas. The results of the comparative analysis show a variety of approaches used to define the status of the areas, including a formal, semi-formal and informal status (table 5.1). The definition of the formalization status used by the project is presented in box 3.

Box 3 Definition of the formalization status of the metropolitan area based on SPIMA cases

- *Formal status:* this status implies a formal metropolitan area based on legislation by a higher level of government such as national/federal or regional level. The legal provisions may include obligations for developing metropolitan strategic or spatial plans. It can as well define what the metropolitan area is.
- *Semi-formal status:* This status implies a form of agreement that has been achieved between a numbers of relevant actors to carry a metropolitan planning process. Such an agreements may be based on formalized commitments for collaboration, but do not assign a legally based jurisdictions for planning at metropolitan scale.
- *Informal status:* This status implies an informal form of collaboration and coordination between the pubic authorisers and other relevant actors. This process has a voluntary character aiming at reaching commitment of actors, and does not imply formal intervention in the planning processes. Actors engaged in such collaborative arrangements however may be involved in carrying broad consultation and negotiations to implement metropolitan planning strategies and plans and launch metropolitan development initiatives.

Three of the areas have a *formal status*, i.e. Turin, Lyon and Lille. The formal status is determined by national or regional regulations.

The existing national legislation on metropolitan areas (e.g. in Turin), provides a general framework for the formal status, delineation and jurisdictions for the metropolitan areas. However, the development of the specific strategies and plans about how the metropolitan area should be managed is a competence of the regional authorities. The formalization of the metropolitan areas by national/federal regulations therefore may serve only as a guiding framework, while implementation is the responsibility of the lower levels of government. Some of the legal provisions may explicitly assign a competent metropolitan authority, as in the case of Turin.

The status of the metropolitan areas of Zurich and Brussels can be defined as a *semi-formal* status. The semi-formal status is based on agreements signed between administrative bodies

(cantons, regions, municipalities) about an entire metropolitan area. Such agreements can be stimulated by a higher level of government or be an initiative of the regions. In the case of Zurich a federal spatial development strategy provides a basis for the formation of inter-cantonal strategies and agreements, e.g. the establishment of the METRO-ROK-ZH joint strategic plan. The example of a semi-formal status in Brussels shows an effort by the three federal regions (i.e. Brussels, Wallonia and Flanders) to form a "*Metropolitan community of Brussels"*. The operation of such a community will be based on a formally agreed framework of priority actions to be implemented by the three regions. This agreement and its specific context is currently under negotiation.

Another example of a possible formalization of metropolitan areas is found in the two French cities Lille and Lyon. These examples show a unique policy scheme for coherent territorial development of metropolitan centres. It implies the formation of a complex governance structure for strategic territorial planning (e.g. strategic plans: SCOTs and inter-SCOTs). This process is accompanied by the establishment of formal metropolitan bodies responsible for the development of these plans. The benefits of this process lie in enhancing coordination efforts among a large number of municipalities embedded in inter-municipal clusters.

Meanwhile, areas such as Vienna, Prague, Brno, Oslo-Akershus and Terrassa are examples of a number of informal supplementary options in how metropolitan areas can be defined and managed. These options vary between ad hoc collaborative arrangements, project-based initiatives and spatial planning concepts that aim to support coordination on metropolitan developments between regions and municipalities. In Vienna an inter-regional agglomeration (i.e. Stadtregion+) has been formed based on a functional zoning plan. This plan has a guiding role in discussing the strategic developments in the area, however is not based on formally agreed institutional collaboration or implementation actions. In Prague and Brno, the informal status of the metropolitan areas has been defined with the support of project-based initiatives such as the Integrated Territorial Investments (ITI) projects. These projects supported the formation of temporary management bodies that assisted the development of metropolitan development strategies. In the case of Oslo-Akershus, the functional relations between regions and municipalities were discussed based on informal initiatives by the regions, and then put on the agenda for a strategic metropolitan development area. Terrassa represents another kind of informal status for a metropolitan area, which is focused on establishing specific collaborative initiatives between clusters of municipalities without an overarching strategy or established collaboration body.

The examples of the stakeholder areas indicate that the formalization of the metropolitan areas is not in itself sufficient to fully implement a metropolitan planning approach in practice. Whether a formal, semi-formal or informal status has been assigned to the areas, t the local authorities still lag behind in the implementation of a metropolitan planning approach. Key reasons for this are the lack of clearly defined local policy objectives on metropolitan development, suitable planning tools, administrative capacity or financial resources.

Table 5.1 Current status of the metropolitan areas (based on respondents and document analysis)

Stakeholder area	Status of the metropolitan area	Key characteristic
Vienna	Informal	Spatial configuration based on functional zoning with flexible borders (Stadtregion+)
Zurich	Semi-formal	Semi-formal administrative area agreed upon in a national spatial strategy (not by law) (METRO-ROC-ZH)
Prague	Informal	Ad-hoc collaboration process (project-based ITI)
Brussels	Semi-formal	Undergoing endorsement of an inter-regional collaboration between Brussels, Flanders and Wallonia for the establishment of the Metropolitan Community of Brussels
Brno	Informal	Ad-hoc collaboration process (project-based ITI)
Oslo & Akershus	Informal	Informal area of strategic collaboration, based on shared strategic vision between local and regional authorities
Turin	Formal	Formal area regulated by national and regional law with a formal MA authority (Città Metropolitana di Torino)
Terrassa	Informal	Informal territorial strategic collaboration
Lille	Formal	Formal territorial establishment regulated by strategic plan embedded in law (ScoT)
Lyon	Formal	Formal territorial establishment between 13 territorial municipal unions regulated by strategic plan (Inter-ScoT)

Source: authors (based on the interviews)

5.3.1.2.1 Perceptions among actors on the status and the scale of the metropolitan areas

The most common understanding on the status of the metropolitan area among respondents is that it should reflect the spatial area of joint coordination efforts between multiple regions and/or municipalities and be based on clear institutional arrangements. While some respondents referred to the indispensable need for formalizing the status of the metropolitan area by a higher governmental authority, others said that well-structured bottom-up informal collaborations may operate more effectively. These perceptions often reflected the suitable status of the areas as the most workable option in the current institutional context.

In addition to the issue of the status, the most *relevant scale* for addressing metropolitan developments was considered. Table 5.2 presents the most relevant scales of planning, as mentioned by the interviewed respondents. The inter-municipal level is the level most frequently addressed as relevant, followed by the regional scale. In addition, inter-regional, multilevel and cross-border scales are also considered as essential. Most of the respondents mentioned more than one level as being relevant. There was no significant difference observed in perceptions between different categories of respondents.

In Vienna, there was a consensus between all respondents that the interregional level of metropolitan development is the most relevant. In Zurich, the respondents from the governmental authorities referred more often to the cross-border and interregional (inter-cantonal) scale, while the respondents from private organizations and NGOs referred as well to the multilevel, regional and inter-municipal levels. In Prague and Vienna there is a consensus among the different respondents that the interregional scale of metropolitan development is the most adequate, followed by the regional scale. In Olso & Akershus, there were no significant differences among the different groups of respondents as most mentioned interregional, inter-municipal and multilevel scales as relevant. In Turin, respondents from governmental organizations mentioned inter-municipal and interregional scales as most important while respondents from the academia and the private sector also mentioned the cross-border scale of metropolitan development as very relevant. In Terrassa governmental actors, referred most often to the need for an inter-municipal scale for addressing metropolitan developments, while actors from private and research organizations also mentioned the regional scale as important. In Lille, all groups of respondents referred to several relevant scales with no significant differences between the types of respondent. The

most frequently mentioned scales were cross-border and regional scales. In Lyon, the inter-municipal scale was mentioned as the most relevant by all groups of respondents while among the governmental authorities respondents referred to cross-border, regional and local scales as well.

Table 5.2: Definition of the scale of metropolitan development by respondents in each stakeholder area (the scales mentioned most frequently are in bold)

Scales	**Vienna**	**Zurich**	**Prague**	**Brussels**	**Brno**	**Oslo & Akershus**	**Turin**	**Terrassa**	**Lille**	**Lyon**
Cross-border		**x**					x		**x**	x
Inter-regional	**x**	**x**	**x**	x		**x**				
Regional		x	x		**x**		**x**	**x**	**x**	x
Inter-municipal	x	x			x	x	**x**	**x**	x	**x**
Local (municipal)								x		x
Multilevel (cooperation between municipal, regional and national sector authorities)		x			x	x	x		x	

Source: authors (based on interviews)

5.3.2 Institutional frameworks for metropolitan planning

5.3.2.1 Spatial planning systems

The achievement of a balanced metropolitan development is strongly dependent on the countries' spatial planning systems. The spatial planning systems represent the institutional frameworks and organizational structures embedding responsibilities for managing urban development across national, regional and local levels of government (OECD, 2015). In all the stakeholder metropolitan areas, spatial planning processes are steered to a different extent at the national, regional and local levels. The key findings in this regard are as follows:

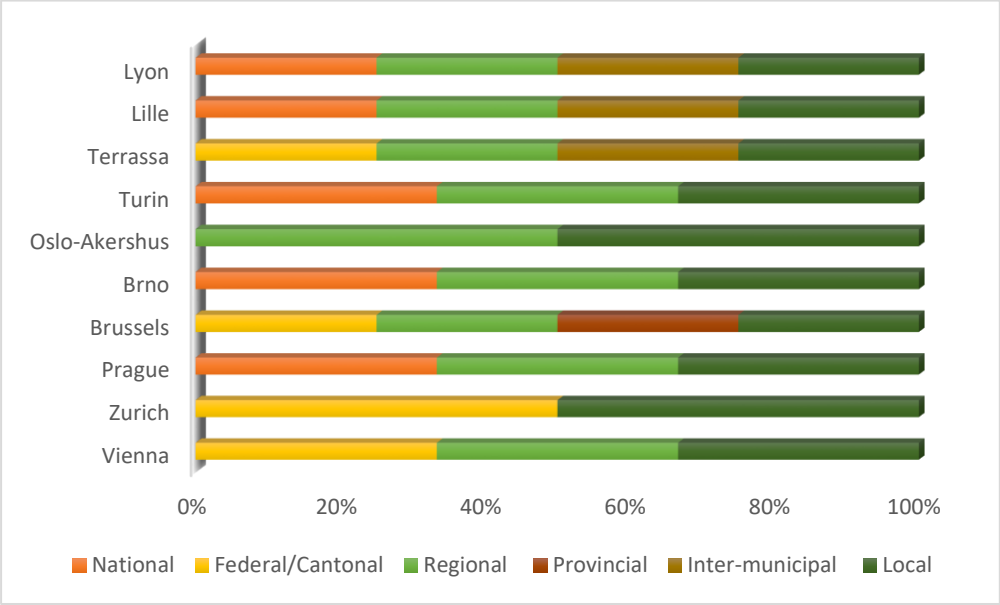
- The spatial planning systems have a direct relation to the development of the metropolitan areas as these embed complex territorial governance models (trilateral) between the national state, the regional (sub-regional) and local authorities. The stakeholder areas represent both a unitary and a federal governance systems with varying degrees of decentralization of spatial planning competences and powers to the regional and local authorities. In most of the cases, however, there is no clear spatial planning framework found at a metropolitan scale, and metropolitan planning is poorly positioned within these governance systems. The management of the metropolitan areas is left to a large degree to the initiative of the regions and the local authorities.
- Generally in all areas there is an interaction between the national, regional and local levels in implementing spatial planning policies and laws. In many cases national governments play a role in planning, but are not directly involved in the planning processes. National governments mostly provide a general direction for spatial development and the "rules of the game" for the lower levels of government. Often the regional and local authorities have rather strong decision-making powers in determining what the actual territory will look like in terms of land use (except for some projects of national importance in the field of energy, transport, nature etc.).
- In the federal states such as Austria, Switzerland, Belgium and Spain, planning is strongly decentralized and devolved to the regional authorities (the sub-national level). Yet in Austria and Switzerland the national governments provide guidance via

national spatial planning strategies or laws. In these countries a metropolitan planning approach is encouraged by the federal states and the regions/cantons.

- In the decentralized unitary states such as Norway, France, the Czech Republic and Italy, the national governments also have a guiding role in planning, including in some cases legislative power. In the Czech Republic, the national government has legislative power via a national planning policy and a spatial planning law which defines the metropolitan areas at the national level. A similar situation is observed in Italy where the national law determines the metropolitan areas and the complement authorities. The regional and local authorities are responsible for the implementation of the national legislation. While the national government in Norway does not have legislative power for planning, it has a role in developing a national concept of territorial planning that stimulates inter-regional cooperation. In France the decentralization of spatial planning was recently induced by a national government regulation, with specific emphasis on the need for a metropolitan scale of strategic and coherent territorial development. In most of the cases, however, there is considerable fragmentation between the three levels of government in implementing spatial plans, as each level may develop separate spatial plans that lack a coherent approach to address metropolitan developments.
- In all cases there is a degree of decentralization and devolution of powers to regions and local authorities in spatial planning. Regional and local administrative structures in charge of spatial planning are directly faced with the challenges of metropolitan development. The decentralization of planning competences, however, is not always accompanied by the necessary administrative capacity to address these challenges in a multifaceted institutional setting.
- Among the different governmental levels, the regional authorities together with a variety of inter-municipal unions and individual municipalities are the most prominent administrative units currently involved in planning initiatives at the metropolitan level.
- In the cases of Turin, Lille and Lyon, formalized metropolitan bodies have been established in compliance with national policies with the aim of coordinating metropolitan developments. These bodies combine regional/provincial and inter-municipal levels of administration.

Figure 5.2 illustrates the current involvement of different governmental levels in metropolitan area planning across the stakeholder areas.

Figure 5.2: Involvement of different administrative levels in metropolitan area planning



Source: authors (based on data from the profiles of the stakeholder areas, Annex I)

5.3.2.2 Strategic planning

Strategic spatial planning is a prominent approach in all stakeholder areas and used to address specific metropolitan developments, particularly at the regional and local levels. There is seldom a comprehensive strategic plan for an agreed upon and clearly defined metropolitan area. Nevertheless, strategic planning initiatives for different metropolitan developments have been taken in all the stakeholder areas. The most common approach to strategic planning is the development of a joint strategic document for a specific part of the metropolitan area or with regard to specific issues. The territorial extent and the thematic scope of these strategies vary greatly depending on the actors involved at the regional and local scales. Based on the experiences of the ten stakeholder areas, several types of strategic plans can be distinguished, including: 1) spatial development concepts or policy frameworks at the national level in the case of Vienna, Prague, Brno, Oslo-Akershus, Lille and Lyon; 2) regional (inter-regional) strategic plans (including cantonal or provincial), present in all ten areas; 3) supra-regional strategies (including intra-regional, inter-cantonal or between a number of municipal unions) such as in Vienna, Zurich, Lille and Lyon; 4) local strategies (including inter-municipal and municipal territorial development strategies) such as in Vienna, Oslo-Akershus, Lille, Lyon, Terrassa, Prague, Brno and Brussels; 5) metropolitan development strategies (approved or in development) such as in Turin, Zurich, Lille and Lyon, Prague and Brno; 6) thematic strategies per sector such as transport development strategies, as present in most areas.

All currently existing strategic plans indicate a certain degree of commitment achieved among different actors and at different administrative levels with regard to the need for a joint vision on metropolitan developments. Currently, however, many of these strategies have not reached the implementation stage as they are not always directly linked to the formal (statutory) process of decision-making for spatial planning. The development of such strategies is a flexible and deliberate process not always regulated by law. The strategic plans in many cases are seen as the first step towards identifying the common benefits for acting upon a comprehensive planning of the metropolitan area. This is particularly so with regard to the establishment of a dialogue between fragmented organizational structures and for reaching joint agreements on specific metropolitan developments.

5.3.2.3 Statutory planning

The statutory planning in most of the cases is implemented through the development of regional spatial plans, master plans or detail municipal land use plans. Often, the statutory spatial plans do not sufficiently address metropolitan developments. The most common categories of plans include regional (including cantonal and provincial), spatial (structure) plans and municipal spatial (structure) plans. There is usually a strong hierarchical relation between the two categories of plans. In some cases such as in Turin, Oslo, Lille and Lyon there are also more specific land use plans at the metropolitan level or inter-regional level.

Many of the land-use plans, however, are still in progress with regard to embedding a metropolitan planning approach that corresponds to the current socio-economic and environmental needs of the areas. In some cases such as in Turin, Terrassa, Brussels, Prague and Brno, the statutory land use planning procedures and laws are outdated and do not always allow an effective integration between different levels of spatial plans. Meanwhile, the regional strategic and structure plans seem in many cases to provide a strong basis for the municipal land use plans. These plans play a role in establishing better coherence between individual municipal plans and therefore in coping with institutional fragmentation in planning (e.g. in Brussels and Turin). Following the subsidiary principle, however, small municipalities still tend to keep their statutory land use plans separate from the regional context of spatial development as their jurisdictions concern their municipal territory only.

5.3.2.4 Perception among actors of the spatial planning practices

The interviewed actors in the metropolitan areas identified 27 key issues regarding the necessary changes and improvements in the current spatial planning practices, including: 1) changes in the legal framework for planning; 2) changes in the cooperation mechanism; and 3) changes in the spatial planning approaches and practices (see Annex 2, table 4.2). Most of the changes indicated relate to the need for cooperation mechanisms and spatial planning approaches. Among these, the need for change most frequently identified was having a better understanding of the territory's spatial dynamics, including limitations on urban growth. Designation of areas for different functions was mentioned as a second priority for improving the spatial planning process. Secondly, the need to improve the coordination of the plans and decisions on spatial developments between the different planning scales (i.e. the region and the municipality) was pointed out by the respondents. In third place, changing the attitudes of planners and other actors was mentioned as something that was much needed by almost all respondents. The fourth most important need for improvement was to consider the socio-economic and environmental impacts of developments on other regions/areas and beyond the borders of the city's master plans.

Per stakeholder area, nine issues were mentioned on average with a minimum of two and a maximum of 14 issues. Most of the respondents across the stakeholder areas said the need for changes in spatial planning practices has been acknowledged. This gives an indication on the significant role of spatial planning processes in addressing metropolitan development. The key findings indicate that:

- According to many of the respondents, spatial planning practices have not yet been adapted to fit a metropolitan scale of spatial development. The spatial configuration of the metropolitan areas has not been clarified in many of the cases. Before a clear spatial planning approach can be established for a metropolitan scale of planning, the possible scenarios for a spatial configuration of the metropolitan area of concern should be formulated. The changes needed most urgently in planning practices are to have an understanding of the territory's spatial dynamics, including the extent of the expected developments, the limitations on urban growth and integration of urban functions. Consideration of the socio-economic and environmental impacts of spatial developments within and between the different spatial scales is seen as essential.
- While in some areas there is a strategic level of spatial planning that addresses metropolitan development, the spatial plans in many of the stakeholder areas have not yet been adapted to fit this scale of planning. This requires deliberate efforts in coordination between the regional and local authorities in achieving coherence between spatial plans.
- The transformation of the traditional spatial planning practices so that they meet the requirements of metropolitan development also needs to include changes in attitudes and understanding among planners and other actors. These attitudes relate to the visionary and proactive role of urban planners, local professionals and even politicians in addressing variety of local interests, while promoting common principles of sustainability, competitiveness and inclusiveness beyond one administrative unit and a single local spatial plan.

5.3.2.5 Collaborative planning

Collaborative planning is one of the most discussed issues in all ten stakeholder areas. While there is not yet an effective collaboration process established for the entire metropolitan area anywhere, there are variety of collaborative initiatives applied in each area. These initiatives most commonly aim to establish collaborative arrangements between fragmented institutional bodies and among a variety of actors (figure 5.3). The most distinctive collaborative initiatives include:

- Collaborative initiatives between institutions and individual actors within the metropolitan area that are engaged in the activities of a specific sectoral policy, i.e. thematic collaborations in the fields of transport, tourism, economic development and

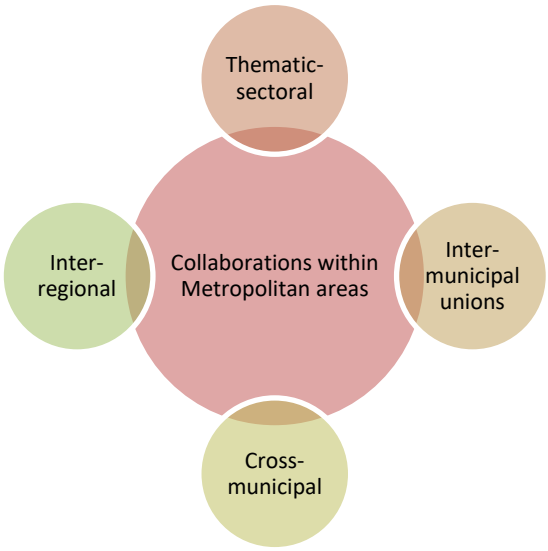
innovation etc. Examples of such collaborations include the associations of transport authorities, associations dedicated to employment and jobs issues, associations dedicated to industries and business, education, tourism etc. or a variety of public networks. These collaborations are found in Vienna, Turin, Oslo, Terrassa, Brussels, Lille, Prague and Brno etc.

- Collaborative initiatives between regional (inter-regional) administrative levels such as between two or more regions, aiming at developing joint visions and strategies for the area. Such a collaboration can be initiated by higher governmental levels or by a specific project initiative at the national and/or EU level (e.g. ITI). This type of collaboration is present in Oslo-Akershus, Brussels, Prague, Brno, Vienna, Brussels and Zurich.
- Collaborative initiatives between groups (unions or establishments) of municipalities that join forces to identify common interests and develop strategic plans. This type of collaboration is prominent in Lille, Lyon, Turin, Terrassa etc.
- Collaborative initiatives between individual municipalities such as are found in Vienna, Prague, Brno, Turin, Terrassa and Lille etc.

In most cases, the status of the collaborations is informal, based on intentional agreements between actors or on specific project-based activities. The existing formal collaborations are based on either a legally registered establishment or on regulations obliging actors to participate in the development of metropolitan strategic plans (e.g. in Turin, Lille and Lyon). Regarding the types of actors involved, the collaborations vary between public, public-private, non-profit and mixed.

Although collaborative planning is considered indispensable for achieving coordinated metropolitan planning processes, the effectiveness of the individual collaborations needs to be enhanced in many of the cases. Yet the collaborative processes are rather fragmented and unsteady in the long term, due to the changing commitments of different actors, whether public or private. Moreover, in many of the cases the collaborative processes are not embedded in the preparation of the regional or municipal spatial plans.

Figure 5.3: Types of collaborations identified within the metropolitan areas



5.3.2.6 Perception among actors of the relevant scale of metropolitan collaboration

The scale of metropolitan collaboration as indicated by different actors varies between the regional, inter-regional and inter-municipal scales. The most relevant scale for establishing a metropolitan collaboration process is considered to be the regional scale (table 5.3). Multilevel and inter-municipal collaboration were also considered as very relevant. Most of the

respondents mentioned more than one scale and prioritized one to two scales as most relevant.

Table 5.3 Scale of collaboration relevant to addressing metropolitan development challenges (the scales mentioned most frequently are in bold)

Scales	**Vienna**	**Zurich**	**Prague**	**Brussels**	**Brno**	**Oslo & Akershus**	**Turin**	**Terrassa**	**Lille**	**Lyon**
Cross-border		**x**					x		**x**	
Inter-regional	**x**	**x**	x	**x**		**x**				
Regional		x	x		**x**		**x**	x	x	x
Inter-municipal	**x**				x	x	**x**		x	**x**
Local (municipal)					x			**x**		
Multilevel (cooperation between municipal, regional and national sector authorities)	x	x			x	x	x		x	

Key findings with regard to the scale of the collaboration:

- Collaboration between a variety of administrative bodies in a given metropolitan area is considered a key to metropolitan governance and planning. Yet there is a high degree of fragmentation between different administrative units responsible for spatial planning. Among actors, there is a wish for a stronger regional performance, meaning that regional authorities should be given more competence and/or a leadership role to perform a coordinating function for more comprehensive metropolitan development.
- The need for inter-regional collaboration reflects the ideas for establishing larger-scale polycentric metropolitan regions where more than one core city and/or region can interact. It is believed that collaboration between more than one regional authority can be effective in identifying urban flows of functions on a larger spatial scale. This is particularly the case concerning issues of transport and the environment.

5.3.3 Shared governance: horizontal and vertical coordination

The analysis of the interaction between the *vertical* (between the levels of government) and *horizontal* (across specialized planning departments) levels of governance in spatial planning reveals complex relationships between the national, regional and local authorities.

These relationships are not based on a systematic approach. This is particularly the case between the regional and local authorities and between the numerous local authorities in the metropolitan areas. Generally, in all stakeholder areas the metropolitan planning approach is either not yet firmly institutionalized and/or not fully embedded in the routine planning practices of the public administration departments. The current institutional structures, and the legal, strategic and collaborative processes, seem insufficient in establishing and maintaining coordinated metropolitan planning. While a number of initiatives have been implemented in the stakeholder areas, these are as yet rather limited and fragmented in terms of their territorial and thematic scope.

With regard to *vertical* coordination, metropolitan planning in most of the cases is positioned between the jurisdictions of existing levels of governance such as: 1) between national, federal and regional levels (e.g. Vienna, Prague, Zurich, Brussels and Oslo); 2) between regional/provincial and local levels (e.g. Brno, Terrassa and Turin); and 3) between several sub-levels such as the regional, inter-municipal and municipal levels (e.g. Lille and Lyon).

In most of the cases, the decentralized spatial planning competences foresee that urban development issues and policies should be addressed as much as possible in a way that is

closer to citizens (subsidiarity principle). In most of the stakeholder areas the empowerment of the local authorities in decision-making about land use planning is seen as both an opportunity and an impediment. There is to some extent a general lack of commitment or even resistance to joint planning initiatives across municipalities or between municipalities and regional authorities.

The *horizontal* coordination is based mostly on informal collaborative planning initiatives between regional or local authorities and other private or public actors. This process is usually initiated at the regional or local level or even between departments of the public administrations. Such a process, however, does not yet imply specific metropolitan reforms in the existing administrative or political structures or in the planning legislation. However, according to the experiences of the stakeholders, enhancing collaborative initiatives at the horizontal level can foster more active participation by different actors across specialized and fragmented departments and agencies and optimize the communication between them.

5.3.3.1 Perception among actors of the need for a metropolitan institutional body

Table 5.4 shows the opinions of the respondents regarding the need for the establishment of a specific institutional body or organization for metropolitan area planning. Half of the respondents supported the idea of an informal metropolitan body, while the other half indicated that a formal institution would be more suitable. Among the different actors interviewed, there is no clear agreement on the need for a single formal or informal institutional body for metropolitan governance. The arguments behind the preference for a formal or informal metropolitan body vary among the stakeholders. Key arguments for an informal collaborative body relate to the current system of decentralized competences, which makes the establishment of a centralized body an inadequate scenario. On the other hand, a formal institutional body is justified by some respondents as a solution for achieving more effective top-down coordination and providing decision-support to the regional and local authorities in dealing with complex metropolitan developments. Evidently, the role and the status of a consolidated metropolitan body may differ according to the local context.

Table 5.4 Need for the establishment of a consolidated MA institutional body as identified by respondents

Stakeholder area	Need for an MA competent body	Formal/informal collaboration	Respondents' arguments
Vienna	Yes	Informal	Need for an operational platform to support collaboration and communication (Stadtregion+)
Zurich	No	Semi-formal	Shared collaboration body (inter-cantonal) among all municipalities and counties based on commitment to implement an inter-regional plan via local land-use plans.
Prague	No	Informal	Formal body is not feasible in the current institutional context. Regional authorities are resistant. Possible options are agglomeration-based council as a consensus-making body. The ITI management body can be used as a basis.
Brussels	No	Semi-formal	Formal body is not feasible and workable in the current institutional context. MA Collaboration Community Agreement between three regions is in development.
Brno	Yes	Informal	Formal body is not yet feasible in the current institutional context. The ITI- management body can be used as a basis.
Oslo & Akershus	No	Informal	Central or formal body is not relevant as the spatial planning responsibilities are decentralized with competences at municipal level.
Turin	Yes	Formal	MA body has been established by replacement of the former provincial authority. The relations between the MA body, the core city administration and the councils needs clarification.
Terrassa	Yes	Formal	Need for an MA planning institution with authority delegated by municipalities e.g. a management centre with experts and budgets but not a typical public administration.
Lille	Yes	Formal	MA is a formal strategy/policy and a collaboration process (agreed by all relevant actors).
Lyon	Yes	Formal	The Metropole of Lyon is a formal, complex body consisting of several units that aims to implement strategic policy and collaboration. In 2020, local elections will include metropolitan elections.

Source: authors (based on results from interviews)

Some of the stakeholder areas already have such bodies established by formal or semi-formal agreements or by law, e.g. Turin, Vienna, Zurich, Lille and Lyon. In Zurich the MA status was formalized as a result of strategic agreements and ot coincides with the latest Swiss spatial development strategy. These bodies differ significantly among the stakeholder areas. In Vienna, these are inter-regional bodies (VOR, PGO) or smaller metropolitan-level cooperation bodies (SUMs). However only a less detailed and easily outdated spatial concept exists and it would need an institutionalized framework for updating and implementation.

In Prague and Brno, a metropolitan management body was established for the implementation of the ITIs projects. These bodies are however of a temporary nature and tied strictly to the ITI time frame. In contrast to the establishment of a formal metropolitan body, the continuation of the ITI management bodies is considered as possibly useful in the case of Prague and Brno.

In Zurich and Oslo/Akershus, respondents did not see a need for a metropolitan body. In the Oslo/Akershus case, this is not considered feasible, as the spatial planning responsibilities are decentralized with key competences given to municipalities. In Zurich, the arguments are related to the fact that cantons have strong decision-making power (e.g. legislative power) and already have an established inter-cantonal body to address metropolitan development.

For Terrassa the need for such a body is feasible in view of its potential coordinating role between municipalities. However, according to the respondents, such a body needs to be first empowered by the municipalities and have delegated functions. It can be seen as a management centre with experts and budgets but not as a typical formal administration.

5.3.4 Key challenges

5.3.4.1 General overview

Understanding the current challenges in metropolitan development is an essential part of the analysis of the ten metropolitan areas. It is primarily based on the perceptions of different actors about what is considered a challenge and why. The local context of spatial development and governance is taken into account.

In Annex 3 (table 4.1), the key challenges facing the stakeholder areas are presented as identified by respondents in the interviews. In total 51 challenges were noted by the respondents. These challenges are categorized into eight categories, namely: 1) demographics; 2) spatial structure; 3) the economy and finances; 4) social welfare; 5) transport infrastructure; 6) the environment; 7) institutions; and 8) culture. Per stakeholder area, 26 issues were mentioned on average with a minimum of 16 and maximum of 35.

Among all the challenges identified, those mentioned most frequently relate to the categories of transport infrastructure, institutional aspects and spatial structure and development (see figure 5.4). More specifically, the top five issues mentioned most frequently by all respondents were: 1) ensuring an efficient transport infrastructure; 2) the need for multilevel collaboration; 3) achieving a shared vision on strategic plans; 4) dealing with traffic congestion; and 5) political reluctance to address issues at the metropolitan scale. These issues are followed by four other key challenges that were rated similarly by the respondents, such as suburbanization, an inefficient spatial planning process, a lack of recognition and identification of the metropolitan development areas and the need to ensure affordable housing within the metropolitan areas.

The largest numbers of challenges were identified in the categories of institutional challenges and in spatial structure and development. However, the respondents in each stakeholder area identified more than 40% of all listed challenges in all categories.

5.3.4.2 Perception among actors of the current challenges

In Vienna, most challenges are in the field of spatial structure and development, related to the management of urban growth and with regard to institutional aspects. In Zurich, most challenges are seen in the institutional aspects and aspects related to spatial structure and

development. In Prague, institutional challenges dominate, followed by the spatial structure and development and quality of life issues. For Brussels, the most important challenges are perceived in the area of institutional collaboration and cultural issues such as linguistic discrepancies between regional communities, but also in dealing with population growth and spatial planning processes. In Brno most of the challenges are in the category of institutional and spatial structure and development. In Oslo-Akershus the key challenges relate to institutional issues, spatial structure and development, transport infrastructure and demographics. Turin respondents were clear about the need to address urban regeneration issues, improve the economic and financial situation, deal with population decline and loss of attractiveness due to stagnation in the housing market and the economy. Turin respondents also pointed to a number of challenges related to social welfare and cultural issues. According to the respondents of the Terrassa metropolitan area, the key challenges are the improvement of the economic situation, dealing with transport infrastructure issues, improving quality of life and solving a number of institutional and cultural issues. Lille respondents mentioned internationalization and inter-regional, including cross-border collaboration as a challenge and an opportunity. Most of the challenges for Lille and Lyon are in the area of the economy and finances and the quality of life, while in Lyon more institutional issues play a role.

In addition to the key challenges identified by the interviewed respondents, the core group of stakeholders participating in the project also emphasized a number of specific challenges, such as the difficulties in land use planning in addressing public and private interests as well as dealing with current tax competition between administrative territorial units. On the one hand, metropolitan development requires a broader range of actors to be involved such as landowners and developers, while many regional and local authorities struggle with the interplay between decision-making powers and the lack of bargaining capacities to steer a balance between public and private benefits. This is a result of fragmented decision-making processes, a lack of clearly defined practices for collaboration between public and private actors (public-private partnerships), or a lack of a spatial development strategy that has been agreed by all actors.

On the other hand, the tax competition that occurs in many of the stakeholder areas reveals the current mismatch between the tax systems of different governmental entities. Usually one tax system affects another one through the tax revenues that it allows to be generated (Goodspeed, 1998). In some cases tax competition may enhance conflicts between different authorities and local communities and impede collaboration at the metropolitan scale.

Identified challenges per group of respondents:

In order to show whether different groups of actors agree or disagree on the key challenges for metropolitan development, figure 5.5 presents the challenges identified by each type of respondent. There are minor differences in the type of challenges indicated by the different groups of actors. Generally, there is a common recognition of all the challenges among the different groups.

The actors representing NGOs and associations identified the most challenges, while private actors identified least. Among the NGOs and political actors, most challenges were mentioned in the category of transport infrastructure. Governmental actors referred most to the challenges in the categories of transport, demographics, economy and finances. The group of academics referred most to the institutional challenges, followed by transport and cultural aspects. Private actors were concerned with challenges related to transport, demographics and spatial development. In addition figure 4.1 in Annex 3 shows the extent to which each of the challenges was identified by each group of actors across all stakeholder areas. Based on this analysis the following key findings were formulated:

- There are a vast number of challenges identified in all stakeholder areas. These challenges illustrate the diversity of issues that are necessitating actions at the metropolitan scale of planning and governance. Key issues of concern include transport, multilevel governance, shared strategic planning and political constraints.
- There is a general consensus about the types of challenges identified among different groups of actors across the stakeholder areas.

5.3.4.3 Summary of key challenges per stakeholder area

Vienna - Managing urban growth and creating opportunities. The challenges of Vienna are to deal with the resistance to urban growth in most settlements around Vienna. Extensive population growth is expected in the coming decades and the metropolitan area will have to accommodate high number of new residents. While the spatial potential of the area seems sufficient to tackle this trend, the challenge is in managing the increasing land prices and the capacity of the public transportation infrastructure to provide services for these residents (i.e. the affordability of the area will be an issue). Besides, the new infrastructure developments (e.g. new train stations) will create new growth poles in the area that single settlements cannot manage alone. In addition, the housing affordability problem is leading to social segregation: the core city accommodates international and national migrants, while the agglomeration accommodates more affluent families moving out of Vienna. Cooperation between municipalities in the metropolitan region is regarded as essential in the fields of infrastructure development and transport, coordination of spatial development, economic development and environmental issues. Integration between these issues is considered one of the greatest challenges ahead.

Prague and Brno - Dealing with transformation in population distribution and land use. Prague and Brno, being the two big metropolitan areas in the Czech Republic, have somewhat similar challenges to face, including continuing suburbanization that is causing typical problems such as traffic intensification, shortages in public services, inefficient use of the fertile land etc. The optimal location of the main infrastructure developments often results in tensions between municipalities. There are however also differences in the challenges, as Brno is part of a larger region, i.e. the South Moravian Region, while Prague is a region in its own right surrounded by the region of Central Bohemia. The challenge for Prague is in dealing with tensions in institutional cooperation between the two regions.

Zurich - Introducing an efficient spatial structure and quality of life: For the metropolitan area of Zurich, the main challenges are related to demographics and spatial structure and development. The area is experiencing considerable challenges posed by sustained population growth, demographic development and social change (Baudirektion Kanton Zürich 2016). There is a need for an adequate spatial structure to accommodate the expected urban growth, upgrading built-up areas and guaranteeing a high quality of life in both the core urban area and the suburban areas. Achieving a balance between urban densification and intensification of urban functions is a key challenge, embedded in the policy agendas of both the federal and cantonal authorities. Meanwhile, the improvement of public transport over recent decades, especially the development of an effective S-bahn, now turns out to have led to urban sprawl. It has made the aim of “inward development” harder to achieve. This must now be taken into consideration in the discussions about future investments in public transport, in order to ensure efficient transport infrastructure, mobility and accessibility (public transport) that stimulates inward development rather than further urban sprawl. In addition, controlling land-use development is also needed to sustain an intact landscape. An intact landscape is an important factor for the quality of life and for developing sustainable tourism opportunities. Not only larger connected landscape areas with a high value in terms of nature, agricultural land and the experience they offer, but also traditional agricultural landscapes are particularly attractive.

Brussels - Achieving a common identity and language through inter-regional collaboration: Brussels faces the challenge of establishing a process of collaboration for more coordinated urban developments at the metropolitan scale. This requires the involvement of the three regions of Belgium. There are a number of unique factors influencing this process comparing to other areas. These include the multicultural environment in the Brussels Capital region that is not always valued by the other two regions, and the cultural differences in terms of language and identity between Brussels, Wallonia and Flanders. The added value for this collaboration has to be shared and seen by all the regions as an asset to their own development. A number of bottom-up initiatives and projects are currently aiming to boost this process on a small scale. Given the confinement of the city limits to the sole core part of the metropolitan area (i.e. the Brussels Capital Region), the absence of a metropolitan-wide planning approach and tensions between the three Belgian regions (i.e. Brussels, Flanders

and Wallonia), current cross-regional developments entail many issues of territorial competitiveness between the core city and its Flemish or Walloon suburbs.

Oslo-Akershus – Enhancing coordinated inter-interregional polycentric development:
The Oslo-Akershus metropolitan area is faced with the challenge of increasing population growth in the core city, while ensuring that the urban functions of other urban centres are used optimally, e.g. not concentrated only in the core city but in a polycentric structure. Such polycentric growth is seen as the best way to prevent further intensification of traffic to the core city and to distribute functions and services more effectively across the area. The key challenge is also to determine the scale of the metropolitan development between the regions. This is a highly contested issue on the agenda of the local and regional authorities. Meanwhile, the transport infrastructure is faced with the need to be more efficient in order to meet the current and future commuting patterns of the population living in the suburbs and working in the core city. This also relates to the challenge of ensuring affordable housing in the core city and in the suburban areas. Being a national growth and business centre, there is an increasing pressure on housing prices in the Oslo area. This leads to migration of the population to suburban areas. New inhabitants moving to the area also prefer to live in the suburbs due to the unaffordable high housing prices in the core urban area. Moreover, local authorities are looking for solutions for the institutional fragmentation at the national and regional levels, which often results in a number of national sectoral authorities being unable to coordinate their decision-making processes about spatial developments. At the same time, municipalities in the outskirts need to be persuaded to act beyond their administrative centres. The strategic planning for the Oslo-Akershus metropolitan area needs to be further recognized by the national authorities in formulating future national investments plans (e.g. by the transport authorities). A key institutional challenge is to encourage municipalities to be actively involved in the preparation of the interregional strategic plan and in its implementation. Municipalities tend to resist participating in planning activities beyond their administrative level due to the lack of clear understanding of the mutual benefits of such a development.

Turin - Urban regeneration and collaboration for an attractive metropolitan city: Turin MA's main challenge is to regenerate the urban areas, including post-industrial sites, and enhance its attractiveness and economic competiveness. Developing the new strategic plan of the area with its new spatial structure is currently one of the most important tasks. As a formal metropolitan administrative territory Turin MA is developing a series of actions and plans to attract new residents, tourists, students and businesses. The newly established metropolitan authority has been given the responsibility of developing the strategic plan and still needs to be recognized as the legitimate body for coordinating metropolitan spatial planning across the 316 municipalities. The new strategy is promoting a spatial structural approach for the management of the territory, based on 11 homogenous zones that form the metropolitan area. The key challenge is to provide coherent spatial planning, considering the specific geographical characteristics of the area being inhabited by urban and rural communities. The fragmented landscape, consisting of mountains and plains, requires different types of public services, economic activities and quality of the environment.

Terrassa - Innovation strategy for urban regeneration: Terrassa MA's key challenge is in reaching balanced development between the cluster of 11 municipalities. While a range of issues such as mobility and transport infrastructure are essential for this balanced development, the focus of the local authorities is on grasping opportunities for innovative solutions based on knowledge and sustainability principles. Terrassa's current urban plan aims to achieve a compact and sustainable urban model. Key challenges include preventing uncontrolled urban sprawl, urban regeneration, improving ecological connectivity between natural landscapes and managing agro-forest areas. Achieving coordinated urban planning is needed to understand the development of the entire territory. Another key challenge is to address the polycentric development influenced by the metropolitan area of Barcelona.

Lille - Economic excellence, quality of life and stakeholder involvement across the border:
Lille MA's challenges are oriented to several aspects of the metropolitan development and arise from the complex planning system and urban development process at the cross-border scale of development. The key challenges include: 1) the enhancement of the current institutional collaboration across the established municipal agglomerations and their plans

(SCOTs); 2) boosting the exchange and fluidity between the administrative areas, 3) mobilizing different types of stakeholders such as businesses to promote development and innovation in order to attain economic excellence; 4) improving accessibility to the territory and improving the mobility flows; 5) meeting the needs in the housing and employment sector, and 6) improving living conditions and the environmental quality. A key aspect of the Lille MA is its cross-border oriented spatial structure. The spatial dynamic and trends of the cross-border area between France and Belgium form a unique metropolitan cluster with intensifying urban functions and exchange of public services and economic activities. This structure needs to be embedded in the currently established institutional framework of strategic and coherent spatial planning at the metropolitan level established by the national government in France. This requires a better collaboration between LMA and the Region.

Lyon-Favourable institutional environment to improve attractiveness: Lyon MA's key challenge is to strengthen its position as an urban hub of opportunities for businesses, residence and education. With its strategic position as a bridge between the Mediterranean region of France and the urban areas of Northern Europe, Lyon's future MA needs to enhance and benefit from its internationalization potential and attractiveness for technology and innovation. Due to the rather complex governance structure for strategic planning between 13 formal municipal agglomerations. Lyon's MA needs to find more effective mechanisms for coordination between the strategic plans of these agglomerations (SCOT plans) and to implement its strategic plan (Inter-SCOT).

Figure 5.4: Challenges identified by the respondents in all stakeholder areas (% of cities in which the challenges occur)

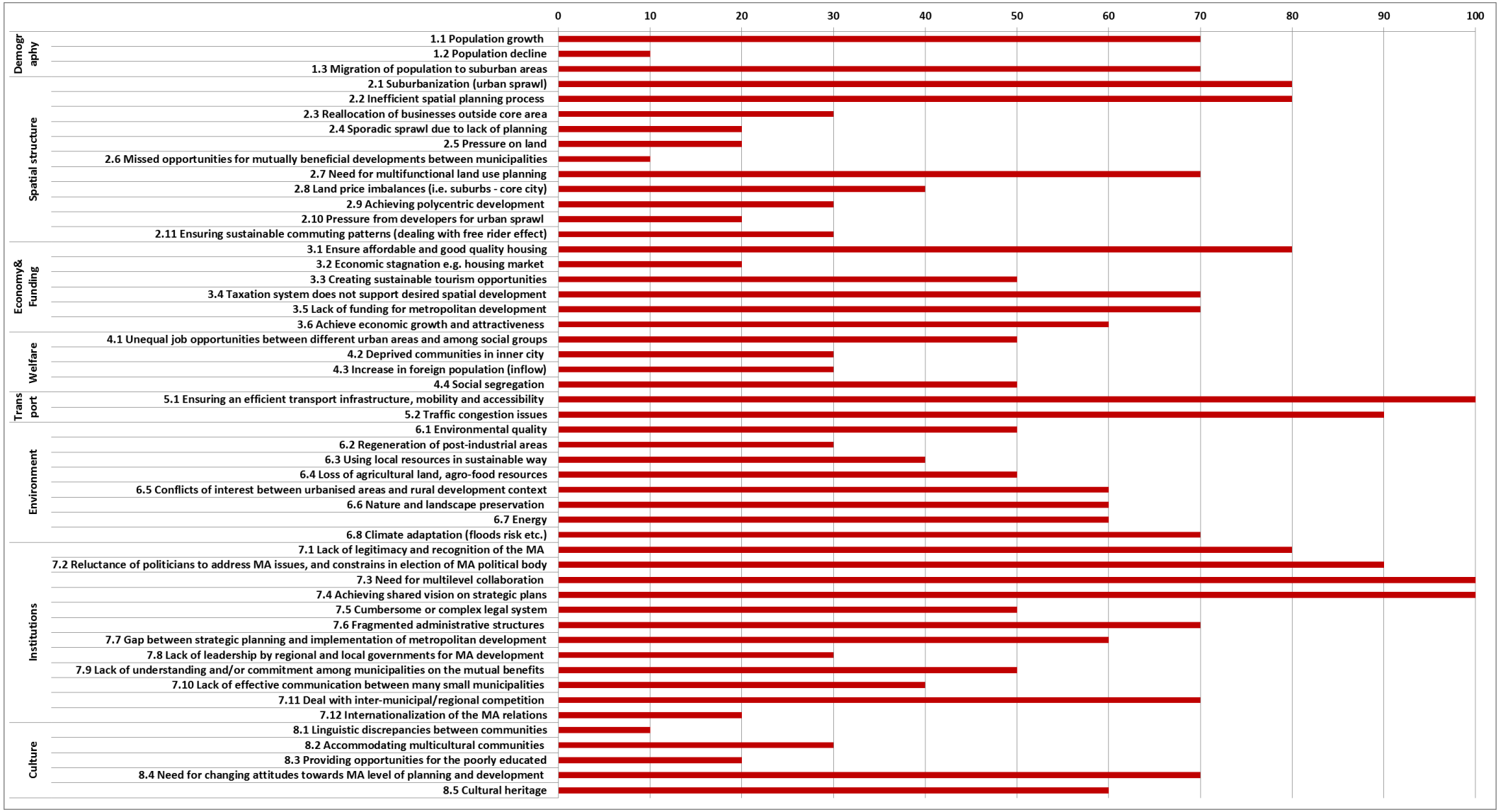
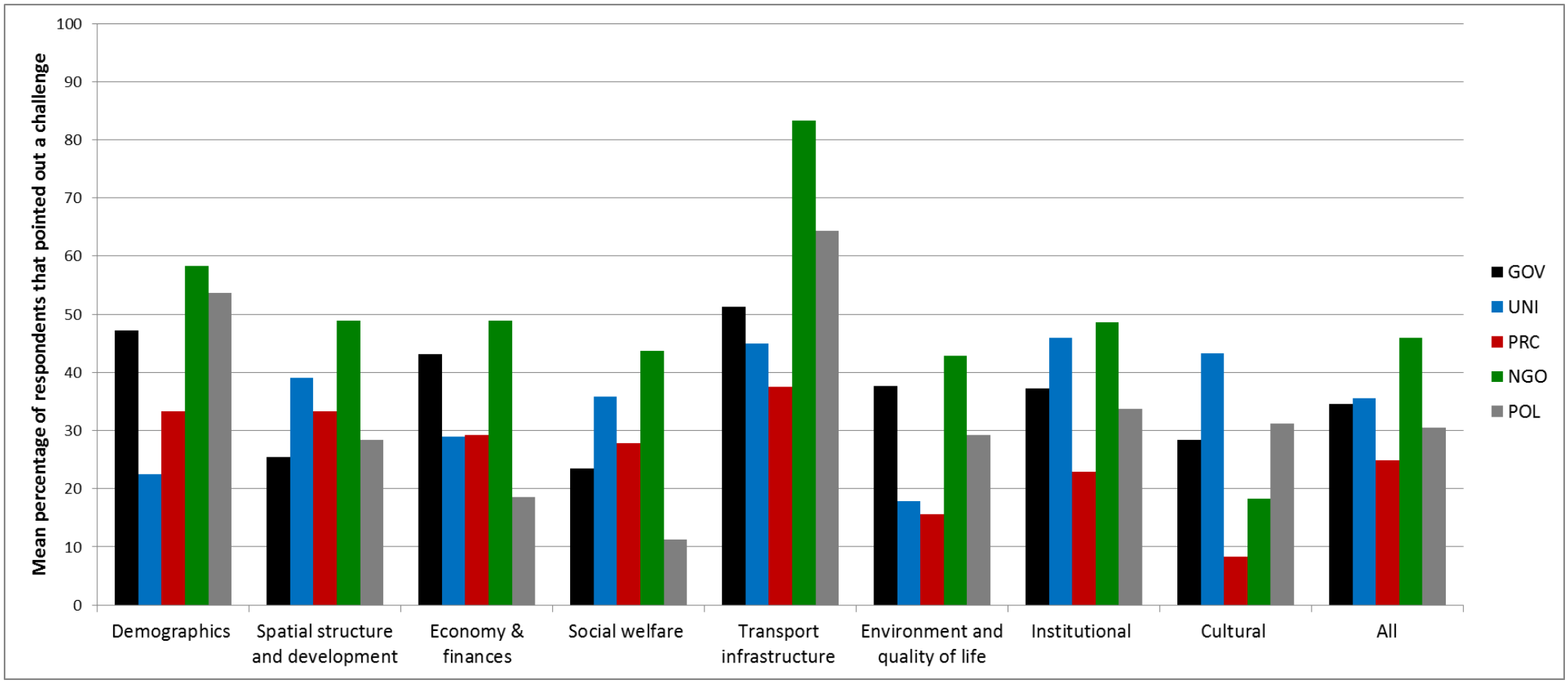


Figure 5.5: Mean percentage of respondents that pointed out a challenge per actor group across all cities (within each group of challenges and for all challenges together)



5.4 Discussion

The findings presented in this chapter regarding the current situation in the metropolitan areas, including their status, institutional frameworks and key challenges, illustrate the unique context of metropolitan development and planning in different countries and cities.

The ongoing transformations in the urban landscape and in the institutional environment of the metropolitan areas call for a clearer and more firmly established spatial planning structure and a governance model. The metropolitan areas are characterized by manifold spatial relations and interdependencies that are often not reflected in the way they are governed or developed. Ongoing urban growth and suburbanization inevitably involves the interests of more than one local authority and even more than one single region or a country. However, administrative fragmentation is still an impeding factor in introducing a coordinated metropolitan planning approach. This is a commonly observed phenomenon in many other countries in Europe and beyond (OECD, 2016).

As evidenced by the ten metropolitan areas and in conformance with the findings of preceding studies (e.g. Brenner, 2003; OECD, 2014), metropolitan planning is not yet firmly institutionalized in the spatial planning systems and governance practices. It is often positioned between intermediary levels of the administrative systems of spatial planning (i.e. national, regional and local levels), without clear jurisdictions and competence assigned to specific authority or a cluster of authorities. Therefore, metropolitan planning and governance is a "*problem without an owner*". As a result, the smooth integration of metropolitan issues in the actual spatial planning process is highly impeded. Meanwhile, the core cities are more keen on internalizing the metropolitan spatial plans (as they reflect mostly their own interests).

Meanwhile, the decentralization and subsequent devolution of decision-making power to the local level has often led to a misinterpreted independence of the local authorities in spatial planning that has isolated the local authorities from a wider, regional, context of territorial governance. Evidently, with the emergence of a stronger regionalization and metropolitization of the urban territories there is a need to revive the interest of the local authorities in shared territorial governance.

As this study indicates, there are a number of ongoing transformations within the national, regional and local governments oriented towards urban policies outside a single administrative unit and based on functional relations between urban and suburban areas. In most of the areas metropolitan governance does not follow a single recipe or a hierarchical model with a strict legal basis. It is however, a product of multi-faceted interactions between different actors across administrative levels of government (*vertical*) and sectoral administrative structures (*horizontal*).

The formal/informal status of the metropolitan area varies greatly and represents a number of options for the recognition and legitimization of the metropolitan areas. In some cases formalization of a straightforward metropolitan administrative level of authority seems to be the most suitable way forward. In other cases co-governance between several administrative levels with a more informal and flexible status is seen to be most workable. In yet other cases a mix of approaches can be used. However, in all cases a clear division of responsibilities and competences is needed. As earlier studies indicate, effective metropolitan governance is achieved when metropolitan planning is a competence of a specific organizational structure/s, whether a formal or informal one (OECD, 2016).

5.5 Conclusions

A few important conclusions can be drawn from the findings discussed above, as follows:

- The current administrative and spatial planning systems of the ten stakeholder areas address metropolitan development issues (agendas) to a limited extent. Only in exceptional cases do these systems define the metropolitan area and/or embed a metropolitan planning approach.
- Metropolitan planning needs to be based on a governance process that is closely linked with the administrative levels of statutory spatial planning, with clearly defined

competences and responsibilities allocated between the relevant authorities and governmental levels.

- Metropolitan development always concerns a variety of issues which can rarely be viewed in isolation because they tend to interact with each other. This makes metropolitan planning a complex process that in most cases will require an interplay between different institutional structures (*vertical and horizontal coordination*). These interactions can be coordinated by a single metropolitan body or involve shared competences between different institutional structures, based on collaborative arrangements.
- The formal (legal procedures) or informal (collaborative arrangements) status of the metropolitan area does not seem to be a determining factor for the effectiveness of the metropolitan planning and governance, in as far as it leads to a metropolitan strategy and an implementation plan commonly accepted by all relevant actors.
- There is no “one-size-fits-all” model for metropolitan planning and governance. The relevance of the various governance mechanisms can be different for different MAs, and needs to be adopted to the local institutional context.

6 Success factors, incentives and policy tools

6.1 Introduction

This chapter describes the key success factors needed to effectively implement a metropolitan planning approach in the stakeholder areas. The success factors reflect on both the necessary institutional structures ('hard' measures) and the institutional capacities ('soft' measures). It also describes the key incentives for implementing a metropolitan planning approach.

6.2 Methodology

The identification of the successes factors is based on the analysis of the results of the interviews with relevant actors in the ten stakeholder areas (see Chapter 1, section 1.4). As part of the questionnaires, examples of categories of success factors were identified in the form of multiple choice answers. This was done in terms of two aspects: 1*) key success factors for achieving the desired metropolitan development* and *2) key success factors for achieving effective metropolitan cooperation.* The first aspect aims to solicit the view of the actors about the key success factors that will ensure sustainable metropolitan development in their stakeholder area. The second aspect aimed to identify success factors for an effective collaboration between relevant actors that will bring about effective metropolitan governance.

With regard to both aspects, respondents were asked to identify and prioritize, based on their perception and experience, the success factors that they thought would be crucial in addressing metropolitan development challenges. They were also encouraged to mention any other success factors that seemed relevant to them.

A similar approach was used in identifying the key incentives for implementing a metropolitan planning approach in each stakeholder area.

6.3 Key findings

6.3.1 Perception among actors of the success factors for achieving the desired metropolitan development and collaboration

Table 6.1 shows the proportion (%) of respondents who pointed out each success factor for each stakeholder area. The most important success factors according to the respondents were political support and commitment (52%), the availability of funding (35%), the existence of a policy framework for MA development and collaboration (28%) and the existence of legislation for MA development (25%). More than one success factor was mentioned per stakeholder area.

Table 6.1: Key success factors for achieving the desired metropolitan development in the stakeholder areas as perceived by respondents based on their experience and expectations (proportion of respondents (%) who mentioned each success factor per stakeholder area)

Key success factors (%) mentioned by respondents	Vienna	Zurich	Prague	Brussels	Brno	Oslo & Akershus	Turin	Terrassa	Lille	Lyon	Total
Existence of legislation for MA development and collaboration	11	43	40	14	0	17	25	100	17	0	**25**
Existence of policy framework for MA development and collaboration	33	57	20	29	17	17	13	40	17	60	**28**
Political support and commitment	89	43	40	71	50	25	38	100	17	80	**52**
Communication between different actors' experts	33	29	0	29	33	0	13	60	0	20	**19**
Pressure from stakeholders	11	0	10	29	0	0	0	20	0	20	**8**
Support from stakeholders	33	0	0	14	0	8	0	20	17	20	**11**
Availability of funding	44	29	50	0	33	17	50	80	17	40	**35**
Availability of spatial data maps	0	29	10	0	0	0	0	20	17	60	**11**
Availability of relevant planning tools and knowledge	11	29	0	0	0	0	13	20	33	0	**9**
Adequate institutional capacity among the local/regional authorities	22	14	10	0	0	0	25	60	0	40	**15**
Other: contractual agreements, citizens' engagement	11	0	10	0	0	17	13	0	0	0	**7**

Source: interviews with key respondents

With regard to the success factors for achieving desired metropolitan development the following key findings were formulated:

- The political support and commitment is shown to be one of the most important success factors in all stakeholder areas. It refers to the need for better recognition of the existing metropolitan areas by political actors. This recognition should address the governance process at the metropolitan scale at which shared benefits can be realized. As spatial developments in most of the cases are influenced by political decisions, metropolitan spatial development implies the involvement of multiple interests and political bodies and implies shared decision-making across administrative units. The degree of support and commitment may differ per area and per type of sectoral interest. Any degree of commitment, however, among local politicians to support and participate in metropolitan governance process is essential in all cases regardless of the specific local context of the developments.
- The availability of funding was mentioned by many of the respondents as a means to realize activities for metropolitan development. In many cases, metropolitan developments have no clear financial framework in the current local and regional budgets. There is a need to purposefully commit financial resources to support the regional and local authorities in taking up new jurisdictions for metropolitan planning (e.g. from EU funds and/or national funds).
- The existence of a general policy framework and/or legislation to guide metropolitan planning approach has been defined as an important success factor. Such policy and legislation is considered as a potentially useful support mechanism that may help the jurisdictions of the regional and local authorities to implement a coordinated metropolitan planning approach.

Table 6.2 shows the success factors identified by respondents for enabling an effective collaboration process at the metropolitan scale. The most important success factor according to the respondents was political leadership (35%), followed by the actors' awareness and

commitment (28%), financial incentives (28%) and knowledge and expertise (25%). In each stakeholder area, more than one success factor was mentioned per respondent. Political power, consensus building and achieving common goals in planning metropolitan developments were also frequently mentioned success factors. In addition to the list in the questionnaire, other factors were pointed out by 17% of the respondents; they included trust, communication, decentralization, citizens' involvement and shared responsibilities.

Table 6.2: Key success factors for establishing and maintaining collaboration at the metropolitan scale as perceived by respondents based on their experience and expectations (proportion of respondents (%) pointing out each success factor per stakeholder area)

Success factors	**Vienna**	**Zurich**	**Prague**	**Brussels**	**Brno**	**Oso & Akershus**	**Turin**	**Terrassa**	**Lille**	**Lyon**	**Total**
Political leadership	33	57	20	14	0	25	25	100	67	40	**35**
Administrative leadership (chief executive/planning executive)	0	29	20	0	0	8	13	40	0		**11**
Actor's awareness and commitment	56	14	40	14	17	17	38	0	33	40	**28**
Political power	33	14	70	0	17	17	0	0	0	0	**19**
Knowledge/expertise	0	29	40	57	17	8	38	20	50	0	**25**
Understanding of policy priorities	22	29	0	0	17	0	13	0	0	0	**8**
Understanding common benefits and interdependence	44	29	20	43	33	8	0	80	33	20	**28**
Achieving common goals	0	14	20	71	0	0	13	0	33	20	**16**
Financial incentives	44	0	30	29	33	25	38	20	50	0	**28**
Ability to make trade-offs	0	0	0	14	0	8	25	40	0	0	**8**
Consensus building	0	29	0	0	0	8	38	80	33	40	**19**
Equal representation and participation	0	0	0	0	17	17	25	0	33	20	**11**
Other (personal factors, trust, communication, decentralization, citizens' involvement, shared responsibilities)	0	0	10	14	0	17	25	20	33	0	**12**

Source: interviews with key respondents

The key findings regarding success factors for achieving metropolitan collaboration are:

- Political leadership is considered an indispensable success factor for enforcing collaboration at metropolitan scale. This specific factor refers to the need for direct initiatives to be taken by political actors in the establishment of collaboration for the development of metropolitan policies and plans. While some initiatives have already been taken across the stakeholder areas, the political leadership has not always been continuous and steady. Straightforward and systematic actions need to be embedded in the agendas of the political leaders in order to enhance collaboration in dealing with metropolitan development challenges.
- Both the availability of financial capacities and of knowledge and expertise were identified as success factors. These refer to the need for institutional support, funding, administrative capacity and competences committed to metropolitan development.
- The success of metropolitan collaboration depends to a high degree on the recognition and the understanding of different actors of the common benefits to be achieved in joining forces in metropolitan planning. These benefits are not always evident to all actors and need to be part of a joint metropolitan strategy.
- The awareness among relevant actors, including local communities, of the need to address emergent metropolitan developments in a comprehensive way is considered as another important success factor. Awareness building about the existing and

expected urban development trends might reinforce the commitment of actors to participate in joint collaboration efforts.

6.3.2 Perception among actors of the opportunities for implementing a metropolitan planning approach

This section presents the perceptions among respondents regarding the necessary following steps and the incentives for the implementation of a metropolitan planning approach (see Annex 2, table 4.3). The respondents indicated 38 issues that could in their view be the most important steps to be taken in the future. These issues concern eight specific themes, namely: 1) policy & law; 2) strategic planning and improving the identity of the MA; 3) finances and funding; 4) spatial planning tools and practices; 5) collaboration; 6) organizational matters; 7) politics and 8) civil society. On average 15 steps were identified per stakeholder area with a minimum of 8 and a maximum of 30.

The most frequently mentioned steps to be taken next are the enhancement of cooperation between municipalities in the metropolitan area, followed by the improvement of collaboration between regional and local authorities and collaboration between agencies at the multilevel scale (see figure 6.1). Achieving a stronger identity and recognition of the metropolitan area was also frequently mentioned as a step forward.

Figure 6.2 illustrates the following steps as identified by each type of respondents. The key differences observed are between the actors from NGO/associations and actors from the private sector. The actors from NGOs consider the improvement of spatial planning tools and practices as the most urgent following step. The actors from the private sector consider the involvement of businesses and other actors in the process of metropolitan development as most essential. Governmental actors pointed to the strategic planning process and the improvement of collaboration between different authorities as the most important steps forward. The academics mentioned civil society and involvement of other actors among the most important following steps, followed by spatial planning practices and development of strategic plans for metropolitan development. Box 3 summarises the next steps per stakeholder area.

Figure 6.1: Following steps Identified by the respondents in all stakeholder areas (% of cities in which the following steps were identified)

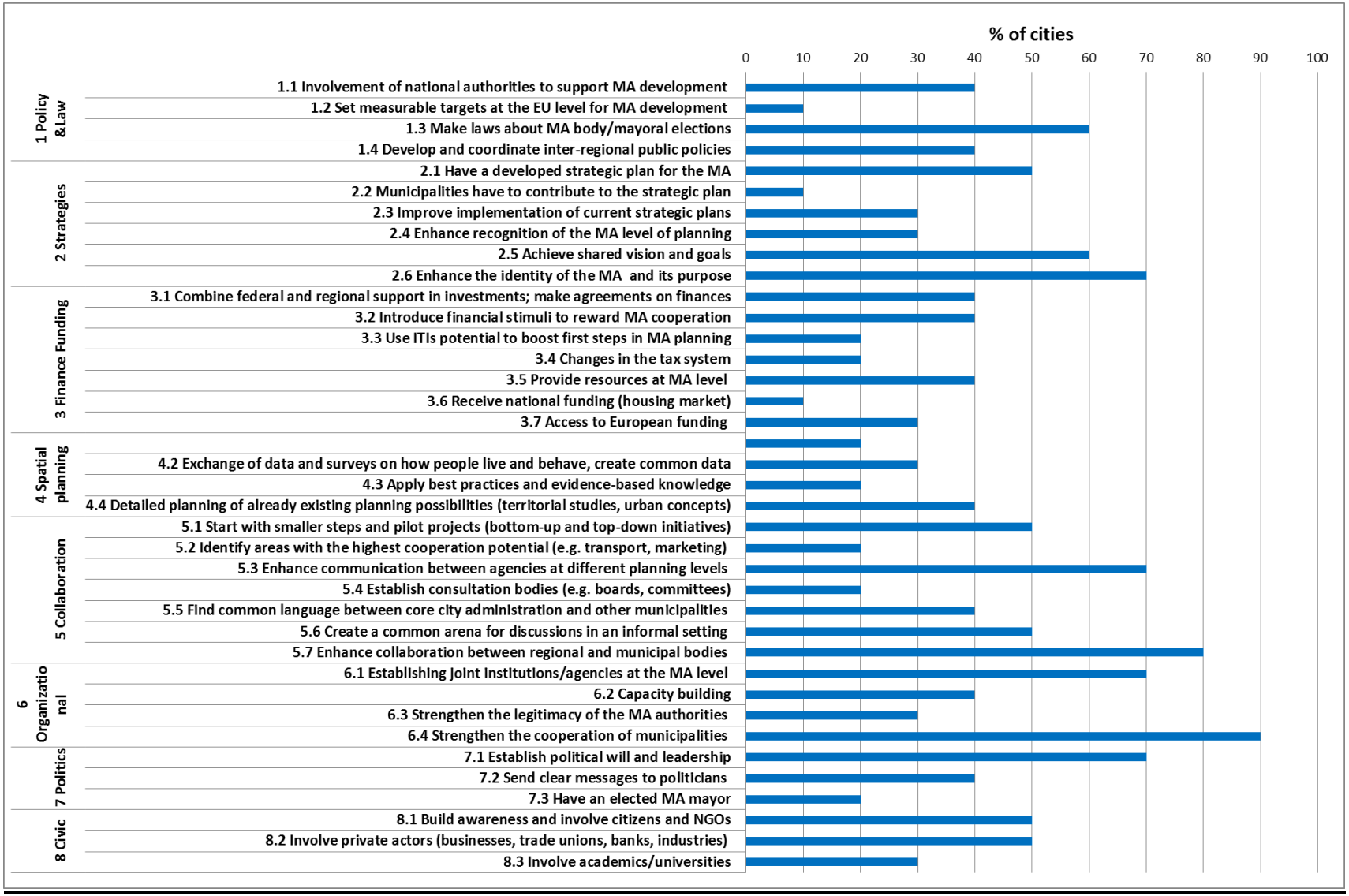
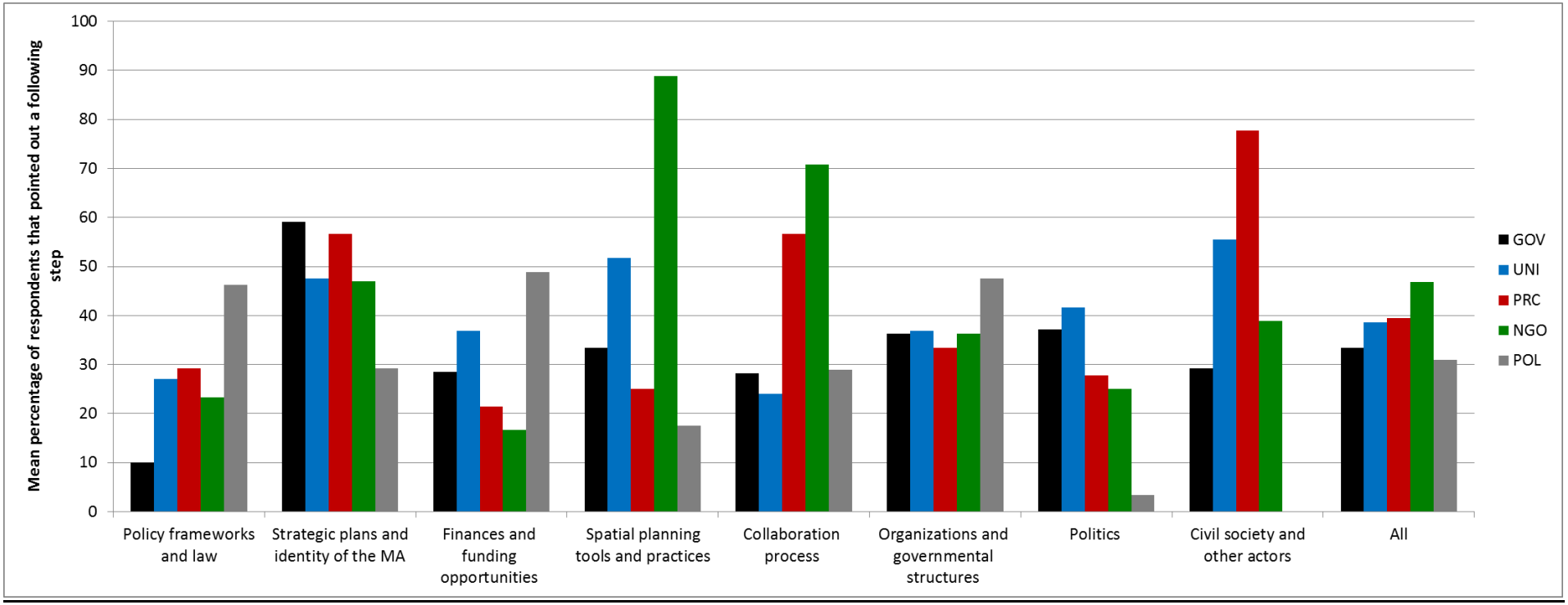


Figure 6.2: Mean percentage of respondents that identified following steps per category and per actor group across all cities



Box 4 Specific following steps in metropolitan planning and governance per stakeholder area

Vienna: Vienna MA still needs to receive broader recognition and develop an identity. In addition, the establishment of joint organizational structures by Vienna and Lower Austria is considered as a possible way forward. Such a joint structure may be effective in implementing a coherent spatial planning policy for the entire region. Furthermore, coordinated spatial planning at the metropolitan scale can be useful to define and implement the urban growth strategy of the region. More detailed spatial planning approaches and tools need to be developed within the existing spatial planning framework. Another important next step is to establish joint decision-making about the allocation of specific metropolitan functions. Furthermore, in order to enhance the collaboration between the municipalities in the region, the potential mutual benefits still need to be made evident to the relevant actors. The potential of the area needs to be explored based on enhancing existing assets that builds upon common positive experiences.

Zurich: The current inter-cantonal association for metropolitan development needs to have a prominent role in enhancing communication between agencies at different levels of planning. Acquiring federal support is considered a possible next step in strengthening the operation of the association and the identity of the metropolitan area. Another next step is identification of relevant spatial planning tools and practices for implementing an MA strategy and a coherent metropolitan planning approach.

Prague and Brno: The successful implementation of the ITI-based projects is an important following step in both areas. These projects are expected to have an effect on the future metropolitan spatial planning. In the next few years, a stronger information basis (common dataset) should be developed to support the development of a metropolitan planning approach. The communication between relevant actors needs to be strengthened along with the development of the metropolitan strategic plans. In both Prague and Brno there seems to be a new window of opportunity as new politicians/decision-makers have come into power that may resolve accumulated political tensions over time.

Brussels: In Brussels the specific following steps relate to the establishment of a stronger strategic planning process and collaboration between the three federal regions. The elaboration of an agreement about the establishment of the Brussels Metropolitan Community is an important next step in the legitimization of the metropolitan collaboration based on consultation between the regions.

Oslo & Akershus: The key next step considered for Oslo & Akeshus is the legitimization of the metropolitan area and strengthening the involvement and the support of the national authorities. New 'urban growth agreements' ('urban development agreements' between national authorities and the local and regional authorities in the metropolitan areas) are currently in preparation. These agreements aim to ensure the commitment of all parties in the implementation of the current inter-regional plan. Applying evidence-based knowledge and decision-support tools in defining the most appropriate scale of metropolitan development is another important step forward.

Turin: The formal metropolitan authority of Turin is currently developing the strategic plan for the area. The implementation of this plan will be the most important next step. This process needs to be agreed by all actors. Ensuring adequate funding and administrative capacity is seen as essential. Employing effective planning tools and practices in land use planning of fragmented landscapes is also seen as an important next step.

Terrassa: Terrassa's future focus is in developing a shared vision of the area by mobilizing the political leadership and enhancing collaboration between the municipalities. Important next steps are also involving other actors such as businesses, academics and NGOs. Combining federal and regional funds to finance metropolitan planning activities is seen as another important future step. Discussing the need for the establishment of a metropolitan coordinating body could be considered.

Lille: The following steps for Lille are in improving the communication and consultation processes between the municipal agglomerations and between the municipalities to implement the coherent spatial planning policy. The strategic plans of the Lille cross-border metropolitan area need to be upgraded with a view to the cross-border metropolitan developments and trends. Involving civil society is another important step. Furthermore the organizational structure for strategic planning needs to be well defined and enhanced in terms of the capacity needed to address metropolitan challenges.

Lyon: The important following step for Lyon is to implement the current strategic territorial planning process and support inter-regional cooperation (Inter-SCOT plans). Clear coordinated actions are needed for the different municipal agglomerations and their strategic plans. Follow-up steps are needed in the overall institutional capacity building for the metropolitan level of planning including combining funding opportunities, and having an effective and operational institutional structure. Involving actors from civil society and businesses is also considered as an important next step.

The key findings regarding the needed following steps for metropolitan planning are as follows:

- For most of the MAs, the following steps towards a metropolitan planning approach concern the achievement of better cooperation among different public authorities. This process includes enhancing communication between different actors at different planning levels to support knowledge exchange and the sharing of resources. It implies finding a common language between the core city administration and other municipalities and having all municipalities join forces. Communication between actors is the key factor for developing and implementing metropolitan-level strategic/spatial planning. None of the stakeholders feels that the current communication process is sufficient and sustainable in the long term.

- The establishment of clear institutional structures dedicated to metropolitan planning is also seen as an important next step. Such structures should facilitate better communication and collaboration across the public authorities.

- Respondents also emphasized that the next step is to communicate in a better way with the political leaders by sending clear messages about the metropolitan challenges and possible scenarios for the future urban developments.

- Involvement of businesses and branch organizations is also an important next step for most of the areas.

Table 6.3 illustrates the most relevant incentives for applying a coordinated metropolitan development approach in the stakeholder areas. Presented with seven multiple-choice options, respondents indicated three different incentives per stakeholder area on average. The incentives most frequently mentioned were: *1) European regulations, policies and funding; 2) national regulations and policy; 3) sustainability goals; and 4) economic drivers.*

Table 6.3: Key incentives mentioned by respondents for enhancing a coordinated metropolitan spatial planning approach in each stakeholder area

Incentives	**Vienna**	**Zurich**	**Prague**	**Brussels**	**Brno**	**Oslo & Akershus**	**Turin**	**Terrassa**	**Lille**	**Lyon**
European regulations, policies, funding			x	x	x		x	x	x	
National/federal regulations and policy		x	x	x	x	x				
Spatial strategies or policy plans	x	x			x		x	x		
Media and/or social pressure								x	x	
Sustainability goals		x					x	x	x	x
Economic drivers					x	x		x	x	x
Other (active civil society, social and cultural relations)				x						

Source: interviews with key respondents

The key findings regarding the implementation of a metropolitan planning approach are as follows:

- Many of the respondents reflected on the positive attitude among different actors on the guiding role of the European regulations, policies and funding. It is believed that a future European policy dedicated to the metropolitan developments across Europe would be an important stimulus for the regional and local authorities in starting up a shared governance process to address key metropolitan challenges. Such policy should be based on clear goals and principles of urban sustainability.

- While national/federal state regulations and policies on metropolitan development exist only in one or two cases, respondents believe that such policies and regulations

may serve as stimuli from the higher level of government to initiate a metropolitan planning approach at the regional and local levels. These can vary between framework policies or collaboration strategies developed by national or federal authorities, and binding regulations where appropriate that establish specific formal institutional status or jurisdictions for metropolitan governance.

- Economic benefits generated as a result of cost-effective and more sustainable urban developments are key incentives for initiating coordinated metropolitan development. Such benefits are more evident in the economic sectors such as transport infrastructure, retail or housing. Collaborative initiatives between public and private actors take place more often in relation to these sectoral issues rather than in social or environmental sectors. The economic benefits in these sectors, however, are seen as the basis for starting bottom-up development initiatives at the metropolitan scale that can be extended to benefits for other sectoral issues in the future.

6.4 Discussion

One of the most important success factors for better metropolitan collaboration is political commitment and support backed by up-front political leadership.

Furthermore, achieving a common understanding between actors on metropolitan development is believed to be much more important than establishing specific legal and financial frameworks at the metropolitan level. To achieve such a common understanding, the benefits of metropolitan collaboration should be made evident to all actors. Political leadership and commitment plays an important role in this process as individual inhabitants elect their local and sometimes their regional politicians. The key success factor in this regard is for these politicians to project the message that metropolitan collaboration is needed to achieve joint benefits in a bigger territory than just one municipality. Such benefits are focussed on improving services (e.g. housing, welfare, environment, quality of life etc.) in the long term and for a larger group of citizens, while some short-term services might be compromised.

As illustrated in this study, understanding mutual benefits and interdependence between actors can start from more commonly recognizable issues such as transport services, or the economic activities in the metropolitan area. This was also indicated by earlier studies of metropolitan governance (Urbact-Metrogov). In some cases bottom-up initiatives have brought opportunities to upscale collaborations to include other actors, which in turn received the support of other institutions and of the national government.

Furthermore, the implementation of a metropolitan planning approach requires adequate institutional capacity and policy tools (*hard and soft tools*), which currently vary greatly between the metropolitan areas. These relate to the capacity to ensure effective communication processes, multilevel governance interplay, legal and financial capacities and the capacities of actors to think ‘out of the box’, collaborate and commit.

Similarly the METREX project (METREX, 2005) concluded that specific competencies (jurisdictions), capabilities (skills and knowledge) and process (monitoring, evaluation, updating) are key institutional capacities needed to integrate economic, social and environmental aspects in a metropolitan spatial planning approach. Moreover, it highlights that developing and implementing a metropolitan perspective in spatial plans is a dynamic process with changing spatial characteristics.

The current study has also illustrated that due to the complexity of challenges in the metropolitan areas, a metropolitan planning approach should be comprehensive and adaptive to changes in order to be able to address the policy contexts, institutional structures and spatial dynamics of the metropolitan areas. This points towards shared governance modes (co-governance) which can provide for more flexible and adaptive policy actions to accommodate these changes instead of just the establishment of rigid governmental institutions.

6.5 Conclusions

Regardless of their position in the metropolitan spatial planning process, all stakeholder areas are faced with the issue of how to accommodate metropolitan development agenda in the existing rigid governance structure for planning. In contrast to the existing rather fragmented levels of governance, the metropolitan scale of planning needs to be more coherent, fluent and flexible in order to address the ever-changing spatial scales, policy issues and functions. Thus the key precondition for success will be to create a fluent shared governance process that is flexible enough in addressing these changes and in engaging the relevant actors. The keys to implementing such a flexible metropolitan governance could include:

- The combination of top-down incentives/obligations with bottom-up collaboration;
- Collaboration between the dedicated planning authorities within the MA;
- Involvement of a wider range of stakeholders;
- Ensuring the transparency and openness of collaboration processes;
- Creating a “minimum gain for all” in each case when compromise is needed;
- Creating common funds and agencies at the MA level that may provide expertise and financial incentives (national sources may be included in these pools);
- Fine-tuning cooperation takes time: it is more efficient to start with topics like transportation that can be internalized more easily by most actors, strengthening the most competitive attributes of the area;
- Engaging political leaders and gaining support from higher levels of government: flexible systems and the changing environment call for strong political leadership;
- Setting the rules of the game: combine flexible and fluent co-governance modes with the establishment of fixed points (more restrictive/legal mechanisms) for growth management (e.g. concerning land-use change, major infrastructure development, environment protection and social services).

7 Policy implications for metropolitan governance

7.1 Introduction

With its expected results and recommendations, the SPIMA analysis provides evidence that will support future policy-making regarding the benefits of a metropolitan planning approach in the stakeholder areas and that is transferable to other European cities.

Metropolitan-level spatial planning and governance must be rooted in the evidence of the benefit of metropolitan coordination and the willingness of the local stakeholders to cooperate. Nevertheless, the benefit may not be evident for all stakeholders at least not in the short run and conflicts of interest may occur from time to time. As experience shows, the support of higher-level entities (like the nation state or the European Union) has proved to be essential in all cases where sustainable and efficient metropolitan structures have been created.

This chapter highlights the most relevant conclusions from the SPIMA research guiding the decision-making procedure of national governments and the policy makers of the European Union.

A more detailed recommendations for the implementation of a metropolitan planning approach in general and per stakeholder area are presented in the SPIMA Guidelines for a Metropolitan planning approach (see Annex 1).

7.2 Methodology

The key policy implications for the metropolitan spatial development agenda were derived from the comparative analysis of the ten stakeholder areas. The generalized conclusions of this analysis were linked to the relevant European policy agenda and the policies of the member states at the national, regional and local levels. The policy implications are formulated against the background of the currently existing policy frameworks for metropolitan governance and planning, and provide a recommendation on how these policies could evolve in the future to address the challenges of metropolitan development addressed by the SPIMA study.

7.3 Key findings

7.3.1 Embracing metropolitan area challenges in policy making

The Urban Europe analysis (Eurostat, 2016) show that about 72.5% of the EU-20 inhabitants live in cities, but that there are differences regarding the size and spatial distribution of urban development functions. These differences are based on the distinctive territorial development strategies and spatial planning systems of the countries (Eurostat, 2016). A specific challenge is the lack of “spatial fit” between the *de jure* city and the *de facto* city (agglomeration, commuting patterns), which creates challenges when developing sustainable metropolitan areas. The SPIMA project generates new insights for policy makers regarding these challenges and the possible steps forward.

A number of preceding studies from ESPON, OECD and other European initiatives have shown that there is need for coherent policy on metropolitan development. Such policy can direct actions towards addressing metropolitan challenges and creating new territorial development opportunities. Based on the cities’ potentials, certain areas can be more attractive than others. However, in a wider metropolitan territory these potentials can be utilized in a more complementary way. Along with the emergence of polycentric developments, urban development can go far beyond the administrative borders of individual municipalities, and a metropolitan policy aims at ensuring a wider spatial fit of the local governance processes.

In addition, the EU Cohesion Policy 2014-2020 and the EU Macro-Regional Strategies (MRS) of the European Council emphasize the need for greater coordination between different actors for the alignment of resources and strategies in order to address common territorial challenges. These actors are national, regional and local authorities, managing authorities of programmes, academia, businesses, local municipal associations and civic organizations. Major policy implications at the EU level

As evidenced in this study, there is an increasing need for a coordinated spatial planning approach at the metropolitan level. Spatial planning is seen as a policy mechanism that can potentially enhance the coherence between different categories of strategies and plans of the local and regional authorities and can ensure the missing "spatial fit" between the *de jure* city and the *de facto* city (agglomeration, commuting area). The implementation of such an approach should be considered in the key EU policy frameworks, which could foster the establishment of an EU-wide accepted metropolitan policy agenda. A number of existing policy frameworks can be used to set up this policy agenda, including the EU Cohesion Policy.

The 2014-2020 EU Cohesion Policy has embraced the issue of coherent urban territorial development as one of its key goals. It addresses the importance of the interaction between cities and surrounding areas and the need for a wider territorial approach across administrative borders.

One of the novelties was the launch of Article 7 in the ERDF that earmarked funding of at least 5% of the ERDF to urban development issues. The Article served as an incentive for fostering metropolitan cooperation. The dedicated resources are eligible to cities, specific city areas, networks of cities or consolidated metropolitan areas. In recent informal communication by the EC officials, the flexibility in applying Article 7 is seen as a positive phenomenon. However, the application of the Article is rather fragmented across the Member States and the individual local authorities. There is a need for a common EU policy framework and a coordination mechanism to address and fund issues of metropolitan development.

This study showed that in a number of cases, the EU programmes and policies such as the Integrated Territorial Investment Programme served as a key incentive for starting up a variety of initiatives at the metropolitan scale. The ITIs were a catalyst for launching projects in metropolitan area development in the Czech Republic. Yet these initiatives are not common across the Member States. Metropolitan area-based territorial planning needs to still gain more solid ground in the Cohesion Policy. Experts agree that the post-2020 Cohesion Policy needs to have a more prominent role in promoting and supporting a coherent metropolitan planning approach that allows the key challenges in metropolitan development to be addressed. The implementation of such an approach can be further strengthened by allowing local and regional authorities and consolidated metropolitan bodies to be beneficiaries of funding.

It is generally acknowledged that EU policies need to be enhanced with regard to the importance of metropolitan development. As the current project results imply, EU policy is a key incentive for regional and local authorities and it needs to provide support in setting a European vision and funding for enhancing metropolitan governance. As the EU institutions do not have direct responsibility for spatial planning and development and the spatial planning systems are in many cases decentralized based on the principle of subsidiarity, the EU can have a guiding role in this process. The most relevant EU policy frameworks that may be considered as having a further focus on the metropolitan agenda include the Cohesion Policy, the European spatial planning compendium and the specific sectoral policies of the DGs, such as the DG for the Environment's programmes and its strategy on urban environment and sustainability.

During the debates at the Cities Forum in November 2017 in Rotterdam, representatives of the Commission acknowledged that the current Cohesion policy has too much of a thematic prioritization which may not allow the wider territorial dimension of urban developments across Europe to be grasped. According to the deputy Director-General of the DG for Regional and Urban Policy, the European Commission, needs to reconsider the approach by which urban development is addressed. A wider territorial scope will be needed that focuses on the integrated spatial structure of the urban areas, suburban areas and peripheries which form the metropolitan areas. This will allow an examination of urban functions and spatial

structures beyond the administrative borders of a single local authority and an individual core urban area; instead, it will address key challenges across multiple local administrative units. This issue needs to be adopted by the policy objectives of the new policy framework, complementing the successful implementation of the Article 7 regulation of the ERDF. The Article 7 regulation could be further elaborated in order to address the wider scope of metropolitan development as functional territories and the need for integrated spatial strategies for these territories.

These issues are also recognized by the ESPON 2020 Cooperation Programme, which aims to foster coherent European territorial development and cooperation. In addition the Urban Agenda for the EU, established in 2016, has fostered a number of partnerships around different urban development issues (e.g. housing, urban poverty, integration of migrants/refugees, air quality etc.). These partnerships also highlighted the importance of metropolitan planning and the need for inter-municipal and inter-regional cooperation. Yet this policy issue needs to be embedded in specific thematic partnerships.

Yet the phenomenon of metropolitan development, planning and governance is under-researched and not fully addressed in the contemporary context of territorial governance and spatial planning. This reviving area of policy intervention and research needs to be more robustly addressed in the current and future EU funding programmes (e.g. Cohesion funds and framework programmes such as Horizon 2020).

7.3.2 Major policy implications at the national level

This research touched upon important issues with regard to the need for policy actions at different levels of government to address metropolitan development challenges. While there is no one single governmental level that can fully meet these challenges, there is a need for a more overarching policy framework and guidance to enhance the involvement of regional and local authorities in metropolitan development initiatives. Such a process depends on the level of decentralization of the countries' planning systems. While there are currently a number of bottom-up initiatives taken by the Member States at the regional and local levels based on collaborative practices developed at that level, there is also a need for an overarching framework that oversees the course of action in metropolitan development. Such an overarching role is often considered something for the national governments. The role of the national government is seen as well in potential interventions for resolving conflict of interests between different regional and local governments that cannot be resolved locally.

The stakeholder areas included in this project illustrate the dilemma of top-down and bottom-up decision-making which manifests itself very strongly in the spatial planning systems of the Member States. What issues should be decided at the centralized level and what issues should remain the key area of intervention for the regional and local authorities?

The experiences of the stakeholder areas illustrate that there is no 'one-size-fits-all' solution to this problem and that often a mix of approaches is needed. Nevertheless, in many cases there is a strong consideration of the need for a national framework on metropolitan governance embedded in the specific context of the planning systems in the Member States. Such a national framework can be both an impetus and a guiding mechanism for the definition of the metropolitan areas, their functions and the vision on future development.

Furthermore, a national framework can provide an official recognition of the metropolitan areas and can set a platform for the establishment of formal or informal cooperation to implement metropolitan development plans and strategies. This can be done by different policy tools and governance mechanisms, including the possible formalization of the metropolitan area, establishment of dedicated collaborative institutional structures, financial incentives and assistance for local authorities etc.

Such networks can only be established with the involvement of the regional and local authorities as these have the best understanding of the development challenges in their territories and of the actors that need to be mobilized locally. In addition, a national policy framework can be developed to oversee the support mechanisms for the public financing of metropolitan developments (including support for consultation and negotiation processes).

Another role for the national government would be in strengthening the spatial planning powers of the regional authorities in order to allow for regional spatial visions and strategies to be considered and implemented in the municipal spatial plans. This would allow better links between the different categories of spatial plans with regard to growth management and zoning of the metropolitan area. Planning capacities within the spatial planning authorities need to be enhanced as well to allow a proper understanding of the territory's spatial dynamics and the necessary integration of different sectoral issues in the specific metropolitan area. Clear spatial planning tools are needed that will support decision making in planning at the metropolitan scale. The metropolitan planning approach developed in SPIMA offers a set of such tools.

7.3.3 Discussion

The key findings with regard to the role of the EU and the national governments of the Member States illustrate the need for a series of policy interventions in promoting a coherent metropolitan spatial planning approach. Clear guidance and support mechanisms are needed to initiate targeted actions by the national, regional and local authorities across Europe. While a number of initiatives have already been undertaken at the EU level and within the Member States, there is a need for more systematic and operational approach.

The current project provides an insight into the key challenges faced by the selected local and regional authorities, which can serve as an example for other areas across Europe. Furthermore, the guidelines provided here can serve as a basis for a better understanding about what metropolitan governance and spatial planning implies in European urban areas, what knowledge and actions are needed to support this process and how it could be organized and structured. These issues can be a constituent part of the new Cohesion policy.

There are already initiatives ongoing that promote the transformation of polices towards a metropolitan planning approach. Some of these initiatives are based on collaborations between local authorities in Europe e.g. the European Metropolitan Authorities (EMA) association, Eurocities etc. These collaborations play an important role in translating the policy implications of metropolitan studies into the local policies of the metropolitan cities and into the national and EU policies and programmes. Further deliberation between the EU, national governments and the regional/local authorities is needed regarding the eligibility of the metropolitan areas/bodies for EU funding. While some actors argue that this should be the case, others refer to the need for EU support for metropolitan areas based on local decision-making. The latter argument is based on compliance with the subsidiarity principle.

7.3.4 Conclusions

The following key conclusions are made with regard to the policy implications:

- There is a general call for a stronger metropolitan governance agenda to be embedded in the current EU and national policy frameworks. The process of metropolization needs to receive stronger recognition and more understanding by policy makers at the EU and national levels.
- The metropolitan areas need to be redefined as clusters of administrative and functional areas for which better understanding is needed about the spatial planning and governance approaches.
- The role of spatial planning policies needs to be enhanced at the national, regional and local levels by setting different foci in strategic, statutory and collaborative processes.
- Enhancing the role of EU programming in promoting effective policies for sustainable and inclusive metropolitan development can lead to a key incentive for the future. The promotion of a cohesive metropolitan planning approach and guidelines at the EU level can support the initiation of targeted actions to be undertaken by the national, regional and local authorities.

8 Extrapolation of findings to other metropolitan areas

8.1 Introduction

This chapter illustrates the potential policy tools that may assist the governing bodies of the ten stakeholder metropolitan areas to better address the identified challenges and improve their metropolitan governance process. The chapter develops a typology for a metropolitan planning approach as a method to extrapolate the findings of the case study analysis to other metropolitan areas that were not part of this research. This will allow cities across Europe to make better use of the key findings of the project.

8.2 Methodology

In a first step we developed two simple typologies for metropolitan areas that would enable any metropolitan area to be categorized. The first typology - hereafter referred to as typology A - is based on the size of the area and population density, and consequently focusses on spatial characteristics of the metropolitan areas. The size of the area is based on the MDA delineation. The second typology – hereafter referred to as typology B - is based on the status of the metropolitan area - formal, semi-formal or informal - and the number of municipalities (based on the MDA delineation), and consequently focusses on the institutional characteristics of the metropolitan areas. Both typologies consist of six categories (tables 8.1 and 8.2). The criteria in both typologies were selected because they can be seen as key characteristics of the metropolitan areas. Furthermore, data on these criteria are usually easily available, which makes the typologies easy to apply.

Table 8.1 Typology A for metropolitan areas based on size of the metropolitan area (MA) and population density

Population density (number of inhabitants per km^2)	Size of MA (km^2)		
	Large-sized (>7000)	Medium-sized (2000-7000)	Small-sized (<2000)
Moderate to high population density (≥500)	*Type 1: Large-sized MA with moderate to high population density*	*Type 3: Medium-sized MA with moderate to high population density*	*Type 5: Small-sized MA with moderate to high population density*
Low population density (<500)	*Type 2: Large-sized MA with low population density*	*Type 4: Medium-sized MA with low population density*	*Type 6: Small-sized MA with low population density*

Table 8.2 Typology B for metropolitan areas based on the status of the metropolitan area (MA) and number of municipalities

Number of municipalities	Status of metropolitan area		
	Formal (based on law/regulation)	Semi-formal (based on agreements)	Informal (based on collaboration)
High number of municipalities (≥500)	*Type 1: Formal MA with high number of municipalities*	*Type 3: Semi-formal MA with high number of municipalities*	*Type 5: Informal MA with high number of municipalities*
Low number of municipalities (<500)	*Type 2: Formal MA with low number of municipalities*	*Type 4: Semi-formal MA with low number of municipalities*	*Type 6: Informal MA with low number of municipalities*

Step 2: Linking the case-study metropolitan areas to the typology

In a second step we took both typologies and determined which category applies for the ten metropolitan areas of our case study analysis (tables 8.3 and 8.4). In both typologies, A and B, four categories are represented by one case study area, one category by two and one by four.

Table 8.3 Categorization of stakeholder metropolitan areas over six distinguished types of metropolitan areas on the basis of typology A.

Type of metropolitan area	Stakeholder metropolitan area										Number of MAs
	Vienna	Zurich	Prague	Brussels	Brno	Oslo-Akershus	Turin	Terrassa	Lille	Lyon	
Large-sized MA with moderate to high population density									X		1
Large-sized MA with low population density	X									X	2
Medium-sized MA with moderate to high population density				X							1
Medium-sized MA with low population density		X	X			X	X				4
Small-sized MA with moderate to high population density								X			1
Small-sized MA with low population density					X						1

Table 8.4 Categorization of stakeholder metropolitan areas over six distinguished types of metropolitan areas on the basis of typology B

Type of metropolitan area	Stakeholder metropolitan area										Number of MAs
	Vienna	Zurich	Prague	Brussels	Brno	Oslo-Akershus	Turin	Terrassa	Lille	Lyon	
Formal MA with high number of municipalities									X	X	2
Formal MA with low number of municipalities							X				1
Semi-formal MA with high number of municipalities		X									1
Semi-formal MA with low number of municipalities				X							1
Informal MA with high number of municipalities			X								1
Informal MA with low number of municipalities	X				X	X		X			4

Step 3: Identifying potential planning tools per type of metropolitan area

In a third step we determined, on the basis of both typologies, which policy tools could be relevant for each type of metropolitan area and their relative importance in addressing the key challenges. To do so, we developed two matrices. In the first matrix we identified the key challenges per type of metropolitan area, based on the identified key challenges for the individual stakeholder metropolitan areas that represent the type (see tables 6.3 and 6.4 as well as the table with key challenges in Annex 2). In the second matrix we identified which potential policy tools (see section 2 in Annex 1) could be important in addressing the identified key challenges. Finally, by combining the two matrices we linked the potential policy tools to the different types of metropolitan area.

8.3 Key findings

8.3.1 Key challenges per type of area

8.3.1.1 Typology A

- On average 34 key challenges – 66% of all identified key challenges (n=51) – were identified per type of metropolitan area. However, there are considerable differences between different types of metropolitan area (table 8.5).
- The highest number of key challenges is found for medium-sized metropolitan areas with low population density: 92% of all identified key challenges were found to be relevant.
- The lowest number of key challenges is found for large-sized metropolitan areas with moderate to high population density: 41% of all identified key challenges were found to be relevant.
- Challenges that relate to demographics seem relevant for all types of metropolitan areas, except large-sized metropolitan areas with moderate to high population density.
- Challenges that relate to the spatial structure and development seem of less relevance to both large-sized and small-sized metropolitan areas with moderate to high population density.
- Challenges that relate to the economy and finances seem relevant for all types of metropolitan areas, except small-sized metropolitan areas with low population density.
- Challenges that relate to social welfare seem relevant for all types of metropolitan areas, except small-sized metropolitan areas with either high or low population density.
- Challenges that relate to transport infrastructure seem relevant for all types of metropolitan areas. The same applies, although to a lesser extent, for challenges that relate to institutional issues or the environment and quality of life.
- Challenges that relate to culture seem relevant to large-sized metropolitan areas with low population density and medium-sized metropolitan areas with either high or low population density.

Table 8.5 Key challenges per type of metropolitan area, based on typology A.

Key challenges	Large-sized MA with moderate to high population density	Large-sized MA with low population density	Medium-sized MA with moderate to high population density	Medium-sized MA with low population density	Small-sized MA with moderate to high population density	Small-sized MA with low population density
Demographics						
Population growth		x	x	x	x	x
Population decline				x		
Migration of population to suburban areas		x	x	x	x	x
Spatial structure and development						
Suburbanization (urban sprawl)	x	x	x	x		x
Inefficient spatial planning process		x	x	x	x	x
Reallocation of businesses outside core area		x	x	x		
Sporadic sprawl due to lack of planning			x	x		
Pressure on land		x	x			
Missed opportunities for mutually beneficial developments between municipalities		x				
Need for multifunctional land use planning		x	x	x	x	
Land price imbalances (i.e. suburbs - core city)		x		x		x
Achieving polycentric development				x		

Key challenges	Large-sized MA with moderate to high population density	Large-sized MA with low population density	Medium-sized MA with moderate to high population density	Medium-sized MA with low population density	Small-sized MA with moderate to high population density	Small-sized MA with low population density
Pressure from developers for urban sprawl				x		x
Ensuring sustainable commuting patterns (dealing with free rider effect)		x		x		x
Economy & finances						
Ensure affordable and good quality housing	x	x	x	x	x	
Economic stagnation e.g. housing market	x			x		
Creating sustainable tourism opportunities	x	x		x	x	
Taxation system does not support desired spatial development		x	x	x	x	
Lack of funding for metropolitan development	x	x		x	x	x
Achieve economic growth and attractiveness	x	x	x	x	x	
Social welfare						
Unequal job opportunities between different urban areas and among social groups	x	x	x	x		
Deprived communities in inner city	x	x	x			
Increase in foreign population (inflow)		x	x	x		
Social segregation		x	x	x	x	
Transport infrastructure						
Ensuring an efficient transport infrastructure, mobility and accessibility	x	x	x	x	x	x
Traffic congestion issues	x	x	x	x	x	x
Environment and quality of life						
Environmental quality	x	x	x	x	x	
Regeneration of post-industrial areas				x	x	
Using local resources in sustainable way		x	x	x		
Loss of agricultural land, agro-food resources	x	x		x	x	x
Conflicts of interest between urbanized areas and rural development context		x		x		x
Nature and landscape preservation	x	x	x	x	x	
Energy	x	x		x	x	
Climate adaptation (floods risk etc.)	x	x		x	x	x
Institutional						
Lack of legitimacy and recognition of the MA		x	x	x		x
Reluctance of politicians to address MA issues, and constrains in election of MA political body	x	x	x	x	x	x
Need for multilevel collaboration	x	x	x	x	x	x
Achieving shared vision on strategic plans	x	x	x	x	x	x
Cumbersome or complex legal system		x	x	x	x	
Fragmented administrative structures		x	x	x	x	
Gap between strategic planning and implementation of metropolitan development		x	x	x		x
Lack of leadership by regional and local governments for MA development		x		x		x
Lack of understanding and/or commitment among municipalities on the mutual benefits of planning beyond their administrative borders		x		x		x
Lack of effective communication between too many small municipalities with administrative power		x		x		x
Deal with inter-municipal/regional competition	x	x	x	x	x	
Internationalization of the MA relations	x			x		
Cultural						
Linguistic discrepancies between communities			x			
Accommodating multicultural communities		x	x	x		
Providing opportunities for the poorly educated			x	x		
Need for changing attitudes towards MA level of planning and development		x	x	x		x
Cultural heritage	x	x		x	x	
Number of challenges per type of MA:	21	42	32	47	25	22
In %	41	82	63	92	49	43

8.3.1.2 Typology B

- On average 33 key challenges – 64% of all identified key challenges (n=51) — were identified per type of metropolitan area. However, there are considerable differences between types (table 8.6).
- The highest number of key challenges is found for informal metropolitan areas with a small number of municipalities: 86% of all identified key challenges were found to be relevant.
- The lowest number of key challenges is found for semi-formal metropolitan areas with a large number of municipalities: 49% of all identified key challenges were found to be relevant.
- Challenges that relate to demographics seem relevant for all types of metropolitan areas, except formal metropolitan areas with a large number of municipalities.
- Challenges that relate to the spatial structure and development seem relevant for all types of metropolitan areas, but in particular for informal metropolitan areas.
- Challenges that relate to the economy and finances seem relevant for all types of metropolitan areas, but in particular for formal metropolitan areas.
- Challenges that relate to social welfare seem less relevant for semi-formal and informal metropolitan areas with a small number of municipalities.
- Challenges that relate to transport infrastructure seem relevant for all types of metropolitan areas. The same applies, although to a lesser extent, to challenges that relate to institutional issues or the environment and quality of life.
- Challenges that relate to culture seem relevant to formal, semi-formal and informal metropolitan areas with a small number of municipalities.

Table 8.6 Key challenges per type of metropolitan area, based on typology B.

Key challenges	Formal MA with high number of municipalities	Formal MA with low number of municipalities	Semi-formal MA with high number of municipalities	Semi-formal MA with low number of municipalities	Informal MA with high number of municipalities	Informal MA with low number of municipalities
Demographics						
Population growth			x	x	x	x
Population decline		x				
Migration of population to suburban areas		x	x	x	x	x
Spatial structure and development						
Suburbanization (urban sprawl)	x		x	x	x	x
Inefficient spatial planning process	x	x	x	x	x	x
Reallocation of businesses outside core area				x	x	x
Sporadic sprawl due to lack of planning				x	x	
Pressure on land				x		x
Missed opportunities for mutually beneficial developments between municipalities						x
Need for multifunctional land use planning	x	x	x	x		x
Land price imbalances (i.e. suburbs - core city)	x				x	x
Achieving polycentric development		x	x			x
Pressure from developers for urban sprawl					x	x
Ensuring sustainable commuting patterns (dealing with free rider effect)					x	x
Economy & finances						
Ensure affordable and good quality housing	x	x		x	x	x
Economic stagnation e.g. housing market	x	x				
Creating sustainable tourism opportunities	x	x	x			x
Taxation system does not support desired spatial development	x	x	x	x	x	x
Lack of funding for metropolitan development	x	x			x	x
Achieve economic growth and attractiveness	x	x		x		x
Social welfare						
Unequal job opportunities between different urban areas and among social	x	x		x	x	

Key challenges	Formal MA with high number of municipalities	Formal MA with low number of municipalities	Semi-formal MA with high number of municipalities	Semi-formal MA with low number of municipalities	Informal MA with high number of municipalities	Informal MA with low number of municipalities
groups						
Deprived communities in inner city	x			x		x
Increase in foreign population (inflow)		x		x		x
Social segregation	x	x		x		x
Transport infrastructure						
Ensuring an efficient transport infrastructure, mobility and accessibility	x	x	x	x	x	x
Traffic congestion issues	x		x	x	x	x
Environment and quality of life						
Environmental quality	x	x		x		x
Regeneration of post-industrial areas		x			x	x
Using local resources in sustainable way	x	x		x		x
Loss of agricultural land, agro-food resources	x				x	x
Conflicts of interest between urbanized areas and rural development context		x	x		x	x
Nature and landscape preservation	x		x	x		x
Energy	x	x	x			x
Climate adaptation (floods risk etc.)	x	x			x	x
Institutional						
Lack of legitimacy and recognition of the MA	x	x	x	x	x	x
Reluctance of politicians to address MA issues, and constrains in election of MA political body	x	x	x	x	x	x
Need for multilevel collaboration	x	x	x	x	x	x
Achieving shared vision on strategic plans	x	x	x	x	x	x
Cumbersome or complex legal system	x		x	x	x	x
Fragmented administrative structures	x	x	x	x	x	x
Gap between strategic planning and implementation of metropolitan development		x	x	x		x
Lack of leadership by regional and local governments for MA development					x	x
Lack of understanding and/or commitment among municipalities on the mutual benefits of planning beyond their administrative borders			x		x	x
Lack of effective communication between too many small municipalities with administrative power			x		x	x
Deal with inter-municipal/regional competition	x	x	x	x	x	x
Internationalization of the MA relations	x	x				
Cultural						
Linguistic discrepancies between communities				x		
Accommodating multicultural communities		x		x		x
Providing opportunities for the poorly educated		x		x		
Need for changing attitudes towards MA level of planning and development		x	x	x	x	x
Cultural heritage	x	x	x			x
Number of challenges per type of MA:	30	33	25	32	30	44
In %	59	65	49	63	59	86

8.3.2 Relevant policy tools per type of area

The matrix in table 8.7 presents the link between the key challenges and the relevant policy tools to address these challenges per stakeholder area. The policy tools have been formulated and categorized based on a literature analysis as part of the development of the guidelines for a metropolitan planning approach (see section 8.5).

Table 8.7 Potential policy tools for metropolitan areas per key challenge

Key challenge	Strategic	Coordinative	Structural	Procedural/financial	Collaborative
Demographics					
Population growth	x	x			x
Population decline	x	x			x
Migration of population to suburban areas	x	x			x
Spatial structure and development					
Suburbanization (urban sprawl)	x	x		x	x
Inefficient spatial planning process		x	x	x	x
Reallocation of businesses outside core area	x				x
Sporadic sprawl due to lack of planning		x	x	x	
Pressure on land	x			x	x
Missed opportunities for mutually beneficial developments between municipalities	x	x			x
Need for multifunctional land use planning		x	x		x
Land price imbalances (i.e. suburbs - core city)		x		x	
Achieving polycentric development	x	x			
Pressure from developers for urban sprawl		x		x	x
Ensuring sustainable commuting patterns (dealing with free rider effect)	x	x		x	
Economy & finances					
Ensure affordable and good quality housing		x	x	x	x
Economic stagnation e.g. housing market		x	x	x	
Creating sustainable tourism opportunities	x	x			x
Taxation system does not support desired spatial development			x	x	x
Lack of funding for metropolitan development		x		x	x
Achieve economic growth and attractiveness	x	x	x		x
Social welfare					
Unequal job opportunities between different urban areas and among social groups	x	x			x
Deprived communities in inner city		x	x		
Increase in foreign population (inflow)	x	x			
Social segregation	x	x			
Transport infrastructure					
Ensuring an efficient transport infrastructure, mobility and accessibility	x	x	x		x
Traffic congestion issues			x	x	x
Environment and quality of life					
Environmental quality	x		x	x	x
Regeneration of post-industrial areas	x				x
Using local resources in sustainable way	x	x		x	
Loss of agricultural land, agro-food resources	x	x		x	x
Conflicts of interest between urbanized areas and rural development context		x			x
Nature and landscape preservation	x		x	x	x
Energy	x	x			
Climate adaptation (floods risk etc.)	x	x	x		x
Institutional					
Lack of legitimacy and recognition of the MA	x		x		x
Reluctance of politicians to address MA issues, and constrains in election of MA political body	x	x			x
Need for multilevel collaboration		x	x		x
Achieving shared vision on strategic plans	x	x			x
Cumbersome or complex legal system		x	x	x	
Fragmented administrative structures		x	x		x
Gap between strategic planning and implementation of metropolitan development			x	x	x
Lack of leadership by regional and local governments for MA development		x	x		x

Key challenge	Strategic	Coordinative	Structural	Procedural/financial	Collaborative
Lack of understanding and/or commitment among municipalities on the mutual benefits of planning beyond their administrative borders	x				x
Lack of effective communication between too many small municipalities with administrative power		x	x		x
Deal with inter-municipal/regional competition		x	x		x
Internationalization of the MA relations			x		x
Cultural					
Linguistic discrepancies between communities		x			x
Accommodating multicultural communities		x			x
Providing opportunities for the poorly educated		x			x
Need for changing attitudes towards MA level of planning and development			x		x
Cultural heritage	x	x		x	

The relative importance of the potential policy tools to address the key challenges per type of metropolitan area is shown in figure 8.1 (based on typology A) and figure 8.2 (based on typology B). Although percentages differ, the overall pattern is very similar for each type of metropolitan area, no matter what typology was used.

For both typologies, it is true that coordinative and collaborative policy tools address most key challenges; these tools may address about 80% or more of all challenges. Procedural/financial policy tools are much less widely applicable; these tools may address about 40% of all challenges. Strategic and structural policy tools take an intermediate position, addressing about 50-60% of all challenges.

Figure 8.1 Relative importance of the potential policy tools to improve strategic planning per type of metropolitan area, based on typology A.

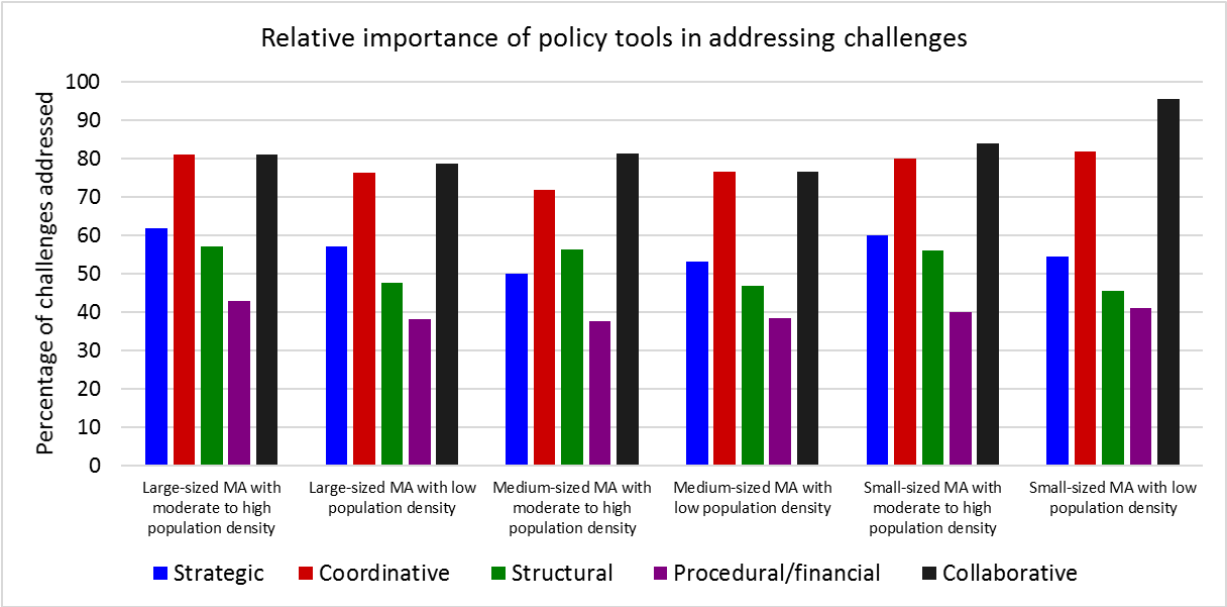
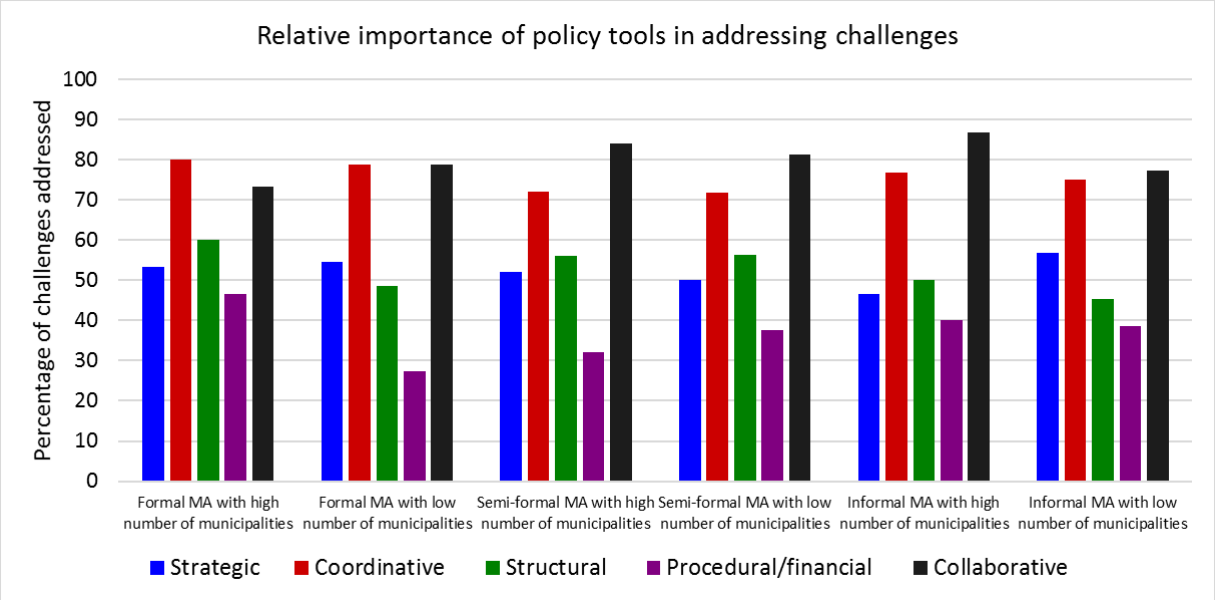


Figure 8.2 Relative importance of the potential policy tools to improve strategic planning per type of metropolitan area, based on typology B



8.4 Discussion

Based on the findings of our case study analysis, we linked potential policy tools to different types of metropolitan area, categorized on the basis of two typologies: one with a focus on the spatial characteristics of the metropolitan areas and the other with a focus on the institutional characteristics of the metropolitan areas. The outcome should be seen as a first attempt to generalize the findings and allow metropolitan areas across Europe to explore their potential challenges and the policy tools that may assist in addressing current problems that relate to the strategic planning of metropolitan areas. The outcome, however, should be used with care as the analysis is based on only a limited number of stakeholder metropolitan areas. Consequently, the data used for each type of metropolitan area are derived from a limited number of datasets, i.e. respectively one, two or four case studies (see tables 6.3 and 6.4). Moreover, no city is the same, hence there may always be challenges that are specific to an individual metropolitan area. As a result, the outcome presented here should be used as an indicative list rather than a full list of possible policy tools that can help address identified key challenges. We recommend carrying out similar analyses for other metropolitan areas to enlarge the dataset and thus increase the inference power of both the analysis and the recommendations.

8.5 Conclusions

- The recommendations that relate to potential policy tools for the ten stakeholder metropolitan areas can be extrapolated to other metropolitan areas, but caution is needed as the dataset used is too limited for robust generalizations.
- The relative importance of the policy tools in addressing key challenges per type of metropolitan area should be seen as indicative and primarily as a reflection of the needs of studied metropolitan areas that are similar in size and population density (typology A) or similar in status and number of municipalities (typology B).
- The overall pattern in the applicability of policy tools is very similar for each type of metropolitan area, no matter what typology was used. For all metropolitan areas, coordinative and collaborative policy tools address most key challenges while procedural/financial policy tools are the least widely applicable. Strategic and structural policy tools take an intermediate position.

9 The future of metropolitan planning: an evidence-based knowledge agenda

Existing knowledge suggests that the contemporary metropolitan policy reforms will powerfully shape the political and institutional environment in which future strategies of spatial planning and territorial restructuring will be articulated, whether at local, regional, national or supranational scales. Future territorial studies could advance research to further reveal the specific action areas through which metropolitan spatial development will be taking place.

As the current study has illustrated, cross-national and comparative research on these matters is essential in order to provide benchmarking and enhance the theoretical and empirical understanding of many different institutional processes, political strategies and social struggles through which metropolitan governance and spatial planning is or could be taking place. Whereas metropolitan planning initiatives are strongly conditioned by existing frameworks of governmental territorial organization, they also represent an important political mechanism through which such frameworks are being rescaled. Metropolitan development is strongly influenced by the inherited institutional frameworks of national territorial organization and its political-economic regulation. These institutional frameworks hinge upon the degree of decentralization of planning responsibilities that has been attained within a particular region.

Spatial planning at metropolitan scale represents complex process of interaction between actors and involves a number of governance and technical aspects of planning. Metropolitan development however, needs to be first understood as a phenomenon that can have its advantages or disadvantages and needs to be addressed by public action (plans and programs, strategic thinking, investment, etc.). Metropolitan scale of planning can be perceived as an opportunity to find joint solutions to current challenges, but also as a direct competition between local or regional authorities.

The commonly recognized strategies at national or local level that address the phenomenon of metropolitan development are based on three key spatial development principles, namely *accumulation, redistribution and governmental institutional reform* (Box 11).

Box 5: Strategic spatial planning foci for metropolitan development

Accumulation strategies
Accumulation strategies may seek to reduce the costs of investment within a regional economy, and thus to attract mobile capital; they may seek to create non-substitutable, place-specific locational advantages, and thus to enhance capital's embeddedness within a regional economy; or they may seek to promote distinctive combinations of the latter's agendas. Although accumulation strategies have remained relatively immature in many European city regions, they have played a central role in recent debates on metropolitan political reform.

Redistributive strategies
*R*edistributive strategies may attempt to recalibrate the social and geographical balance between growth and redistribution within an urban region. Such strategies may entail the introduction of new social and environmental policies to manage the dysfunctional effects of regional economic restructuring as well as new fiscal policies to re-channel tax revenues into fiscally enfeebled city cores and older industrial towns and neighbourhoods. Whereas the tension between redistribution and growth exists in some form in nearly all contemporary city regions, it is only politicized under certain circumstances, generally due to the activities of a redistribution-oriented territorial alliance within a national, regional or local economy. Strategies of intraregional fiscal redistribution and territorial equalization have played particularly prominent roles within recent debates on metropolitan institutional reform.

Institutional reform
This strategy is based on the attempt of the government to modify the specific accumulation regimes, institutional arrangements, patterns of regulatory intervention and forms of inter-organizational coordination within an urban region. Such strategies may entail a reorientation of local and regional economic policies, a reorganization of the division of regulatory tasks, burdens and responsibilities within existing institutions and, under some conditions, the creation of entirely new state agencies and regulatory bodies oriented towards specific aspects of regional economic governance. Governmental strategies can be a strong trigger in metropolitan institutional reform and foster the mobilization of political strategies oriented towards other goals, such as accumulation, redistribution and so forth.

The choice of one or the other of these spatial development principles can lead to targeted actions towards specific direction of the metropolitan development.

When powerful social and economic interests are tied closely to existing levels of national/regional territorial organization, metropolitan rescaling generates intense struggles between opposed parties, political coalitions and territorial alliances regarding issues such as jurisdictional boundaries, institutional capacities, democratic accountability, tax systems and intergovernmental linkages. Even when new frameworks of metropolitan political organization are successfully established, any number of unresolved tensions may permeate the idea of promoting place-specific strategies of socio-economic development within their jurisdictions. In most western European city-regions, the agenda of enhancing regional distinctiveness stands in direct tension with the perceived need to reduce production costs through regulatory downgrading, decentralization and direct subsidies to core cities.

Meanwhile, enhancing regional institutional flexibility stands in direct tension with the need for continued fiscal support and administrative coordination by superordinate tiers of the government, including regional and national governments. The specific balance among these opposed regulatory priorities within a given urban region is thus likewise a matter of intense socio-political contestation at a range of spatial planning scales (Jones, 2001).

Furthermore, some newly established metropolitan political institutions with the capacity to manage the city-regions have become key geographical sites in which various trends and counter-trends of institutional reorganization are being articulated. On the other hand, this discussion has suggested that the national government powers are being rescaled through a conflictual interaction between inherited institutions based on regulation and political strategies oriented towards the transformation of those institutions.

This illustrates the contemporary struggles over metropolitan areas development as strategic political responses to regulatory deficits, governance failures and crisis tendencies induced by former urban policies.

In the attempt to advance the current discursive foundation of the academic field and the policy agenda on metropolitan development in Europe, a number of fundamental questions can be raised. Getting the answers to these questions will further form the ground for evidence-based metropolitan planning in a wider European context:

- Whether the integrated spatial organization of economic activities can intensify inter-place competition for the movement of capital investments;
- Whether large-scale urban regions rather than urban localities (cities) or national economies represent the basic territorial units between which this competition is occurring;
- Whether competition among places and localities within a major urban region attracts external capital investment and challenges the region's capacity to compete for such investment at supra-regional scales;
- Whether new forms of region-wide cooperation, spatial planning and governance will respond to the need to enhance a region's capacity to engage in metropolitan and European territorial competition that can contribute to overall SDGs in Europe;
- Whether effective region-wide socio-economic cooperation hinges upon the incorporation of important local and regional actors, including businesses, development agencies, transport authorities and other local booster organizations;
- Whether existing administrative structures and spatial planning systems undermine metropolitan-level competitiveness insofar as they fragment rather than unify a region's capacities for economic development;
- Whether the introduction of new administrative structures (and if so, which) would provide an important institutional means of enhancing metropolitan cooperation, bundling regional productive capacities and strengthening regional/inter-regional and cross-border competitive advantages.

While these issues are under development, a new model of urban planning has been remerging among urban policies, which 'highlights values of negotiation, partnership, voluntary participation and flexibility in the constitution of new institutional relations and

structures in urban planning (Healey, 2003; Sager, 2013, Simeonova, 2016). Metropolitan governance is being redefined from a vertical, coordinative and redistributive relationship within a national administrative hierarchy into a horizontal, competitive and development-oriented relationship between subnational territories. The challenge is in ensuring balanced strategies between opposed political and economic forces and territorial alliances. Potential metropolitan institutions are considered to be the new agents in this process (Box 12).

Box 6 The potential role of metropolitan institutions

Metropolitan institutions as agents of locational policy
Metropolitan reform initiatives have promoted city regions as sites for new forms of locational policy that interiorize the perceived constraints of international territorial competition directly into local and regional policy agendas. This institutional upscaling can deal with the criticism of promoting purely localist economic development and an affirmation that metropolitan regions rather than cities or localities represent the most appropriate territorial units within which place-specific competitive advantages may be secured. The metropolitanization of locational policy can be viewed as a means to strengthen the competitive advantages of a regional economy in the face of local market failures and intensifying external pressures.

Metropolitan institutions as agents of multi-scale management
Metropolitan initiatives can promote city regions as major institutional arenas in which new forms of multi-level governance are developed. Contemporary metropolitan planning can thus be understood as an attempt to secure new regionalized scales and to manage the competitive interactions that underpin inter-local relations within an integrated European economy. The city region is being mobilized as the key institutional pivot between an internal territory of cooperation, administrative coordination and socio-spatial solidarity and an external space of territorial competition, intergovernmental relations, mobile capital flows and market relations. By calibrating the interplay between competitive and cooperative relations within an urban region, metropolitan institutions can be viewed as a means to alleviate the intra-territorial tensions, conflicts and contradictions associated with unregulated economic competition.

Metropolitan institutions as agents of meta-governance
New approaches to metropolitan governance and planning in Europe may also be viewed as an important institutional medium through which new governmental capacities for meta-governance are being constructed. The mobilization of local economic initiatives can generally entail the transfer of authority to a range of private and para-state actors and organizations. By contrast, metropolitan planning can also be an attempt by national and local institutions to maintain some measure of regulatory coordination over the informal governance networks, voluntary bodies and public-private partnerships that underpin metropolitan governance.

These discussed above considerations should be a subject of future elaborate debates among policy makers and academia. Yet deeper insight is needed into each institutional model as well as a strategy of metropolitan planning and governance in the context of the specific metropolitan areas. While there is no one comprehensive knowledge base on what works what not in the metropolitan spatial planning arena, more evidence is needed about current practices and challenges.

References

Bright E & A, Coleman P R, and R, Amy N (2013) *LandScan 2012 Global Population Database*, Oak Ridge National Laboratory.

Commission of the European Communities (2016) Cities leading the way to a better future State of European Cities Report, UN-Habitat, European Union.

Dijkstra L, Poelman H (2012) *Cities in Europe: the new OECD-EC definition*. European Commission.

ESPON (2011) *ESPON 2013 database. Final report*. ESPON.

ESPON (2011) Mapping guide-Cartography in ESPON 2013.

ESPON (2013a) *Metropolisation and Polycentric Development in Central Europe (POLYCE)*. ESPON.

ESPON (2013b) *GEOSPECS -European Perspective on Specific Types of Territories*. ESPON and University of Geneva.

ESPON (2013c) *Territorial Approaches for New Governance* (TANGO). ESPON

ESPON (2014a) Database portal, Urban OLAP Cube, ESPON M4D. Available at: http://database.espon.eu/db2/resource?idCat=21 (accessed October 2017).

ESPON (2014b) Urban OLAP Cube, ESPON M4D.

ESPON & Spiekermann & Wegener,Urban and Regional Research (S&W), (2015) TRACC - Transport Accessibility at Regional/Local Scale and Patterns in Europe. Applied Research 2013/1/10; Final Report Version 06/02/2015, Volume 2, TRACC Scientific Report

ESPON (2017) *Spatial dynamics strategic planning in metropolitan areas, Inception report*. ESPON.

European Forum for Geography and Statistics (2017) GEOSTAT 3. Available at: http://www.efgs.info/geostat/geostat-3/ (Accessed November 2017).

European Commission, Joint Research Centre (JRC); Columbia University, Center for International Earth Science Information Network - CIESIN (2015): GHS population grid, derived from GPW4, multitemporal (1975, 1990, 2000, 2015). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/jrc-ghsl-ghs_pop_gpw4_globe_r2015a

European Union, UN-Habitat (2016) *The state of European cities 2016: Cities leading the way to a better future.* London: PFD Media Group.

Eurostat (2016) *Urban Europe. Statistics on cities, towns and suburbs*. Luxembourg: European Union.

Homan, Jackie – Howl, Dave – Tosics, Ivan (2007) URBACT METROGOV Final Report. Sub-national policy and governance on metropolitan issues: Birmingham / Budapest / Cologne / Frankfurt / Glasgow / Lille / Malmö / Milan. http://urbact.eu/sites/default/files/metrogov.pdf

Jacquier, C., 2010: Challenges and Opportunities of Multilevel Governance in Europ e.
Presentation at the Belgian Presidency Multi -level Urban Governance Conference, Li ège,
December 2010.

Milego, R., M. J. Ramos, F. Domingues, & C. Martínez (2014). OLAP technologies applied to the integration of geographic, thematic and socioeconomic data in the context of ESPON, Universitat Autònoma de Barcelona (UAB) Technical Repor. 50p.; available at: http://database.espon.eu/db2/resource?idCat=21

OECD (2012) *Redefining "Urban": A New Way to Measure Metropolitan Areas*. 19 April 2011. DOI: 10.1787/9789264174108-en.

OECD (2013) *Definition of Functional Urban Areas (FUA) for the OECD metropolitan database*. OECD.

Pesaresi, Martino; Ehrilch, Daniele; Florczyk, Aneta J.; Freire, Sergio; Julea, Andreea; Kemper, Thomas; Soille, Pierre; Syrris, Vasileios (2015): GHS built-up grid, derived from Landsat, multitemporal (1975, 1990, 2000, 2014). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/jrc-ghsl-ghs_built_ldsmt_globe_r2015b

Simeonova, V. & van der Valk, (2009) The need for a Communicative Approach to improve Environmental Policy integration in urban Land Use Planning, Journal of Planning Literature 23 (3). - p. 241 - 261.

Simeonova, V.S. (2016) Shaping tomorrow's urban environment today : Environmental Policy Integration in urban planning: the challenges of a communicative approach, Wageningen : Wageningen University, - 215 p.

Silva, E. & R. Acheampong (2015) Developing and Inventory and Typology of Land-Use Planning Systems and Policy Instruments in OECD Counties, OECD Environment Working Papers, No.94, OECD Publishing, Paris. http://dx.doi.org/10.1787/5jrp6wgxp09s-en

Tosics I (2013) *MAIA study, City sheet Brno*. Budapest: Metropolitan Research Institute.

Tosics, Iván: City-regions in Europe: the potentials and the realities. Town Planning Review Vol. 78, No. 6 2007, 775-796 http://mri.hu/wp-content/uploads/2012/07/City-regions-in-Europe-the-potentials-and-the-realities.pdf

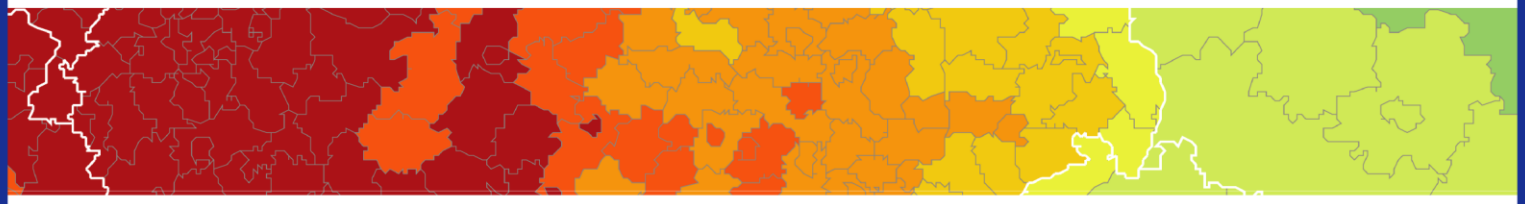
Tosics, I. 2013. „Sustainable land use in peri-urban areas: government, planning and financial instruments." In: Nillson, K., Pauleit, S., Bell, S., Aalbers, C. and Nielsen, T.S. (eds.) Peri-urban futures: Scenarios and models for land use change in Europe. Springer. pp. 373-404

Goodspeed TJ (1998) Tax competition, benefit taxes, and fiscal federalism. Natl Tax J sl(3):579-586

UNEP-WCMC and IUCN (2017), Protected Planet: The World Database on Protected Areas (WDPA), November 2017, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net.

van Donkelaar, A., Martin R.V., Brauer M., Hsu N.C., Kahn R.A., Levy R.C., Lyapustin A., Sayer A.M. & Winker D.M.(2016). Global Estimates of Fine Particulate Matter using a Combined Geophysical-Statistical Method with Information from Satellites, Models, and Monitors. Environ Sci Technol. 2016 Apr 5;50(7):3762-72. doi: 10.1021/acs.est.5b05833. Epub 2016 Mar 24.

Zanin C, Lamber N and Ysebaert R (2013) *Mapping guide-Cartography in ESPON 2013.* ESPON.



ESPON 2020 – More information

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