

Radu-Matei COCHECI

**Suburbanization in Romanian
Metropolitan Areas**
A Spatial Planning Perspective

Foreword by Alexandru-Ionuț PETRIȘOR

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I have wanted to write this book ever since I wrote my dissertation on urban sprawl in the metropolitan area of Braşov, Romania, ten years ago. Un-controlled suburbanization around Romania's largest cities has been a research theme of great interest to me and I am grateful to the teachers who guided my first research steps and the colleagues with whom I had the pleasure of carrying out research in this field in the past.

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Bucharest, November 2023

M.C.

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Foreword

Alexandru-Ionuț PETRIȘOR, PhD, habil.

Thinking about writing this foreword, I recalled the title of Professor Cătălin Niculae Sârbu's 2005 book, "*Urban habitat in peri-urban expansion*". While in 2003 the share of urban population was forecasted to reach 50% in the next decade (Cohen, 2003), and this value was already exceeded by 2008 (Grimm *et al.*, 2008), the trend announced by the aforementioned title is obvious. The process is exacerbated by the human tendency to organize the space (Ianoș *et al.*, 2011). As a result, urban nature is fragmented and lost (Petrișor *et al.*, 2016), and urban habitats take the shape of a patched matrix (Luck and Wu, 2002). The same trend is propagated unto peri-urban areas (Cocheci and Petrișor, 2023a, 2023b).

Urbanization takes many forms (for more details on urbanization mechanisms across the world, see Pușcașu, 2011; Kupková *et al.*, 2013; Díaz-Palacios-Sisternes *et al.*, 2014; Grădinaru *et al.*, 2015; Ianoș *et al.*, 2016; Iașu and Eva, 2016; Hamma and Petrișor, 2018, and for a brief presentation, Petrișor *et al.*, 2022). In Eastern Europe, the process occurs especially around large cities, taking exactly the form of expanding human habitat over peri-urban areas, natural and agricultural (Kupková *et al.*, 2013), fragmenting and simplifying them (Petrișor and Sârbu, 2010), and consequently diminishing their biodiversity, functionality, carrying capacity and ability to provide quality ecosystem services (Petrișor *et al.*, 2016, 2021, 2022). Abandonment of agriculture and deforestations are seen as precursors of urbanization (Grădinaru *et al.*, 2015). The result is an unsustainable development, with negative consequences not only over the environment, but also over life quality (Petrișor *et al.*, 2016).

The solution for turning this vicious circle into a virtuous one is found in planning. Wise planning (accounting for the environment in general and urban green infrastructure in particular) is able to prevent sprawl, ensure the connectivity of urban greenery, and increase its ecosystem services, contributing to urban sustainability and the welfare of urban dwellers (Petrișor *et al.*, 2016). Unfortunately, changing the planning system to more sustainable patterns is not an easy task. Comparative studies revealed the inertia of Eastern European planning systems to change, and to moving from satisfying political or administrative requirements or short-term economic interests to meeting the needs of citizens (Nowak *et al.*, 2022, 2023; Legutko-Kobus *et al.*, 2023). In Romania, in particular, planners are rarely ready to listen to other professionals, and there seem to be language barriers (Petrișor and Petrișor, 2013; Slave *et al.*, 2023). The planning language is outdated with respect to environmental issues,

and reflects the 1950's vision according to which the environment is a more or less definite shell placed 'out there', and able to absorb indefinitely human impacts, providing services at the same rate and quality irrespective of the human actions against it (Petrișor and Petrișor, 2013). Unfortunately, the Romanian case is not singular. Recent comparative studies indicated that Romanian and Polish cities have continuously experienced the loss and fragmentation of their greenery since 2006, although the Romanian planning system consists of too many plans, and the Polish one of too few (Petrișor *et al.*, 2021, 2022). The trends indicate that cities tend to lose most green infrastructure from the most dominant category (landscaped, agricultural or natural), suggesting that city administrators seem to be indifferent to the loss, since 'much' is still left over (Petrișor *et al.*, 2022).

Dealing with the generally shifting relationship between planning and the environment in general (Petrișor and Petrișor, 2013) and with metropolitan planning in particular (Cocheci and Petrișor, 2023a, 2023b), Dr. Radu Matei Cocheci's book, "*Suburbanization in Romanian Metropolitan Areas. A Spatial Planning Perspective*", makes an important contribution to the debate. The book is the outcome of the research project "*Impact of sub-urbanization on Romanian metropolitan areas - need for new planning and territorial management tools - METROPLAN*", which I had the honor and opportunity to mentor. The project employed a complex methodology, combining geospatial analyses with geo-statistical tools based on indicators, field work, and expert interviews, able to produce altogether a substantial understanding of the complex puzzle of planning.

The results are relevant and very important for a wide range of direct and indirect stakeholders. Planners can find knowledge on the importance of environmental issues and tools for preserving and developing urban green infrastructure, and especially for maintaining its spatial continuity. City managers can find research-based evidence for decision-making on urban policies and developing targeted policies, more exactly by identifying the most vulnerable areas and targeting retrofitting interventions in these areas, and finally scientists can find a way for better communicating their results via planning manuals. While the book (and project) focused on Romania, making the results relevant especially for Eastern Europe and post-socialist countries, comparisons were made with Western countries, particularly Italy, in order to extend their significance to a more global audience, such as countries practicing derogatory planning (e.g., despite having a regulatory system for planning, spatial development occurs through exceptions from the rules rather than observing the planning regulations). Also, apart from focusing on metropolitan areas, analyses were carried out nationally and locally too.

The study is a premiere in terms of assessing urbanization patterns specific to Romania since 1990 at the national level in all metropolitan areas and also integrating environmental and spatial planning methods of analysis in suburban areas affected by urban sprawl, answering to three research goals: identifying the metropolitan areas experiencing highest suburbanization, assessing the negative effects of urban sprawl, and defining a new planning instrument at metropolitan level, aimed at curbing the negative outcomes of sprawl. The most important and also novel contribution is made by defining the requirements that a potential new planning instrument, i.e., the Metropolitan Plan, should meet in order to successfully mitigate the negative effects of sprawl. This instrument meets the core conditions proposed by Nadin *et al.* (2021), being integrated, adaptive and participatory.

The novel approach to a problem affecting many cities around the world, based on scientific evidence and transposed in planning recommendations makes “Suburbanization in Romanian Metropolitan Areas. A Spatial Planning Perspective” an important contribution to the field, useful to all stakeholders involved in the planning process.

References

- Cocheci R. M., Petrișor A.-I. (2023a), *Extended suburbanisation and land cover dynamics in post-socialist metropolitan areas: Evidence from Romania*, dISP - The Planning Review 59(2): 88-102.
- Cocheci R. M., Petrișor A.-I. (2023b), *Assessing the negative effects of suburbanization: the urban sprawl restrictiveness index in Romania's metropolitan areas*, Land 12(5):966.
- Cohen J. E. (2003), *Human population: The next half century*, Science 302(5648): 1172-1175.
- Díaz-Palacios-Sisternes S., Ayuga F., García A. I. (2014), *A method for detecting and describing land use transformations: An examination of Madrid's southern urban-rural gradient between 1990 and 2006*, Cities 40A: 99-110.
- Grădinaru S. R., Ioja I. C., Onose D. A., Gavrilidis A. A., Pătru-Stupariu I., Kienast F., Hersperger A. M. (2015), *Land abandonment as a precursor of built-up development at the sprawling periphery of former socialist cities*, Ecological Indicators 57: 305-313.
- Grimm N. B., Faeth S. H., Golubiewski N. E., Redman C. L., Wu J., Bai X., Briggs J. M. (2008), *Global Change and the Ecology of Cities*, Science 319(5864): 756-760.
- Hamma W., Petrișor A.-I. (2018), *Urbanization and risks: case of Bejaia city in Algeria*, Human Geographies 12(1): 97-114.
- Ianoș I., Petrișor A.-I., Stoica V. I., Sârbu C. N., Zamfir D., Cercleux A. L. (2011), *The different consuming of primary eco-energies and their degradation in territorial systems*, Carpathian Journal of Earth and Environmental Sciences 6(2): 251-260.

- Ianoş I., Sîrodoev I., Pascariu G., Henebry G. (2016), *Divergent patterns of built-up urban space growth following post-socialist changes*, Urban Studies 53(15): 3172-3188.
- Iaşa C., Eva M. (2016), *Spatial profile of the evolution of urban sprawl pressure on the surroundings of Romanian cities (2000-2013)*, Carpathian Journal of Earth and Environmental Sciences 11(1): 79-88.
- Kupková L., Bičík I., Najman J. (2013), *Land Cover Changes along the Iron Curtain 1990-2006*, Geografie 118(2): 95-115.
- Legutko-Kobus P., Nowak M. J., Petrişor A.-I., Bărbulescu D., Crăciun C., Gârjoabă A. I. (2023), *Protection of Environmental and Natural Values of Urban Areas against Investment Pressure: A Case Study of Romania and Poland*, Land 12(1): 245.
- Luck M., Wu J. (2002), *A gradient analysis of urban landscape pattern: a case study from the Phoenix metropolitan region, Arizona, USA*, Landscape Ecology 17: 327-339.
- Nadin V., Stead D., Dąbrowski M., Fernandez-Maldonado A. M. (2021), *Integrated, adaptive and participatory spatial planning: Trends across Europe*, Regional studies 55(5): 791-803.
- Nowak M. J., Mitrea A., Lukstina G., Petrişor A.-I., Filepné Kovács K., Simeonova V., Yanchev P., Jürgenson E., Pödra K., Řezáč V., Mikalauskaitė K., Pranevičienė B., Ladzińska Z., Baloga M. (2023), *Spatial Planning Systems in Central and Eastern European Countries. Review and Comparison of Selected Issues*, SpringerBriefs in Geography, Springer, Cham, Switzerland.
- Nowak M. J., Petrişor A.-I., Mitrea A., Filepné Kovács K., Lukstina G., Jürgenson E., Ladzińska Z., Simeonova V., Lozysky R., Rezac V., Pantyley V., Praneviciene B., Fakeyeva L., Mickiewicz B., Blaszkę M. (2022), *The Role of Spatial Plans Adopted at the Local Level in the Spatial Planning Systems of Central and Eastern European Countries*, Land 11(9): 1599.
- Petrişor A.-I., Andronache I. C., Petrişor L. E., Ciobotaru A. M., Peptenatu D. (2016), *Assessing the fragmentation of the green infrastructure in Romanian cities using fractal models and numerical taxonomy*, Procedia Environmental Sciences 32: 110-123.
- Petrişor A.-I., Mierzejewska L., Mitrea A. (2022), *Mechanisms of Change in Urban Green Infrastructure - Evidence from Romania and Poland*, Land 11(5): 592.
- Petrişor A.-I., Mierzejewska L., Mitrea A., Drachal K., Tache A. V. (2021), *Dynamics of Open Green Areas in Polish and Romanian Cities During 2006-2018: Insights for Spatial Planners*, Remote Sensing 13(20): 4041.
- Petrişor A.-I., Petrişor L. E. (2013), *The shifting relationship between urban and spatial planning and the protection of the environment: Romania as a case study*, Present Environment and Sustainable Development 7(1): 268-276.
- Petrişor A.-I., Sârbu C. N. (2010), *Dynamics of geodiversity and eco-diversity in territorial systems*, Journal of Urban and Regional Analysis 2(1): 61-70.
- Puşcaşu V. (2011), *Some considerations about urban planning and urban landscape relationship in Romania*, Public Administration and Regional Studies 4(1): 50-60.
- Slave A. R., Ioja I. C., Hossu C. A., Grădinaru S. R., Petrişor A.-I., Hersperger A. M. (2023), *Assessing public opinion using self-organizing maps. Lessons from urban planning in Romania*, Landscape and Urban Planning 231: 104641.

Introduction. The importance of metropolitan planning for managing suburbanization

Overview

The suburbanization of metropolitan areas has been the predominant pattern of urban growth in European post-socialist countries since 1990. In Romania, the drivers of suburbanization leading to urban sprawl have been similar to those in other post-socialist countries: privatization, deregulation of economic activities (emergence of a private and independent real estate housing market) and decentralization of political power, with land use planning responsibilities given to local public authorities (Stanilov & Sýkora, 2014).

The visible result is the emergence of new morphological patterns having a negative impact on the landscape of peri-urban areas (Stan, 2013). However, the problems posed by this uncontrolled urban development are not merely aesthetic. Suburbanization in Romania has been a process almost entirely led by private developers who rarely invested in infrastructure, placing all burden on the already stretched public budgets. The overall impact of these developments on the environment of metropolitan areas in Romania has not been assessed, nor has there been a thorough analysis of the quality of living issues in these new neighbourhoods. All in all, the lack of coherence in the development of new residential areas is aided by territorial fragmentation (with rural local public authorities around cities often encouraging new residential development in order to increase income from taxes) and the fact that there are no adequate planning instruments or governance structures at metropolitan level.

There is a general need for new planning instruments that could question current institutional formats and practices (Hajer, 2015) and respond to pressing societal needs. As some metropolitan areas in Romania (the so-called Magnet Cities - see Cristea et al., 2017) become more and more attractive for new residents, these areas could become a test bed for the application of new planning instruments. Given the social vulnerability of suburbs lacking adequate social infrastructure (Klinenberg, 2018), these new planning instruments should also address possible retrofitting strategies, like increasing walkability and public service provision (Mantey & Pokojski, 2020). Furthermore, proper spatial planning can improve the provision of ecosystem services in suburban areas through the protection and expansion of existing green infrastructure, thus responding to existing environmental issues generated by urban sprawl.

Research focus

This book provides a synthesis of the results of the METROPLAN research project (*The impact of suburbanization in Romania's metropolitan areas - the need for new territorial planning and management instruments*), implemented between April 2022 - December 2023 and financed by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI.

The research contains a thorough analysis of suburbanization characteristics and impact in Romania's metropolitan areas. In order to do so, the research focuses on three different territorial scales:

- National (measuring suburbanization);
- Metropolitan (impact assessment in relation to socio-economic indicators);
- Local (detailed morphological and public service provision analysis).

Its first aim is to assess urbanization patterns since 1990 at national level, in all of Romania's metropolitan areas, by combining geospatial techniques (GIS using CORINE Land Cover Change data) and statistical analysis (using data from the National Institute for Statistics database). The result is a ranking of metropolitan areas which allows the selection of the five metropolitan areas most affected by suburbanization.

A methodology for assessing the negative effects of suburbanization at metropolitan level was then developed, with the objective of determining the local administrative units most affected by environmental degradation and quality of living issues, through the computation of a restrictiveness index (Cocheci, 2016). The application of this methodology allows policymakers to identify the most vulnerable suburban areas - the local administrative units with the highest restrictiveness - which need retrofitting interventions.

The two local administrative units with the highest restrictiveness index values were then selected for a more detailed qualitative analysis regarding landscape and urban planning issues, showcasing the negative effects of uncontrolled suburban development. The analysis of existing and proposed urban plans for the selected local administrative units was used to highlight the issues of existing planning instruments.

In the end, through inputs from experts in the field of spatial planning and direct access to other planning cultures (studying the case of Italy), the research identifies principles and content elements for a new planning instrument at metropolitan level, that could help tackle uncontrolled suburbanization issues in the future. The new planning

instrument - the Metropolitan Plan - would integrate possible procedures related to public service provision, green infrastructure development and retrofitting of existing suburban developments. **Table 1** summarizes the three objectives of this research, along with the methods used for reaching these objectives.

Table 1. Research objectives and methods

Research objective	Methods used
O1. Identifying the metropolitan areas in Romania with the highest suburbanization dynamic since 1990.	CORINE Land Cover change analysis between the years 1990 and 2018 for the entire national territory, using ArcGIS Spatial Analyst tools.
	Analysis of data from the National Institute of Statistics regarding the evolution of housing units.
	Ranking of metropolitan areas in Romania based on the two indicators (artificial surface growth and number of housing units' growth).
O2. Assessing the negative effects of uncontrolled urban development in five metropolitan areas, highlighting the local administrative units with the highest restrictiveness and the effects on the quality of living.	Extensive literature review regarding the negative effects of urban sprawl
	Defining a set of indicators for impact assessment, in different categories: environmental, social and economic impact.
	Applying an online questionnaire to minimum 50 experts in the field - Expert opinion for establishing the final set of indicators and their weights in the computation of a restrictiveness index related to urban sprawl development in each local administrative unit.
	Ranking of the local administrative units in the five selected metropolitan areas according to the value of the restrictiveness index.
O3. Defining a new planning instrument at metropolitan level - the Metropolitan Plan - and listing its principles, content and possible procedures.	Detailed morphological and public service provision analysis for the two local administrative units with the highest restrictiveness index, highlighting the main problems faced by residents in uncontrolled suburban developments. On-field surveys will be used for the analysis.
	Extensive literature review regarding the possible solutions for mitigating uncontrolled suburban development.
	Extensive review of the current legislation, in order to better understand the current barriers for a sustainable development of suburban areas.
	Structured interviews with at least 10 experts involved in central or local public administration.
	Detailed case study of metropolitan planning in Italy.

This research aims to be the first in Romania to integrate environmental and spatial planning methods of analysis in suburban areas affected by urban sprawl, thus providing both a quantitative impact assessment (comprising effects like environmental degradation, quality of living issues, potential biodiversity loss) and a detailed qualitative analysis of landscape and urban planning issues in selected local administrative units. The research could help local authorities identify the most vulnerable areas, but also motivate the urgency of retrofitting interventions, considering the perceived negative effects on the quality of living. Lastly, the research project has also explored an applicative direction that could be considered by policymakers in the future, by defining the requirements that a potential new planning instrument - the Metropolitan Plan - should meet in order to successfully mitigate the negative effects of suburban development in Romania's metropolitan areas.

Structure

The first chapter of this work focuses on defining the concept of suburbanization within the specific context of post-socialist countries, while the second chapter provides an overview of the Romanian spatial planning system in relation to the challenges posed by the development of metropolitan areas.

The third chapter of this book presents the core of the analytical research for the three territorial scales mentioned before: national, metropolitan and local (Objectives 1 and 2 of the research). Chapter 4 presents the Italian approach to metropolitan planning and governance. This approach was partially used, along with the conclusions of the interviews taken from Romanian specialists working in public administration, to propose a spatial planning instrument at metropolitan level that could better tackle suburbanization (Chapter 5, covering Objective 3 of the research).

1. Defining suburbanization in a post-socialist context

Conceptual frameworks

The aim of this section is to define suburbanization and explain its relationships to other concepts. **Figure 1** presents a graphical summary of this section.

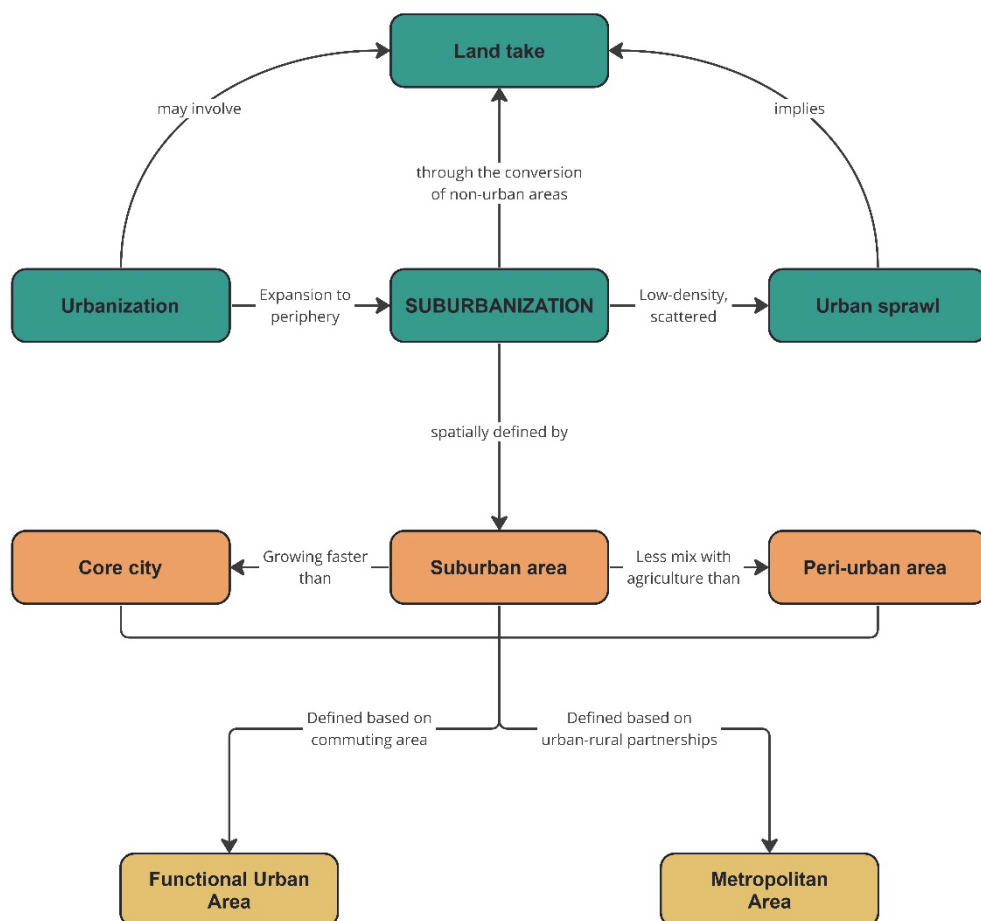


Figure 1. Suburbanization and its linked concepts

Urbanization is defined as *a complex socio-economic process that transforms the built environment, converting formerly rural into urban settlements, while also shifting the spatial distribution of a population from rural to urban areas* (UN DESA, 2019, p. 3). Urbanization can be analysed through different lens (Champion, 2001):

- The proportion of the population living in urban places, traditionally measured at national level.

- The distribution of the population between different sizes of urban places, leading to discussions regarding urban population concentration in the largest cities.
- The stages of urban development, where the life cycle of the city is examined by distinguishing between growth in the city core and its surrounding hinterland.

The latter perspective provides a more nuanced view of urbanization processes, which can be regarded as a cycle of development stages: urbanization, suburbanization, desurbanization (or counter-urbanization) and reurbanization. From a demographic viewpoint, suburbanization is characterized by a stagnating or declining population in the city core and a growing population in the peri-urban area (van den Berg et al, 1982).

Suburbanization can thus be defined as an urbanization pattern characterized by the outward expansion of populations and economic activities from the core city to the surrounding periphery (Kovács et al., 2019). The origins of suburbia can be traced back to bourgeois weekend houses in 18th century Britain. The growth of suburbs was based on the improvement of urban transport systems, like London's underground and suburban railways, or the metropolitan railway systems in the USA. Consequently, *there is strong evidence that the notion of suburbia is substantially Anglo-American in origin* (Couch et al., 2007, p. 11).

Despite starting off as a natural growth process, the emergence of suburbs was integrated in urban development models. Ebenezer Howard's *Garden City* proposed the development of new settlements combining the benefits of town and countryside (Howard, 1902). Frank Lloyd Wright's *Broadacre City* proposes a model of low-density housing on one-acre parcels of land, supported by the development of highways and the proliferation of personal cars (Wright, 1935). Harris and Ullman include residential and industrial suburbs in their polycentric city structure model (Harris & Ullman, 1945).

Joel Garreau identifies three steps in the individualization of *Edge Cities* in USA - places located on the edge of the urban landscape, developed without taking administrative boundaries into account and containing all the functions of the city, but in a spread-out form (Garreau, 2011):

- Relocation of homes: suburbanization in the USA after World War II.
- Relocation of marketplaces closer to the new residential areas: the emergence of malls in the 1960s and 1970s.
- Relocation of jobs in the suburbs, in the 1980s and 1990s.

The relocation of offices and industrial capacities to less congested and lower cost areas outside of the central cities was not limited to the US

(Sassen, 2018). As a result, suburbanization processes around the globe are not limited to residential areas, but also industrial, commercial and other economic activities. In time, such processes can lead to complex suburban areas with a diverse mix of economic activities, in the form of mini-cities (Røe & Saglie, 2011) or post-suburbia (Phelps & Wood, 2011).

A distinction should be made between suburban and peri-urban*. Suburban areas represent the outermost rings of the urban fabric and are often characterized by low to moderate population densities, predominantly residential land use, and a significant dependence on commuting to urban centres for employment and services (Brueckner, 2000). The distinction between peri-urban and suburban areas is highlighted by the peri-urban's tendency to possess a more intricate mix of land uses, and its role as an interface where urbanization and rural activities intersect (Tacoli, 2003). The peri-urban can be thus defined as a transition area, an urban-rural interface (Ros-Tonen et al., 2015) between the denser urban core and the rural hinterland. Together, the urban core, peri-urban area and rural hinterland form the **rural-urban region**, seen as the spatial extension of Functional Urban Areas (Piorr et al., 2011).

The **Functional Urban Area** is a territory comprising an urban core and its surrounding area, delineated by using commuting models or accessibility criteria. In Europe, FUAs are defined as a territory comprising an urban centre - a city of at least 50,000 inhabitants, with over 50 % of the population living in a contiguous area with a population density of minimum 1,500 inhabitants per km² - and its commuting area, containing contiguous local administrative units with minimum 15 % of their residents working in the urban core (Dijkstra et al., 2019). Hence, the delineation of FUAs is based on objective criteria.

On the other hand, **metropolitan areas** are territories including a polarizing city and its peri-urban area, defined based on rural-urban partnerships, often in the form of associations between local administrative units. The concept is of American origin: metropolitan districts were introduced as a statistical unit in 1910 and Standard Metropolitan Statistical Areas were defined in 1960 around cities with at least 50,000 inhabitants (Berry et al., 1969). Metropolitan areas can be a problem for traditional planning instruments, as they are characterized by phenomena, such as suburbanization, which are difficult to manage within fixed administrative boundaries (Cotella, 2021). They are also

* In the case of Romania, peri-urban areas are defined as the first ring of settlements around a core city.

often the weakest governance level in a country (Zimmermann & Feiertag, 2022).

Consequently, both suburbanization and peri-urbanization are terms used to describe decentralized urban expansion patterns occurring outside of the core city (Caruso, 2001), most likely within the city's metropolitan area. We have opted to use the term suburbanization, as it is better related both to previous work on post-socialist countries (Stanilov & Sýkora, 2014) and to the model of urban development stages.

Suburbanization refers to the expansion of urbanized land into peripheral areas, while urban sprawl denotes a particular form of urban expansion marked by low densities and scattered suburbanization patterns (Slaev et al., 2018). **Urban sprawl** can be thus regarded as an effect of suburbanization (EEA, 2006): an urban expansion characterized by low population density and discontinuous development (OECD, 2018). Urban sprawl tends to be automobile-oriented and consists mainly of residential developments (Bruegmann, 2006). There are multiple dimensions that can be used to define and measure urban sprawl, mostly based on urban morphological characteristics and density (Abreu e Silva & Correia, 2023; Arribas-Bel et al., 2011). As a result, urban sprawl can be defined as *a pattern of land use in an urbanized area that exhibits low levels of some combination of eight distinct dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity* (Galster et al., 2001, p. 685). Other authors choose to focus on urban sprawl as a process of change rather than a pattern of urbanization, using the evolution of density gradients to separate it from urban growth (Couch et al., 2007).

Suburbanization is a process that involves **land take**: the conversion of non-urban areas into urban areas, often accompanied by soil sealing (EEA, 2022). Worldwide, between 2000 and 2015, 37.5 % of built-up area expansion was related to density decrease (Li et al., 2022). Since 1990, the expansion of urban areas in Functional Urban Areas has reduced the compactness of settlements (Schiavini et al., 2022). Consequently, a significant part of land take occurs in the form of urban sprawl. In Europe, urban residential sprawl is a significant land take driver in commuting areas, leading to much lower land use efficiency in these areas compared to core cities (EEA, 2022).

All in all, much of what we consider today urban is, in fact, suburban (Harris & Lehrer, 2018). This is supported by data at European level: 78 % of new land take in the European Union and the UK region between 2012 and 2018 occurred in commuting areas (EEA, 2022). Moreover, over 20 % of residents in the European Union live in the commuting zone of a city

with at least 50,000 inhabitants (Dijkstra & Poelman, 2017). At the beginning of the 2010s, the built-development in peri-urban areas in Europe was 48,000 km², almost equal to the one in urban areas, which also registered a far slower growth rate (Piorr et al., 2011).

How did it come to this, and at what cost? The next section attempts to briefly explain the drivers of suburbanization and its environmental, social and economic impacts.

Drivers and effects of suburbanization

First and foremost, suburbanization is a process based on demographic changes, defined by faster population growth in the suburbs compared to the core city (Kunzmann & Wegener, 1991). As the preference for urban proximity has remained consistent throughout the years, it has led to a concentration of people closer to urban centres (Golding & Winkler, 2020). Traditionally, suburbs have relied on migration from the core city for their population growth. This was triggered by young people wanting to start a family (Booi & Boterman, 2020), drawn by the appeal of suburban neighbourhoods with their emphasis on privacy, green spaces, and community-oriented environments. As a result, individual residential preference, directed mostly towards low-density housing areas (Howley, 2009; Huang et al., 2023), seeking better childhood environments (Karsten, 2020), is a significant driver of suburbanization. The post-World War II "American dream" of becoming a suburban homeowner (Benites-Gamirazio, 2017) was mimicked by individuals and families in Europe as well (Dura-Guimera, 2003), driving suburbanization in the form of low-density housing.

Scholars in urban economics have long considered suburbanization, in the form of urban sprawl, to be related to population, growth, income and agricultural rent (Brueckner & Fansler, 1983). There are important links between economic development and urban sprawl (EEA & FOEN, 2016). Economic growth has caused a desire for larger homes, while also enabling individuals and families to purchase cars. At the same time, the increased cost of urban living, including higher rents and property prices, has compelled individuals to seek more affordable alternatives outside of core cities (Christiansen & Loftsgarden, 2011; Karsten, 2020). Moreover, the low productivity of agricultural land around cities has been highlighted as a factor encouraging the expansion of urban areas (Oueslati et al., 2015).

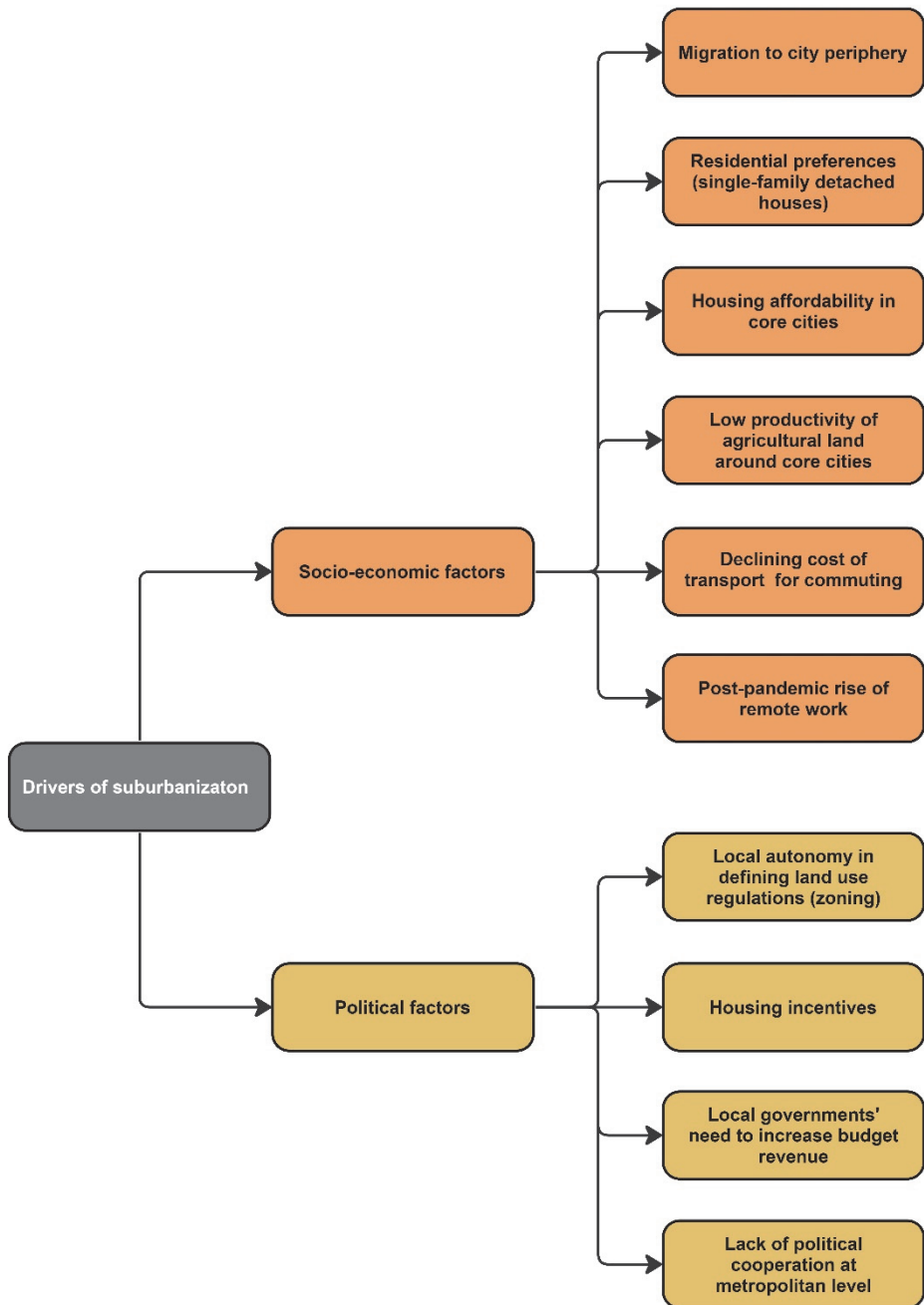


Figure 2. Drivers of suburbanization.

Technological advancements and declining costs for transportation have also played an influential role in driving suburbanization. Some scholars believe that the main factor supporting suburbanization has been the automobile (Glaeser & Kahn, 2004). The development of efficient transportation systems, particularly in the form of highways (Baum-Snow, 2007), has facilitated suburban living by reducing commuting times to the main urban centres (Christiansen & Loftsgarden, 2011). More recently, the rise of remote work, accelerated by the COVID-19 pandemic, has reduced the necessity for individuals to live close to their workplace, thereby enabling them to choose suburban housing offering more space and greenery (Gallent, 2022).

Government policies also exert a considerable influence on the trajectory of suburbanization. Inadequate spatial planning regulations and subsidies encouraging housing development and automobile transportation can increase urban sprawl (Colsaet et al., 2018). Suburban zoning plans often focus on the protection of single-family housing (Fischel, 2004). In some cases, local public administration could voluntarily adopt policies encouraging suburbanization, in order to ensure their financial stability (Benitez-Gamirazio, 2017).

Consequently, in broad terms, the main drivers of suburbanization are either social and economic factors (including access to low-cost transportation systems) or political factors - see **Figure 2**. This research will mostly focus on this second set of factors, as provisions on land use and local governance systems tend to play a significant role in suburbanization (Siedentop & Fina, 2012).

The European Environmental Agency considers three main categories of impacts when analysing urban sprawl: environmental, economic and social impacts (EEA, 2006; EEA & FOEN, 2016). While acknowledging the differences between suburbanization and urban sprawl, most of these negative impacts could be regarded as effects of suburbanization processes - see **Table 2**. This section chooses to focus on these negative effects of suburbanization, to aid in a better understanding of the challenges that suburbanization poses to urban planners and policymakers.

Firstly, suburbanization implies **land take**, which leads to landscape fragmentation and habitat destruction, thus having a potential significant impact on ecological systems (EEA, 2022). Land use changes determine the loss of agricultural land (van Vliet et al., 2017), as well as the sealing of soil surfaces (Naumann et al., 2019). Other negative effects on soil quality include soil compaction and the loss of ecological functions, also leading to a reduced capacity for the soil to act as a carbon sink (EEA &

FOEN, 2016). New urban patterns affect biodiversity, primary productivity, nutrient and material cycling, while also promoting the spread of natural disturbances in the form of invasive species (Alberti, 2005).

Table 2. Effects of suburbanization

Theme	Consequences
Land use	Loss of farmland
	Sealing of soil surfaces
Energy and climate change	Higher energy consumption and higher greenhouse gas emissions
	Removal of natural vegetation
Air pollution	Rise in air pollution caused by road traffic
	Rise in air pollution caused by residential sources
Water	Increased water consumption per capita
	Higher risk of leakages per capita
	Water pollution from residential sources
Flora and fauna	Increased fragmentation of landscape
	Natural habitat degradation
Economy	Higher costs for transport associated with commuting for households
	Higher material use for construction per housing unit
	Economic loss in touristic areas due to landscape degradation
Social	Higher proportion of single households leading to a more resource-intensive living style
	Difficult access to social infrastructure

Source: Cochei & Petrișor, 2023b.

The scientific debate on suburbanization processes has recently resurfaced due to **climate change** related concerns (Rubiera-Morollón & Garrido-Yserte, 2020). Detached houses in sprawling residential areas register increased energy consumption compared to housing in denser urban areas (Navamuel et al., 2018). As a result, suburbs are characterized by lower energy efficiency leading to higher household carbon footprints (Jones & Kamen, 2014). Moreover, land cover changes lead to vegetation removal, thus lowering the potential of carbon absorption in suburban areas (Carpio et al., 2021).

Closely related to climate change is the theme of **air pollution**. On the one hand, the growth of transport emissions has been regarded as a result of the increase in urban areas (Bart, 2010), as urban sprawl exposes more inhabitants to higher concentrations of nitrogen oxides (Valencia et al., 2023). On the other hand, the greater air pollution generally associated with urban sprawl (Johnson, 2001) can be also linked to the rise in residential pollution sources such as individual heating systems. In this context, the expansion of urban heat islands can be regarded as a critical link between all the factors already mentioned: land use, climate change, air pollution, transport (Wilson & Chakraborty, 2013).

As far as impacts on **water quantity and quality** are concerned, lower density suburban areas are more likely to experience water shortages (Heidari et al., 2021), as well as a higher risk of leakages as networks continue to extend (Pauliuk et al., 2014). Suburbanization has also been linked to increased water pollution (Dong et al., 2014), with suburban areas registering higher increases in water pollutant concentrations compared to core cities (Tu et al., 2007).

As mentioned before, land use changes related to suburbanization impact ecosystems, affecting **flora and fauna**. Urban sprawl can lead to declining habitat quality (Wu et al., 2021) and the loss of fragile environmental lands (Chin, 2002), as well as ecosystem fragmentation (Johnson, 2001; Alberti, 2005).

Among the **economic impacts** of suburbanization, the following can be listed:

- ☐ Higher transportation costs because of increased daily commuting (Travisi et al., 2010).
- ☐ More material use for construction per housing unit (Roy et al., 2015).
- ☐ Rapid increases in land prices determined by modified land use regulations related to suburban development (Harris & Lehrer, 2018).
- ☐ Reduced touristic attractiveness because of un-aesthetic sprawl developments (Chin, 2002) in touristic areas (Rusu et al., 2020).

Lastly, the **social impacts** of suburbanization are mostly related to the poor access to services for individuals with limited mobility (Chin, 2002), as rapidly growing suburban areas often lack adequate social infrastructure (Nechyba & Walsh, 2002; Klinenberg, 2018). There is mostly a high proportion of single-family houses in suburban residential areas, which leads to a more resource-intensive lifestyle (EEA-FOEN, 2016). The high decentralization of urban sprawl developments and rising commuting times also make social interactions in suburban areas more difficult (Farber et al., 2013).

The specific case of post-socialist countries

Unlike the USA or Western European countries, Central and Eastern European countries under a communist regime experienced limited suburbanization before 1990. Following Ekers et al.'s three types of suburban development - self-built, state-led and private-led (Ekers et al., 2012) -, suburbanization during the communist period can be considered a state-led affair. The centralized spatial planning system aimed to develop compact urban areas, with housing provision being almost exclusively state-led (Grădinaru et al., 2015a). As a result, socialist cities developed in a more compact manner than capitalist ones, having the distinctive feature of large housing estates built at the cities' periphery (Pichler-Milanović et al., 2007).

The main reform of post-socialist transition after 1990 was related to the property of land: the transferring of assets from state to private actors, in the form of privatization and property restitution. Coupled with the adoption of neo-liberal doctrines which prioritized private interests, this led to a legitimacy crisis of spatial planning (Hirt & Stanilov, 2009). From a cultural perspective, the shift to a democratic society and market-based economy was also followed by internationalization and adoption of Western values (Pichler-Milanović et al., 2007). People wanted to replace their flats in large housing estates, associated with communist housing, with more spacious housing units in suburban areas (Dumitrache et al., 2016), inspired by the American way of life (Pichler-Milanović et al., 2007).

Consequently, suburbanization in post-socialist countries, especially in the form of self-built, fragmented residential areas around larger cities (Hirt, 2007), became possible due to three main factors (Stanilov & Sýkora, 2014):

- Property restitution, especially in the case of agricultural land in the proximity of cities.

- Deregulation of economic activities, encouraging the emergence of a privately-operated real estate housing market.
- Decentralization of political power, by giving local public authorities control over land use regulations, devoid of limitations from higher national or regional administrations.

As mentioned above, suburbanization in post-socialist countries has been strongly linked to the transformation of agricultural land (Iojă et al., 2011; Grigorescu et al., 2021). The process was facilitated by property restitution in the years after 1990 (Bičík et al., 2015) and subsequent agricultural land abandonment (Müller et al., 2009; Grădinaru et al., 2015b).

As a result, three main types of urban transformations occurred in suburban areas after 1990 (Pichler-Milanović et al., 2007):

- Residential suburbanization, in the form of both single-family detached housing and collective housing speculatively built for sale.
- Commercial development, especially out-of-town shopping centres.
- Industrial and warehousing development, usually in relation to highways and main national roads' connections.

The most significant transformation, however, was the development of new housing units around the largest cities, as proven by studies comparing urbanization patterns in several Central and Eastern European countries (Schmidt et al., 2015). In the beginning, residential suburbanization was primarily driven by the relocation of more affluent households (Hirt, 2007). Consequently, suburbanization in post-socialist countries continues to be regarded as a socially polarized process, as families with low or high social status are the ones most likely to relocate (Krisjane & Berzins, 2012). These social changes coincide with a loss of local identity in rural settlements because of changing rural landscapes, given the architectural diversity of new residential and commercial buildings. Furthermore, newly developed suburban areas often experience problems related to the accessibility of schools and other public facilities, mostly affecting the young and the elderly (Pichler-Milanović et al., 2007). **Table 3** provides an overview of the characteristics of suburbanization in post-socialist countries.

Most of these consequences have been driven by urban planning and policy. Spatial planning had a negative connotation in the former socialist regime and was neglected in the 1990s (Pichler-Milanović, 2001), being associated with forced industrialization and urbanization. Local governments were given higher sovereignty after 1990, but insufficient resources for providing necessary infrastructure (Csizmadý et al., 2022). Because of low budgetary revenue, local governments adopted an

entrepreneurial approach to urban planning (Stanilov & Sýkora, 2014), using re-zoning and land conversion to increase their resources (Kovács et al., 2019). However, the approval of new residential areas was possible without imposing strict requirements for the provision of public infrastructure and services (Mikuła, 2023). The result was the emergence of new residential suburban areas often lacking basic infrastructure (adequate roads, water and sewage networks) and without access to public amenities in the form of educational, sanitary or leisure facilities.

Table 3. Suburbanization in post-socialist countries

Key characteristics	Drivers	Period
State-led socialist planning system focusing on forced urbanization in compact urban areas.	Centralized political regime. Forced industrialization meant that cities dictated to the surrounding countryside.	Before 1990
Transition from a socialist planning system to a post-socialist planning system encouraging suburbanization.	Privatization of state assets. Adoption of neo-liberal doctrines prioritizing private interests. De-centralization of political power towards local public authorities.	1990 - 2000
Suburbanization linked to sprawling developments on former agricultural lands, lacking basic public infrastructure and services.	Lack of coherent development policies, planning instruments and institutional arrangements. Budgetary and taxation measures encouraging the extension of built-up land.	2000 - 2010
Emergence of new governance arrangements and planning instruments that could play a role in managing suburbanization.	2008 economic crisis slowing-down real-estate development. EU policy guidelines influencing new member states.	After 2010

Source: Cocheci & Petrișor, 2023a.

The integration of a large part of post-socialist countries in the European Union has determined the adoption of European spatial planning discourse, in the form of meta-narratives such as the European Spatial Development Perspective supporting the compact city model (Reimer et al., 2014). Nevertheless, as proven by recent research (Grădinaru et al.,

2023), local government decisions are often opposed to policy targets assumed at national level. Objectives regarding land take limitation are often overridden by local lobbying, prioritization of individual private interests and even corruption (Kovács et al., 2019).

Suburbanization in Romania largely followed the same patterns as the other post-socialist countries. After 1990, urban sprawl has affected the urban hinterlands of the most important cities (Grădinaru et al., 2015a). Its main drivers have been property restitution (Petrișor et al., 2020), agricultural land abandonment (Grădinaru et al., 2015b), the continuous extension of urban growth boundaries in order to increase local budget revenues (Suditu, 2012), demographic trends supported by people's desire to live in the suburbs (Ianoș & Jones, 2019; Grigorescu et al., 2012) or low housing affordability for young families in core cities (Cocheci & Mitrea, 2018). The resulting suburbanization patterns can be characterized as chaotic and un-controlled (Stănuș et al. 2021, Carrière et al. 2018, Grigorescu et al. 2012), with the local administrative units located closest to core cities being the most affected (Drăghia et al., 2023). These local administrative units thus become *immigration places* where core city residents establish main or secondary residences (Sârbu, 2012). Research on suburbanization and urban sprawl in Romania touches issues such as the negative impact on natural protected areas (Petrișor, 2016), green infrastructure fragmentation (Petrișor et al., 2016), environmental degradation (Cocheci, 2014) or poor accessibility to social infrastructure (Halban-Cotoara-Zamfir et al., 2021).

Consequently, a metropolitan approach is now considered essential for rapidly urbanizing areas, given the fact that 61 % of all urban expansion in Romania since 2006 has taken place in peri-urban areas (Romanian Government, 2022). Moreover, 32.5 % of new housing units built between 1990 and 2015 in Romania were realized in the suburban and peri-urban areas around Bucharest and the 40 county capitals. Suburbanization processes occurred, in most cases, without coherent urban planning and adequate investment in public infrastructure and amenities (MDLPA, 2022).

The public authorities' lack of understanding regarding the problems faced by new peri-urban housing developments leads to a poor management of suburbanization processes (Sârbu, 2005). From an institutional perspective, administrative fragmentation makes controlling suburbanization very difficult, especially due to the lack of cooperation and mistrust between local governments in metropolitan areas (Hințea et al., 2019). As spatial planning departments in local public authorities do not have sufficiently powerful tools to influence suburbanization, new planning instruments at metropolitan level are required (Kubeš, 2015).

The next chapter focuses on the Romanian spatial planning system and the institutionalization of metropolitan areas. It thus aims to highlight the main legislative and technical issues that have undermined the planning of suburban areas since 1990.

2. Romania's spatial planning system - the metropolitan gap

Institutional evolution of metropolitan areas

Romanian metropolitan areas were first mentioned in national law in 2001, with the approval of the National Territorial Plan's fourth Section - The Settlement Network (Romanian Parliament, 2001b). The metropolitan area was defined as the territory surrounding rank 0 (the capital) and rank 1 cities (eleven major cities) within a 30 km radius, that could be institutionalized as a **voluntary association** of local administrative units, including the core city and surrounding towns and communes. Romanian metropolitan areas were thus created as inter-jurisdictional cooperation bodies: non-administrative private entities of public utility, regulated by the national law on associations and foundations. Metropolitan areas were one of three possible association mechanisms between multiple local administrative units, besides the Local Action Groups created in rural areas under the Common Agricultural Policy's second pillar, or Inter-community Development Associations having a project oriented and sectoral approach (Cotae, 2015).

The emergence of institutionalized metropolitan areas in Romania can be strongly linked to European funding incentives in the 2007 - 2013 programming period. In spite of the legal framework being existent since 2001, most of Romanian metropolitan areas have only been established after 2007. The process was stimulated by the growth pole policy, with the Romanian Government designating seven of Romania's most important cities (excluding the capital city) as national growth poles: Cluj-Napoca, Timișoara, Brașov, Craiova, Ploiești, Iași and Constanța (Benedek & Cristea, 2014). These cities were allocated 50 % of the Regional European Development Funds for sustainable urban development investments - Axis 1 of the 2007-2013 Regional Operational Program (Romanian Government, 2008b). The condition was that they should establish metropolitan areas and should define their investment projects based on Integrated Development Plans covering the entire metropolitan territory. While the National Growth Pole policy led to the establishing of metropolitan areas across the country, its benefits for the rural areas surrounding core cities remained limited. Most core cities acted in their own interest, with limited investment in projects outside of their administrative territories being included in the metropolitan Integrated Development Plans.

The growth pole policy was abandoned in the 2014-2020 programming period, having failed at delivering its main goal of reducing spatial inequalities at national level (Benedek et al., 2022). Nevertheless, the condition of developing strategic planning instruments at metropolitan

level remained in place for the 2014-2020 and 2021-2027 programming periods (Drăghia, 2023). Growth poles had to establish their funding priorities on Axis 4 of the 2014-2020 Regional Operational Program according to an Integrated Urban Development Strategy and a Sustainable Urban Mobility Plan drafted at metropolitan level. The 2014-2020 Regional Operational Program also opened the possibility for the other municipalities acting as county capitals to develop these two strategic planning instruments at metropolitan or functional urban area level.

The Government's support for the creation of metropolitan areas was echoed by legislative changes. The Administrative Code approved by Government Decision no. 57/2019 increased the number of cities that could establish a metropolitan area. Besides the twelve rank 0 and rank 1 cities, all other rank 2 cities which acted as county capitals could establish a metropolitan area. This took the total number of cities that could form metropolitan areas with surrounding local administrative units, through voluntary association, to 41. In 2022, the first Romanian law regarding metropolitan areas was approved (Romanian Parliament, 2022), which allows all 103 municipalities (cities with rank 0, 1 or 2) to establish metropolitan areas- see *Figure 3*.

Nevertheless, with a lack of proper incentives after 2013, the institutionalization of metropolitan areas in Romania remains a slow process. Metropolitan areas in Romania have been characterized as purely formal governance arrangements (Munteanu & Servillo, 2014). They have failed to properly function because of multiple causes: development barriers related to the legal framework, lack of financial resources, lack of trust and tradition of cooperation, as well as their voluntary character (Danielewicz, 2020).

While the new law on metropolitan areas has covered some of the existing legislative gaps - see the next sections -, at local level there is limited interest for metropolitan cooperation. The main issues are the general mistrust for cooperation at local level (Hințea et al., 2019), as well as the lack of institutional capacity and spatial planning instruments necessary to manage urban development across administrative borders (Leopa, 2019). These factors become an important barrier to the territorial management of metropolitan areas (Ianoș et al., 2012), impeding the proper control of suburbanization processes.

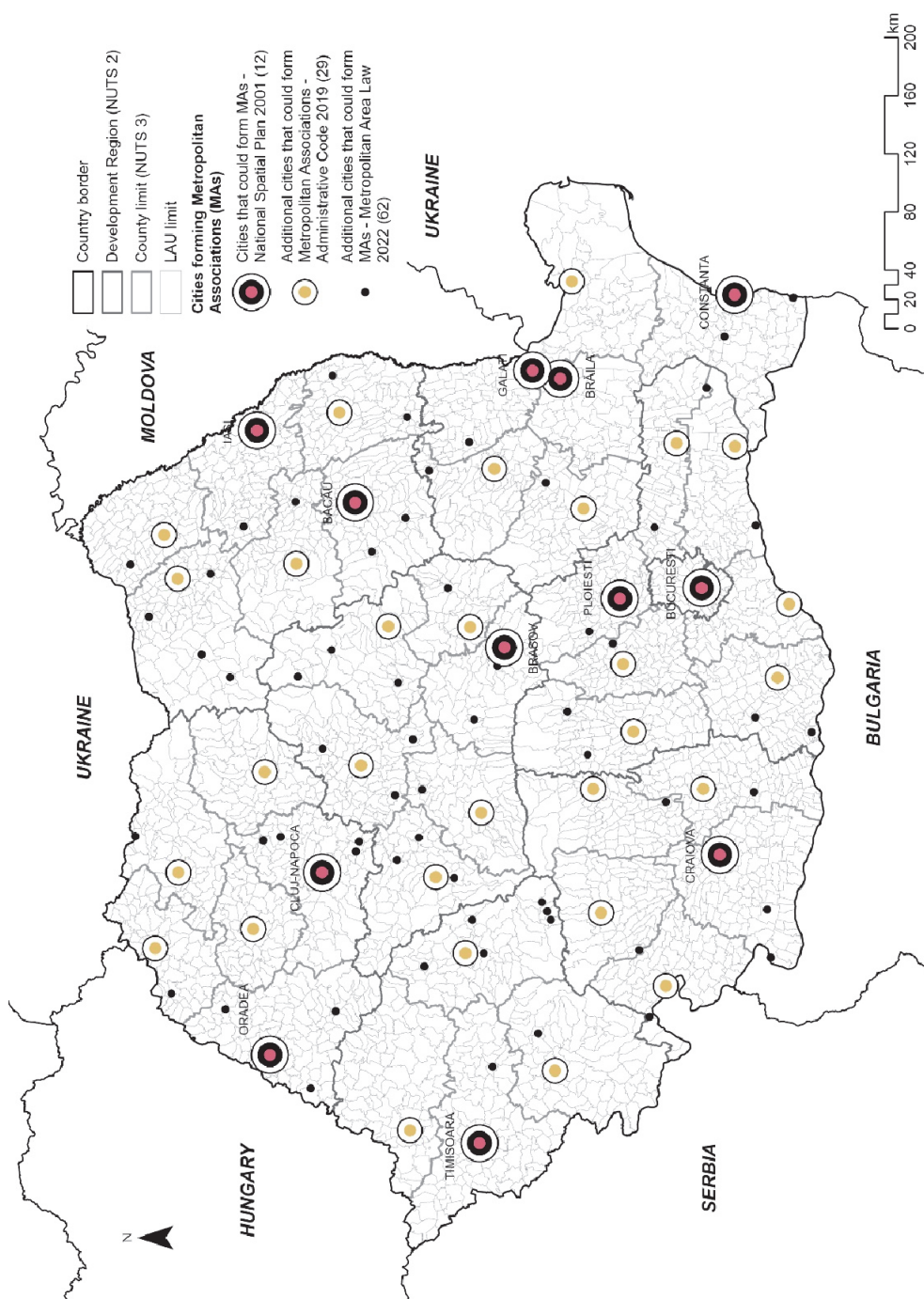


Figure 3. Evolution of cities in Romania that could establish metropolitan areas.

The spatial planning system: structure and tools

The spatial planning system consists of the rules, competences and practices that influence spatial dynamics (Servillo & Lingua, 2014). Four analytical dimensions can be discussed while exploring the relationship between spatial planning systems and territorial governance features (Cotella & Janin Rivolin, 2010):

- ☐ Structure - determined by the constitutional and legal frameworks, according to the country's administrative and government systems;
- ☐ Tools - the instruments used to achieve aims and priorities at different territorial levels;
- ☐ Discourse - the definition of goals and priorities in a political context;
- ☐ Practices - the implementation of spatial policies and land development goals.

Before the fall of the socialist regime, spatial planning in Romania (formerly called systematization) was a centralized, top-down activity, supporting the government's policy of forced urbanization and industrialization (Benedek, 2013). The Law no. 58/1974 regarding the systematization of the territory (Romanian Parliament, 1974) specifically mentioned restricting the buildable areas of settlements and ensuring an optimal use of land as objectives. In December 1989, after the Romanian Revolution, this law was one of the first to be abolished, as systematization had a negative perception. Consequently, the general public has been reluctant to accept spatial planning, given its strong tradition during the socialist regime (Florescu & Mitrea, 2015).

Law no. 50/1991 regarding building permitting included provisions related to territorial and urban planning instruments, but mainly focused on the procedures needed to obtain building permits. It was completed by the Ministerial Order 91/1991, detailing the content of territorial and urban plans. The first post-socialist law regarding spatial planning in Romania was only approved in 2001: Law no. 350/2001 regarding territorial and urban planning in Romania (Romanian Parliament, 2001a). The law has been amended over 20 times since its approval, but without any major structural changes to the system of plans - spatial planning tools - proposed in 1991 (Cocheci & D'Orazio, 2019). Consequently, the entire legal framework of Romania's spatial planning system has failed to respond to the needs of post-socialist transition, especially on the topic of metropolitan cooperation (Ianăși, 2008).

Romania's spatial planning tools closely follow the country's administrative structure - see **Table 4**. There are two administrative levels below the central government, where there are locally-elected public officials. The intermediate level is represented by 41 counties

(NUTS 3). The local administrative units are divided into urban (municipalities and towns) and rural (communes). At regional level, the eight development regions established in 1998 do not have a legal-administrative status, with their institutional role being limited to the management and implementation of EU funds (Dobre, 2010). At inter-jurisdictional level, as mentioned before, the intercommunity development associations, local action groups and metropolitan areas are established as voluntary associations without administrative status.

Table 4. Romania's spatial planning system: structure and tools

Territorial units (NUTS*)	Structure (administrative of statistical / associative)	Territorial and urban planning documents
NUTS 0 - National	National Government	National Territorial Plan (PATN) - 6 sectoral sections
NUTS 1 - Macro-regional	<i>4 Macro-regions</i>	-
NUTS 2 - Regional	<i>8 Development Regions</i>	Regional Zonal Territorial Plan (PATZR) Inter-County Zonal Territorial Plan (PATZIJ)
NUTS 3 - Sub-regional	41 counties	County Territorial Plan (PATJ)
Inter-jurisdictional (former NUTS 4/LAU1)	<i>Metropolitan areas Local Action Groups Inter-community Development Associations</i>	Peri-urban / metropolitan territorial development strategy (SDTZP/M); Inter-City Zonal Territorial Plan (PATZIO); Inter-Communal Zonal Territorial Plan (PATZIC).
LAU - Local level	319 urban (103 municipalities and 216 towns) and 2.859 communes	General Urban Plan (PUG)
Sub-local level	-	Zonal Urban Plan (PUZ); Detailed urban Plan (PUD) - for a single parcel.

Source: Law no. 350/2001 and National Institute of Statistics. For the territorial and urban planning documents, the Romanian acronym is mentioned in brackets.

* NUTS -Nomenclature of territorial units for statistics. Eurostat's standard for comparing indicators.

According to the national law, spatial planning in Romania has two components. On the one hand, territorial planning (*Amenajarea teritoriului*) has a strategic and steering character and covers territories across multiple local administrative units. On the other hand, urban planning (*Urbanism*) has a strong focus on land use and building regulations and is carried out at local level, in most cases on the territory of a single local administrative unit. The central public authority for territorial planning is the Ministry of Development, Public Works and Administration (MDLPA).

Due to their coordinating and strategic role, territorial plans have limited effect on land use decisions. At national level, the sections of the National Territorial Plan (PATN) define sectoral guidelines for lower-level plans on issues such as transportation networks, water resources, protected areas, the settlement network, natural risk areas and tourism. The County Territorial Plan (PATJ) is a planning instrument whose aim is to coordinate different sectoral policies and territorialize the county's socio-economic development program. All territorial planning documents are limited to indicative provisions. As a result, there are few mechanisms* to impose the implementation of these provisions on the local administrative units covered by these plans.

In 2008, the Government Ordinance no. 27 proposed the Peri-urban Zonal Territorial Plan (PATZP) as a compulsory planning instrument for all urban local administrative units. Its role was to underlie the subsequent General Urban Plans of local administrative units within a given peri-urban area (Romanian Government, 2008a). However, in 2011 the Government Ordinance no. 7 (Romanian Government, 2011) replaced this planning instrument with the Peri-urban / Metropolitan Territorial Development Strategy (SDTZP/M). Its role, according to the law, was to ensure the correlation of development priorities and the efficiency of public investment. Published in 2016, the methodological norms for Law no. 350/2001 defined a general structure for the SDTZP/M (MDRAP, 2016), confirming its limited effects on land use.

Consequently, metropolitan spatial planning (see **Figure 4**) has remained limited to strategic planning instruments:

- ☐ The Peri-urban/Metropolitan Territorial Development Strategy defined by spatial planning law;
- ☐ The Integrated Urban Development Strategy and the Sustainable Urban Mobility Plan which have become a pre-condition for applying to structural funds under the Regional Operational Programs.

* Other than the approval procedures for urban plans.

The latter have been widely adopted in the last two programming periods. These strategic plans often lack integration with the existing territorial plans and are often designed strictly for justifying a priority project list for EU funding (Elisei & Pascariu, 2012). However, these planning documents have been preferred by Romanian public authorities due to their importance for accessing EU funding and their easier approval procedures compared to the SDTZP/M.

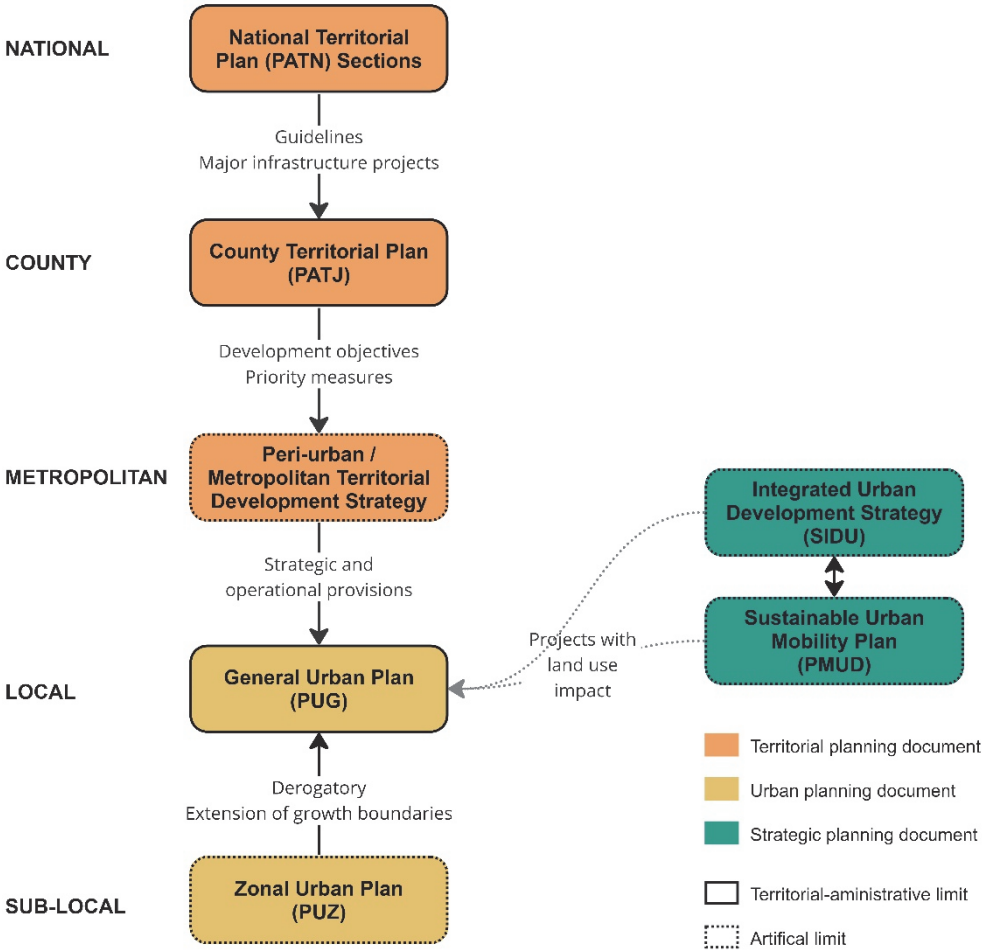


Figure 4. Planning instruments with a direct impact on metropolitan areas - current legislation

With no regulatory spatial planning instrument at metropolitan level, controlling suburbanization processes is only possible through General Urban Plans developed and approved by each local administrative unit in a metropolitan area. The General Urban Plan (GUP) is a legally-binding local zoning plan (Nowak et al., 2022) which establishes urban growth

boundaries and provides detailed regulations on land use and building characteristics. The current system poses two main problems to attempts at controlling suburbanization:

1. **Cooperating when resources are scarce.** Because of low budgetary revenues and lack of tradition for cooperation, local administrative units in Romania have often developed an entrepreneurial approach to urban planning. By encouraging suburbanization and continuously expanding the urban growth boundary (*intravilan*), local public authorities have increased both the budgetary allocations received from the government, due to the increase in buildable area (Suditu, 2012), and the local revenue from land and building taxes.
2. **Modifying the public General Urban Plan with private-led Zonal Urban Plans.** Should the provision of General Urban Plans be coordinated among local administrative units in a given metropolitan area, another issue arises. Many local administrative units have old General Urban Plans, which have not been updated in a long time and, in some cases, have expired and are no longer valid (Luca et al., 2021). In this case, decisions on the expansion of built-up areas are often taken based on Zonal Urban Plans, which are financed by private investors and often propose the extension of growth boundaries, as a derogation from the General Urban Plan (Grădinaru et al., 2020). Zonal Urban Plans are locally approved, which means that, in some cases, municipalities may encourage this type of derogatory planning in order to benefit from an increased revenue, as mentioned above.

Recent attempts of reform in Romanian law

In recent years, metropolitan areas have taken an important place on the Romanian Government's agenda. Since 2019, the Ministry of Development, Public Works and Administration has supported the development of **Romania's Urban Policy**, in the form of a National Strategy for Integrated Urban Development for Resilient, Green, Inclusive and Competitive Cities 2022-2035, which was approved by Government Decision in December 2022 (Romanian Government, 2022). The document highlights the lack of both dedicated policies for urban development and financing programs for metropolitan areas. Among the promoted principles, the strategy lists the *cooperation between cities and local administrative units in the metropolitan territory for ensuring the necessary framework for sustainable urban development* (Romanian Government, 2022, p. 10).

The process of drafting Romania's Urban Policy also included implementation mechanisms, in the form of:

- ☐ A methodology for developing and managing public services at metropolitan or functional urban area level.
- ☐ A methodology for the identification and delimitation of functional urban areas and metropolitan areas.

The proposals in Romania's Urban Policy were followed by important legislative initiatives impacting spatial planning in metropolitan areas. Firstly, the **Law no. 262/2022 regarding metropolitan areas** contains provisions aimed at removing some of the existing barriers for metropolitan cooperation in Romania. Besides defining the delimitation of the metropolitan territory for the capital city of Bucharest, the 40 county capitals and the other 62 municipalities in Romania, the law establishes norms related to (Romanian Parliament, 2022):

- ☐ The possibility of local administrative units to mandate metropolitan areas to carry out some of their competences, as long as these competences are circumscribed to the purpose and objectives of metropolitan areas. These objectives include ensuring an integrated and sustainable territorial planning, developing infrastructure for mobility, utilities, health and education, providing public services of local interest, managing housing or reducing socio-economic disparities.
- ☐ The organization and functioning of metropolitan areas as private associations of public interest: the representation of each local administrative unit by its mayor in the General Assembly of the Metropolitan Area and the composition of the metropolitan area's board of directors according to geographical areas, with the core city's mayor being automatically a member of the board.
- ☐ The definition of the metropolitan area's competences according to the mandates given by the local administrative units. These competences may include the development, adoption, monitoring and evaluation of the metropolitan area's Integrated Sustainable Development Strategy, Sustainable Urban Mobility Plan and Intercommunity Territorial Plan. If they have not received a specific mandate, the metropolitan areas can still make recommendations regarding the General Urban Plans developed at local level.
- ☐ Having a minimum of 30 % of investments in infrastructure carried out through the metropolitan area directed in the local administrative units located in the first and second ring of settlements in the metropolitan territory, with the objective of reducing territorial disparities.
- ☐ The financing of metropolitan areas: the national law of local public finances has been changed, including a new article regarding the local administrative units located in metropolitan areas. As a result, 5 % of

the income tax collected in the local administrative units will be directed towards the metropolitan area, starting from the 1st of January 2024.

Secondly, the **Law no. 155/2023 regarding sustainable urban mobility** defines the Sustainable Urban Mobility Plan (PMUD) as a territorial strategic planning instrument correlating the spatial development of the metropolitan territory with the mobility and transportation needs of people and goods. If a metropolitan area is established, the Sustainable Urban Mobility Plan should be developed by the metropolitan association, covering the metropolitan territory, based on the mandate received from the local administrative units (Romanian Parliament, 2023a).

Thirdly, since 2019 the spatial planning legislation in Romania has been undergoing a process of reform, through the drafting of a **Territorial and Urban Planning and Constructions Code (CATUC)**. The prerequisite theses of the Code, approved in 2021 by the Romanian Government, highlighted the problem of un-controlled expansion of built perimeters in the last three decades. In brief, the legislative project adopted by the Senate (June 2023) proposes three significant changes to spatial planning in Romanian metropolitan areas (Romanian Senate, 2023b). The Code still needs to be approved by the Chamber of Deputies to enter into force.

1. A definition of a **metropolitan planning level** where spatial planning can be carried out using the following instruments:
 - ☐ The Zonal/Intercommunity Territorial Plan (PATZI), as a directory scheme for coordinating the strategic provisions of the local administrative units' General Urban Plans and their common major development projects. In this case, each local administrative unit continues to develop its own General Urban Plan. The coordination of the PATZI drafting is done at county level.
 - ☐ The Metropolitan Area's General Urban Plan (PUGZM), as an urban planning document providing specific urban regulations for the entire metropolitan territory. In this case, it is no longer necessary for each local administrative unit to develop their own General Urban Plan.
 - ☐ The Zonal Urban Plan, for investments realized on the territory of more than one local administrative unit.

2. **Urbanization areas** are defined as new territories introduced in the built-up area of a local administrative unit (by expanding the urban growth boundary). Urbanization areas can be established in the General Urban Plan or in upper-level territorial plans and are regulated through Zonal Urban Plans. For these areas, local administrative units would be allowed to introduce local taxes for

public infrastructure, applicable to the private investors initiating these Zonal Urban Plans. Local administrative units would also be able to negotiate urbanization contracts with private investors, regarding the private financing of public infrastructure or the transfer of private land in the public domain for facilitating public investment in infrastructure.

3. New competences influencing **metropolitan governance**:

- ☐ The County Council (NUTS 3) could propose the establishing of intercommunity development associations for metropolitan and peri-urban areas, according to the provisions of the County Territorial Plan (PATJ).
- ☐ For local administrative units within a metropolitan area, the competences regarding the drafting and approval of territorial and urban plans would be fulfilled by the chief-architect of the core city.
- ☐ Metropolitan areas could establish Territorial and Urban Planning Agencies, as non-governmental associations acting as centres of expertise supporting public authorities.

The attempted reform could provide solutions for the metropolitan gap in the spatial planning system during the three decades since the fall of communism. From a territorial governance viewpoint, the Law no. 246/2022 regarding metropolitan areas proposes fiscal measures offering additional incentives to metropolitan areas. However, in the year since its approval, interest for metropolitan cooperation has remained low: only three metropolitan areas have sent the necessary documents needed to be introduced in the national Registry of Metropolitan Areas (August 2023, Ministry of Development, Public Works and Administration website).

On the other hand, the proposals of the Territorial and Urban Planning and Constructions Code, in correlation with the provisions of the Law no. 155/2023 regarding sustainable urban mobility try to clarify the relation between different strategic and land use planning instruments - see **Figure 5**. The Metropolitan Area General Urban Plan (PUGZM) has the potential to ensure a better coordination of land use across territorial boundaries, enabling a better control of suburbanization along with the urbanization contracts proposed for urban expansion areas. However, without any incentives or restrictions imposed on local administrative units in order to encourage metropolitan planning, there is a risk that land use planning would still be based on independently drafted and adopted General Urban Plans at local level. The detailed norms for the application of the Code's provisions will be expected to clarify some aspects in this regard, including the technical content and approval procedures for metropolitan plans.

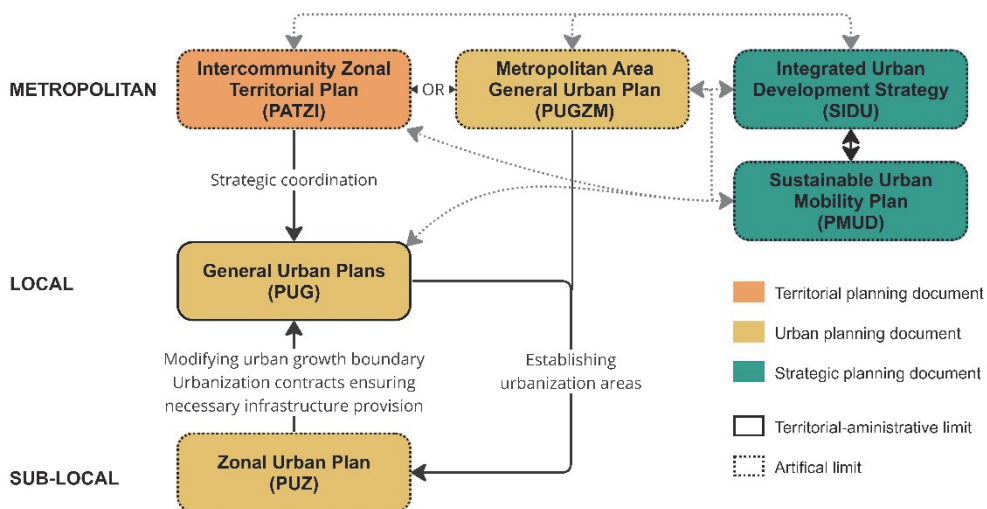


Figure 5. Proposed spatial planning instruments impacting metropolitan areas

The next chapter provides insights regarding suburbanization and its impact in Romanian metropolitan areas. Its aim is to provide a better understanding of suburbanization patterns in post-socialist Romania and its effects on the sustainable development of metropolitan areas. In this regard, the chapter highlights the main issues which need to be addressed by an effective metropolitan planning instrument.

3. Measuring suburbanization and assessing its impact in Romanian metropolitan areas

*National level: a ranking of metropolitan areas**

Which are the metropolitan areas in Romania with the highest urbanization dynamic since 1990? In order to answer this question, a ranking of metropolitan areas was proposed, using land use changes related to urbanization and the growth of housing units as indicators. The analysis was carried out on 13 of the 14 Romanian metropolitan areas which were in May 2022 part of the Federation of Metropolitan Areas and Urban Agglomerations in Romania (FZMAUR). The 14th member, the metropolitan area of Bucharest, was excluded from the analysis because of its unclear status: it is an association comprising just the municipality of Bucharest and Ilfov County, without any other local administrative units.

The 13 metropolitan areas were formed around six National Growth Poles (Cluj-Napoca, Timișoara, Brașov, Craiova, Iași, Constanța) and seven smaller county capitals (Baia Mare, Oradea, Zalău, Târgu Mureș, Drobeta Turnu-Severin, Bacău, Botoșani).

The study was based on two datasets:

- ☐ The CORINE Land Cover and Land Use dataset for the years 1990, 2000, 2006, 2012 and 2018, provided by Copernicus Land Monitoring Service (European Environmental Agency);
- ☐ The number of housing units at the end of the year for the same years, provided by the National Institute for Statistics' Tempo Online database (indicator LOC101B).

While acknowledging the general limitations of using CORINE data (Jansen, 2006; Verburg et al., 2011), its national coverage made it the most suitable land-use dataset for comparing urbanization patterns across the 13 metropolitan areas in Romania.

Figure 6 provides an overview of the methodology used for identifying the Romanian metropolitan areas with the highest suburbanization dynamic. Two intermediate rankings were proposed. The first was based on the reclassification of the CORINE datasets for each of the five years (1990, 2000, 2006, 2012, 2018), which aimed to differentiate the artificial surfaces from the other types of land use. The sum of the reclassified CORINE datasets allowed the computation of the net gain (%) in artificial

* This section synthetically presents the results of previous research (Cocheci & Petrișor, 2023a).

surfaces for each metropolitan area, leading to a ranking of metropolitan areas based on the growth in artificial surfaces. The second ranking was carried out according to the dynamic in the number of housing units (%) for each metropolitan area within the same time intervals (1990-2000, 2000-2006, 2006-2012 and 2012-2018). The final ranking was then computed as an average ranking between the two intermediate rankings mentioned before.

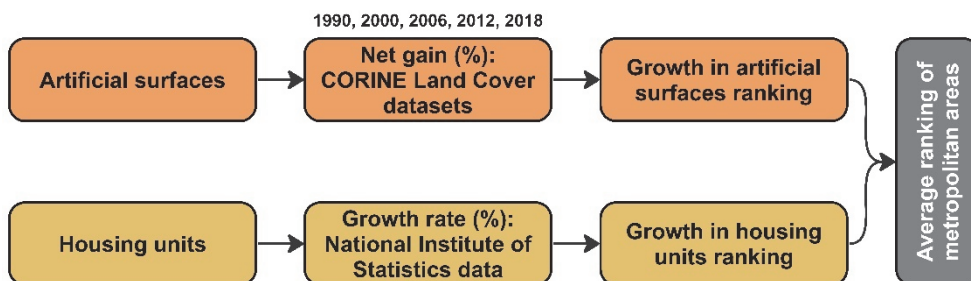


Figure 6. Methodological approach: national level analysis

Source: Adapted after Cocheci & Petrișor, 2023a.

The results of the analysis clearly illustrate the greater urbanization dynamics in Romanian metropolitan areas compared to the overall dynamics at national level - even without including the area of Bucharest, the capital city, in the study. The growth rate of artificial surfaces in the 13 metropolitan areas between 1990 and 2018 was 9.39 %, compared to a decline of 9.02 % at national level. As far as housing units were concerned, the growth rate was 21.59 % between 1990 and 2018 in the 13 metropolitan areas, compared to a growth rate of 12.80 % at national level.

After stagnating in 1990-2000 and registering a slow growth in 2000 - 2006, suburbanization processed peaked between 2006-2012. In this period, metropolitan areas had a growth in artificial surfaces of 9.14 % and a growth in the number of housing units of 10.88 %. In the 2012-2018 period the urbanization dynamic was slower than in 2006-2012, but generally surpassed the growth rates from 2000-2006 - see **Figure 7**.

As far as the individual metropolitan areas were concerned, Oradea registered the highest growth in artificial surfaces between 1990 and 2018 (+26.13 %), followed by Brașov (+25.42 %), Timișoara (+22.62 %), Târgu Mureș (+19.65 %) and Constanța (+13.74 %) - see **Figure 8**. On the other hand, Cluj-Napoca registered the highest growth rate of housing units (+40.26 %), followed by Iași (+35.93 %), Constanța (+34.29 %), Bacău (+21.97 %) and Timișoara (+19.88 %) - see **Figure 9**.



Figure 7. Romanian metropolitan areas - growth rate of artificial surfaces and housing units (1990-2018, %)

Source: Adapted after Cochechi & Petrișor, 2023a.

As a result, the final ranking placed Constanța, Timișoara, Cluj-Napoca, Iași and Brașov as the five metropolitan areas with the highest urbanization dynamic - see **Figure 10**. All of these metropolitan areas were declared National Growth Poles in the 2007-2013 programming period, as they are the most important cities in their respective regions. The results confirm the tendency of suburbanization processes to concentrate around the cities which are better connected both economically and politically. They also underline the territorial disparities compared to smaller metropolitan areas, such as Bacău, Baia Mare or Botoșani, which registered lower growth rates compared to national values after 2012.

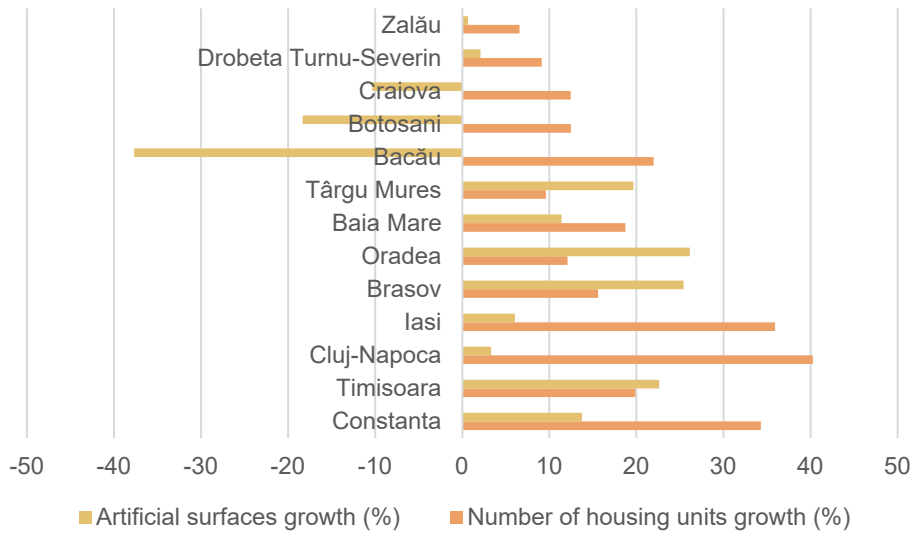


Figure 10. Ranking of Romanian metropolitan areas according to urbanization dynamics (1990-2018)

Source: Adapted after Cochechi & Petrișor, 2023a.

The differences between the two intermediate rankings could be explained by residential preferences, as some metropolitan areas have favoured the development of higher-density collective housing areas (Cluj-Napoca), while others have opted for lower density residential areas, taking up more space, while also registering an important expansion of non-residential areas (Brașov).

The main findings of this research at national level are summarized below:

- Like other post-socialist countries, **suburbanization processes in Romania occurred after 2000 and had a significant impact only after 2006.**
- The ranking of metropolitan areas could be a useful tool for policymakers, especially in **prioritizing the metropolitan areas where spatial planning instruments for controlling suburbanization are more urgently needed.**
- Some limits of the CORINE datasets were highlighted, especially when comparing 2000 and 2006 data, as some metropolitan areas registered significant declines in their artificial surfaces (Bacău -41.36 %, Botoșani -27.02%, Craiova -17.42 %).

Hence, the analysis at metropolitan level (see the next section) was done on the five highest ranked metropolitan areas (Brașov, Cluj-Napoca, Constanța, Iași and Timișoara), using the year 2006 as a baseline for impact assessment.

Metropolitan level: an index for measuring urban sprawl restrictiveness*

Which are the local administrative units in Romania which have been most affected by suburbanization processes? In order to explain the environmental, social and economic effects of suburbanization in the form of urban sprawl developments, a novel, integrative methodology was proposed. The assessment of the effect of urban sprawl in metropolitan areas was carried out using a multicriterial approach. The product of this research was an urban sprawl restrictiveness index computed at the level of each local administrative unit in the five selected metropolitan areas: Braşov, Cluj-Napoca, Constanţa, Iaşi and Timişoara.

The construction of the urban sprawl restrictiveness index was based on the following methods (**Figure 10**):

- ☐ An extensive literature review, which led to the definition of a list of urban sprawl consequences related to environmental, economic and social impacts.
- ☐ A questionnaire applied to 50 experts in territorial and urban planning. The experts were asked to rank each impact category (environmental, economic and social) and each criterion (urban sprawl consequence) from 1 (little negative impact) to 6 (significant negative impact). In the end, criteria obtaining an average rating below 4.00 were removed from the index computation. The experts were also asked to select, from a given list, one proxy indicator considered to be the most relevant for quantifying the criterion's negative impact.
- ☐ A database was built containing data on all local administrative units in the five metropolitan areas, according to the final list of indicators for the selected criteria. For indicators related to land use, GIS spatial analysis was carried out on CORINE Land Cover and Use datasets for the years 2006 and 2018, using reclassification methods to extract artificial surfaces, agricultural areas, natural and semi-natural areas, as well as road and rail networks. A correlation analysis was run in order to identify redundancies in the database's indicators.
- ☐ Finally, the urban sprawl restrictiveness index was computed at LAU level, using min-max normalization to ensure data compatibility. The spatial distribution of the index was then discussed.

* This section synthetically presents the results of previous research (Cocheci & Petrişor, 2023b).

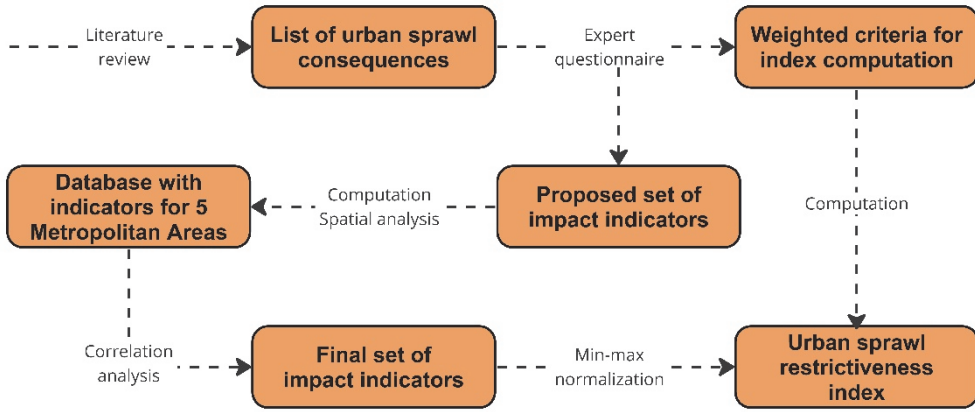


Figure 11. Methodology for defining the urban sprawl restrictiveness index

Source: Adapted after Cochechi & Petrișor, 2023b.

As there were no significant differences between the scores obtained by each criterion according to the questionnaire results, no weights were used in the computation of the urban sprawl restrictiveness index. Consequently, the index was computed as an arithmetic average (1) between three intermediary indices (2, 3, 4), one for each category (environmental, economic and social impacts). The formulas for computing the index are presented below. **Table 5** presents the final set of indicators and the average score obtained by each criterion.

$$(1) USRI = \frac{I_{env} + I_{eco} + I_{soc}}{3}$$

$$(2) I_{env} = \frac{\sum_{i=1}^8 \frac{V_i - V_{i\min}}{V_{i\max} - V_{i\min}}}{8}$$

$$(3) I_{eco} = \frac{\sum_{i=1}^2 \frac{U_i - U_{i\min}}{U_{i\max} - U_{i\min}}}{2}$$

$$(4) I_{soc} = \frac{\sum_{i=1}^2 \frac{W_i - W_{i\min}}{W_{i\max} - W_{i\min}}}{2}$$

Table 5. Average score obtained by the selected criteria and proposed indicators for computing the urban sprawl restrictiveness index

Category	Criteria	Average score	Proposed indicator (proxy)	Source
Environmental impacts	Loss of farmland	4.64	Agricultural land transformed into built land, 2006-2018 (%)	CORINE
	Sealing of soil surfaces	4.76	Percent of newly urbanized surfaces from the total surface of the Local Administrative Unit, 2006-2018 (%)	CORINE
	Higher energy consumption and higher greenhouse gas emissions	4.64	Estimation of the growth in energy consumption for residential use, based on the growth in residential surfaces, 2006-2021 (tons of oil equivalent)	NIS*
	Removal of natural vegetation	4.76	Land covered by natural and semi-natural vegetation transformed into built land, 2006-2018 (%)	CORINE
	Increased water consumption per capita	4.06	Growth in water distributed for residential use, per capita, 2006 - 2018 (cubic meters)	NIS*
	Higher risk of leakages per capita	3.98	Extension of water and waste water networks, 2006 - 2021 (km)	NIS*
	Water pollution from residential sources	4.86	Estimation of growth in municipal waste water, based on population growth, 2006 - 2021 (cubic meters)	NIS*
	Increased fragmentation of landscape	4.88	Growth in land surface occupied by major road and railway networks, 2006 - 2018 (ha)	CORINE
	Natural habitat degradation	5.04	Loss of land covered by natural and semi-natural vegetation, 2006-2018 (ha)	CORINE

Category	Criteria	Average score	Proposed indicator (proxy)	Source
Economic impacts	Higher costs for transport associated with commuting for households	4.72	Percent of active population commuting to an urban centre for work (1-5 ordinal scale according to World Bank data)	World Bank
	Higher material use for construction per housing unit	4.16	Growth in the number of housing units, 2006-2021 (%)	NIS*
Social impacts	Higher proportion of single households leading to a more resource-intensive living style	4.64	Percent of single-family residential units in the total number of building permits issued, 2006 - 2021 (%)	NIS*
	Difficult access to social infrastructure	5.00	Growth in number of students per teacher, 2006 - 2021	NIS*

*NIS - National Institute for Statistics (INSSE)

Source: Adapted from Cochechi & Petrișor, 2023b.

As mentioned before, there were no significant differences between the average scores obtained by each category. Out of a maximum possible score of 6.00, environmental impacts obtained 4.70, followed by social impacts (4.68) and economic impacts (4.14). Ten of the 13 criteria obtained an average score about 4.50. The lowest rated impact was the higher risk of leakages per capita (3.98) - the criterion was subsequently removed from the analysis, as it obtained a score below 4.00. Consequently, the score difference between the lowest rated (increased water consumption per capita - 4.06) and highest rated criterion (natural habitat degradation - 5.04) was lower than 1.00, which supported the decision to exclude weights from the index's computation.

Most of the 50 experts who answered the questionnaire were urban planners (29), followed by architects (9), geographers (5) and engineers (4). Most of them worked in universities or research centres (25), private companies (14) or public administration and inter-community associations

(6). Before rating the categories and criteria and selecting the appropriate proxy indicators, the experts were also asked to characterize suburbanization in Romania using one word. The results (**Figure 12**) showcase the negative perception of suburbanization among Romanian planning experts: a process often characterized as chaotic or uncontrolled.

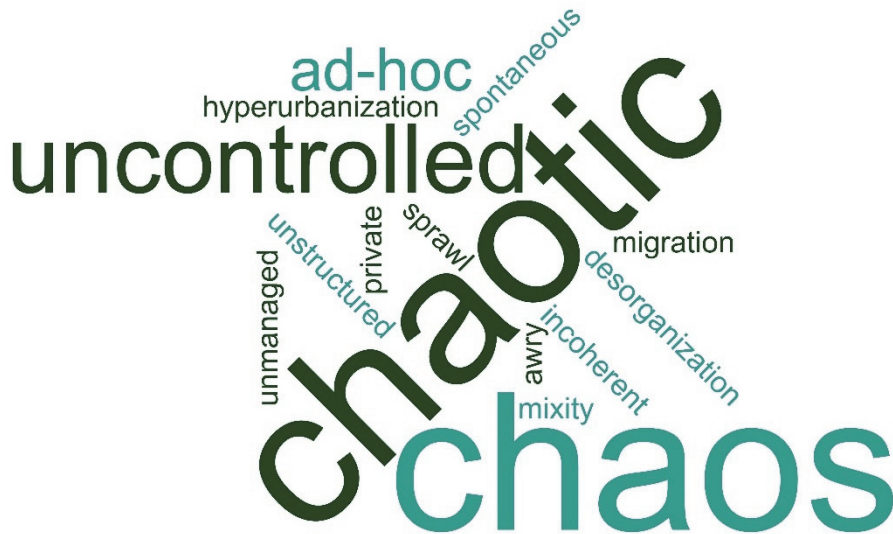


Figure 12. Synthesis of the one-word characterization of suburbanization processes by Romanian spatial planning experts

The correlation analysis highlighted the strong relation (Kendall's tau coefficient of 0.841, significant at the 0.01 level, 2-tailed) between the loss of farmland and the sealing of soil surfaces, confirming previous findings regarding the concentration of suburbanization patterns in post-socialist countries on agricultural land (Bičík et al., 2015, Petrișor et al., 2020).

The values of the urban sprawl restrictiveness index ranged from 0.14 (Cluj-Napoca metropolitan area, Petreștii de Jos commune) to 0.74 (Timișoara metropolitan area, Dumbrăvița commune). As far as the spatial distribution is concerned, from the 17 local administrative units with values in the highest quintile, 15 are located in the first ring of settlements around the core cities - see **Figure 13**. The lower values registered by the core cities suggest that most of suburbanization is actually taking place outside of the core cities' administrative borders. Two local administrative units registered index values above 0.70: Dumbrăvița commune (0.74, Timișoara metropolitan area) and Florești (0.72, Cluj-Napoca metropolitan area) - see **Figure 14**.

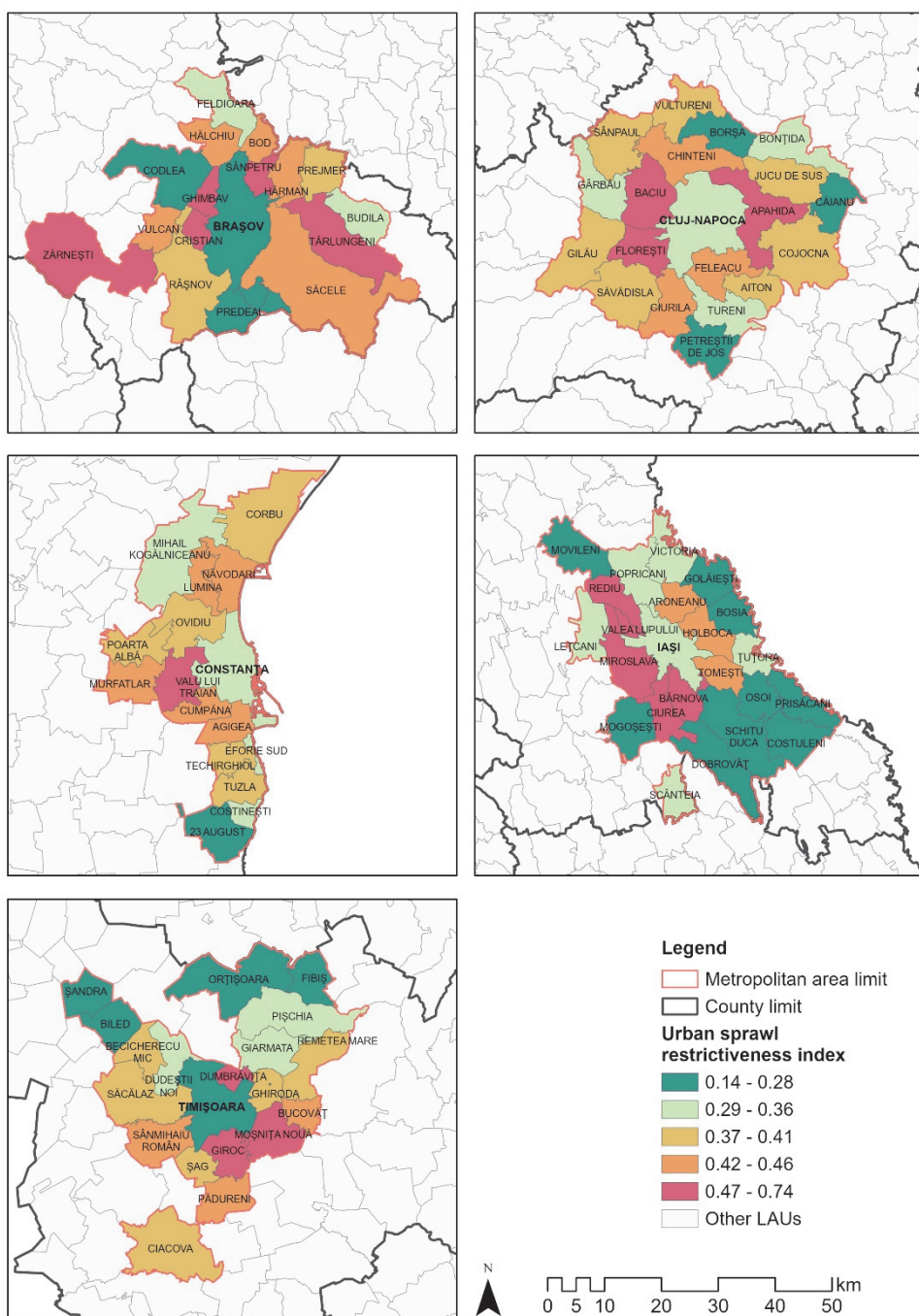


Figure 13. Spatial distribution of the urban sprawl restrictiveness index in the selected metropolitan areas

Source: Adapted from Coheci & Petrișor, 2023b.

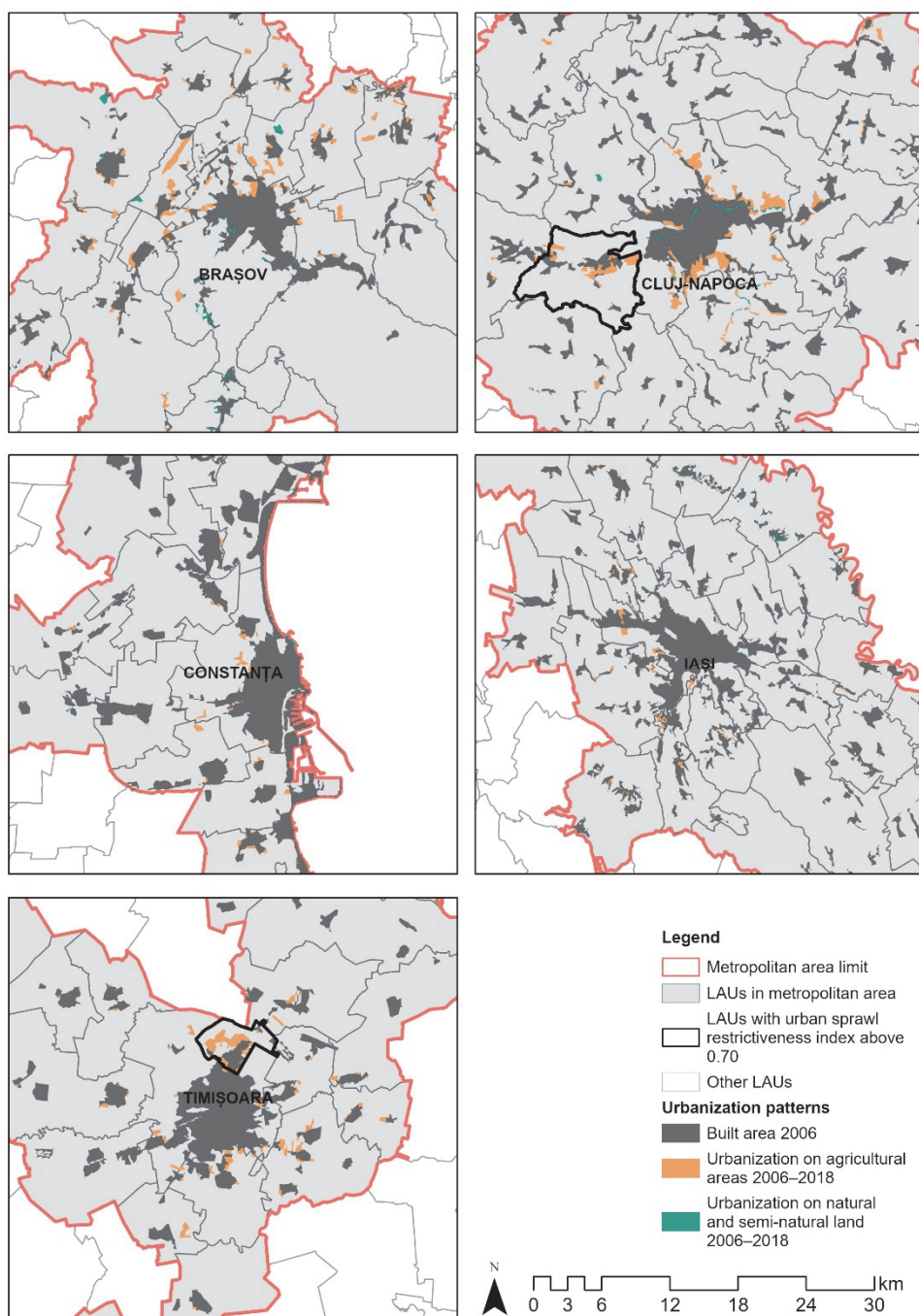


Figure 14. Urbanization between 2006-2018 in the selected metropolitan areas

Source: Adapted from Cocheci & Petrişor, 2023b.

The geographical distribution of the urban sprawl restrictiveness index demonstrates that suburbanization has a more pronounced impact on the nearby local administrative units neighbouring core cities. Across all five chosen metropolitan regions, there are evident territorial disparities in the urban sprawl restrictiveness index values, with the administrative units situated at the outer edges of the metropolitan areas having the lowest index values. This confirms the conclusions of previous research in Romanian cities with over 200,000 people, revealing that the most intense urban sprawl pressure occurs within approximately 8-10 kilometres from the core city (Iașu & Eva, 2016). In general, the lower index values within core cities, combined with the concentration of higher values in the first ring of settlements, emphasize the need for a metropolitan-level approach to managing suburbanization.

Considering the environmental, social and economic consequences associated with urban sprawl, there is a clear need for developing planning tools and policies aimed at effectively managing suburbanization. Within this context, the urban sprawl restrictiveness index has the potential to become an important instrument for policymakers. On the one hand, the index offers a means to identify local administrative units that have experienced the most pronounced impacts of uncontrolled suburbanization, including issues such as landscape fragmentation or lack of social infrastructure. On the other hand, the index can be used as a monitoring tool to evaluate the progress made by local public authorities in dealing with urban sprawl. As the index's computation solely relies on publicly accessible data, it could be used for periodic monitoring, being computed every time new CORINE datasets are published.

To sum up, the main findings of the research at metropolitan level are the following:

- Based exclusively on publicly available data, **the urban sprawl restrictiveness index can be an important tool for policymakers, used in monitoring urban sprawl related issues** and in identifying the local administrative units which should be covered by specific spatial planning instruments for better managing suburbanization.
- In the case of Romania, the spatial distribution of the index illustrates that the **local administrative units located in the first ring of settlements around core cities are the most affected by suburbanization processes.**

Based on this research, the detailed analyses at local level (next section) were done on the two local administrative units registering the highest values of the urban sprawl restrictiveness index: Dumbrăvița and Florești.

Local level: A methodology for qualitative assessment

The United Nations proposed 17 Sustainable Development Goals (SDGs) in 2015. Among these, SDG 11 specifically focuses on sustainable cities and communities, but is also strongly linked with other SDGs related to health and social welfare (Chen et al., 2022). Assessing the sustainability of an urban area can thus be related to the accessibility of green areas (Koprowska et al., 2020), health and education services (Hu et al., 2023), public space quality (Santos et al., 2022) or the capacity of technical infrastructure (Hlaváček et al., 2019).

In this context, **do new suburban residential areas in Romania offer adequate quality of living to their residents?** In order to find out, a methodology was proposed combining quantitative methods (spatial analysis of Urban Atlas datasets for the years 2006 and 2018) with qualitative methods. The selected study areas were the two communes registering the highest urban sprawl restrictiveness index values: Dumbrăvița and Florești. The results were then discussed in relation to the urban planning regulations in the two local administrative units.

Dumbrăvița, located to the north of Timișoara municipality, is one of the fastest growing communes in Romania, having reached 20.000 residents according to the 2021 National Census. It is considered one of the most developed communes in Romania (Sandu, 2022), characterized by important suburban developments, especially in the form of low-rise individual housing - **Figure 15**. Florești, located to the west of Cluj-Napoca municipality, is the largest rural local administrative unit in Romania in terms of population: over 52.000 residents according to the 2021 National Census. Its significant population growth is mainly caused by young people moving in from Cluj-Napoca (Cocheci & Mitrea, 2018), with multiple collective housing projects being developed in the last two decades - **Figure 16**. Both communes can be considered car-dependent dormitory suburbia for people working in the city.

For quantifying the extent of suburban development, Urban Atlas vectorial datasets for the years 2006 and 2018 were used, provided by Copernicus Land Monitoring Service. The vectors were rasterized using 10 x 10 meters cell size and reclassified in order to highlight the extension of urbanized areas between 2006 and 2018. Two detailed study areas were then selected in each of the two communes, using a 500 x 500 meters generated grid covering the urban expansion areas in both Dumbrăvița and Florești. The four detailed study areas were then qualitatively assessed. The assessment was carried out during on-site field surveys, based on an observation file - see **Table 6**.



Figure 15. Suburbanization in Dumbrăvița - overview

Source: Google Earth, 2023



Figure 16. Suburbanization in Florești - overview

Source: Google Earth, 2023

Table 6. Observation file used for the field survey: qualitative analysis

Domain	Criterion	1 (Bad)	2 (Medium)	3 (Good)
Urban morphology	Street network	Irregular with narrow cul-de-sacs	Narrow streets, cul-de-sacs are an exception	Organized network with decent street width
	Ratio: maximum building height and distance between buildings	Height greater than distance	Height smaller than distance	Height approximately equal to distance
	Lot coverage	Over 60 %	Under 30 %	Around 45 %
	Street front coherence	Discontinuous, no coherent alignment of buildings	Coherent alignment of buildings, no rhythm	Coherent alignment of buildings, with rhythm
Access to infrastructure and services	Energy network	Both gas and public lighting are missing	Either public lighting or gas is missing	Access to both gas and public lighting
	Water and sewage network	Both water and sewage are missing	Sewage is missing	Access to both water and sewage
	Education	No public or private schools and kindergartens within 1 km	Private schools or kindergartens within 1 km*	Public schools and kindergartens within 1 km
	Healthcare	No public or private healthcare or pharmacies within 1 km	Private healthcare or pharmacies within 1 km*	Public healthcare and pharmacies within 1 km
	Leisure	No park or green space within 1 km	No park or green space within 300 meters**	Park or green space within 300 meters**

Domain	Criterion	1 (Bad)	2 (Medium)	3 (Good)
Landscape quality	Green areas	Green areas are missing or their quality is bad	Well-maintained green areas on private lots	Well maintained green areas on private lots and public streets
	Waste management	No sanitation services, waste is visible in public areas	Waste collected by sanitary operators, but no street cleaning	Access to sanitation services, including street cleaning
	Aesthetics of the facades	Degraded image or use of strident colours and materials	Well-maintained, lack of homogeneity in colours or materials	Well maintained and unitary approach to colours and materials
	Public space	Dirt or cobbled streets, no social activities possible	Mostly paved streets, few social activities possible	Paved streets, quality of public space encourages social activities

** Or 15 minutes walking distance (Moreno et al., 2021). ** See the 3-30-300 rule regarding green areas (Konijnendijk, 2023). *** Assessing if the quality of public spaces encourages social activities (Gehl, 2011).*

Source: Cochechi & Petrișor, 2023c

The criteria used for the qualitative assessment covered three domains: urban morphology, access to infrastructure and services and landscape quality. A score between 1 (Bad) and 3 (Good) was assigned to each criterion, based on direct on-field observation and a GIS accessibility analysis done using Points of Interest vectorial data provided by Open Street Map (OSM). For the latter, a buffer distance of 1 km was used, taking into account the 15-minute city principle regarding the accessibility of basic services (Moreno et al., 2021), as well as an average walking pace of 4 km/h. For each of the four detailed study areas, an overall score was computed, with the results discussed comparatively, considering the urban planning regulations in the existing and proposed General Urban Plans. **Figure 17** provides an overview of the methodology used for the quantitative and qualitative assessment at local level.

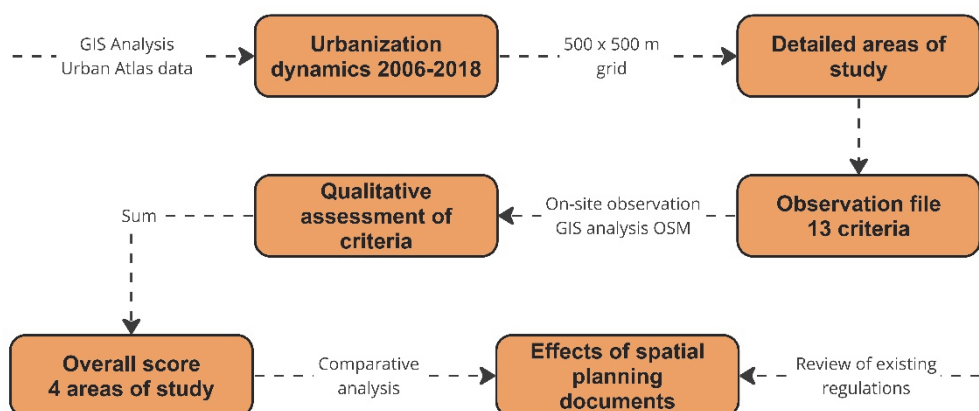


Figure 17. Research flow: quantitative and qualitative assessment at local level

Source: Adapted from Cochechi & Petrișor, 2023c.

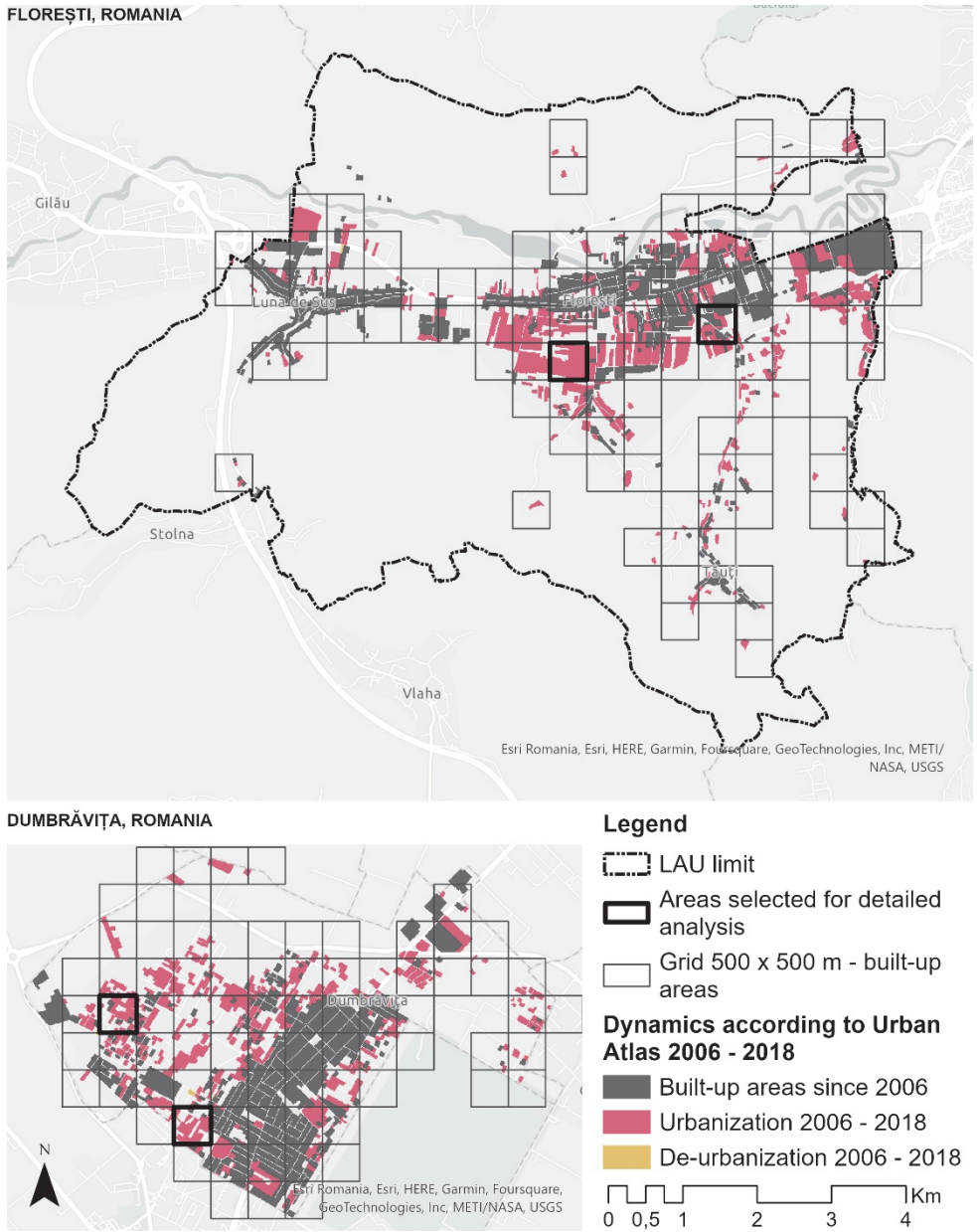
Table 7 summarizes the main findings of the quantitative assessment of suburban development in Dumbrăvița and Florești between 2006 - 2018. Both communes experienced important suburbanization processes, accompanied by significant population growth: an increase in the number of inhabitants of over 3.5 times in Dumbrăvița and over 4.5 times in Florești. The indicators highlight the different suburbanization patterns in the two communes. Dumbrăvița was characterized by a low-density suburban development, which could be characterized as urban sprawl given the high land take per additional inhabitant (over 270 sqm). On the other hand, suburbanization in Florești was characterized by higher densities, with a considerably lower land take per additional inhabitant.

Table 7. General characteristics of urbanization: Dumbrăvița and Florești

Criterion	Dumbrăvița	Florești
Expansion of built-up areas 2006-2018 (hectares)	275.87	332.52
Growth rate of built-up areas 2006-2018 (%)	66.68	73.25
Average size of built-up area patches (hectares)	1.89	1.80
Population growth 2006-2018	10,048	31,271
Population growth rate 2006-2018 (%)	358	445
Land take per additional inhabitant 2006-2018 (sqm)	274.55	106.33

Population data according to National Institute of Statistics (INS Tempo Online Database): 1st of January 2006 and 1st of January 2019.

The criteria for the selection of the study areas for qualitative assessment included a balanced geographical coverage of new expansion areas in the two communes, as well as the consideration of different morphological patterns - see **Figure 18**.



*Figure 18. Expansion of built-up areas in Dumbrăvița and Florești.
Selection of detailed study areas*

Source: Adapted from Cocheci & Petrișor, 2023c

The four areas selected for detailed analysis (**Figure 19**) had the following general characteristics and morphological patterns (Stan, 2013):

- ☐ **Dumbrăvița West:** residential area, single-family housing. Scattered, low-density urbanization of individually developed, detached single-family houses with maximum two levels. Morphological pattern: fringes;
- ☐ **Dumbrăvița South:** residential area, mostly single-family housing. Real estate development projects continuing Timișoara's urban agglomeration to the north, focused on row houses, semi-detached and detached houses with maximum three levels. Morphological pattern: cluster.
- ☐ **Florești South-East:** residential area, single-family and collective housing. Real estate development projects on former agricultural land plots close to the old settlement, with building heights ranging from two to four levels. Morphological pattern: patches.
- ☐ **Florești South-West:** residential area with collective housing and isolated commercial activities. Real estate development projects on former agricultural land plots, consisting of isolated apartment buildings of four to five levels. Morphological pattern: patches.

All study areas offer basic water, sewage and energy infrastructure, but the other analysed criteria present different situations. **Table 8** synthetically presents the results of the qualitative assessment, while **Figures 20-33** highlight important aspects of the on-site observation (photographs made by the author, March 2023).

Both study areas in Florești registered an overall score of 26 out of 39. The high density of residential areas, leading to high lot coverage values, as well as the lack of road infrastructure planning determines a poor situation in terms of urban urban morphology. This is especially true for the South-East study area in Florești, where the street network mostly consists of private cul-de-sacs (**Figure 24**). Both study areas in Florești also registered lower values in the criteria related to landscape quality (**Figure 31**). Public streets often lack sidewalks (**Figure 29**) and are mostly occupied by car parks for residents (**Figure 30**). The building facades are characterized by a lack of homogeneity in colours and materials, with some apartment buildings in the South-West area of Florești presenting heavily degraded facades (**Figure 32**).

FLOREȘTI - SOUTH-EAST



FLOREȘTI - SOUTH-WEST



DUMBRĂVIȚA - WEST



DUMBRĂVIȚA - SOUTH



LAU limit

Areas selected for detailed analysis

Provision of amenities

Educational facilities

Healthcare facilities

Parks and green areas

Dynamics according to Urban Atlas 2006 - 2018

Built-up areas since 2006

Urbanization 2006 - 2018

De-urbanization 2006 - 2018

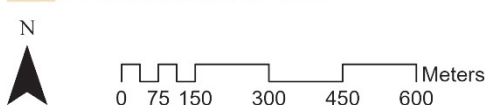


Figure 19. The four study areas for detailed analysis - overview

In spite of these issues, the medium overall score obtained by the two study areas in Florești can be explained by the fact both areas benefit from the proximity of private educational and healthcare facilities, as well as leisure areas in the form of small parks: the study areas obtained a score of 13 out of 15 in the criteria regarding access to infrastructure and services. The emergence of private education and healthcare facilities could be explained by the higher population densities in Florești, which encouraged private companies to offer such services.

All in all, the lack of planning is also evident in the allocation of street addresses for new developments (**Figure 33**). As urbanization is done in patches (**Figure 23**) and is exclusively led by private investors, there is a risk of excessive densification as all remaining land reserves are built in the same manner (**Figure 21**). There is often little space left for the development of public amenities, coherent street networks or parks.

The overall scores obtained in Dumbrăvița were higher than those in Florești, especially due to a better coherence in the urban morphology of the studied areas. Both areas have coherent street networks and respect the setbacks from the parcel limits recommended in the national spatial planning regulations (**Figure 20**). The lower scores in the West study area can be explained by the lower densities and tendencies towards a more scattered development resembling urban sprawl patterns (**Figure 22**). These lower densities have also led to a poorer situation regarding the access to infrastructure and services, where the West study area obtained a score of only 9 out of 15. As a result, despite a good score obtained in the landscape quality criteria (9 out of 12) due to the unitary approach for the building facades, the West study area in Dumbrăvița registered an overall score only slightly better than the Florești areas (28 out of 39).

On the other hand, the South study area in Dumbrăvița obtained the highest score (34 out of 39), displaying potential for a sustainable suburban development, should corrective measures be implemented. Unlike Florești, the private real estate developments in the South study area in Dumbrăvița showcased a coherent approach regarding the development of the street network and the resulting street fronts. The area also benefits from the presence of a small park (Nordic Residence Park - **Figure 25**), which brings a significant improvement to the neighbourhood's quality of life. However, just like in the case of the other study area in Dumbrăvița, there are issues regarding the proximity to educational and healthcare facilities. While the quality of public spaces is clearly higher than in the other study areas, there are still unpaved streets which affect overall landscape quality (**Figure 28**).

Table 8. Results of the qualitative assessment in Florești and Dumbrăvița

Domain	Criterion	Florești		Dumbrăvița	
		South-West	South-East	West	South
Urban morphology	Street network	2	1	3	3
	Ratio: maximum building height and distance between buildings	2	2	3	3
	Lot coverage	1	1	2	3
	Street front coherence	2	1	2	3
Access to infrastructure and services	Energy network	3	3	3	3
	Water and sewage network	3	3	3	3
	Education	2	2	1	1
	Healthcare	2	2	1	2
	Leisure	3	3	1	3
Landscape quality	Green areas	1	2	2	3
	Waste management	2	3	2	2
	Aesthetics of the facades	1	1	3	3
	Public space	2	2	2	2
OVERALL SCORE		26	26	28	34

Source: Adapted from Cocheci & Petrișor, 2023c



Figure 20. Dumbrăvița: coherent (albeit diverse) street fronts

Top: South study area. Bottom: West study area. March 2023



Figure 21. Florești: lack of coherent street fronts and excessive densification

Top: South-East study area. Bottom: South-West study area. March 2023



Figure 22. Dumbrăvița: urban sprawl patterns

Top: South study area. Bottom: West study area. March 2023



*Figure 23. Florești: private-led urbanization focused on collective housing
South-West study area. March 2023*



*Figure 24. Florești: private, narrow cul-de-sacs for each development
South-East study area. March 2023*



Figure 25. Dumbrăvița: improved quality of public spaces

Top: South study area (Nordic Res. Park). Bottom: West study area. March 2023



*Figure 26. Florești: contrast between private and public spaces
South-East study area. March 2023*



*Figure 27. Florești: degraded public spaces, designed only for cars
South-West study area. March 2023*



Figure 28. Dumbrăvița: un-paved streets in new residential areas

Top: South study area. Bottom: West study area. March 2023



Figure 29. Florești: lack of sidewalks a discomfort for parents with baby carriage

South-East study area. March 2023



Figure 30. Florești: open spaces occupied by car parks with little vegetation

South-West study area. March 2023



Figure 31. Florești: degraded landscape quality around new apartment buildings

Top: South-East study area. Bottom: South-West study area. March 2023



Figure 32. Florești: strident colors and degraded facades on new buildings

South- West study area. March 2023

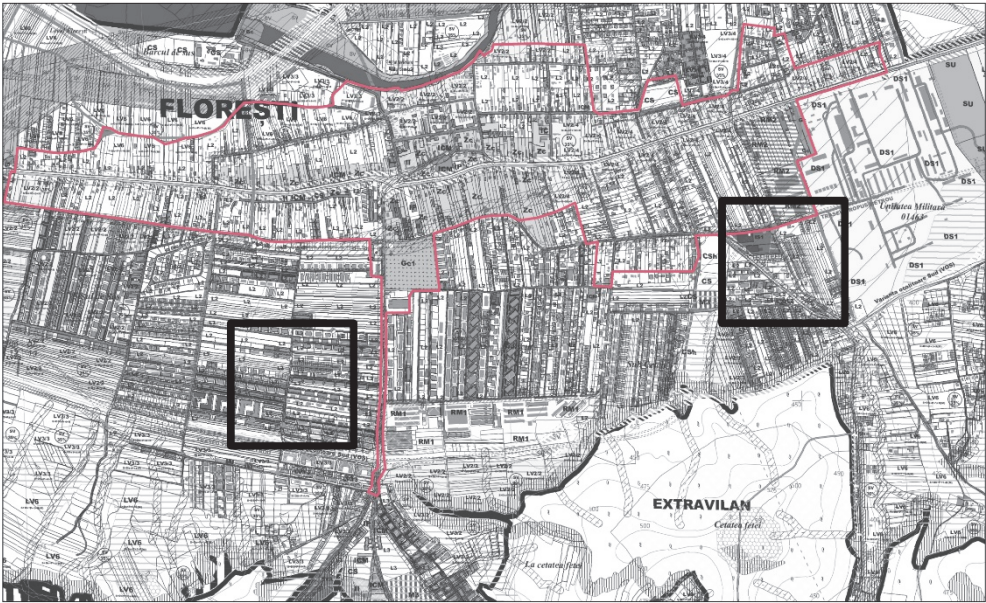


Figure 33. Florești: lack of infrastructure planning leading to street orientation problems

South- West study area. March 2023

To explain these differences between the study areas, an analysis of existing and proposed urban planning provisions was carried out. The General Urban Plans (GUP) in both Dumbrăvița and Florești are expired. In Dumbrăvița, the GUP was approved in 2000, but did not include any of the study areas within the urban growth boundary - see **Figure 34**. In 2004, a steering Zonal Urban Plan for future developments was approved (**Figure 35**), regulating the proposed street network, defining areas for the development of public amenities and establishing minimum setbacks from property limits and maximum heights for future single-family houses. In spite of the public amenities never being implemented, the steering Zonal Urban Plan ensured a coherent suburban development as far as building height, setbacks, street front coherence and a unitary approach to the materials and colours used were concerned.

FLOREȘTI



DUMBRĂVIȚA

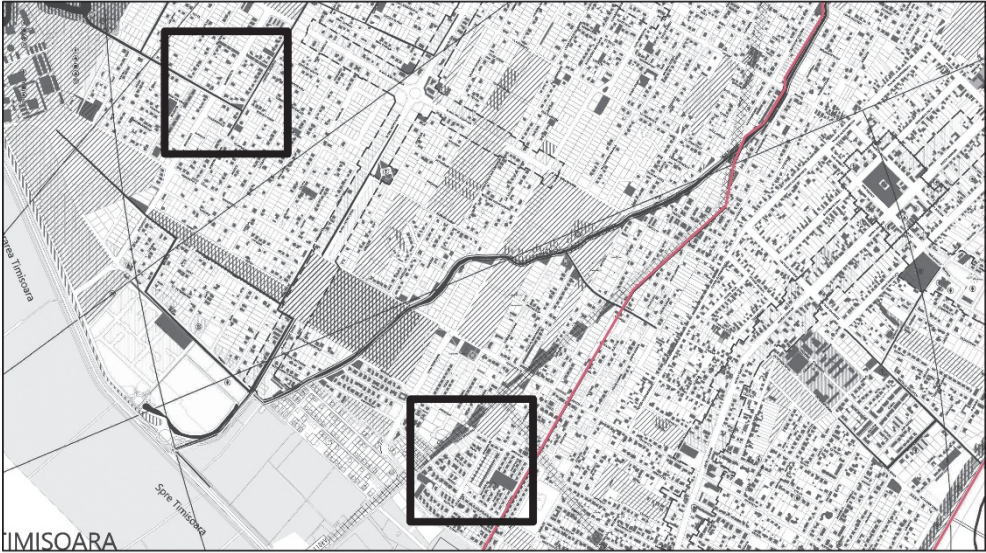


Figure 34. Status of study areas in existing and proposed urban planning regulations.

The GUP of Florești, approved in 2005, also regulated an urban growth boundary without taking into account future housing developments - the South-West study area was not included within the urban growth boundary, while the South-East study area was only partially included. Consequently, urbanization in Florești was made possible through the adoption of individual Zonal Urban Plans allowing the extension of the urban growth boundary for new developments. This process was uncoordinated, as each private real estate investor developed its own Zonal Urban Plan, without the municipality proposing an overarching vision regarding the settlement's development.

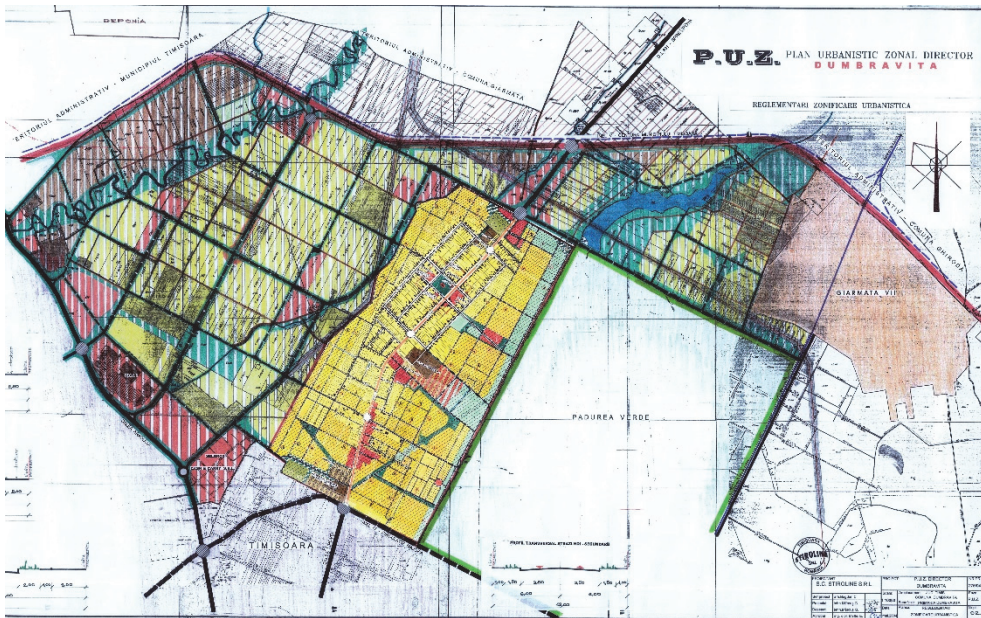


Figure 35. Steering Zonal Urban Plan for Dumbrăvița (approved 2004)

Source: STIROLINE SRL, 2004

The process of revising the General Urban Plan commenced several years ago in both Dumbrăvița and Florești. Currently, these updated documents are in the midst of approval procedures carried out by various institutions. The versions currently under approval can be accessed by the public through the official websites of the local administrative units (specifically, the Dumbrăvița commune website and the Florești commune website). The urban growth boundaries approved in the previous General Urban Plans, illustrated in **Figure 34**, were taken from these versions. Notably, both General Urban Plans propose significant extensions of the urban growth boundary: Florești's boundary is set to expand from 381.32 hectares to 3,663.21 hectares, while Dumbrăvița's boundary is anticipated to increase from 1,078.35 hectares (accounting for 56.85% of the

administrative territory) to 1,789.35 hectares (encompassing 94.32% of the administrative territory).

The analysis highlights the failure of current urban planning instruments in controlling suburban development in Romanian metropolitan area. To increase budgetary revenue, local public authorities have opted to approve the development of new residential areas, despite lacking the financial resources for providing the required public amenities and infrastructure.

Despite the un-controlled suburbanization leading to the emergence of residential areas without essential public amenities, the new General Urban Plans for Florești and Dumbrăvița, presently in the process of receiving approvals, continue to propose considerable expansions of the existing urban growth boundaries. These expansions could be considered reasonable, given the population growth trends in the past twenty years. However, Romania's current spatial planning system lacks both a higher-level metropolitan planning instrument to guide suburban development across various municipalities and explicit criteria that could ensure the sustainable advancement of suburbs in terms of population density, accessibility, and the availability of public services. In this situation, there is a notable risk of further expanding already unsustainable suburban areas without providing solutions for the current problems.

To conclude, the research at local level illustrated the following:

- ☐ **Qualitative methods can prove a useful tool in facilitating comparative analyses of suburban areas.** The proposed methodology can aid experts and policymakers, highlighting the public policy areas which need to be addressed in order to improve the quality of life in new residential suburban areas.
- ☐ **Sustainable development goals in Romanian suburban areas are hampered by the lack of basic public services,** especially educational and healthcare facilities.
- ☐ **Locally approved Zonal Urban Plans have had a negative impact on Romanian suburbs,** encouraging private-led urbanization without taking into account the requirements for public infrastructure and amenities.

The next chapter synthetically presents the Italian approach to metropolitan planning and governance. Its aim is to identify possible tools that could be replicated and adapted for a better management of suburbanization in Romanian metropolitan areas.

4. Other approaches to metropolitan planning and governance: Italy*

The Italian Spatial Planning System

The Italian spatial planning system has been chosen as a case study due to its similarities to Romanian spatial planning. First, at local level, municipalities develop legally-binding regulatory plans which play a significant role in the spatial planning system. Second, the emergence of metropolitan areas as an institution in Italy has been rather recent, in spite of the concept being discussed for more than three decades.

Three main aspects have been considered to be structural features of the Italian spatial planning system (Lingua & Servillo, 2014):

- ☐ Primacy of the legally-binding master plan (*Piano Regolatore Generale* - General Regulatory Plan) at the local level;
- ☐ The architectural roots of spatial planning as a discipline - a similar situation to the one in Romania;
- ☐ The persistence of standards despite an almost absent programming capacity.

The spatial planning system was defined as a three-level system by the National Spatial Planning Law no. 1150/1942 (Colavitti et al., 2013), see **Figure 36**:

- ☐ Regional level (NUTS 2): Regional Territorial Plan (PTR);
- ☐ Provincial level (NUTS 3): Provincial Coordinating Territorial Plan (PTCP), mostly aiming to coordinate local land use plans (Zimmermann, 2022);
- ☐ Local level (LAU): General Regulatory Plan (PRG) containing zoning provisions[†].

There are no spatial planning instruments defined at national level. At interjurisdictional level, there is a possibility for regions, provinces or communes to propose the development of Intercommunal General Regulatory Plans (PRGI). This planning instrument is similar to the Metropolitan General Urban Plan proposed in Romania's Code for Territorial and Urban Planning and Constructions. In Italy, the relevance of this plan for metropolitan areas has become limited, due to the

* This chapter is based on two main sources: a literature review on the Italian Spatial Planning System and a research study visit in the Turin Metropolitan Area in April 2023, where information was gathered from interviews with experts at the Politecnico di Torino, Turin Metropolitan Area and Torino Urban Lab.

[†] Similar to the Romanian General Urban Plan (PUG).

institutionalization of metropolitan cities* and proposal of new spatial planning instruments at this level.

In 2001, the changes to the Italian Constitution (Chapter V) led to a sharing of spatial planning competences between the state and the 20 regions. While the 1942 national law is still in force, territorial government laws adopted by the regions have included innovative aspects, often changing the structure of existing planning instruments (Colavitti et al., 2013). These changes have continued the decentralization trends from the 1970s, when some responsibilities related to land use and natural resource preservation were transferred from the central government to the regions (Cocheci & D’Orazio, 2019). As a result, there is still an overlap of competences between the Italian state and its regions (Zimmermann, 2022).

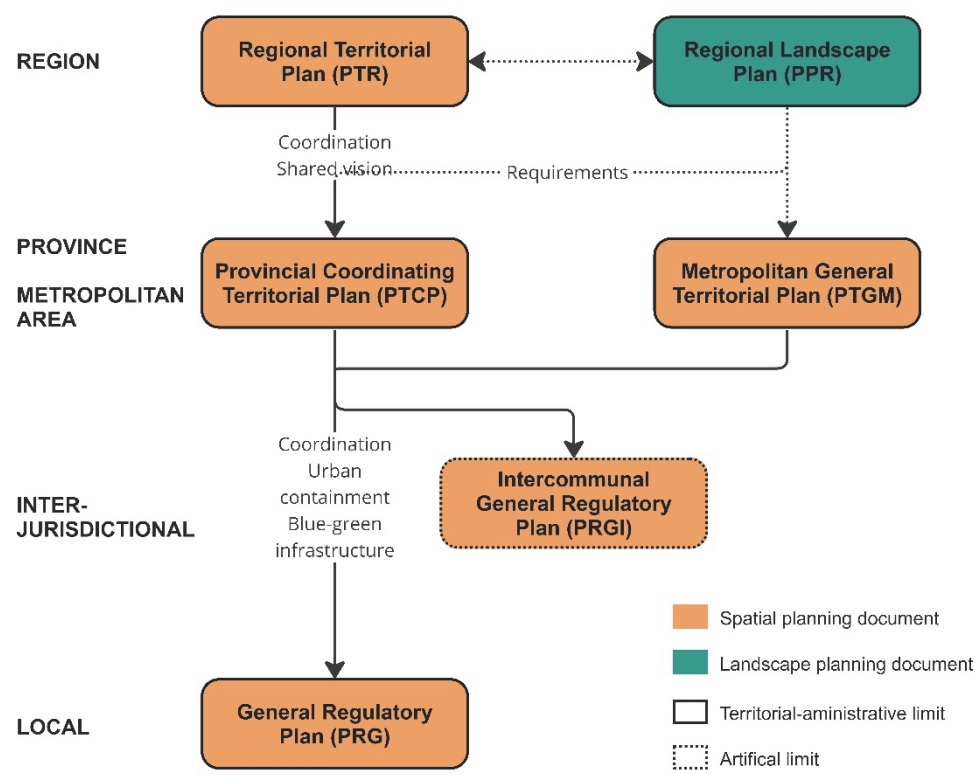


Figure 36. Spatial planning instruments in Italy

* *Città Metropolitana*, in Italian. They will be referred to as Metropolitan Areas throughout the chapter.

Regions in Italy also draft Regional Landscape Plans (PPR), according to Law no. 42/2004. The landscape plan, which is incorporated in the Regional Territorial Plan, sets out requirements that need to be respected by all lower-level plans, including the local General Regulatory Plans (Colavitti et al., 2013).

The regional reforms that followed the Constitutional changes in 2001 undermined the primacy of the legally binding Regulatory General Plan (Servillo & Lingua, 2014). This encouraged the transition towards more strategic planning instruments (Cocheci & D'Orazio, 2019). In some regions, the PRG was split in two dimensions: a structural (strategic) level and an operational one focused on land use regulation (Lingua & Servillo, 2014).

As mentioned before, the spatial planning system still heavily relies on normative prescriptions in the form of urbanistic standards. These parametrical limits to construction, imposed for the determination of public spaces and services by Law no. 765/1967, were a reaction to speculative urbanization processes which often lacked adequate planning (Servillo & Lingua, 2014).

The institutionalization of metropolitan areas through legislative reform

The metropolitan level was first introduced in Italian law in 1990. Law no. 142/1990 allowed nine Italian cities (Turin, Milan, Venice, Genova, Bologna, Florence, Rome, Naples and Bari) to form a new institutional entity. However, only the regions of Liguria (for Genova), Veneto (for Venice) and Emilia Romagna (Bologna) proceeded to propose a delimitation of the metropolitan territory, without taking further steps for establishing a metropolitan area (Giangaspero et al., 2015).

The metropolitan areas (*città metropolitane*) were officially introduced as an administrative level of the Italian republic in 2001, following the change to article 114 of the Italian Constitution. In 2014, Law no. 56 (Delrio Law) established that ten metropolitan areas (Roma, Turin, Genova, Milano, Venice, Florence, Bologna, Bari, Naples, Calabria) would replace the provinces as administrative level, followed by four metropolitan areas in regions with special status (Cagliari, in Sardinia, and Catania, Messina and Palermo, in Sicily) - see **Figure 37**. Both the Constitutional amendment and the Delrio law were meant as steps for abolishing the provinces. Nevertheless, as the 2015 referendum for Constitutional changes was not approved, the administrative level of provinces was preserved. Consequently, there are currently two main



Administrative boundaries: © EuroGeographics, © TurkStat. Source: European Commission – Eurostat/GISCO

Figure 37. The 14 Italian Metropolitan Areas

types of institutions at sub-regional level (NUTS 3) in Italy: 93 provinces and 14 metropolitan areas.

The process of establishing metropolitan areas could thus be considered a top-down approach which led to a missed opportunity for defining adequate administrative limits (Dimitriu, 2023). The designation of metropolitan areas within the boundaries of former provinces did not address the functional relationships between the core city and the surrounding local administrative units (Fedeli, 2017). In the case of Turin, for example, the metropolitan area consists of 312 local administrative units, having a much wider territorial coverage than the functional relations between the city of Turin and its hinterland (Cotella et al., 2021).

The approach for the designation of metropolitan areas has led to a questioning of their institutional effectiveness (Vinci, 2019). They are characterized by a dominant influence of the core city, as well as limited powers and funding by State and Regions (Boggero, 2016). However, metropolitan areas have benefitted from special financing opportunities within the 2014-2020 European Union programming period, supporting their materialization as a new institutional level (Dimitriu, 2023).

The Italian National Operational Programme on Metropolitan Areas for the 2014-2020 programming period (PON Metro) was meant as a programming instrument for financing social innovation and smart city projects, strengthening the new institutional level (Cotella, 2021). However, the majority of the projects were implemented by the core municipalities, with the operational programme having limited effects on suburban areas.

The governance structure of the metropolitan areas is based on (Fedeli, 2017):

- ☐ The Mayor of the Metropolitan Area - the mayor of the core city (elected only by the core city's residents) is automatically designated as the mayor of the metropolitan area.
- ☐ The Metropolitan Council - executive body, its members elected from the mayors and local councillors of the local administrative units in the metropolitan area;
- ☐ The Metropolitan Conference - formed by the mayors of the local administrative units in the metropolitan area.

For ensuring a better governing of the territory, metropolitan areas can also establish homogenous areas. In the case of Turin, given the large territory of the metropolitan area, 11 homogenous areas were established, with one mayor designated as a spokesperson for each area.

The metropolitan areas have taken up the responsibilities of the former provinces regarding territorial planning coordination, school network planning and road infrastructure, while also being in charge with the management of public services like water supply and waste management. In the case of Turin, the metropolitan area also gained additional responsibilities regarding strategic, spatial and mobility planning, the coordination of digitalization and of economic and social development, as well as gaining supranational relevance when accessing European Union funds (Cotella et al., 2021).

Metropolitan planning instruments and possible lessons for Romania

In the 2000s, the lack of spatial planning instruments at metropolitan level led to the emergence of voluntary strategic plans in many metropolitan areas (Lingua & Servillo, 2014). The status of metropolitan spatial planning instruments was clarified after the Delrio law. As a result, three important spatial planning instruments currently co-exist at metropolitan level - see **Figure 38**. The first one, the Metropolitan General Territorial Plan (PTGM), resembles the previous Provincial Coordinating Territorial Plan (PTC2). It encompasses various norms for coordinating local-level urban planning, including provisions related to the control of land consumption. The second instrument is the Metropolitan Strategic Plan (PSM), developed every three years, while the third planning instrument is the Sustainable Urban Mobility Plan (PUMS). The latter two serve as strategic planning tools, but have no direct impact on land use.

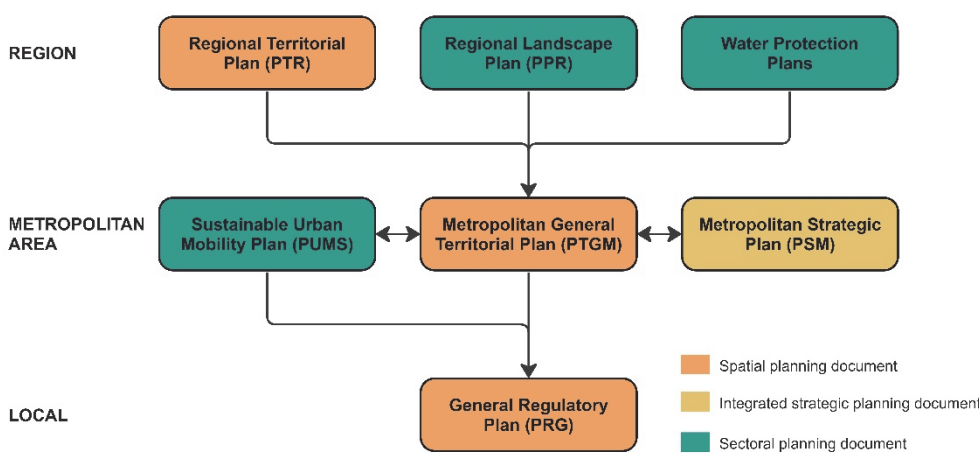


Figure 38. Spatial planning instruments influencing metropolitan planning in Italy

The Metropolitan General Territorial Plan generally includes three levels of norms:

- ☐ Prescriptive (compulsory) provisions: on residential and productive systems, road viability measures and natural protected areas;
- ☐ Steering provisions: on blue-green infrastructure;
- ☐ Guidelines (recommendations): on themes such as agriculture or forests.

The Region verifies that the provisions of the PTGM are coherent with the provisions of the regional plans (including the Regional Landscape Plan). The preliminary project for the PTGM is also presented to each commune in the metropolitan area, for gathering observations at local level. After the approval of the PTGM, metropolitan areas are involved in the co-planning table of the PRGs in the area. As a result, metropolitan areas can formulate observations regarding the coherence between the regulations of the PRG and the prescriptions of the PTGM.

The structure of the metropolitan plans is established by each regional law, which leads to important differences between metropolitan areas. For instance, in the Bologna Metropolitan area (Emilia Romagna region) the metropolitan plan has provisions related to land use, with the local level plans (PRGs) having to respect these provisions when detailing land use regulations. Hence, the provisions of the PTGM can contribute to urban containment. The steering provisions related to blue-green infrastructure must also be considered at local level and can act as an urban containment strategy.

In the case of Turin Metropolitan area, the most recently developed plans offer important insights regarding the characteristics of Italian metropolitan spatial planning. As far as the Strategic Metropolitan Plan is concerned, the current PSM 2021-2023 is strongly linked to EU funding opportunities (Città metropolitana di Torino, 2021). It is especially consistent with the pillars of the Next Generation EU post-pandemic recovery plan, having axes related to digitalization and innovation, green revolution and ecological transition, infrastructure for mobility, training and education, equity, as well as health. The Strategic Metropolitan Plan contains 111 actions, which are placed in relation to the United Nations Sustainable Development Goals and the priorities of the National Recovery and Resilience Plan (PNRR).

The strategic planning document proposes a shared vision for the metropolitan territory and clearly defines its relationship to the other metropolitan planning instruments, which are meant to continue on the same premises (Città metropolitana di Torino, 2021):

- ☐ The PTGM focuses on the implementation of actions leading to the transformation of spaces.
- ☐ The PUMS tackles the implementation of actions leading to the transformation of flows.

The Metropolitan General Territorial Plan (PTGM) of Turin, whose preliminary project form has been published in December 2022 (Città Metropolitana di Torino, 2022), is explicitly stating its role in territorializing the strategic metropolitan vision. The plan considers land use containment to be one of the central themes of metropolitan urban policy. It takes the principles from the former Provincial Coordinating Territorial Plan, assuming the function of general planning and coordination for the entire metropolitan territory, according to the objectives and indications of the regional-level plans (PTR, PPR):

- ☐ Configuring the territorial structure;
- ☐ Protecting and valorising the natural environment in its integrity;
- ☐ Considering existing local-level planning;
- ☐ Coordinating policies for transforming and managing the territory;
- ☐ Creating and integrating a territorial data bank.

The PTGM includes analysis tools designed for supporting decision-making processes, thus aiding in the implementation of the plan's objectives. One such tool is the Observatory of Territorial Transformations, monitoring the impact of territorial and urban policies on soil consumption, in relation to the soil consumption observatory at national level maintained by the Italian Institute for Environmental Protection and Research (ISPRA).

Soil consumption is an important subject of Turin's PTGM, being listed as one of the plan's main aims. The plan also focuses on blue-green infrastructure, ecosystem services and natural protected areas. It proposes operational actions for the protection and valorisation of peri-urban open areas (*spazi aperti periurbani*): the contact areas between city and countryside (Città Metropolitana di Torino, 2022). The PTGM also proposes a methodological framework for establishing urbanized areas (*aree dense*), transition areas (*aree di transizione*) and open areas (*aree libere*). This methodological framework needs to be respected by each General Regulatory Plan.

Table 9 illustrates a comparison of planning instruments and governance arrangements between Romanian and Italian metropolitan areas. The review of the Italian spatial planning system and the analysis of metropolitan planning instruments in Turin has led to the definition of several principles and tools that could be adapted in Romanian metropolitan areas.

Table 9. Comparison of planning instruments and governance arrangements in Romanian and Italian metropolitan areas

Country	Planning instruments	Governance arrangements
Romania	Peri-urban / Metropolitan Territorial Development Strategy* (SDT-P/M) Integrated Urban Development Strategy (SIDU) Sustainable Urban Mobility Plan (PMUD)	Metropolitan Intercommunity Development Association** Transfer of responsibilities (including spatial planning) from LAUs to the Metropolitan Area.
Italy	Metropolitan General Territorial Plan (PTGM) Metropolitan Strategic Plan (PSM) Sustainable Urban Mobility Plan (PUMS)	Metropolitan City, led by the mayor of the main city, a Metropolitan Council (executive body) and a Metropolitan Conference (comprising all mayors in the metropolitan area).

* - *strategic, non-regulatory and non-mandatory spatial planning instrument*

** - *voluntary association of LAUs - private organizations of public utility.*

Source: Cochechi & Petrișor, 2023c.

Purely-voluntary inter-jurisdictional arrangements tend to have certain limitations (Zimmermann & Feiertag, 2022). Consequently, institutionalized metropolitan areas, which have a territory overlapping with the Functional Urban Areas and which manage specifically designated funds, bring a significant added-value to metropolitan development (Cotella, 2021). While acknowledging the institutional issues of transforming provinces into metropolitan areas, the existence of a metropolitan governance level in Italy provides great support to metropolitan spatial planning. From a perspective purely related to spatial planning instruments, the following elements of Italian metropolitan spatial planning could be an inspiration for the Romanian planning system:

1. **A coherent metropolitan planning framework**, with the Territorial Plan explicitly assuming the role of territorializing the strategic metropolitan vision defined by the Metropolitan Strategic Plan (PSM).
2. **An upper-level planning instrument** (the Metropolitan General Territorial Plan - PTGM) specifically targeting the coordination of local level plans while ensuring limited soil consumption.

3. An important **landscape planning** component in the territorial plan, using blue-green infrastructure proposals as an urban containment strategy.
4. The proposal of analytical tools based on geo-spatial techniques and methods, in the form of **Territorial Observatories**, for monitoring the impact of the plan on soil consumption.
5. **Approval procedures** which ensure that the Metropolitan Area can verify that the provisions of local-level regulatory plans are in line with the objectives and provisions of the Metropolitan General Territorial Plan.

5. A planning instrument for managing suburbanization

Spatial planning instruments and policy tools

Spatial planning instruments (or tools)* represent one of the four key dimensions of spatial planning systems (Janin Rivolin et al., 2012). Planning instruments are significantly influenced by factors such as (Nowak et al., 2021):

- **Property rights law**, leading to the distinction between regulatory planning systems, focusing on legally-binding plans, and discretionary planning systems, characterized by strategic, more flexible instruments.
- **Administrative-territorial organization**, bringing into discussion the compatibility between administrative boundaries and functional phenomena. This poses an issue for suburbanization in metropolitan areas, challenging the effectiveness of territorial governance and spatial planning in inter-jurisdictional territories.

A spatial planning instrument can be defined as a plan that is used in the mediation and regulation of spatial development, influencing land use change and urban form (Nadin et al., 2018). Planning instruments can guide processes of change for achieving wider social, economic and environmental goals (Hurliman & March, 2012). Consequently, planning instruments can facilitate the mediation between public and private interests and can bridge the gap between broader economic needs, on the one hand, and environmental and social sustainability goals, on the other hand (Leshinsky & Legacy, 2015).

Spatial planning instruments can be discussed in relation to the policy tools supporting their development and implementation (Stead, 2021). These policy tools can be classified into two main categories (Howlett, 2000):

- **Substantive**, influencing the delivery of policy objectives.
- **Procedural**, influencing the process of policy development.

Substantive planning tools are not limited to land use regulation. According to their relation to the market, planning tools can be categorized as (Tiesdel & Allmendinger, 2005; Stead, 2021):

- **Market shaping**, for example transport infrastructure investment plans;
- **Market regulating**, for example development controls;

* Throughout this chapter, we will refer to *planning instruments* when discussing about spatial plans at different levels (national, regional, metropolitan, local). We will use the term *tool* to refer to broader policy tools which may directly or indirectly support the development or implementation of planning instruments.

- **Market stimulating**, for examples subsidies for encouraging desired activities.
- **Market capacity-building tools**, for example partnerships.

Starting from the distinction between substantive and procedural policy tools, Stead proposes a revised taxonomy of policy tools for spatial planning - see **Table 10**. The categorization also takes into account Hood's NATO model proposing a typology of policy tools (**Nodality** - information-based; **Authority** - regulatory; **Treasure** - fiscal; **Organization** - direct government action - Hood & Margetts, 2007) - see **Table 11**. The choice, combination and calibration of policy tools into successful policy packages is thus regarded as fundamental for attaining spatial planning objectives (Stead, 2021).

Table 10. Categorization of procedural tools for spatial planning

Category	Scope
Plan-making (and review)	Secure public or political support for a spatial plan and its revisions
Development control	Test the fit between the proposed development and the aims of the spatial plan. Secure public or political support for a development.
Plan enforcement	Address cases of nonconformance between development and the aims of the spatial plan.

Source: Stead, 2021.

Table 11. Categorization of substantive tools for spatial planning - examples

Scope	Nodality	Authority	Treasure	Organization
Deliver development congruent with the plan	Nonbinding policy advice	Urban growth boundary	Tax relief for land remediation	Provision of facilities as a catalyst for urban development

Source: Stead, 2021.

Another categorization of tools is proposed by Carmona. Focusing on tools related to urban design, the author distinguishes between formal and informal tools. The following typologies are proposed (Carmona, 2017 - see also **Figure 39**):

- **Formal tools:**
 - **Guidance** tools (like design standards);
 - **Incentive** tools (like subsidies or incentive zoning);
 - **Control** tools (in the form of authorizations given by the public sector or contributions given by the developer).
- **Informal tools:**
 - **Evidence** (from research and from audit);
 - **Knowledge** (coming from practice guides, case studies or education and training);
 - **Promotion** (categorized as awareness raising and targeted influence tools);
 - **Evaluation** (formative, for example design review, and summative, for example certification);
 - **Assistance** tools (indirect or direct assistance).

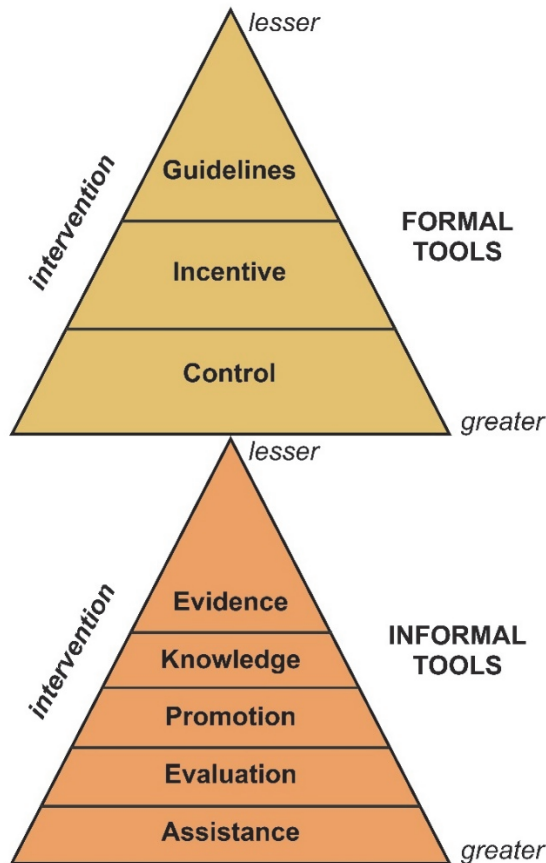


Figure 39. Formal and informal tools of design governance

Source: Adapted from Carmona, 2017.

The general character of planning instruments can be visionary, **strategic**, **framework-setting**^{*} or **regulative**[†] (Nadin et al, 2018). This categorization of spatial planning instruments is similar to the one proposed by *The EU compendium of spatial planning systems and policies* (European Commission, 1997). Based on this typology, we consider that Romanian metropolitan areas could be better managed using a spatial planning instrument that could have strategic, framework-setting (steering) and regulative (normative) character.

As far as suburbanization-driven land consumption is concerned, a better public control in spatial planning can support urban containment objectives (Berisha et al., 2023). Higher-level institutions could play a decisive role in land containment by supervising local planning practices (Pagliarin, 2018).

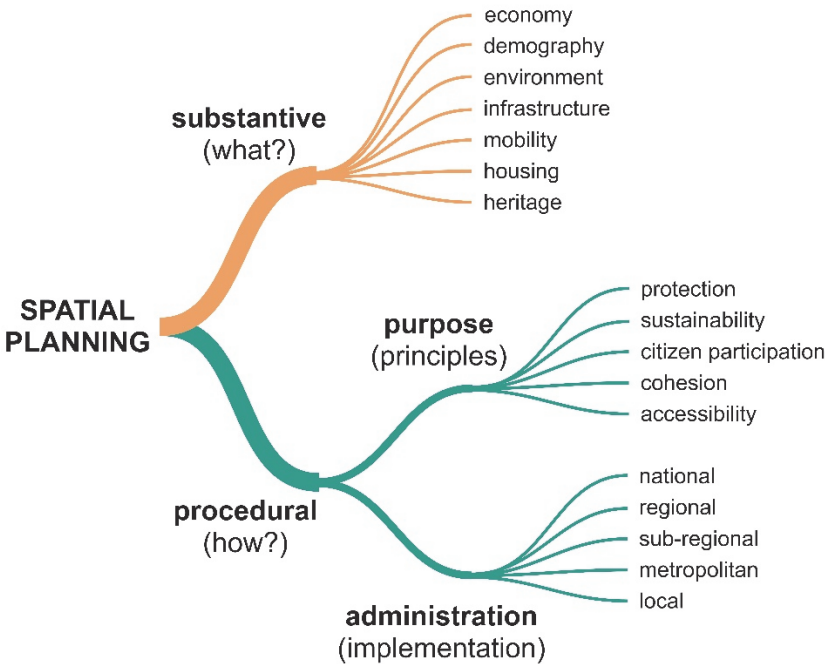


Figure 40. Formal scopes of spatial planning

Source: Adapted from Nadin et al., 2018.

^{*} Establishing policies, proposals and other criteria for a territory that provide a non-binding reference for other plans and decision-making (Nadin et al., 2018, 22). This can be mostly associated with the *steering* character (*caracter director*) of the territorial plans in the Romanian spatial planning system.

[†] Legally binding commitments or decisions concerning land use change and development (Nadin et al., 2018, 22). This can be mostly associated with the normative approach of the PRG (Italy) or PUG (Romania).

Consequently, the aim of this research is to define a possible spatial planning instrument at metropolitan level for better managing suburbanization in Romania's metropolitan areas. Considering the formal scope of spatial planning (see **Figure 40**), the definition of the spatial planning instrument will focus on both substantive (**what?**) and procedural topics (**how?** - in terms of purpose or principles and in terms of administration - competences and implementation). References to possible policy tools that could support the development and implementation of the Metropolitan Plan will also be made.

The ESPON SUPER project provides a compilation of interventions in Europe that attempt to affect urbanization patterns. Five main types of interventions have been identified for promoting sustainable land use and urbanization (Cotella et al., 2021):

- **Densification:** mostly through zoning and infill development;
- **Regeneration:** improving problematic sites like brownfield areas;
- **Containment:** limiting land development beyond a certain area;
- **Governance:** improving the mechanisms through which stakeholders manage urban areas;
- **Sectoral policies:** impact of transport, environment or rural development policies on urbanization.

Achieving sustainable urbanization is possible through a variety of instruments / tools (Cotella et al., 2021):

- **Visions and strategies:** non-binding instruments establishing the main directions for development;
- **Legal devices:** laws, norms, disincentives that could affect sustainable land use;
- **Land use regulations:** defining how land can be transformed, mostly through zoning;
- **Programmes:** creating economic conditions for sustainable urbanization;
- **Projects:** individual initiatives within a given timeframe.

Table 12 illustrates the tools and types of interventions taken into consideration in the proposed metropolitan planning instrument. This matrix serves as a general framework for the proposed content of the Metropolitan Plan, discussed in the next sections.

Table 12. Instruments / tools and types of interventions taken into consideration

	Visions and strategies	Legal devices	Land use regulations	Programmes
Densification	X	X	X	X
Regeneration			X	X
Containment			X	
Governance	X	X		

Source: Types of instruments and interventions after Cotella et al., 2021. Sectoral policies and projects were not considered, given their nature.

From a strategic viewpoint, the plan should refer to interventions related to densification, regeneration, containment and governance. Legal devices, in the form of local norms, incentives or urbanization standards, should also be associated with the plan in order to achieve densification and governance targets. Moreover, the main focus of the Metropolitan Plan should be on the definition of land use regulations that encourage densification, regeneration or containment measures. Specific programmes should also be proposed as an operational part of the plan, for ensuring the economic conditions that could foster densification and regeneration.

Interviewing Romanian experts

The proposals regarding the spatial planning instrument at metropolitan level were based on a series of interviews taken in May - June 2023 with experts working in central, metropolitan or local administrative structures. **Figure 41** illustrates the territorial distribution of the ten experts that were interviewed*:

- ☐ **National level:** One director and two experts working in the Ministry of Development, Public Works and Administration;
- ☐ **County level:** One chief-architect and two directors in spatial planning departments;
- ☐ **Metropolitan level:** One expert working in a Metropolitan Area Association;
- ☐ **Local level:** Three chief-architects (one working for the core city and two working for peri-urban communes).

The structure followed by the interviews is described below:

- ☐ **Barriers:** What are the main barriers for planning suburbanization in Romanian metropolitan areas? For example:
 - Administrative / institutional barriers (lack of powerful institutions at metropolitan level that could ensure a coherent land use planning).
 - Legislative / technical barriers (lack of clearly-defined planning instruments at metropolitan level).
 - Financial barriers (lack of financial incentives encouraging the cooperation of local public authorities).
 - Political barriers (lack of political will for cooperation).
- ☐ **Principles:** What principles should be at the core of a metropolitan spatial planning instrument?
- ☐ **Content:** What character (strategic, steering, regulatory) should the planning instrument have? What should the content of the metropolitan plan be, in terms of baseline studies, indicators for analysis, specific provisions and deliverables?
- ☐ **Procedures:** What procedures could ensure the implementation of the metropolitan plan's provisions?

The next section presents a synthesis of the main barriers described by the interviewed experts. After that, the following sections comprise the proposals for a metropolitan spatial planning instrument, which are based on the interviews, the Italian case study in Chapter 4, as well as other ideas adapted from literature and policy review.

* The list of experts can be found in *Annex I*.

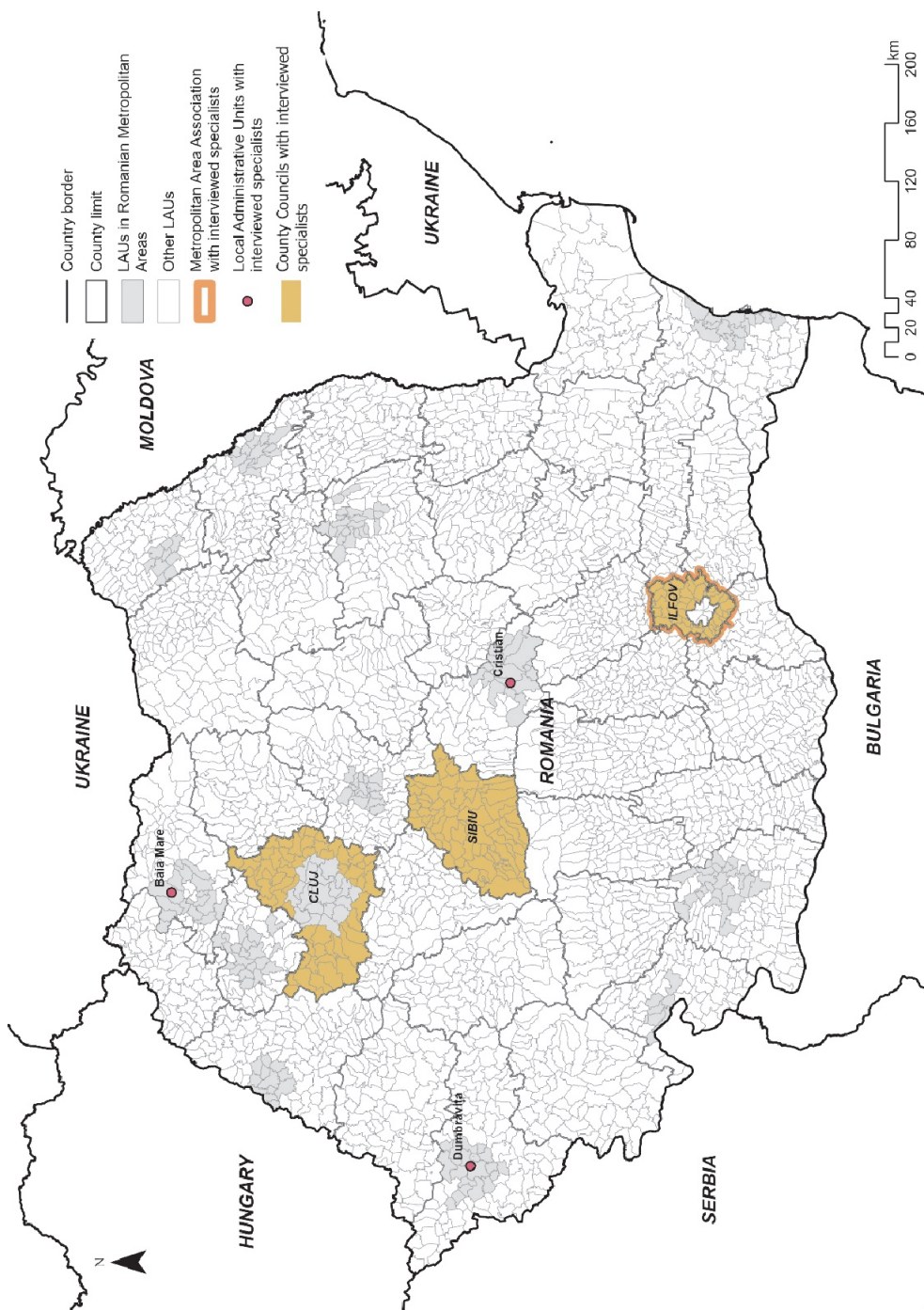


Figure 41. Territorial distribution of interviewed experts

Barriers for managing suburbanization in Romania

Political barriers were mentioned by seven of the ten interviewed experts as the main barriers for planning for coherent suburbanization in Romanian metropolitan areas. Five of them highlighted the lack of political will at local level for metropolitan cooperation, a problem also identified by other researchers (Hințea et al., 2019). Two experts mentioned that some of the politicians in the Local Councils are also real estate developers, thus having the ability to gather political support to approve their own projects. While this is clearly a matter of conflict of interests which should be dealt with by administrative law, it has its roots in the fact that private investors in Romania can change the provisions of General Urban Plans in their own interest through derogatory Zonal Urban Plans (Marin, 2010), pending the approval of the Local Council.

Legislative barriers were also mentioned by seven interviewed experts. Three of them stated that existing spatial planning instruments and procedures are not sufficient for ensuring coherent suburban development, pointing out the existing gap regarding metropolitan planning in Romanian law already discussed in this work. Two experts highlighted the fact that the current law does not consider the specificities of peri-urban communes, which are considered rural despite sometimes having a population superior to the one in medium-sized cities (the case of Florești). Another issue, also identified by two of the interviewed experts, was the lack of common standards and procedures for building permitting, which has led investors to develop land where such procedures are easier and faster to complete.

Technical, financial, cultural and administrative barriers were each mentioned by only two experts. From a **technical** viewpoint, the lack of reliable data resulting from a permanent data-collection and monitoring system was highlighted as a flaw, as well as the fact that there are situations when existing planning regulations are difficult to impose.

Financially, the lack of a government programme for metropolitan areas was mentioned alongside the lack of financial resources at local level for realizing necessary public investments like roads and technical infrastructure in new suburban areas. As far as **administrative** barriers were concerned, two experts mentioned the lack of institutional capacity, aggravated by the fact that experts in spatial planning are not attracted by the prospect of working in local public administration. The **cultural** barrier mentioned was the strong individualism which characterizes individual landowners, who often do not accept that they could give away a small part of their land in order to ensure better roads or the development of technical infrastructure.

Other barriers that were mentioned where of **economic** nature (the fact that the lower price of land in certain areas is a significant driver for residential development, irrespective of planning regulations) or related to **property rights** (as most of the land is in private property, development and planning is led by private investors).

Table 13 and **Figure 42** summarize the main findings regarding the barriers for managing suburbanization in Romania. As some of the barriers concern broader cultural or legislative issues, the issues which can be tackled through the proposed Metropolitan Plan are specified.

Table 13. Barriers for managing suburbanization and their relationships with the metropolitan plan

Types of barriers	Examples	Could the metropolitan plan provide a solution?
Political	Lack of political will for metropolitan cooperation. Some local councillors are real estate developers.	No, as there are currently few incentives encouraging the cooperation of local public authorities at local level.
Legislative	Existing planning instruments not enough for a coherent development. Lack of common standards and procedures at local level.	Yes, through steering or regulatory provisions aiming to control suburban development.
Technical	Lack of data resulting from a permanent data collection system.	Yes, by compiling geospatial databases and setting-up Territorial Observatories at metropolitan level.
Financial	Lack of resources for necessary public investments in new suburban areas.	Yes, through taxes or partnerships.
Administrative	Lack of institutional capacity	No.
Cultural	Strong individualism, reluctance for giving away private land for the development of public infrastructure	No, although a participatory planning approach might aid in explaining the benefits of enforcing certain urban planning regulations.
Economic	Lower land prices drive residential developments in certain areas.	No, although the plan could partially work as a market regulating tool.
Property rights	Most of the land is private, therefore planning and development is private-led.	Yes, by providing a clear planning framework for the private developers.

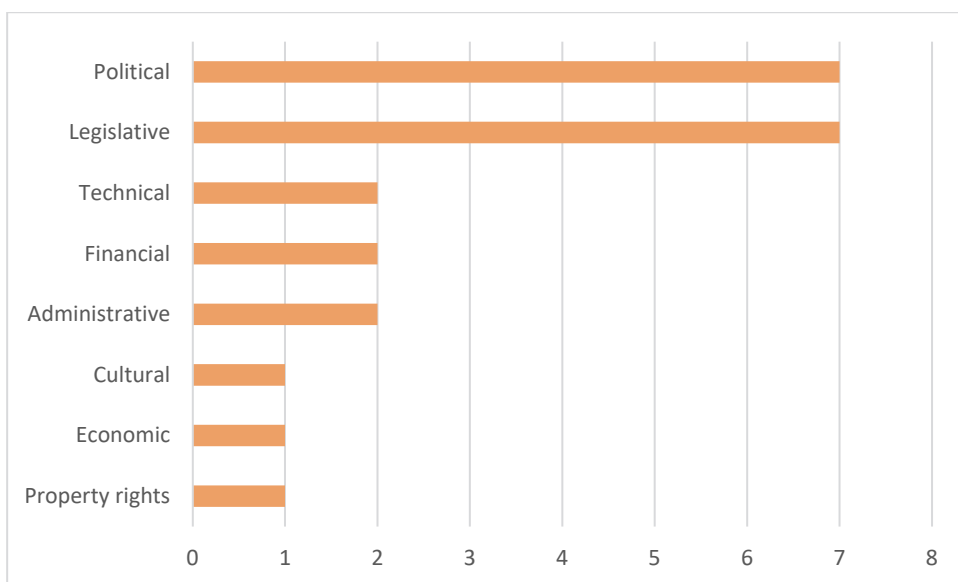
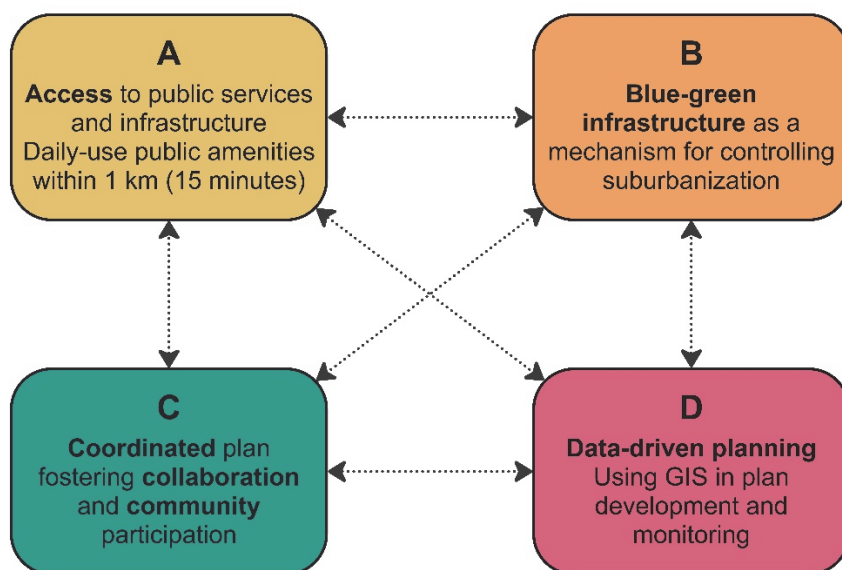


Figure 42. Barriers for managing suburbanization in Romania according to the interviewed experts

Why? Principles of the metropolitan plan

Figure 43 provides an overview of the proposed principles for the Metropolitan Plan - the A-B-C-D for metropolitan planning in Romania.



*Figure 43. Principles of the Metropolitan Plan.
The A-B-C-D for metropolitan planning in Romania.*

Access to public services and infrastructure (daily-use public amenities) within 1 km (15 minutes). The Metropolitan plan should ensure that existing and proposed residential areas will be within 15 minutes walking (1 km) of daily-use public amenities such as kindergartens and schools, medical facilities, but also publicly accessible green areas or commercial areas and public transport connections.

Within the 15-Minute City framework, this implies urban planning provisions that consider four dimensions: density, proximity, diversity and digitalization (Moreno et al., 2021). The first dimension is a significant one, although it is often ignored in discussions about sustainable urbanization in Romania: if certain density thresholds are not met, it will become very difficult, from an economic viewpoint, to ensure the development of educational, healthcare, commercial or even public transport services (Whitehead, 2008).

Four of the ten interviewed experts considered this type of accessibility, including good connectivity provided by efficient public transport systems, to be one of the key principles on which a metropolitan planning instrument should focus.

Blue-green infrastructure as a mechanism for controlling suburbanization. Three interviewed experts envisaged that blue-green infrastructure should play an important role in the metropolitan plan's provisions. The large-scale adoption of nature-based solutions, establishing blue-green-yellow belts for controlling urbanization or the regulation of a minimum area of green infrastructure for new developments, including a minimum percentage of green areas on private parcels, were among the mentioned mechanisms.

Strict urban containment regulations, associated with the characteristics of the property market in core cities, can often force households to move even farther away from the main urban centres (Charmes & Rousseau, 2021). However, blue-green infrastructure provisions could become a soft tool ensuring both a better control of suburbanization and encouraging a more ecological approach within future development projects.

Coordination - collaboration - community participation. Three of the interviewed experts expressed ideas which could be placed under this umbrella. In this regard, the metropolitan plan should first and foremost ensure the coordination of suburbanization proposals across administrative borders. Consequently, the plan-making process should encourage the collaboration between different administrative levels (for example, County Council and local public authorities), but also between the different local public authorities within the metropolitan area. This would ensure that the plan's provisions correlate the needs of neighbouring local administrative units. It would also allow a better correlation of the metropolitan plan with the provisions of superior plans (at national or county level) and sectoral strategies having an impact on the metropolitan territory.

Given the cultural barriers mentioned in the previous section, a participatory planning approach ensuring wide citizen and stakeholder involvement in the plan's development could greatly aid the future implementation of the plan's provisions. A participatory approach would ensure that the needs of the local communities are taken into account, while also providing a transparent dialogue platform for discussing with landowners and developers in the area.

Data-driven spatial planning. There is a wide range of publicly available data which could greatly aid the planning and monitoring of metropolitan areas. CORINE Land Cover and Use, Urban Atlas and Open Street Map datasets have been used in this research, while other datasets provided at global or European level, like those related to population grids or degree of urbanization, could also provide important information to planners and policymakers. Three experts considered data to be of

significant importance for metropolitan planning. The use of GIS methods and publicly available datasets, as well as the collection and continuous updating of data related to land use, social, environmental or economic aspects could provide an answer to some of the technical barriers mentioned in the previous section.

Geographical Informational Systems have recently gained a significant importance in Romanian spatial planning, as the technical norms regarding the spatial datasets for urban and territorial planning documentations were published as a Ministerial Order in May 2023 (MDLPA, 2023). The norms could be a first step for ensuring the standardization of data collection in Romanian territorial and urban plans, which could support the creation of Territorial Observatories monitoring challenging phenomena such as land take in metropolitan areas.

Table 14 illustrates how the spatial planning instrument could aid in the implementation of these principles. Further details are given in the next section.

Table 14. Principles of the Metropolitan Plan and proposed tools

Principles	Consideration within the metropolitan planning instrument	Supporting policy tools required
Access to public services and infrastructure	Land use regulations (mixed-use zoning, minimum density thresholds, rules regarding proximity to public amenities).	Treasure tools (incentives).
Blue-green infrastructure for controlling suburbanization	Land use regulations (delimitation, rules regarding minimum surface of green area on private land).	Authority tools (defining <i>non-aedificandi</i> areas)
Coordination - collaboration - community participation	Plan-making and approval procedures.	Nodality tools: public exhibition, consultations etc.
Data-driven spatial planning	Standardized collection of data within the plan-making process. Drafting of monitoring procedures.	Nodality tools: metropolitan observatory.

What? Content of the metropolitan plan

This section presents general recommendations regarding the content of the proposed Metropolitan Plan. Territorial planning instruments in Romania are usually composed of two main parts:

1. An **analysis** of the existing situation, which usually ends with a diagnosis of the territory affected by the plan. This analysis is based on a series of preliminary baseline studies.
2. A **proposal**, which can contain strategic and operational, framework-setting provisions of normative regulations.

The proposed Metropolitan Plan would have five parts (0 - Baseline studies, I - Territorial Diagnosis Report, II - Territorial Development Strategy, III - Action Plan for Implementation and IV - Framework Regulations). Parts I - III include all the steps of strategic spatial planning, from identifying specific problems and challenges to defining an integrated strategic plan with associated short-term and long-term actions (Albrechts, 2004). Part IV of the Metropolitan Plan introduces a land-use component, thus connecting the strategic approach to a regulatory framework aiming to influence land use at metropolitan level.

First, the following **baseline studies** will need to be developed in order to assess the current status of the metropolitan territory:

- Analytical studies:
 - **Housing and access to social infrastructure:** evolution of the housing stock, its characteristics, proximity and access to public or private social infrastructure (educational, sanitary, cultural, sports, green areas);
 - **Blue-green infrastructure:** studying the network of blue-green infrastructure, including natural protected areas, forests, public parks, rivers and lakes, ecological corridors, ecological agricultural areas;
 - **Cultural heritage:** location and status of listed architectural monuments and archaeological sites.
 - **Mobility and public transport provision:** analysis of metropolitan mobility patterns considering the existing road and railway infrastructure;
 - **Technical infrastructure:** studying the network of water and sewage, energy and telecommunications infrastructure, including its capacity and necessities of modernization or extension;
 - **Property rights and real-estate market:** land in public property, studying the average price of land in different areas in order to establish future expropriation corridors at a minimum cost;

- Prospective studies:
 - **Demography:** population evolution in the next 20 years;
 - **Financial capacity:** projections regarding the local budgets available for public investment (including external sources, like EU funds) in the next 10 years;
 - **Climate change impacts:** areas vulnerable to natural risks;
 - **Economic development:** analysis of current and future trends regarding economic development (direct foreign investments, number of companies and employees per sector, real estate market projections).
- Advisory study - public consultations with relevant stakeholders at metropolitan level, organized on different themes for collecting relevant data on local needs and possible solutions.

The conclusions of the baseline studies will be then synthesized into a **Territorial Diagnosis Report** (Part I of the Metropolitan Plan). The report should present the main problems and challenges of the metropolitan area in relation to economic development, socio-demographical trends, housing and social infrastructure, transport, technical infrastructure, cultural heritage and property rights of different local public authorities. Several maps should also be delivered in this phase, presenting information regarding land use (including existing blue-green infrastructure), cultural heritage, mobility and transport infrastructure, public utilities and property rights (highlighting strategic areas where most of the land is public property). A Territorial Context map, presenting the relationships between the metropolitan area and its region, should also be drafted.

The role of the Territorial Diagnosis Report is to substantiate a **Territorial Development Strategy** (Part II of the Metropolitan Plan) presenting a medium-long term development vision (20 years) for the metropolitan territory. The strategic document will present the metropolitan area's development objectives and main courses of action, considering both the needs for development identified in the first part of the Metropolitan Plan and the financing priorities established by European, national or regional policies. Part II of the Metropolitan Plan should also contain a map territorializing the medium-long term development vision for the metropolitan area.

This strategic part of the Metropolitan Plan will be detailed and complemented by an operational component in the form of an **Action Plan for Implementation** (Part III). The action plan should have a shorter implementation timeframe (10 years) and include a list of soft and hard interventions coordinated by local public authorities for improving the quality of life in the metropolitan area. This could include area-based

programmes concerning urban regeneration, retrofitting of urban sprawl developments, densification or expansion of suburban areas. The proposed interventions should be made according to an in-depth resource planning for implementation, taking into account issues such as budgetary revenue, proposed public investments, fiscal measures and transfer of property rights. One or more maps illustrating the different stages of intervention for the ten-year action plan should also be presented. Consequently, Part III of the Metropolitan Plan could indicate and detail other necessary policy tools for attaining the plan's objectives (metropolitan observatory for monitoring progress, incentives and taxes for encouraging or discouraging certain types of land developments in certain areas, approval of minimum standards for urbanization, etc.).

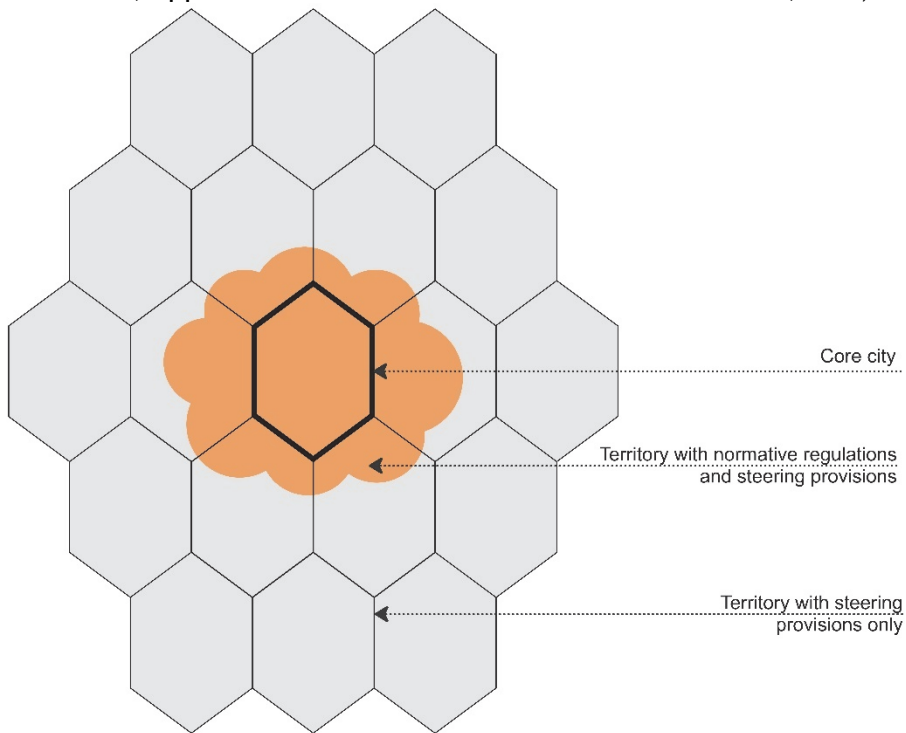


Figure 44. Types of regulations within the metropolitan territory

The Action Plan for Implementation will be strongly linked with a set of **Framework Regulations** for the metropolitan area (Part IV of the Metropolitan Plan). The metropolitan regulations will allow a better correlation and coordination of urban planning provisions developed locally by each local administrative unit within their General Urban Plan. Two types of regulations should be included:

- **Steering provisions**, concerning the main sectoral proposals influencing land use patterns: major economic areas, the location of neighbourhood centres and residential areas, blue-green

infrastructure network, proposed road and railway network or improvement and extensions of public utilities.

- **Normative regulations** regarding land use and density zoning, natural protected areas and reserved corridors for transport network and public utilities. The regulations should also detail the conditions for urbanization in the form of an urbanization procedure (minimum parcel surface, proximity to daily-use services, access to public transport and technical infrastructure, minimum density thresholds, negotiation mechanisms between public authorities and private investors, etc.). Normative regulations could be developed on a smaller part of the metropolitan area, focusing on the territories which are most prone to urbanization and ignoring administrative boundaries - see **Figure 44**.

The Framework Regulations should be accompanied by a set of maps concerning: proposed land use and density zoning (including areas with development restrictions, like blue-green infrastructure network, natural protected areas or reserved infrastructure corridors), as well as proposed transfers of property rights, covering the areas affected by normative regulations.

Table 15 synthesizes the main proposals regarding the content of the Metropolitan Plan, while **Figure 45** illustrates the relationships between the plan's components. While similar to existing approaches in Romanian territorial planning, the Metropolitan Plan presents some notable differences from the existing law:

- Introduction of specific baseline studies on real-estate market, financial capacity, as well as housing and social infrastructure, which could provide significant information for ensuring that the plan's objectives are realistic and respond to the needs of the metropolitan area's residents.
- Greater focus on property rights, especially regarding the land in public property, which is a vital resource as it can be used both directly (as land for future social infrastructure) or indirectly (for land exchanges with private landowners).
- The operational part of the plan would be developed according to the available financial resources of the local public authorities in the metropolitan area and would include area-based programmes for regeneration, retrofitting, densification or expansion, as well as a list of necessary policy tools for plan implementation.
- Framework Regulations are absent from the existing law and are not part of the proposals for new spatial planning instruments in the legislative project of the Territorial and Urban Planning and Constructions Code. However, some Peri-Urban Territorial Plans have proposed a similar approach in the past (see Brăila Peri-Urban Territorial Plan - **Figure 46**).

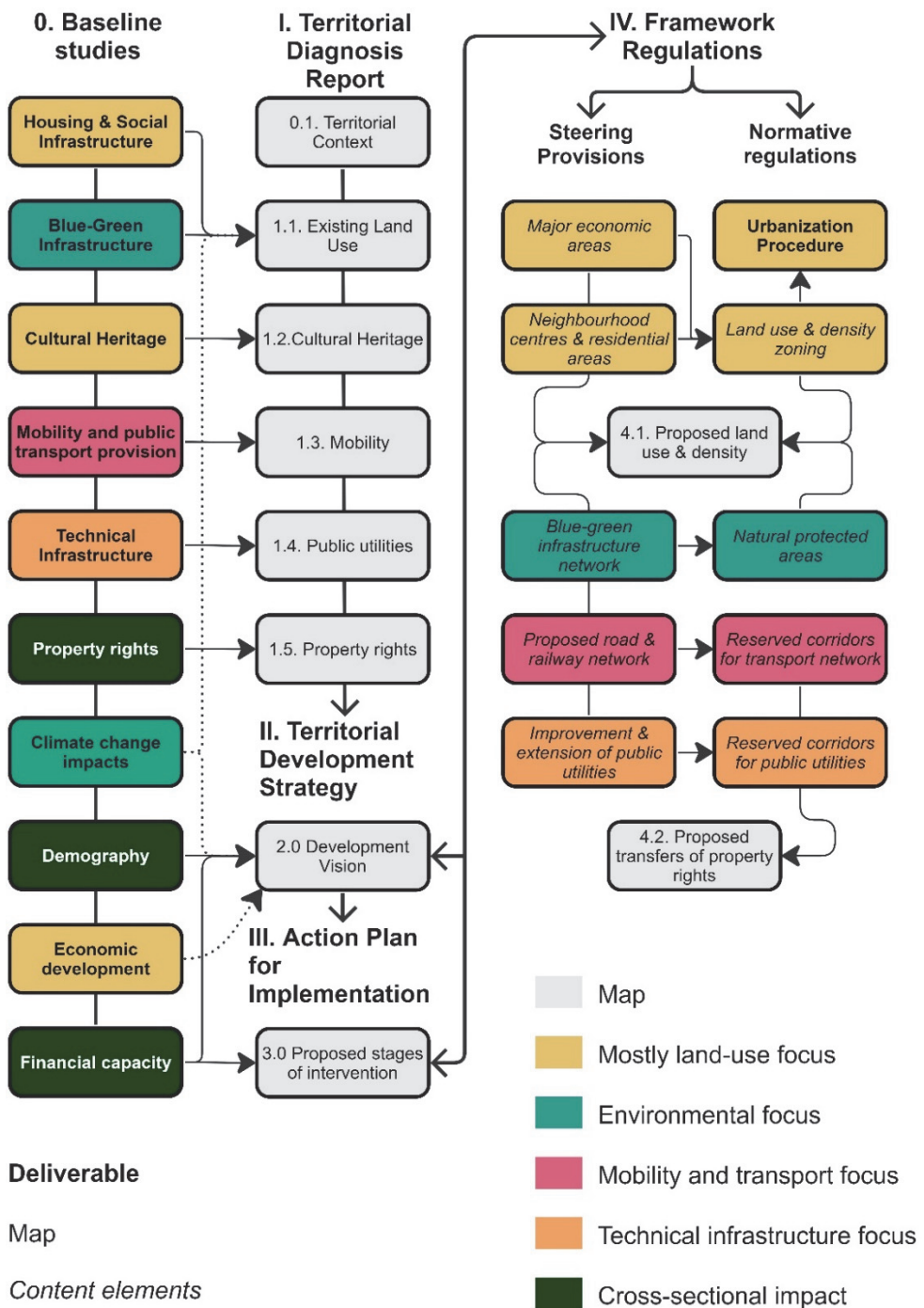


Figure 45. Content of the Metropolitan Plan

Table 15. Content of the Metropolitan Plan

Part	Deliverables	Maps	Embedded policy tools
0	Baseline studies 6 analytical studies. 4 prospective studies. 1 advisory study.	-	Geospatial database creation. Public consultations on specific themes (housing, mobility, blue-green infrastructure, etc.).
I	Territorial Diagnosis Report	0.1. Territorial context. 1.0. Existing situation: (1.1) Land use; (1.2) Cultural heritage; (1.3) Mobility; (1.4) Public utilities; (1.5) Property rights.	Geospatial database integration.
II	Territorial Development Strategy	2.0. Development vision for the metropolitan area.	Public exhibition and consultations (reaching a shared vision between stakeholders).
III	Action Plan for Implementation	3.0. Proposed stages of intervention: area-based integrated programmes.	Setting-up of a Metropolitan Observatory for monitoring purposes. Proposal of fiscal measures (taxes, incentives). Approval of common urbanization standards at metropolitan level.
IV	Framework Regulations Urbanization procedure.	4.1. Proposed land use and density; 4.2. Proposed transfers of property rights.	Zoning (areas with strict restrictions regarding building possibilities). Public-private negotiation mechanisms for approving the urbanization of new areas.

Building on past experiences, the proposed Metropolitan Plan introduces specific planning provisions which need to be respected by local-level plans. The Framework Regulations can be separated into steering provisions and normative regulations, with the latter applied on a smaller territory which does not necessarily consider administrative boundaries. This distinction makes the plan more adaptive, as normative regulations could be established only for the territories with the greatest suburbanization dynamic.

Consequently, the Metropolitan Plan addresses some of the underlying issues concerning un-controlled suburbanization in Romanian metropolitan areas. First, it proposes clear regulations aiming to secure access to basic services and blue-green infrastructure for existing and future residential suburban developments across administrative boundaries. Second, it manages to link its strategic and regulatory components through an operational approach which places property rights and financial budgetary capacity at its core.

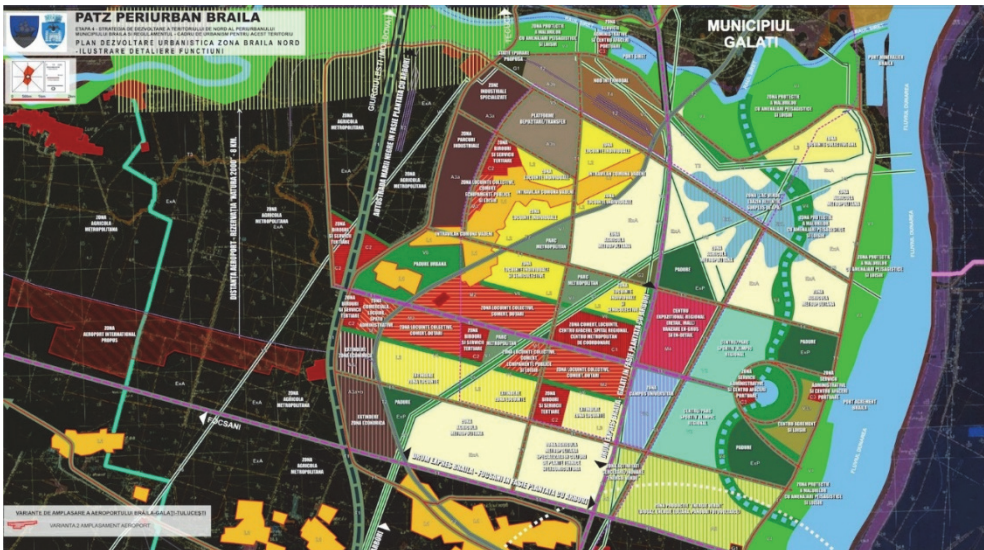


Figure 46. Example of a Peri-Urban Territorial Plan with Framework Regulations and land use zoning proposals: PATZP Brăila.

Source: UAUM, 2011.

Third, the Metropolitan Plan expressly stipulates the need to develop and adopt certain policy tools in order to fulfil its objectives. Besides the regulatory zoning already embedded in the plan, the importance of tools supporting community participation, the development of geodatabases for facilitating monitoring activities, as well as the definition of an urbanization procedure comprising common standards and public-private negotiation mechanisms are also considered.

However, the question of integrating the Metropolitan Plan in Romania's current spatial planning instrument remains an issue to be discussed. The next section lists some recommendations in this regard, taking into consideration the legislative changes proposed by the future Territorial and Urban Planning and Constructions Code.

How? Integration in the current planning system

The proposed Metropolitan Plan would replace the existing Peri-urban / Metropolitan Territorial Development Strategy as a spatial planning instrument within the current planning system (see **Figure 47**). If we consider the Territorial and Urban Planning and Constructions Code, currently being debated in the Romanian Parliament, the Metropolitan Plan can be seen as a hybrid between the strategic coordination provided by the Intercommunity Zonal Territorial Plan (PATZI) and the regulatory character of the Metropolitan Area General Urban Plan (PUGZM). Other proposals of the Code, like the urbanization contracts, can be easily embedded as policy tools supporting the plan’s objectives.

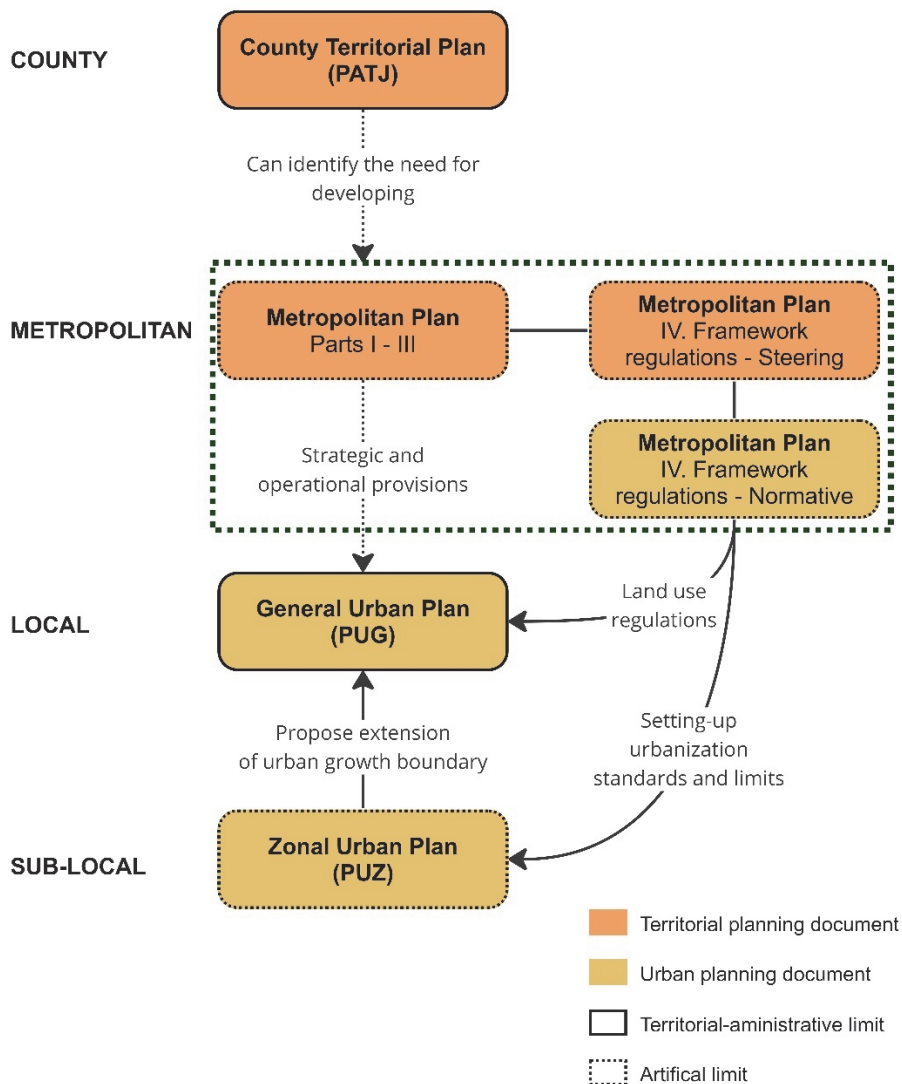


Figure 47. Integration of the Metropolitan Plan in the spatial planning system

The success of spatial planning in dealing with contemporary challenges depends on its capacity to be integrated, adaptive and participatory (Nadin et al., 2021). First, **integration** will be achieved due to the cross-sectional approach of the plan in considering provisions related to land use, housing, social infrastructure, blue-green infrastructure, mobility or public utilities. Second, **participation** should be encouraged in all the phases of the plan’s development, through public consultation, but also during implementation, through the proposed Metropolitan Observatory tool.

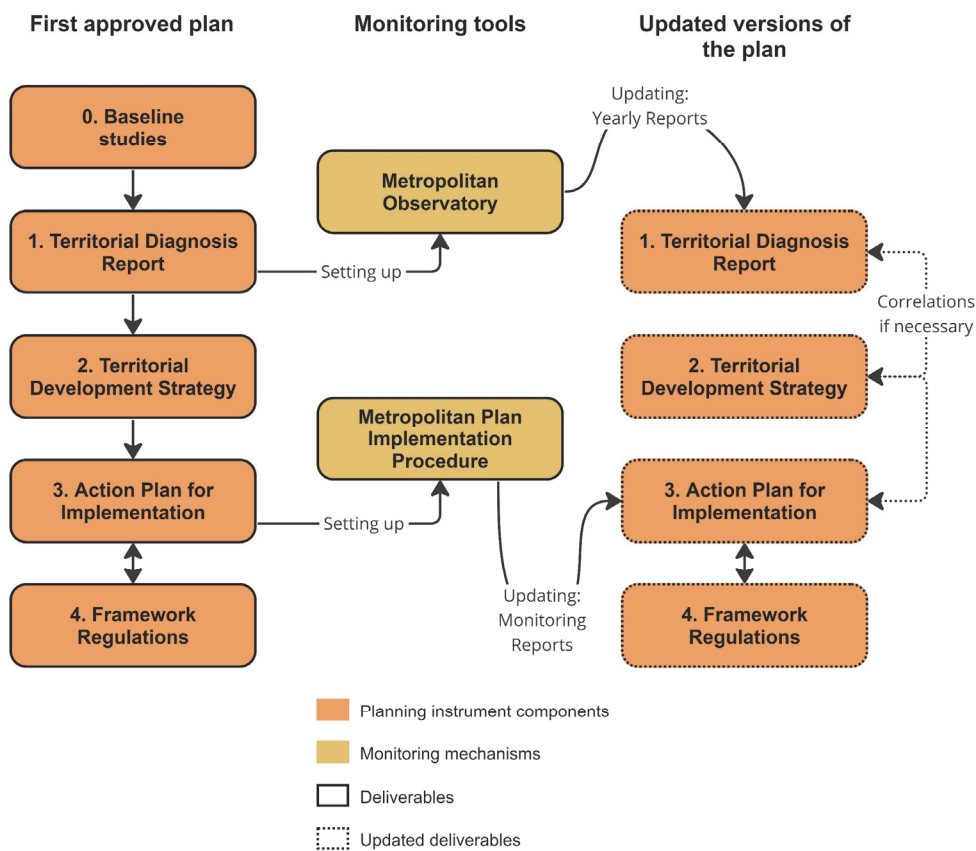


Figure 48. Adaptive plan: monitoring tools and updating process

The **adaptive** nature of the plan would be supported through a flexible approach in the development and updating of the plan (**Figure 48**). Once approved along with the necessary tools (especially the Metropolitan Observatory used for collecting data), the Metropolitan Plan could be updated either integrally or by components (parts). The Action Plan for Implementation and the Framework Regulations could be updated every ten years or even sooner, based on the Metropolitan Plan’s Monitoring Reports and the Metropolitan Observatory’s Yearly Reports, and according

to changing financing opportunities at national or European level. This would enable metropolitan spatial planning to be based on a continuous data-collection system and to be open to different development scenarios, according to the evolution of suburban areas.

Nevertheless, in order to be developed, approved, implemented and monitored, the Metropolitan Plan would need a clear governance structure and administrative procedures. As metropolitan areas currently do not have an administrative status in the Romanian Constitution, they would remain voluntary associations of local administrative units created around Romanian municipalities, according to the norms established by Law no. 246/2022. As a result, two scenarios can be taken into account.

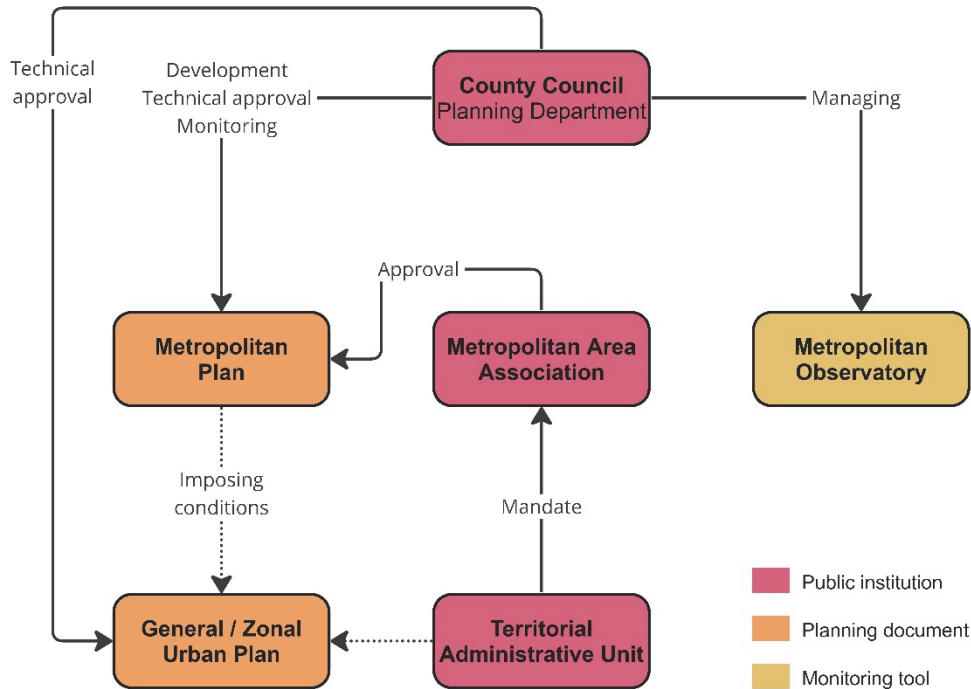


Figure 49. County-centred scenario: Development and approval of the plan

- **County-centred** - see **Figure 49**. The County Council, as a NUTS 3 administrative unit, is responsible for the development of the Metropolitan Plan, which then needs to be approved by the General Assembly of the Metropolitan Area. The development of the plan is done in close collaboration with the Metropolitan Area Association and its members (local public authorities). The Chief-Architect of the County Council oversees the development of the plan and checks the conformation of lower-level planning documents (General Urban Plans and Zonal Urban Plans) to the provisions of the Metropolitan Plan through technical approvals. A Metropolitan Monitoring Unit is created

at county level, under the supervision of the County Chief-Architect, with responsibilities in managing the Metropolitan Observatory and publishing Monitoring Reports regarding the implementation of the Action Plan.

- **Metropolitan-centred** - - see **Figure 50**. The Metropolitan Area Association is responsible for the plan, through the mandate given by the territorial administrative units in the metropolitan area for the exercise of territorial and urban planning activities. This implies the existence of a spatial planning department at metropolitan level, which would also have responsibilities related to data collection and analysis and would control the implementation of the plan. Consequently, the Metropolitan Spatial Planning Department would be responsible for overseeing the development of the Metropolitan Plan, verifying that lower-level planning documents are in line with the Metropolitan Plan's provision and monitoring the implementation of the plan. Another option would be for the development and monitoring of the Metropolitan Plan to be placed in the responsibility of a Metropolitan Spatial Planning Agency, established according to the provisions of the future Territorial and Urban Planning and Constructions Code.

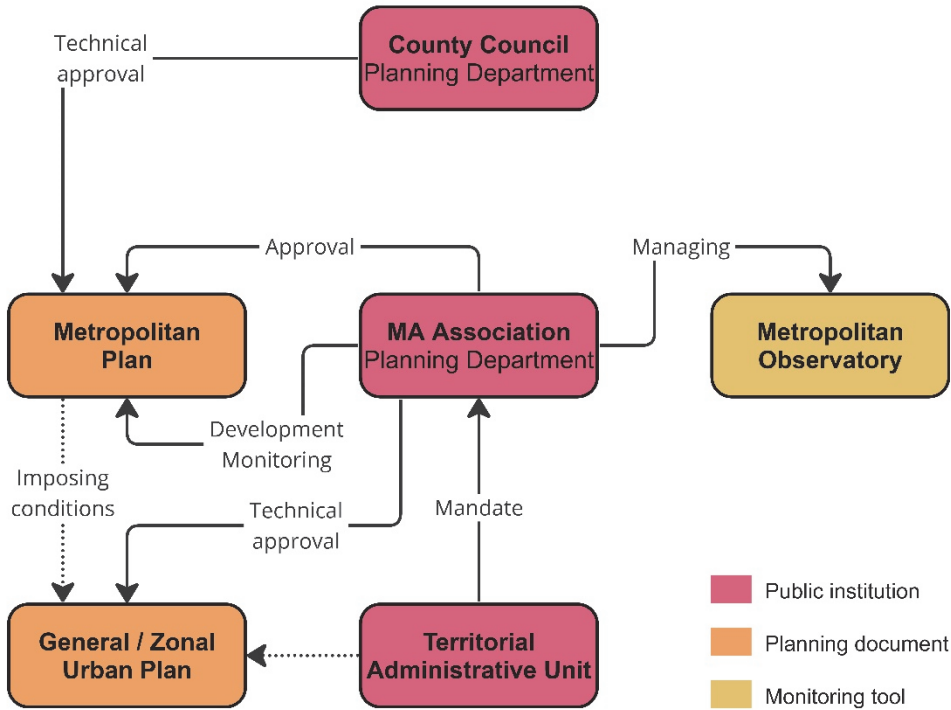


Figure 50. Metropolitan-centred scenario: Development and approval of the plan

While both scenarios are possible, their feasibility depends on the final version of the Territorial and Urban Planning and Constructions Code, but also on the development of a policy for metropolitan areas at national level. The first scenario seems more realistic in the current legislative framework, but is reliant on the cooperation of local administrative units in the metropolitan area and also places an additional burden on the Territorial and Urban Planning Departments within the County Council. The second scenario will only be possible if there is a mandate given by the territorial administrative units in the metropolitan area for the Metropolitan Area Association to exercise territorial and urban planning activities.

All in all, in order for the metropolitan planning instrument to function, there is a need for incentivizing metropolitan collaboration. One possibility would be the creation of a specific financial instrument for metropolitan areas, conditioned by the development of a Metropolitan Plan. This would help overcome the most important barrier for managing suburbanization in metropolitan areas which was mentioned by the interviewed experts and remains impossible to solve through the proposed Metropolitan Plan: the political will for metropolitan cooperation.

Conclusion: The demand for new planning instruments in Romanian metropolitan areas

This work aimed to analyse suburbanization trends in post-socialist Romania on multiple scales (national, metropolitan, local) and to identify, based on this analysis, the general requirements for a new metropolitan spatial planning instrument that could support a better management of metropolitan areas.

O1. Identifying the metropolitan areas in Romania with the highest suburbanization dynamic since 1990. The study analysed 13 of the 14 metropolitan areas in Romania that were part of the Federation of Metropolitan Areas and Urban Agglomerations in Romania, with Bucharest excluded due to its unique status. Artificial surface data from CORINE datasets for the years 1990, 2000, 2006, 2012, and 2018 were examined, revealing a total increase of artificial areas in Romanian metropolitan regions by 9.39% from 1990 to 2018, with the highest growth rate recorded between 2006 and 2012. Notable increases occurred in Oradea, Braşov, and Timișoara.

The second stage involved analysing the dynamics of the number of dwellings using INS Tempo data. While Romania, as a whole, saw a 12.80% increase in dwellings between 1990-2006, the 13 metropolitan areas experienced a 21.59% growth, also peaking between 2006 and 2012. Cluj-Napoca, Iași and Constanța saw the most significant increases.

The ranking of metropolitan areas in Romania considered their positions in both the increase of artificial surfaces and the rise in the number of households. **Constanța, Timișoara, Cluj-Napoca, Iași, and Braşov were the metropolitan areas with the most dynamic growth from 1990 to 2018.** These areas were designated as national growth poles during the 2007-2013 programming period, underlining their importance as urban centres in their respective regions. These findings confirm the initial research hypothesis that suburbanization primarily occurs around cities with stronger economic and political connections. Furthermore, the results indicate that suburbanization in Romania gained momentum after 2000, particularly from 2006 to 2012, and subsequently slowed due to the impact of the financial crisis on the real estate market.

O2. Assessing the negative effects of uncontrolled urban development in five metropolitan areas, highlighting the local administrative units with the highest restrictiveness and the effects on the quality of living. The aim was to highlight, in an integrated manner, the negative impact of urban sprawl in Romanian metropolitan areas, using as a case study the five most dynamic metropolitan areas determined before. Starting from

the types of negative impacts (environmental, social and economic) highlighted by international literature, a series of relevant themes and criteria for describing the negative impact of suburbanization were identified. For each criterion, at least two impact indicators were identified to quantify how suburbanization processes in metropolitan areas could affect the quality of the environment and housing.

The choice of indicators was made taking into account the availability of data and the possibility of aggregating them at the level of a basic administrative-territorial unit (municipality, city or commune). In order to finalize the methodology for evaluating the impact of suburbanization in metropolitan areas, an expert opinion questionnaire was applied. The answers supported the final choice of criteria and indicators for defining an urban sprawl restrictiveness index at local administrative unit level.

The geographical distribution of the index, computed on the five metropolitan areas, highlighted that suburbanization has had a more pronounced impact on the nearby local administrative units neighbouring core cities. Lower index values within core cities and the concentration of higher values in the first ring of settlements suggest the need for a metropolitan-level approach to managing suburbanization.

The index offered a means to identify local administrative units that have experienced the most pronounced impacts of uncontrolled suburbanization, including issues such as landscape fragmentation or lack of social infrastructure. **The two local administrative units with the highest index values, Dumbrăvița (Timișoara metropolitan area) and Florești (Cluj-Napoca metropolitan area), were used as a case study for a more detailed analysis,** involving a qualitative assessment based on field surveys.

Criteria for three domains were used in the qualitative assessment: urban morphology, access to infrastructure and services, landscape quality. An observation file comprising the 13 criteria was used as a tool of qualitative analysis for two areas in each of the two local administrative units, with each criterion being assigned a score between 1 (Bad) and 3 (Good). The analysis showcased the poor access of new suburban residential areas to public services, especially educational and sanitary infrastructure. Other problems include incoherent street fronts and excessive densification (especially in Florești), lack of coordination in street development, with un-paved streets (Dumbrăvița) and degraded public spaces often designed only for cars (Florești), or landscape quality issues caused by strident colours and degraded facades.

Besides the effects of suburbanization, an examination of both existing and upcoming urban planning documents in the two communes was conducted. This analysis revealed the inadequacy of current urban planning tools in regulating suburban expansion within the Romanian metropolitan region. In an effort to boost their budgetary income, local public authorities have chosen to authorize the creation of new residential zones, even though they lack the financial means to provide the necessary public services and infrastructure.

All in all, the fact that suburbanization is led by private developers, through locally-approved Zonal Urban Plans which do not consider public infrastructure requirements, highlighted the need for a new planning instrument at metropolitan level.

O3. Defining a new planning instrument at metropolitan level - the Metropolitan Plan - and listing its principles, content and possible procedures. The proposals for a Metropolitan Plan were based on the conclusions of the first two research objectives, coupled with the conclusions of the research on Italian metropolitan areas and the interviews carried out with ten experts in the field of spatial planning working in public administration.

First, political and legislative barriers were considered by the interviewed experts to be the most important barriers for managing suburbanization in Romanian metropolitan areas today. While some barriers, like the lack of political will for cooperation or the lack of institutional capacity, cannot be solved through new spatial planning instruments, the Metropolitan Plan tried to address, directly or indirectly, the other issues highlighted by the experts.

Consequently, the **A-B-C-D for metropolitan planning in Romania** was proposed as a framework, with the main principles of the proposed Metropolitan Plan being:

- Access to public services and infrastructure (daily-use public amenities) within 1 km (15 minutes).
- Blue-green infrastructure as a mechanism for controlling suburbanization.
- Coordinated plan fostering collaboration and community participation.
- Data-driven planning - using GIS in plan development and monitoring.

The proposed content of the plan tries to follow-up on these principles. The five parts of the Metropolitan Plan (Baseline studies, Territorial Diagnosis Report, Territorial Development Strategy, Action Plan for Implementation and Framework Regulations) comprise both strategic spatial planning and land use planning approaches. The innovative feature

is the introduction of Part IV - Framework Regulations, including two types of regulations:

- **Steering provisions**, which integrate aspects related to economic areas, blue-green infrastructure, neighbourhood centres, metropolitan mobility or technical infrastructure<
- **Normative regulations**, proposing land use and density zoning rules for the most dynamic areas within the metropolitan area.

As a result, the Metropolitan Plan addresses several fundamental concerns related to uncontrolled suburbanization in Romanian metropolitan areas. First, it introduces clear regulations aimed at ensuring access to essential services and green infrastructure for both current and prospective residential suburban developments across administrative boundaries. Second, it successfully integrates its strategic and regulatory elements through an operational approach that prioritizes property rights and financial capacity within its framework. Third, the Metropolitan Plan explicitly emphasizes the necessity of establishing and adopting specific policy instruments to achieve its goals. In addition to the regulatory zoning already incorporated into the plan, it recognizes the significance of tools that facilitate community involvement, the creation of geodatabases to streamline monitoring activities through Metropolitan Observatories, and the formulation of an urbanization procedure that includes standardized norms and public-private negotiation mechanisms.

As far as the possible integration of the Metropolitan Plan within the current spatial planning system is concerned, two scenarios are discussed: one placing the responsibilities regarding the Metropolitan Plan at an upper-administrative level (the County) and one based on a strong metropolitan area association with a dedicated spatial planning department. Nevertheless, both scenarios need a better cooperation between local administrative units within a metropolitan area in order to properly function.

While the proposed research objectives have been attained, this work opens several research avenues which could be explored in the future, in order to have a better assessment of suburbanization dynamics in metropolitan areas and develop better planning and policy instruments:

- Framing the discussion on suburbanization within the broader context of EU policies, including the EU Soil Strategy 2030 regarding land take.
- Comparing the situation in Romania's metropolitan areas with the one in other post-socialist countries, which could lead to the identification of planning instruments that are better adapted to the Central and East-European context.

- Consider the impact of the new Territorial and Urban Planning and Constructions Code for metropolitan planning, once it is approved by the Romanian Parliament.
- A more in-depth analysis of the impact of urban planning regulations on urbanization trends within a Local Administrative Unit.
- Analysing suburbanization patterns in Romania's largest urban agglomeration - the Bucharest Metropolitan Area.
- Creating a database of best practice case studies at European level regarding the application of spatial planning instruments and policy tools for countering un-controlled suburbanization.
- Assessing different scenarios of metropolitan governance in Romanian metropolitan areas for ensuring a better management of suburban development.

Annex I: List of interviewed experts

1. Mihaela Atănăsoaei, Chief-architect, Commune of Cristian, Braşov Metropolitan Area.
2. Liviu Băileşteanu, urban planner - Director of Strategies and Policies, Ministry of Development, Public Works and Administration.
3. Alina Cârciumărescu, architect - Head of Construction Discipline Service, Ilfov County Council.
4. Roxana Cârjan, architect - Chief-architect, Commune of Dumbrăviţa, Timişoara Metropolitan Area.
5. Bogdan Micu, geographer - Counsellor, Strategies and Policies Department, Ministry of Development, Public Works and Administration.
6. Izabella Morth, urban planner - Chief-architect, Municipality of Baia Mare.
7. Paul Mureşan-luga, urban planner - Head of Urban Planning, Territorial Planning and Environment Service, Sibiu County Council.
8. Claudia Pamfil, architect - Head of Urban Planning Office, Intercommunity Development Association - Bucharest Metropolitan Area.
9. Claudiu Salanţă, architect - Chief-architect, Cluj County Council.
10. Amalia Vîrdol, geographer - Counsellor, Strategies and Policies Department, Ministry of Development, Public Works and Administration.

Bibliography

Scientific literature

- Abreu e Silva, J. D., Correia, M. (2023). *The main drivers of urban sprawl in Portuguese medium cities between 2001 and 2011*. Land Use Policy, 132, 106803.
- Alberti, M. (2005). *The effects of urban patterns on ecosystem function*. International regional science review, 28(2), 168-192.
- Albrechts, L. (2004). *Strategic (spatial) planning reexamined*. Environment and Planning B: Planning and design, 31(5), 743-758.
- Arribas-Bel, D., Nijkamp, P., Scholten, H. (2011). *Multidimensional urban sprawl in Europe: A self-organizing map approach*. Computers, environment and urban systems, 35(4), 263-275.
- Bart, I. L. (2010). *Urban sprawl and climate change: A statistical exploration of cause and effect, with policy options for the EU*. Land use policy, 27(2), 283-292.
- Baum-Snow, N. (2007). *Did highways cause suburbanization?*. The quarterly journal of economics, 122(2), 775-805.
- Benedek, J. (2013). *The spatial planning system in Romania*. Romanian Review of Regional Studies, 9(2), 23-30.
- Benedek, J., Cristea, M. (2014). *Growth pole development and "metropolization" in post-socialist Romania*. Studia UBB Geographia, 59(2), 125-38.
- Benedek, J., Ursu, C.D., Varvari, Ș. (2022). *Growth pole policy's induced development and spatial inequalities in the metropolitan areas of Romania - a critical assessment*. Tér és Társadalom, 36(3), 47-67.
- Benites-Gambirazio, E. (2017). *The social logic of urban sprawl: Arizona cities under environmental pressure*. In: Poupeau, F. et al. (Eds.), *Water Bankruptcy in the Land of Plenty*, CRC Press, Boca Raton, pp. 121-140.
- Berisha, E., Cotella, G., Janin Rivolin, U., Solly, A. (2023). *Spatial governance and planning systems vis-à-vis land consumption in Europe*. European Planning Studies, 1-16.
- Berry, B. J. L., Goheen, P. G., Goldstein, H. (1969). *Metropolitan area definition: A re-evaluation of concept and statistical practice (Vol. 28)*. US Bureau of the Census, Washington.
- Bičík, I., Janoušek, Z., Kabrda, J. (2015). *Czechia: Changes in landscape use in the transformation period*. Revue Roumaine de Géographie, 59 (1), 3-17.
- Boggero, G. (2016). *The establishment of metropolitan cities in Italy: an advance or a setback for Italian regionalism?*. Perspectives on Federalism, 8(3), 1-22.

- Booi, H., Boterman, W. R. (2020). *Changing patterns in residential preferences for urban or suburban living of city dwellers*. Journal of Housing and the Built Environment, 35, 93-123.
- Brueckner, J. K. (2000). *Urban sprawl: Diagnosis and remedies*. International regional science review, 23(2), 160-171.
- Brueckner, J. K., Fansler, D. A. (1983). *The economics of urban sprawl: Theory and evidence on the spatial sizes of cities*. The review of Economics and Statistics, 479-482.
- Bruegmann, R. (2006). *Sprawl: a compact history*. University of Chicago press, Chicago.
- Carmona, M. (2017). *The formal and informal tools of design governance*. Journal of Urban Design, 22(1), 1-36.
- Carpio, A., Ponce-Lopez, R., Lozano-García, D. F. (2021). *Urban form, land use, and cover change and their impact on carbon emissions in the Monterrey Metropolitan area, Mexico*. Urban Climate, 39, 100947.
- Carrière, J. P., Filimon, L., Guitel, S., Savourey, C., Irincu, E. (2018). *Urban sprawl within the metropolitan area of Oradea*. disP-The Planning Review, 54(3), 36-51.
- Caruso, G. (2001). *Peri-urbanisation. the situation in Europe. A bibliographical note and survey of studies in the Netherlands, Belgium, Great Britain, Germany, Italy and the Nordic countries*, Report prepared for DATAR.
- Champion, T. (2001). *Urbanization, suburbanization, counterurbanization and reurbanization*. In: Paddison, R. (Ed.), Handbook of Urban Studies, Sage Publishing, London, pp. 143-161.
- Charmes, É., Rousseau, M. (2021). *What's in a Name? That Which We Call Sprawl: Introduction to the Special Issue: Losing Growth Control*. disP-The Planning Review, 57(3), 22-32.
- Chen, M., Chen, L., Cheng, J., Yu, J. (2022). *Identifying interlinkages between urbanization and Sustainable Development Goals*. Geography and Sustainability, 3(4), 339-346.
- Chin, N. (2002). *Unearthing the Roots of Urban Sprawl: A Critical Analysis of Form, Function and Methodology*. Working Paper Series, Centre for Advanced Spatial Analysis University College London, London.
- Christiansen, P., Loftsgarden, T. (2011). *Drivers behind urban sprawl in Europe*. TØI report, 1136, 2011.
- Cocheci, R. M., D'Orazio, A. (2019). *The impact of Europeanization on national planning systems. A comparison of spatial planning processes in Italy and Romania*. In L'apporto della geografia tra rivoluzione e riforme-Atti XXXII Congresso Geografico Italiano, A. Ge. I., pp. 2551-2561.
- Cocheci, R.M., Petrișor, A.I. (2023a). *Extended suburbanisation and land cover dynamics in post-socialist metropolitan areas. Evidence from Romania*. disP, 59(2), 34-48.

- Cocheci, R.M., Petrișor, A.I. (2023b). *Assessing the Negative Effects of Suburbanization: The Urban Sprawl Restrictiveness Index in Romania's Metropolitan Areas*. Land, 12, 966.
- Cocheci, R.M., Petrișor, A.I. (2023c). *Challenges for sustainable suburban communities: comparing suburbanization in Romanian and Italian metropolitan areas*. Article under review.
- Cocheci, V., Mitrea, A. (2018). *Youthification in the Metropolitan Area of Cluj*. Urbanism. Arhitectura. Construcții, 9(2), 121-130.
- Colavitti, A. M., Usai, N., Bonfiglioli, S. (2013). *Urban planning in Italy: the future of urban general plan and governance*. European Planning Studies, 21(2), 167-186.
- Colsaet, A., Laurans, Y., Levrel, H. (2018). *What drives land take and urban land expansion? A systematic review*. Land Use Policy, 79, 339-349.
- Cotae, C. (2015). *Decision Making Patterns in Territorial Public Administration: The Case of Romania*. Urbanism. Arhitectură. Construcții, 6(4), 17-32.
- Cotella, G., Janin Rivolin, U. (2010). *Institutions, discourse and practices: towards a multidimensional understanding of EU territorial governance*. In XXIV AESOP Congress Space is Luxury, Helsinki, pp. 7-10.
- Cotella, G., Evers, D., Janin Rivolin, U., Solly, A., Berisha, E. (2020). *ESPON SUPER - Sustainable urbanisation and land-use Practices in European Regions. A guide to sustainable urbanisation and land-use*. ESPON EGTC, Luxembourg.
- Cotella, G. (2021). *METRO - The role and future perspectives of Cohesion Policy in the planning of Metropolitan Areas and Cities*. Synthesis report, ESPON EGTC, Luxembourg.
- Cotella, G., Brovarone E.V., Staricco, L., Casavola, D. (2021). *METRO. The role and future perspectives of Cohesion Policy in the planning of Metropolitan Areas and Cities. Annex III Metropolitan City of Turin case study*, ESPON EGTC, Luxembourg.
- Couch, C., Leontidou, L., Arnstberg, K.O. (2007). *Introduction: Definitions, Theories and Methods of Comparative Analysis*. In: Couch, C., Leontidou, L., Petschel-Held, G. (Eds.), *Urban Sprawl in Europe. Landscapes, Land-Use Change & Policy*, John Wiley & Sons, Hoboken, pp. 3-38.
- Cristea, M., Mare, C., Moldovan, C., China, A.M., Farole, T., Vințan, A., Park, J., Garrett, K.P., Ionescu-Heroiu, M. (2017). *Magnet Cities: Migration and Commuting in Romania*. World Bank, Bucharest.
- Csizmady, A., Bagyura, M., Olt, G. (2022). *From a Small Village to an Exclusive Gated Community: Unplanned Suburbanisation and Local Sovereignty in Post-Socialist Hungary*. Urban Planning, 7(3), 115-129.

- Danielewicz, J. (2020). *Integrated Management of Metropolitan Areas in Romania*. Acta Universitatis Lodziensis. Folia Oeconomica, 6(351), 61-79.
- Dijkstra, L., Poelman, H.. (2017). *European Cities - The EU-OECD Functional Urban Area Definition*. EUROSTAT, European Commission, DG Regio. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:European_cities_%E2%80%93_the_EU-OECD_functional_urban_area_definition (accessed on 10 August 2023).
- Dijkstra, L., Poelman, H., Veneri, P. (2019). *The EU-OECD Definition of a Functional Urban Area*. OECD Regional Development Working Papers, 11(1), 1-18.
- Dimitriu, S. (2023). *Planificarea integrată a dezvoltării spațiale în contextul guvernărilor zonelor metropolitane*. Editura Universitară "Ion Mincu", București.
- Dobre, A. M. (2010). *Europeanization and new patterns of multi-level governance in Romania*. Southeast European and Black Sea Studies, 10(1), 59-70.
- Dong, Y., Liu, Y., Chen, J. (2014). *Will urban expansion lead to an increase in future water pollution loads? – a preliminary investigation of the Haihe River Basin in northeastern China*. Environmental Science and Pollution Research, 21, 7024-7034.
- Drăghia, M. (2023). *A review of the Romanian legal framework concerning metropolitan areas and functional urban areas. Over a decade of changes*. Urbanism. Arhitectură. Construcții, 14(3), 229-248.
- Drăghia, M., Cocheci, R. M., Olariu, B. (2023). *Housing dynamics around Romania's developing cities: the high demand for specific planning instruments in functional urban areas*. European Planning Studies, 1-25.
- Dumitrache, L., Zamfir, D., Nae, M., Simion, G., Stoica, I. V. (2016). *The Urban Nexus: Contradictions and Dilemmas of (Post) Communist (Sub) Urbanization in Romania*. Human Geographies--Journal of Studies & Research in Human Geography, 10(1), 39-58.
- Dura-Guimera, A. (2003). *Population deconcentration and social restructuring in Barcelona, a European Mediterranean city*. Cities, 20(6), 387-394.
- Ekers, M., Hamel, P., Keil, R. (2012). *Governing suburbia: Modalities and mechanisms of suburban governance*. Regional studies, 46(3), 405-422.
- Elisei, P., Pascariu, G. (2012). *EU Approaches to Urban and Territorial Development in Times of Slow Growth: Case Studies from South East Europe*. In 48th ISOCARP Congress, pp. 1-11.
- European Environmental Agency (EEA). (2006). *Urban sprawl - The Ignored Challenge*. European Environmental Agency, Copenhagen.

- European Environmental Agency (EEA) & Federal Office for the Environment (FOEN). (2016). *Urban sprawl in Europe. Joint EEA-FOEN report*. European Environmental Agency, Copenhagen.
- European Environmental Agency (EEA). (2022). *Land take and land degradation in functional urban areas*. European Environmental Agency, Copenhagen.
- Fedeli, V. (2017). *Metropolitan governance and metropolitan cities in Italy: Outdated solutions for processes of urban regionalisation?*. *Raumforschung und Raumordnung | Spatial Research and Planning*, 75(3), 265-274.
- Fischel, W. A. (2004). *An economic history of zoning and a cure for its exclusionary effects*. *Urban Studies*, 41(2), 317-340.
- Florescu, T., Mitrea, A. (2015). *Tiberiu Florescu, Andrei Mitrea – Romania*. *disP-The Planning Review*, 51(1), 64-65.
- Gallent, N. (2022). *Back to the City? What are the implications for rural areas?*. *Town and Country Planning*, 91(3), 163-166.
- Galster, G., Hanson, R., Ratcliffe, M. R., Wolman, H., Coleman, S., Freihage, J. (2001). *Wrestling sprawl to the ground: defining and measuring an elusive concept*. *Housing policy debate*, 12(4), 681-717.
- Garreau, J. (2011). *Edge city: Life on the new frontier*. Anchor, New York.
- Gehl, J., (2011). *Life between buildings*. The Danish Architectural Press, Copenhagen.
- Giangaspero, P., Gambini, F., Cozzi, A. O., Faraguna, P. (2015). *Città metropolitana: il quadro normativo statale e regionale*. In Carosio, M. et al., *La città metropolitana di Trieste. Analisi territoriale, economica, sociologica, giuridica*. EUT Edizioni Università di Trieste, Trieste, pp. 127-140.
- Glaeser, E. L., Kahn, M. E. (2004). *Sprawl and urban growth*. In: Vernon Henderson, J., Thisse, J.F. (Eds.), *Handbook of regional and urban economics*, Vol. 4. Elsevier, pp. 2481-2527.
- Golding, S. A., Winkler, R. L. (2020). *Tracking urbanization and exurbs: Migration across the rural-urban continuum, 1990-2016*. *Population research and policy review*, 39, 835-859.
- Grădinaru, S. R., Ioja, C. I., Pătru-Stupariu, I. (2015a). *Do post-socialist urban areas maintain their sustainable compact form? Romanian urban areas as case study*. *Journal of Urban and Regional Analysis*, 7(2), 129-144.
- Grădinaru, S. R., Ioja, C. I., Onose, D. A., Gavrilidis, A. A., Pătru-Stupariu, I., Kienast, F., Hersperger, A. M. (2015b). *Land abandonment as a precursor of built-up development at the sprawling periphery of former socialist cities*. *Ecological Indicators*, 57, 305-313.
- Grădinaru, S. R., Fan, P., Ioja, C. I., Niță, M. R., Suditu, B., Hersperger, A. M. (2020). *Impact of national policies on patterns of built-up*

- development: an assessment over three decades*. Land Use Policy, 94, 104510.
- Grădinaru, S. R., Paraschiv, M., Iojă, C. I., Van Vliet, J. (2023). *Conflicting interests between local governments and the European target of no net land take*. Environmental Science & Policy, 142, 1-11.
- Grigorescu, I., Mitrică, B., Mocanu, I., & Ticană, N. (2012). *Urban sprawl and residential development in the Romanian Metropolitan Areas*. Romanian Journal of Geography, 56(1), 43-59.
- Grigorescu, I., Kucsicsa, G., Popovici, E. A., Mitrică, B., Mocanu, I., Dumitrașcu, M. (2021). *Modelling land use/cover change to assess future urban sprawl in Romania*. Geocarto International, 36(7), 721-739.
- Hajer, M. (2015). *On being smart about cities: Seven considerations for a new urban planning and design*. In Hajern, M. & Dassen, T. (Eds.), Smart about cities. Visualising the challenge for 21st century urbanism, NAI010 publishers/PBL publishers, pp. 11-43.
- Harris, R., Lehrer, U. (2018). *Suburban land question: A global survey*. University of Toronto Press, Toronto.
- Harris, C. D., Ullman, E. L. (1945). *The nature of cities*. The annals of the American academy of political and social science, 242(1), 7-17.
- Heidari, H., Arabi, M., Warziniack, T., Sharvelle, S. (2021). *Effects of urban development patterns on municipal water shortage*. Frontiers in Water, 3, 694817.
- Hintea, C. E., Neamtu, B., Stanica, V. (2019). *Metropolitan Areas In Romania-The Shift From Forced Cooperation To Collaborative Governance. A Case Study*. In TAD 14 The disciplines and the study of Public Administration: Transatlantic perspectives in the margin of the 14th Administration and Public Management International Conference, Bucharest, June 6-18 2018 (No. 3), p. 29-45.
- Hirt, S. (2007). *Suburbanizing Sofia: Characteristics of post-socialist peri-urban change*. Urban Geography, 28(8), 755-780.
- Hirt, S., Stanilov, K. (2009). *Revisiting urban planning in the transitional countries*. Unpublished regional study prepared for the Global Report on Human Settlements.
- Hlaváček, P., Kopáček, M., Horáčková, L. (2019). *Impact of suburbanisation on sustainable development of settlements in suburban spaces: Smart and new solutions*. Sustainability, 11(24), 7182.
- Hood, C., Margetts, H. (2007). *The tools of government in the digital age*. Bloomsbury Publishing.
- Howard, E. (1902). *Garden Cities of To-morrow*. Swan Sonnenschein & Co., London.

- Howlett, M. (2000). *Managing the "hollow state": Procedural policy instruments and modern governance*. Canadian Public Administration, 43(4), 412-431.
- Howley, P. (2009). *Attitudes towards Compact City Living: Towards a Greater Understanding of Residential Behaviour*. Land Use Policy, 26, 792-798.
- Hu, S., Zhao, R., Cui, Y., Zhang, D., Ge, Y. (2023). *Identifying the uneven distribution of health and education services in China using open geospatial data*. Geography and Sustainability, 4(2), 91-99.
- Huang, Y.; Lieske, S.N.; Wang, S.; Liu, Y. (2023). *How Does Heterogeneity in Dwelling Type Preferences Relate to Housing and Built Environment Characteristics?*. International Journal of Digital Earth, 16, 93-112.
- Hurlimann, A. C., March, A. P. (2012). *The role of spatial planning in adapting to climate change*. Wiley Interdisciplinary Reviews: Climate Change, 3(5), 477-488.
- Ianăși, L. (2008). *Priorități pentru agenda legislativă în urbanism și amenajarea teritoriului*. In: Sârbu, C., Pascariu, G. (Eds.), *Preocupări recente în planificarea spațială. Spre confluența tendințelor europene cu prioritățile naționale*, Editura Universitară "Ion Mincu", București, pp. 123-143.
- Ianoș, I., Peptenatu, D., Drăghici, C., Pintilii, R. D. (2012). *Management elements of the emergent metropolitan areas in a transition country. Romania, as case study*. Journal of Urban and Regional Analysis, 4(2), 149-172.
- Ianoș, I., Jones, R. (2019). *Local aspects of change in the rural-urban fringe of a metropolitan area: A study of Bucharest, Romania*. Habitat International, 91, 102026.
- Iațu, C., Eva, M. (2016). *Spatial Profile of the Evolution of Urban Sprawl Pressure on the Surroundings of Romanian Cities (2000-2013)*. Carpathian Journal of Earth and Environmental Sciences, 11, 79-88.
- Iojă, I., Onose, D., Niță, M., Vânău, G., Pătroescu, M., Gavrilidis, A., Zarea, R. (2011). *The conversion of agricultural lands into built surfaces in Romania. Recent Researches in Urban Sustainability and Green Development*, 6, 115-20.
- Janin Rivolin, U., Santangelo, M., Cotella, G., Governa, F., Caruso, N., De Luca, A., Schmitt, P. et al. (2012). *Towards Better Territorial Governance in Europe; A Guide for Practitioners, Policy and Decision Makers Based on Contributions from the ESPON TANGO Project*. ESPON & Politecnico di Torino.
- Jansen, L. J. (2006). *Harmonization of land use class sets to facilitate compatibility and comparability of data across space and time*. Journal of Land Use Science, 1(2-4), 127-156.

- Johnson, M. P. (2001). *Environmental impacts of urban sprawl: a survey of the literature and proposed research agenda*. Environment and planning A, 33(4), 717-735.
- Jones, C., Kammen, D. M. (2014). *Spatial distribution of US household carbon footprints reveals suburbanization undermines greenhouse gas benefits of urban population density*. Environmental science & technology, 48(2), 895-902.
- Karsten, L. (2020). *Counterurbanisation: Why settled families move out of the city again*. Journal of Housing and the Built Environment, 35, 429-442.
- Klinenberg, E. (2018). *Palaces for the people: How social infrastructure can help fight inequality, polarization, and the decline of civic life*. Crown.
- Konijnendijk, C. C. (2023). *Evidence-based guidelines for greener, healthier, more resilient neighbourhoods: Introducing the 3-30-300 rule*. Journal of forestry research, 34(3), 821-830.
- Koprowska, K., Łaszkiewicz, E., Kronenberg, J. (2020). *Is urban sprawl linked to green space availability?*. Ecological Indicators, 108, 105723.
- Kovács, Z., Farkas, Z. J., Egedy, T., Kondor, A. C., Szabó, B., Lennert, J., Baka, D., Kohán, B. (2019). *Urban sprawl and land conversion in post-socialist cities: The case of metropolitan Budapest*. Cities, 92, 71-81.
- Krisjane, Z., Berzins, M. (2012). *Post-socialist urban trends: new patterns and motivations for migration in the suburban areas of Rīga, Latvia*. Urban studies, 49(2), 289-306.
- Kunzmann, K. R., Wegener, M. (1991). *The pattern of urbanization in Western Europe*. Ekistics, 350-351, 282-291.
- Leopa, S. (2019). *Instruments for metropolitan development in Romania: Between shortcomings and possibilities*. Journal of Urban and Landscape Planning, (4), 85-97.
- Leshinsky, R., Legacy, C. (Eds.). (2015). *Instruments of planning: tensions and challenges for more equitable and sustainable cities*. Routledge, New York and London.
- Li, M., Verburg, P. H., & van Vliet, J. (2022). *Global trends and local variations in land take per person*. Landscape and Urban Planning, 218, 104308.
- Lingua, V., Servillo, L. (2014). *The modernization of the Italian planning system*. In: Reimer, M., Gemitis, P., Blotevogel, H.H., Spatial planning practices in Europe. A comparative perspective of continuity and changes, Routledge, New York, pp. 127-148.
- Luca, O., Gaman, F., Răuță, E. (2021). *Towards a National Harmonized Framework for Urban Plans and Strategies in Romania*. Sustainability, 13(4), 1930.
- Mantey, D., Pokojski, W. (2020). *New Indicators of Spatial Chaos in the Context of the Need for Retrofitting Suburbs*. Land, 9(8), 276.

- Marin, V. (2010). *Parallel discourses on urban policy and the Romanian urban planners: between EU principles and local contradictions*. In: New Europe College Yearbook 2009-2010, New Europe College, Bucharest, pp. 195-228.
- Mikuła, Ł. (2023). *City-regions in Central Eastern Europe: emerging metropolitan territorialities in post-socialist planning systems*. European Planning Studies, 1-21.
- Moreno, C., Allam, Z., Chabaud, D., Gall, C., Pratlong, F. (2021). *Introducing the "15-Minute City": Sustainability, resilience and place identity in future post-pandemic cities*. Smart Cities, 4(1), 93-111.
- Müller, D., Kuemmerle, T., Rusu, M., & Griffiths, P. (2009). *Lost in transition: determinants of post-socialist cropland abandonment in Romania*. Journal of Land Use Science, 4(1-2), 109-129.
- Nadin, V., Fernández Maldonado, A. M., Zonneveld, W., Stead, D., Dąbrowski, M., Piskorek, K., ... & Münter, A. (2018). *COMPASS - Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe*, Applied Research 2016-2018, Final Report, ESPON EGTC, Luxembourg.
- Nadin, V., Stead, D., Dąbrowski, M., & Fernandez-Maldonado, A. M. (2021). *Integrated, adaptive and participatory spatial planning: Trends across Europe*. Regional studies, 55(5), 791-803.
- Naumann, S., Frelih-Larsen, A., Prokop, G., Ittner, S., Reed, M., Mills, J., Morari, F., Verzandvoort, S., Albrecht, S., Bjuréus, A., Siebielec, G., Miturski, T. (2019). *Land take and soil sealing—drivers, trends and policy (legal) instruments: insights from European cities*. In: Ginzky, H. et al. (Eds.), International Yearbook of Soil Law and Policy 2018, Springer, pp. 83-112.
- Navamuel, E. L., Morollón, F. R., & Cuartas, B. M. (2018). *Energy consumption and urban sprawl: Evidence for the Spanish case*. Journal of cleaner production, 172, 3479-3486.
- Nechyba, T. J., Walsh, R. P. (2002). *Urban sprawl*. Journal of economic perspectives, 18(4), 177-200.
- Nowak, M., Cotella, G., Śleszyński, P. (2021). *The Legal, Administrative, and Governance Frameworks of Spatial Policy, Planning, and Land Use: Interdependencies, Barriers, and Directions of Change*. Land, 10(11), 1119.
- Nowak, M., Petrișor, A. I., Mitrea, A., Kovács, K. F., Lukstina, G., Jürgenson, E., Ladzianska, Z., Simeonova, V., Lozyskyy, R., Reza, V., Pantyley, V., Praneviciene, B., Fakeyeva, L., Mickiewicz, B., Blaszkę, M. (2022). *The role of spatial plans adopted at the local level in the spatial planning systems of central and eastern European countries*. Land, 11(9), 1599.
- OECD. (2018). *Rethinking Urban Sprawl: Moving Towards Sustainable Cities*. OECD Publishing, Paris.

- Pagliarin, S. (2018). *Linking processes and patterns: Spatial planning, governance and urban sprawl in the Barcelona and Milan metropolitan regions*. *Urban Studies*, 55(16), 3650-3668.
- Pauliuk, S., Venkatesh, G., Brattebø, H., Müller, D. B. (2014). *Exploring urban mines: pipe length and material stocks in urban water and wastewater networks*. *Urban Water Journal*, 11(4), 274-283.
- Petrișor, A.I. (2016). *Assessment of the long-term effects of global changes within the Romanian natural protected areas*, *International Journal of Conservation Science*, 7(3), 759-770.
- Petrișor, A.I., Andronache, I.C., Petrișor, L.E., Ciobotaru, A.M., Peptenatu, D. (2016). *Assessing the fragmentation of the green infrastructure in Romanian cities using fractal models and numerical taxonomy*, *Procedia Environmental Sciences*, 32, 110-123.
- Petrișor, A. I., Sirodoev, I., Ianoș, I. (2020). *Trends in the national and regional transitional dynamics of land cover and use changes in Romania*. *Remote Sensing*, 12(2), 230.
- Phelps, N. A., Wood, A. M. (2011). *The new post-suburban politics?*. *Urban Studies*, 48(12), 2591-2610.
- Pichler-Milanovich, N. (2001). *Urban housing markets in Central and Eastern Europe: convergence, divergence or policy 'collapse'*. *European Journal of Housing Policy*, 1(2), 145-187.
- Pichler-Milanović, N.; Gutry-Korycka, M.; Rink, D. (2007). *Sprawl in the Post-Socialist City: The Changing Economic and Institutional Context of Central and Eastern European Cities*. In: Couch, C., Leontidou, L., Petschel-Held, G. (Eds.), *Urban Sprawl in Europe. Landscapes, Land-Use Change & Policy*, John Wiley & Sons, Hoboken, pp. 102-135.
- Piør, A., Ravetz, K., Tosci, I. (Eds), *Peri-urbanisation in Europe: Towards European Policies to Sustain Urban-Rural Futures. A Synthesis Report*, University of Copenhagen, Copenhagen, pp. 20-23.
- Reimer, M., Getimis, P., Blotevogel, H. (Eds.). (2014). *Spatial planning systems and practices in Europe: A comparative perspective on continuity and changes*. Routledge.
- Ros-Tonen, M., Pouw, N., Bavinck, M. (2015). *Governing Beyond Cities: The Urban-Rural Interface*. In: Gupta, J. et al. (Eds.), *Geographies of urban governance: advanced theories, methods and practices*. Springer, Cham, pp. 85-105.
- Roy, M., Curry, R., Ellis, G. (2015). *Spatial allocation of material flow analysis in residential developments: A case study of Kildare County, Ireland*. *Journal of Environmental Planning and Management*, 58(10), 1749-1769.
- Røe, P. G., & Saglie, I. L. (2011). *Minicities in suburbia - A model for urban sustainability?*. *FORMakademisk*, 4(2), 38-58.
- Rubiera-Morollón, F., Garrido-Yserte, R. (2020). *Recent literature about urban sprawl: A renewed relevance of the phenomenon from the*

- perspective of environmental sustainability*. Sustainability, 12(16), 6551.
- Sandu, D. (2022). *Local Human Development of Rural Places in Romania: A Community Capitals Framework*. Romanian Journal of Population Studies, 16(1), 75-94.
- Santos, T., Ramalhete, F., Julião, R. P., Soares, N. P. (2022). *Sustainable living neighbourhoods: Measuring public space quality and walking environment in Lisbon*. Geography and Sustainability, 3(4), 289-298.
- Sassen, S. (2018). *Cities in a world economy*. Sage Publications, Washington DC.
- Sârbu, C.N. (2005). *Habitatul urban în expansiune perurbană*, Editura Universitară "Ion Mincu", București.
- Sârbu, C. (2012). *Urban expansion-urban shrinking considerations on Brasov agglomeration urban dynamics*. Human Geographies, 6(1), 53-58.
- Schiavina, M., Melchiorri, M., Freire, S., Florio, P., Ehrlich, D., Tommasi, P., ... Kemper, T. (2022). *Land use efficiency of functional urban areas: Global pattern and evolution of development trajectories*. Habitat International, 123, 102543.
- Schmidt, S., Fina, S., Siedentop, S. (2015). *Post-socialist sprawl: A cross-country comparison*. European Planning Studies, 23(7), 1357-1380.
- Servillo, L., Lingua, V. (2014). *The Innovation of the Italian Planning System: Actors, Path Dependencies, Cultural Contradictions and a Missing Epilogue*, European Planning Studies, 22(2), 400-417.
- Siedentop, S., Fina, S. (2012). *Who sprawls most? Exploring the patterns of urban growth across 26 European countries*. Environment and Planning A, 44(11), 2765-2784.
- Slaev, A. D., Nedović-Budić, Z., Krunić, N., Petrić, J., Daskalova, D. (2018). *Suburbanization and sprawl in post-socialist Belgrade and Sofia*. European Planning Studies, 26(7), 1389-1412.
- Stan, A.I. (2013). *Morphological patterns of urban sprawl territories*. Urbanism. Architecture. Constructions, 4(4), 11-24.
- Stanilov, K., Sýkora, L. (2014). *Confronting suburbanization: Urban decentralization in postsocialist Central and Eastern Europe*. John Wiley & Sons, Oxford.
- Stănuș, C., Pop, D., Dragoman, D. (2021). *Changing urban system, changing urban policy: Romania since 1989*. In Zimmermann, K.; Fedeli, V. (eds.), *A Modern Guide to National Urban Policies in Europe*. Edward Elgar Publishing, pp. 195-215.
- Stead, D. (2021). *Conceptualizing the policy tools of spatial planning*. Journal of Planning Literature, 36(3), 297-311.
- Stone Jr, B., Mednick, A. C., Holloway, T., & Spak, S. N. (2007). *Is compact growth good for air quality?*. Journal of the American Planning Association, 73(4), 404-418.

- Suditu, B. (2012). *Urban sprawl - the legal context and territorial practices in Romania*. Human Geographies, 6(1), 73-77.
- Tacoli, C. (2003). *The links between urban and rural development*. Environment and urbanization, 15(1), 3-12.
- Travisi, C. M., Camagni, R., Nijkamp, P. (2010). *Impacts of urban sprawl and commuting: a modelling study for Italy*. Journal of Transport Geography, 18(3), 382-392.
- Tu, J., Xia, Z. G., Clarke, K. C., Frei, A. (2007). *Impact of urban sprawl on water quality in eastern Massachusetts, USA*. Environmental Management, 40, 183-200.
- United Nations Department for Economic and Social Affairs (UN DESA). (2019). *World Urbanization Prospects. The 2018 Revision*. United Nations, New York.
- Valencia, V. H., Levin, G., Ketzel, M. (2023). *Densification versus urban sprawl. Modeling the impact of two urban growth scenarios on air quality*. Atmospheric Environment, 310, 119963.
- van den Berg, L., Drewett, R., Klaassen, L.H., Rossi, A., Vijverberg, C. (1982). *Urban Europe: A study of growth and decline*. Pergamon Press, Oxford.
- van Vliet, J., Eitelberg, D. A., & Verburg, P. H. (2017). *A global analysis of land take in cropland areas and production displacement from urbanization*. Global environmental change, 43, 107-115.
- Verburg, P. H., Neumann, K., Nol, L. (2011). *Challenges in using land use and land cover data for global change studies*. Global change biology, 17(2), 974-989.
- Vinci, I. (2019). *Governing the metropolitan dimension: A critical perspective on institutional reshaping and planning innovation in Italy*. European Journal of Spatial Development, 70, 1-21.
- Whitehead, C.M., 2008. *The density debate: A personal view*. East Thames Housing Group, London.
- Wilson, B., Chakraborty, A. (2013). *The environmental impacts of sprawl: Emergent themes from the past decade of planning research*. Sustainability, 5(8), 3302-3327.
- Wright, F. L. (1935). *Broadacre City: A new community plan*. Architectural Record, 77(4), 243-254.
- Wu, J., Li, X., Luo, Y., Zhang, D. (2021). *Spatiotemporal effects of urban sprawl on habitat quality in the Pearl River Delta from 1990 to 2018*. Scientific Reports, 11(1), 13981.
- Zimmermann, K. (2022). *Italy*. In: Zimmermann, K., Feiertag, P., Governance and city regions: Policy and planning in Europe, Taylor & Francis, pp. 118-186.
- Zimmermann, K., Feiertag, P. (2022). *Conclusion*. In: Zimmermann, K., Feiertag, P., Governance and city regions: Policy and planning in Europe, Taylor & Francis, pp. 277-296.

Planning documents

- Città metropolitana di Torino. (2021). *Piano Strategico Metropolitano 2021-2023*. Torino Metropoli.
- Città metropolitana di Torino. (2022). *Piano Territoriale Generale Metropolitano. Relazione illustrativa*. Torino Metropoli.
- Ministry of Development, Public Works and Administration (MDLPA). (2022). *National Strategy for Housing 2022-2050*. Romania.
- STIROLINE SRL. (2004). *Plan Urbanistic Zonal Director Dumbrăvița*. Primăria Dumbrăvița.
- "Ion Mincu" University of Architecture and Urban Planning (UAUIM). (2011). *Plan de Amenajare a Teritoriului Zonal: Zona Periurbană Brăila. Faza IV: Strategia de dezvoltare a teritoriului de nord al periurbanului Municipiului Brăila*.

Legislation

- Ministry of Development, Public Works and Administration (MDLPA). (2023). Order no. 904/2023 regarding the modification and completion of the methodological norms for applying Law no. 350/2001, approved through Order no. 233/2016.
- Ministry of Regional Development and Public Administration (MDRAP). (2016). Order no. 233 for the approval of the methodological norms for applying Law no. 350/2001. Romania.
- Romanian Government. (2008a). Government Decision no. 27 for modifying Law no. 350/2001 regarding territorial and urban planning.
- Romanian Government. (2008b). Government Decision no. 998 regarding the designation of national growth poles where investments from national and community programmes are prioritized.
- Romanian Government. (2011). Government Decision no. 7 for modifying Law no. 350/2001 regarding territorial and urban planning.
- Romanian Government. (2019). Government Decision no. 57 regarding the approval of the administrative code.
- Romanian Government. (2022). Government Decision no. 1.575 regarding the approval of the National Strategy for Integrated Urban Development for Resilient, Green, Inclusive and Competitive Cities 2022-2035 - Romania's Urban Policy.
- Romanian Parliament. (1974). Law no. 58 regarding the systematization of the territory and urban and rural settlements.
- Romanian Parliament. (1991). Law no. 50 regarding building permitting.
- Romanian Parliament. (2001a). Law no. 350 regarding territorial and urban planning.
- Romanian Parliament. (2001b). Law no. 351 regarding the approval of the National Territorial Plan Fourth Section: The Settlement Network.
- Romanian Parliament. (2022). Law no. 246 regarding metropolitan areas.

Romanian Parliament. (2023a). Law no. 155 regarding sustainable urban mobility.

Romanian Parliament. (2023b). Law regarding the Territorial and Urban Planning and Constructions Code. Legislative project adopted by the Senate.

Websites

Dumbrăvița commune website, 2023. <https://primaria-dumbravita.ro/urbanism/plan-urbanistic-general/> accessed 3 August 2023.

Florești commune website, 2023. <https://floresticluj.ro/urbanism/> accessed 3 August 2023.

National Registry of Metropolitan Areas, <https://www.mdlpa.ro/pages/registru-evidentazone-metropolitane-nationale> accessed 18 August 2023.